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A Wheelbarrow Full of Frogs

Understanding Control on the Portfolio level for Agile organizations

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Organizations increasingly embrace agile approaches for IT initiatives, replacing rigid formal stage-gate control by flexible outcome-orientation. This challenges established portfolio management approaches that largely rely on consolidated (stage-gate) project metrics. Based on seven case studies of large Dutch organizations we explore these challenges and the organizational responses towards a new approach to portfolio management for agile initiatives. Data-collection is guided by four propositions derived from control theory and portfolio management literature. Our findings show that portfolio management adapts to agile initiatives by performing fewer and less strict process controls, by modifying the budget controls and by shifting from IT project/program control to business outcome control, with an increased focus on business value. Additional knowledge contributions concