

DIGITAL TRANSFORMATION PROJECTS - AN ENTERPRISE-WIDE PERSPECTIVE ON AGILE PROJECT PORTFOLIO GOVERNANCE

Research-in-Progress

Track N°7

Schiele, Jan-Philipp, University of St. Gallen, St. Gallen, CH,
jan-philipp.schiele@student.unisg.ch

Abstract

Although various companies started to implement agile and lean methods within the local perspective of projects and project portfolios, many of them struggle to develop an enterprise-wide understanding concerning the characteristics of agile and lean approaches. This leads to high coordination efforts in project portfolio management departments (PPM) and poses new challenges for established, “traditional” project portfolio governance (PPG) mechanisms. In addition, project governance is an interdisciplinary phenomenon, that appears quite ambiguous, and open to various interpretations depending on the perspective and theoretical lens.

Hence, it is necessary to develop an understanding and interpretation of PPG and the relation to PPM, that will be suitable to align the agile perspective to an enterprise-wide understanding of agile approaches. In this work-in-progress paper, the status quo of a literature review is illustrated, which is intended to conceptualize “traditional” PPG in contrast to agile and lean approaches grounded on accepted theory. Some relevant coordination mechanisms had been identified, that are utilized to address the specific information requirements of stakeholders on a global, enterprise-wide perspective.

Keywords: Agile Methodologies, Information and Communication Technologies, Project Portfolio Management, Project Portfolio Governance

1. Introduction

Due to dynamic business environments, especially product-based organizations (PBO; Turner & Keegan, 2001) are forced to continuously change the way they execute product and service development as well as conditions in which they operate (Suomalainen et al., 2015). As a result, PBO increasingly adopt “agile” and “lean” practices & processes (Overby et al., 2005; Van Oosterhout et al., 2005) in order to strengthen their capability to respond to dynamic changes of their environment and to remain competitive in their market (Highsmith, 2002; Kettunen, 2009), to explore, and test new business opportunities.

Developing¹ and integrating enterprise-wide information systems² (ew-IS; Haki et al. 2016) are complex and ambitious undertakings, in which various stakeholders of the PBO (ibidem), and within the market are involved, whose requirements and interests must be thoroughly identified, continuously tested, and implemented. In order to cope with that complexity, and to respond to certain changes of requirements in a flexible way, agile and lean methods have become “mainstream” not only, but also in ew-IS related development projects.

Especially when these kind of projects are embedded in multi-project context like a project portfolio, the complexity increases significantly due to multiple dynamic interdependencies with other projects. Hence, consolidating and sharing project portfolio-specific information requested by the organization and their various stakeholders is an important area of responsibility when it comes to decision-making on the portfolio level and their alignment to an overall strategy. To align decision-making as effective as possible to strategic organizational objectives, effective communication and information flow will be essential. Therefore, critical communication patterns and information streams have to be identified, effectively consolidated and coordinated, in order to guide the process as a whole and in the light of an enterprise-wide understanding regarding the overall status of the portfolio. This implies coordination procedures that consider the individual characteristics of the projects within the portfolio, but acts as institution finding a compromise between interests of stakeholders.

In recent literature, there might exist a plethora of project governance understandings applying coordinating mechanisms for communication and information sharing in multi-project environments, but these “traditional” understandings struggle from two essential challenges. First, from a sound theoretical foundation, as project management in general (Koskela, L. J., & Howell, G. (2002), and, more specifically, project governance as an interdisciplinary phenomenon (Sha, 2016), that is “too multifaceted and complex to be analysed by means of any single theoretical lens” (Aloha et al., 2014). Second, from the high level of dynamic change within projects with agile and lean characteristics, that stay in strong contradiction with the paradigm of scientific management (Taylor, 1913).

As a result of these challenges, traditional decision-control concepts and agile/lean project methods co-exist in a more or less disharmonic relationship, resulting in high coordinating efforts in accountable departments, trying to satisfy specific information and safeguarding requirements of various stakeholders for effective project-related decision-making.

Hence, it is necessary to develop a clear understanding of project governance on the portfolio level (PPG), that has an accepted grounding in theory and will also be suitable to align the local portfolio perspective to a holistic, enterprise-wide understanding of agile and lean approaches. Conceptualizing a theoretically founded understanding of PPG and its coordination activities in agile environments will also contribute to knowledge about portfolio management performance in general, as the performance is directly linked to the quality improvement of decisions to be made.

¹ By using “development”, the author also understands customizing activities of established market solutions, like SAP in the field of ERP software.

² like data-warehouses (DWH), customer relationship management (CRM) or enterprise resource planning (ERP) systems

This research in progress paper is based on a literature review³ to answer the following research questions:

- How can PPG be understood “traditionally” through the lens of local-global coordination?
- How can the local and global perspectives of traditional PPG be conceptualized, and what are established coordination mechanisms?
- What specific differences can be identified between the traditional understanding compared with agile and lean approaches?

2. Literature review (Extract)

2.1 Project Management, Project Portfolio Management, Project Portfolio Governance

Whereas project management (PM) aims at increased efficiency in single projects (doing the project right), project portfolio management (PPM) focusses on high effectivity within a set of multiple projects (doing the right projects) pooled in a portfolio. Consequentially, a project portfolio is commonly defined as “a collection of projects or programs and other work that are grouped together to facilitate effective management of that work to meet strategic business objectives” (Project Management Institute, 2008b, p.138). The portfolio itself is managed by designated actors within “a dynamic decision process whereby a business’ list of active projects is constantly updated and revised. In this process, new projects are evaluated, selected and prioritized; existing projects may be accelerated, killed or deprioritized; and resources are allocated and reallocated to active projects” (Cooper et al. 1999, p. 335). Furthermore, project portfolios are “powerful strategic weapons” (Shenhar et al., 2001) as they can be considered as a central building block in implementing the strategic objectives of the organization (Cleland, 1999; Dietrich and Lehtonen, 2005; Grundy, 2000). The close relationship to organizational strategy postulates a structured process that underlines the importance of alignment aspects of the project portfolio to the strategical objectives of the PBO and the parent organizations in general (Petit, 2012).

Thus, project portfolio management (PPM) is not a straightforward area of responsibility, because not only dependencies between projects have to be coordinated, but all decisions concerning the portfolio have to be continuously aligned to the overall strategic objectives of the parent organization. This also implies, that local interests of multiple stakeholders have to be considered (Derakhshan et al., 2019, Haki et al., 2016) globally from a holistic perspective and, therefore, to ensure strategical alignment, the portfolio have to be governed by generally accepted standards and guidelines applying to all organizational actors.

Providing a practical “framework” to guide accountable decision-makers in transparent decision making & action taking (Mueller, 2011, p. 88), governance procedures have been implemented to ensure alignment of project-related decisions with overall organizational objectives.

Understood as a “sub-set of corporate governance” (Too & Weaver, 2014, p. 1385), governance in the project management domain “comprises the value system, responsibilities, processes and policies that allow projects to achieve organizational objectives and forster implementation that is in the best interest of all stakeholders, internal and external, and the corporation itself.” (Mueller, 2009: 4).

In order to review the status of research on project governance, out of 19 sources of governance literature and 16 sources from project governance and general governance literature, Ahola et al. (2014) identified two independent streams of research. According to the analysis, project governance is either

³ The present literature review is mostly based on domain specific electronic journals (e.g. International Journal of Project Management), and just illustrates the essential status quo of research conducted by the author with all limitations of such methods included. Due to the restriction in terms of length for papers, the review had been shortened to the essential statements.

considered as “internal to a specific project” (IAP) or “external to any specific project” (EANYP). The IAP-perspective is focused on governing a single project with an inter-organizational focus, due to the fact, that actors from other firms are deeply involved into the project’s execution. The EANYP-perspective relates to the multi-project characteristics of a project portfolio environment with an intra-organizational scope (cf. Aloha et al., 2014). Consequently, these two perspectives need different mechanisms of coordination, safeguarding and adaption (ibidem), thus, specific characteristics of the project will affect the applied project governance procedures and standards in general.

Based on the analysis of Aloha et al. (2014) and with respect to the strict intra-/inter-organizational distinction, Sha (2016) distinguishes between Type I Projects and Type II Projects, whereby Type I one projects are inter-organizational in nature due to the fact, that essential skills are purchased from the market (Sha, 2016, p. 120). Moreover, according to Sha (2016), IT-Projects can be classified under Type II-characteristic because they “are undertaken in the support function to create new markets, products or technologies” (ibidem). Consequently, both types of projects do need different approaches of governance. Further, although management and governance are “two sides of the same coin” (Sha, 2016, p. 122), Sha argues that “management” should be considered separate from “governance”, inter alia with respect to the underlying paradigms (managers know best vs. self-organization characteristics of governance).

Nevertheless, by setting the “framework” for management procedures on the portfolio level (PPM), and in the sense of providing clear structures and processes, project governance on portfolio level (Project Portfolio Governance = PPG) can be directly connected to project success as well as project management process (Cooke-Davies, 2002). Consequently, PPM and PPG work rather complementary than in strict separation with a bidirectional relationship between them. Derived from the conclusion, that PPG defines the framework for PPM, widely accepted and therefore regularly applied methods, tools and practices in PPM have to be considered antipodal in PPG procedures, that have to be explicitly described and diligently recorded in governance guidelines and standards.

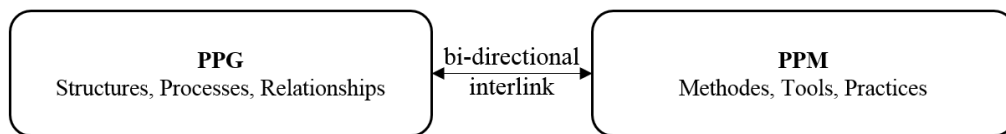


Figure 1. Relation PPG and PPM: PPG defines how PPM should be done. Vice versa, accepted methods, tools and practices applied in PPM have to be considered in PPG procedures.

2.2 Project Portfolio Governance as coordinating authority

Naturally, portfolios are temporary, time-sensitive, dynamic and socio-technical constructs, that are affected by changes in their environment (Petit, 2012). That changes also have the potential to influence and re-define the context in which they are executed, and directly affect the dependencies among these projects. In recent project management literature, the research community increasingly started to pay attention to the contexts in which projects are managed (Engwall et al., 2003) and project governance in particular (Biesenthal and Wilden, 2014). In order to govern projects, and especially portfolios, which are operating in these dynamic contexts, the PBO and the organization as a whole will need a coordinated project planning and control function (Crawford and Cooke-Davies, 2009) as they struggle with comparable issues of hierarchical coordination as governmental agencies or organizations do (Miller and Lessard, 2000).

On a high aggregation, context-changing factors can be classified into (1) actors involved (e.g. stakeholders), (2) tasks that have to be executed, especially by departments in charge, (3) goals (objectives of stakeholders and departments in charge) and (4) resources needed to obtain defined goals.

By following a stakeholder orientated perspective, *actors* and their individual preferences should be essential elements in PPM/PPG, taking into account that a “managing a portfolio” is barely a “true rational” activity (Gutiérrez and Magnusson, 2014; Martinsuo, 2013). Portfolio decisions might be based on incomplete information (Dekker, 2012) and uncertainties (Martinsuo et al., 2014). Moreover, reviewing projects may be influenced by bounded rationality, personal opinions and power relations in

the review team (Kester et al., 2011). As governance in projects aims to ensure solutions, that are in the “best interest of all stakeholders, internal and external, and the corporation itself” (Mueller, 2009, p. 4), *negotiating compromises* will be one essential coordinating mechanism and also *task* for PPG procedures, especially when it comes to conflicts of interdependent interests between project stakeholders’ requirements. Directly interlinked with actors’ behavior and requirements are their specific *objectives*, which are defined within the scope of projects or in the task of supporting departments⁴. *Resources* are essential to reach these specific, individual objectives. The entire amount of resources needed is the result of a planning period conducted by project teams, which results in an aggregation or rather budget, also referred to as a “resource pool”.

PPM is responsible for identifying dependencies as well as synergies between projects (Fink, 2013, p. 11), which therefore cannot be threatened isolated from their environment and context (Mueller et al., 2008). As visualized in Figure 1, arising from the fact that a portfolio is a collection of multiple and interdependent projects, conflicts emerge because projects share and compete for the same resources (Archer & Ghasemzadeh, 1999a, 1999b) in the same time frame and thus have to be reallocated continuously, quintessentially leading to “resource allocation syndrome” (Engwall, et al., 2003).

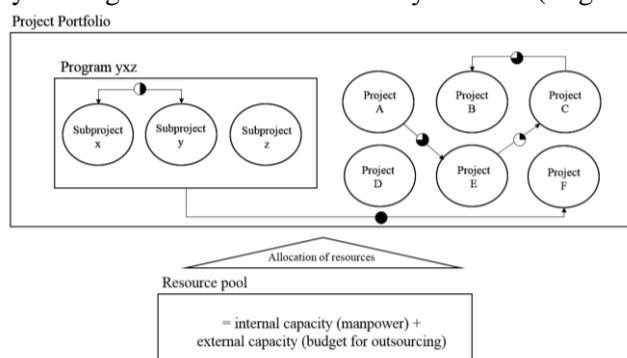


Figure 2. Schematic visualization of dependencies among projects in a portfolio (Harvey Ball = estimated intensity of dependency). Projects share resources from the same pool, thus, in order to prevent conflicts, resource allocation has to be coordinated via pre-defined allocation mechanisms.

As mentioned in section 2.1, PPG sets the “framework” for PPM by defining structures, processes and relationships. According to Sha (2016) (i) the characteristics of projects as well as (ii) the paradigm of self-organization as a *conditio sine qua non* for project governance should be considered in order to conceptualize project governance. Recapitulated, PPM and, thus, in particular PPG have to deal with a variety of challenges, e.g. heterogeneous stakeholder groups with conflicting interests, fast moving targets within the dynamic of changing environments (Haki et al., 2016) in and beyond the project portfolio, and as a result, dynamic dependencies and resource conflicts among projects in the portfolio emerge, which are of different nature regarding to the way they are executed. Thus, they need different mechanisms of governance in order to provide strategic alignment as a main objective of governance.

In order to cope with these challenges concerning actors, tasks, resources and goals, PPG applies a set of coordinating activities (Malone & Crowston 1994) not only concerning managing dependencies of resources/capacities but, decision-making processes in general. Traditional coordination mechanisms are based on the implementation of standardized reporting practices, roles, and monitoring structures (Aloha et al. 2014). Decisions are based on provided information on an aggregated level, therefore a lot of activities have to be conducted among actors involved. These coordinating activities are based for example on (1) (informal) personal communication, (2) operational meetings and (3) steering boards (Ambtmann et al., 2015), also referred to as portfolio boards.

⁴ Supporting departments and functions could be for example a Project Management Office, providing portfolio-specific information the portfolio board (local perspective) or other stakeholders, e.g. the executive board (global perspective).

Informal communication practices, especially on a personal basis, can support the coordination of problem solving within the project portfolio team (Gutiérrez and Magnusson, 2014; Martinsuo, 2013). In addition, reporting measures, and the sharing of project-specific information is one essential coordinating activity which can also be directly linked to the performance evaluation of a portfolio (Fricke & Shenhar, 2000; Nobeoka & Cusumano, 1997).

Operational portfolio meetings will take place on a regular basis and in different compositions of participants, depending on the level of strategic proximity of topics discussed and decisions to be made. For example, participants can be project members/leaders from business, and IT, if these meetings concern questions close to operational execution of projects. In other cases, when strategic issues are matter of concern, the participants in charge will be members of the *portfolio board*, supported by staff departments from PPM⁵. In the latter case, these group is also responsible to comply with structures, processes and relationships of PPG-procedures⁶. This also means, that stakeholder requirements have to be negotiated in due consideration of all interest, and with close alignment to strategic objectives. This presupposes a global understanding of the portfolio as an enterprise-wide endeavour.

Ambtmann et al. (2015) suggest, that considering the project portfolio as a whole containing interdependent projects could help to create value, which might be seen as an indication for the necessity conceptualization of a global, enterprise-wide understanding. In the paper at hand and according to Figure 3, the *local perspective* is defined as aggregation of all PPG and PPM activities and mechanisms within the portfolio with the focus on consolidating and sharing project-specific information in order to ensure reporting, safeguarding and monitoring about the portfolios performance in strict consideration of strategy. The *global perspective* addresses the enterprise-wide understanding of portfolio concerns, meaning (information) requirements of stakeholders within the organization, but also those, which are inherently not members of the organization but have an interest in projects outcomes. That means that the global perspective needs specific portfolio information provided by the local perspective, as proposed before.

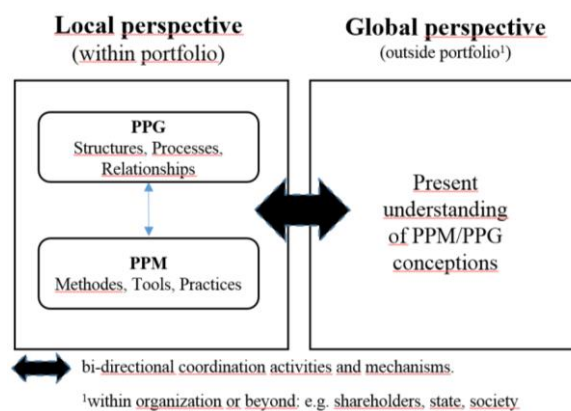


Figure 3. Coordination activities and mechanisms of traditional PPG/PPM within the local portfolio perspective scale to the global perspective addressing an enterprise-wide and beyond understanding of the portfolio.

Summing up, coordinating activities like communicating, operational and portfolio meetings, resource allocation and negotiating of interests are demanding tasks, when it comes to activities of coordination like controlling, safeguarding and monitoring from the local portfolio-perspective to the global, enterprise-wide perspective, outside the portfolio. Especially, when projects within the portfolio have to be distinguished by their characteristics, and the underlying paradigm of their execution.

⁵ Or/and others, e.g. the Project Management Office.

⁶ Effectiveness of information sharing of operational meetings has yet to be proven by case studies during the thesis project.

2.3 Characteristics of agile and lean approaches in project management

In contrast to well-defined scoping right from the beginning, as practiced within plan-driven projects, agile methods like “Scrum” define a “minimal viable product”, which contains the minimum requirements of objectives to be achieved by the project. On a superordinate perspective, instead of conducting a detailed planning, the “agile” development paradigm focusses on incremental, continuous planning iterations, which is the direct opposite of plan-driven project methods, that are planned in detail right before their initialization. Derived from the “Agile Manifesto” (Beck et al., 2001), agile methods are based on (1) self-organization of cross-functional project teams, (2) commitment of the team to deliver results in regular iterations, (3) continuous review of product and collaboration procedures, (4) transparency and knowledge-sharing, (5) application of a cadence in order to create flow in the process of incremental delivery. Although scientific research on agile methods is on their initial phase, the reason for their recent popularity can be found in their advantages, like “adaptability to change, short time frames of releases, continuous feedback from customers, high-quality and bug free software” (Rao et al. 2011, p. 43). In addition, considering their primarily human-centered approach (Beck et al., 2001), some evidence concerning team collaboration is indicated, e.g. “higher satisfaction, feeling of effectiveness, [...] increased autonomy and happiness” (Laanti et al. 2011, p. 276). As agile methods are built around the above mentioned principles, especially self-organizing structures in cross-functional teams and direct customer interaction, they require effective communication patterns as well as coordinating mechanisms as mandatory elements for success. Thus, beside the advantage of direct communication and interaction in terms of immediate feedback, communication is simultaneously identified as one of the main challenges concerning the adoption and applicability of agile methods in practice (Mockus et al. 2001, Paasivaara et al. 2006).

Originally emerging from the manufacturing sector, lean thinking has been widely adapted in several industries and particularly in the area of software development (Poppendieck and Poppendieck, 2003, 2007). The lean paradigm consists of five interconnected steps that are built on one another: (1) specification of value, which is primarily defined by the customer, (2) identification of the value stream, (3) creation of “flow”, (4) enable the customer to pull the product as needed and (5) striving for perfection of the process (Womack and Jones, 1997). In a nutshell, the term “lean”, describes approaches leading to a continuous and smooth flow of production in pursuance of removing waste in processes and increasing customer value (Womack and Jones, 2003; Petersen and Wohlin, 2010) by shorter lead-times and product delivery. Because agile and lean paradigms share some basic principles, e.g. in particular a customer-centric mentality, the term “leagility” is used to express the complementary characteristics of both paradigms, which should not be considered isolated from each other (Naylor et al., 1999). As a result, and in terms of convenience, the author proposes to use the term “leagile” in his further research.

3. Summary

The interest in project governance increased significantly since 2005 (Biesenthal and Wilden, 2014), but, due to its interdisciplinary character (Sha, 2016), it seems to be too multifaceted and complex to be analyzed by means of any single theoretical lens (Aloha et al., 2014). Hence, within the scope of the thesis project, it will be necessary to set the priorities straight, regarding to the overall interest of research.

Defining what is to be understood as project governance, particularly on a portfolio perspective, according to Mueller (2011), project governance on a portfolio level (PPG) will be understood as a *specific framework* defining structures, rules, processes and relationships in order to guide decision-making processes in alignment with the organizational strategy. Moreover, *relationships between actors, goals, tasks and resources* have to be taken into account of further considerations within the thesis project and must be precisely elaborated. Further, PPG shall be understood as a *set of coordinating activities and mechanisms* that are built around *communication and interaction between multiple stakeholders on a local and a global perspective*. As portfolios are affected by *multiple changes in their environment and the context* in which they are executed, various changes are independent from certain periods of time and, thus, may impact portfolio planning cycles. Therefore, agility in the sense

of anticipating developments and preparation for appropriate reactions are essential elements for organizational competitiveness, especially in project-related environments. Thus, agile and lean approaches may provide worthwhile areas of research, not only, but also in software development.

Derived from recent literature, *the following characteristics of “leagile” approaches* can be stated: First, both, agile and lean paradigms can be considered as *complementary*. Primarily due to their flexible, but regular output-orientated qualities, which intend to create value for the customer and, consequently, for the organization itself. Second, agile and lean approaches are *“human-centered”* concerning their application by interacting individuals, who are communicating directly with each other in project-based environments⁷. Third, in order to achieve the first mentioned point and because of the second, on the portfolio level, agile and lean methods require *effective communication patterns* on the project level, and, consequently, *coordination mechanisms on the enterprise-wide perspective* to address the various specific requirements of stakeholders involved. These requirements mainly refer to information artifacts like regularly updated status reports, ad-hoc requests or other artifacts, which may provide an indication of the portfolio’s course.

With respect to the objective of value creation, and their output- and customer-centric orientation, agile and lean approaches correspond with orthodox economical thinking, that originally emphasize the production function of the organization (Williamson, 1996). Nevertheless, a noteworthy finding is, that “leagile” characteristics like self-regulation and delegation of decision-making power to lower hierarchical levels, and autonomous group-decision processes, stand in *significant contradiction* to the functional top-down hierarchical line management paradigm as proposed by Taylor (1913) (Sha, 2016). This “tayloristic” paradigm and the “best way”-practices of scientific management, were globally established since the beginning of the 19th century across a variety of industries, whereas agile and lean are relatively “new” approaches, especially in the domain of project management and software development in particular.⁸ Consequently, the author will refer to the *tayloristic paradigm as “traditional”*.

As stated in section 2, the characteristics or “*type*” of the project will affect the governance procedures, and, thus, the framework in general. This assumption does not only apply with regards of intra- and inter-organizational relationships of actors, but also the underlying paradigm of the project’s execution. Hence, it will be elementary to *distinguish between a “traditional” and a “leagile” understanding* in terms of governance in the domain of project management, and of course, on the portfolio level.

References

- Archer, N., & Ghasemzadeh, F. (1999). An integrated framework for project portfolio selection. *International Journal of Project Management*, 17, 207–216.
- Ahola, T., Ruuska, I., Artto, K., Kujala, J. (2014). What is project governance and what are its origins? *International Journal of Project Management*. 32. 1321–1332.
- Ambtman, A., van Riel, A., Lauche, K. & Hammedi, W. (2015). One Master and Many End Users: Coordination Practices in Managing a Portfolio of Public Service Innovation Projects. *Procedia - Social and Behavioral Sciences*. 194. 3-19.

⁷ The assumption that people are a valuable organizational resource (Collis and Montgomery, 1998; O’Reilly and Pfeffer, 2000; Pfeffer, 1994) will also be an important factor when it comes to the design of an artefact within the thesis project.

⁸ Notwithstanding their recent applicability in IT and physical production, their applicability in other domains will be a task for further research, but will not be in the scope of this thesis project.

- Beck, K., Beedle, M., van Bennekum, A., Cockburn, A., Cunningham, W., Fowler, M., Grenning, J., Highsmith, J., Humt, A., Jerries, R., Kern, J., Marick, B., Martin, R.C., Mellor, S., Schwaber, K., Sutherland, J., Thom, D. (2001): Manifesto for agile software development. Website (2019) <http://agilemanifesto.org/>.
- Biesenthal, C. and Wilden, R. (2014). "Multi-level project governance: trends and opportunities." *International Journal of Project Management*, 32(8), 1291–1308.
- Collis DJ, Montgomery CA. (1998). *Corporate Strategy: A Resource-Based View*. Irwin/McGraw-Hill: Boston, MA.
- Cleland, D.I., (1999). The Strategic Context of Projects. In: Dye, L.D., Pennypacker, J.S. (Eds.), *Project Portfolio Management: Selecting and Prioritizing Projects for Competitive Advantage*. Center for Business Practices, West Chester, PA, USA, pp. 3–22.
- Cooke-Davies, T. (2002). The "real" success factors on projects. *International journal of project management*, 20(3), 185-190.
- Crawford, L., Cooke-Davies, T., 2009. Project Governance: The Role and Capabilities of the Executive Sponsor. *Project Perspectives*, vol. XXXI, 66–74.
- Cooper, R.G., Edgett, S.J., Kleinschmidt, E.J. (1999). New product portfolio management: practices and performance. *Journal of Product Innovation Management*, 16, 333-351.
- Dekker, S., (2012). *Drift into failure: from hunting broken components to understanding complex systems*. Ashgate Publishing, Ltd., Farnham.
- Derakhshan et al. (2019). *International Journal of Project Management* 37, 98–116.
- Dietrich, P., Lehtonen, P., (2005). Successful management of strategic intentions through multiple projects — reflections from empirical study. *International Journal of Project Management* 23 (5), 386–391.
- Engwall, M., Jerbrant, A. (2003). The resource allocation syndrome: the prime challenge of multi-project management? *International Journal of Project Management*, Vol. 21, 6, 403-409.
- Fink, D. (2013). *Project Risk Governance. Managing Uncertainty and Creating Organisational Value*. Farnham: Gower.
- Fricke, S. E., & Shenhar, A. J. (2000). Managing multiple engineering projects in a manufacturing support environment. *IEEE Transactions on Engineering Management*, 47, 258–268.
- Grundy, T., (2000). Strategic project management and strategic behaviour. *International Journal of Project Management* 18 (2), 93–104.
- Gutiérrez, E., Magnusson, M., (2014). Dealing with legitimacy: a key challenge for project portfolio management decision makers. *International Journal of Project Management*, 32, 30-39.
- Haki, K., Aier, S., & Winter, R. (2016). *A Stakeholder Perspective to Study Enterprisewide Is Initiatives*.
- Hauser, J.R., Tellis, G.J., Griffin, A., (2006). Research on innovation: a review and agenda for marketing science. *Marketing Science*, 25, 687-717.
- Hernderson, J.C. & Venkatraman, N. (1999). Strategic alignment: Leveraging information technology for transforming organizations. *IBM Systems Journal*, VOL32, NO 1, 472-487.
- Highsmith, J. (2002) *Agile Software Development Ecosystems*, Addison-Wesley, Boston.
- Kester, L., Griffin, A., Hultink, E.J., Lauche, K., (2011). Exploring portfolio decision-making processes. *Journal of Product Innovation Management*, 28, 641-661.
- Kettunen, P. (2009). Adopting key lessons from agile manufacturing to agile software product development – a comparative study, *Technovation*, Vol. 29, No. 6, 408–422.
- Koskela, L. J., & Howell, G. (2002). The underlying theory of project management is obsolete. In *Proceedings of the PMI Research Conference* (pp. 293-302). PMI.
- Laanti, M., Salo, O., & Abrahamsson, P. (2011). Agile methods rapidly replacing traditional methods at Nokia: A survey of opinions on agile transformation. *Information and Software Technology*, 53(3), 276-290.
- Malone, T.W. & Crowston, K. (1994). The Interdisciplinary Study of coordination, *Computing Surveys*, 26 (1), 87-119.
- Martinsuo, M., (2013). Project portfolio management in practice and in context. *International Journal of Project Management*, 31, 794-803.

- Martinsuo, M., Korhonen, T., Laine, T., (2014). Identifying, framing and managing uncertainties in project portfolios. *International Journal of Project Management*, 32, 732-746.
- Mockus, A. and Herbsleb, J. Challenges of Global Software Development. *Proceedings of the Seventh International Software Metrics Symposium, (METRICS 2001, IEEE)*, 182-184.
- Mueller, R., Blomquist, T., Martinsuo, M. (2008). Project Portfolio Control and Portfolio Management Performance in Different Contexts. *Project Management Journal*, Vol. 39, No. 3, 28-42.
- Mueller, R. (2009). *Project Governance*, Farnham: Gower.
- Mueller, R. (2010). Project Governance. In: *Advances in Project Management*, Vol. XII, 3.
- Naylor, J.B., Mohamed, M.N. and Berry, D. (1999) 'Leagility: integrating the lean and agile manufacturing paradigms in the total supply chain', *Int J Prod Econ*, Vol. 62, 1, 107-118.
- Nobeoka, K., & Cusumano, M. A. (1997). Multiproject strategy and salesgrowth: The benefits of rapid designtransfer in new product development. *Strategic Management Journal*, 18(3), 169-186.
- O'Reilly III CA, Pfeffer J. (2000). *Hidden Value: How Great Companies Achieve Extraordinary Results with Ordinary People*. Harvard Business School Press: Boston, MA.
- Overby, E., Bharadwaj, A. and Sambamurthy, V. (2005). A framework for enterprise agility and the enabling role of digital options, *International Working Conference on Business Agility and Information Technology Diffusion*, Vol. 180, 295-312.
- Paasivaara, M., & Lassenius, C. (2006). Could global software development benefit from agile methods? In *2006 IEEE International Conference on Global Software Engineering (ICGSE'06)*, 109-113.
- Petersen, K. and Wohlin, C. (2010). Software process improvement through the lean measurement (SPI-LEAM) method, *J. Syst. Software*, Vol. 83, No. 7, 1275-1287.
- Petit, Y. (2012). Project portfolios in dynamic environments: Organizing for uncertainty. *International Journal of Project Management*, 30(5), 539-553.
- Pfeffer J. (1994). *Competitive Advantage Through People: Unleashing the Power of the Work Force*. Harvard Business School Press: Boston, MA
- Poppendieck, M. and Poppendieck, T. (2003). *Lean Software Development: An Agile Toolkit*, Addison-Wesley, Boston, MA.
- Poppendieck, M. and Poppendieck, T. (2007) *Implementing Lean software development: From Concept to Cash*, Addison-Wesley Professional, Massachusetts, USA.
- Rao, K. N., Naidu, G. K., & Chakka, P. (2011). A study of the Agile software development methods, applicability and implications in industry. *International Journal of Software Engineering and its applications*, 5(2), 35-45.
- Sha, K. X. (2016). Understanding construction project governance: An inter-organizational perspective. *International journal of architecture, engineering and construction*, 5(2), 117-127.
- Shenhar, A.J., Dvir, D., Levy, O., Maltz, A.C., (2001). Project success: a multidimensional strategic concept. *Long Range Planning* 34 (6), 699-725.
- Suomalainen, T., Kuusela, R. and Tihinen, M. (2015). Continuous planning: an important aspect of agile and lean development', *Int. J. Agile Systems and Management*, Vol. 8, 2, 132-162.
- Taylor, F.W. (1913). *The Principles of Scientific Management*. Harper and Row, New York.
- Too, E. G., & Weaver, P. (2014). The management of project management: A conceptual framework for project governance. *International Journal of Project Management*, 32(8), 1382-1394
- Turner, J. R., & Keegan, A. (2001). Mechanisms of governance in the project-based organization:: Roles of the broker and steward. *European management journal*, 19 (3), 254-267.
- Van Oosterhout, M., Waarts, E. and van Hillegersberg, J. (2005). Assessing business agility: a multi-industry study in the Netherlands, *Business Agility and Information Technology Diffusion*, Vol. 180, 275-294.
- Williamson, O.E. (1996). *The Mechanisms of Governance*. Oxford University Press, New York.
- Womack, J. P., & Jones, D. T. (1997). Lean thinking—banish waste and create wealth in your corporation. *Journal of the Operational Research Society*, 48(11), 1148-1148.
- Womack, J.P. and Jones, D.T. (2003). *Lean Thinking: Banish Waste and Create Wealth in Your Corporation*, Revised and Updated, Free Press, USA.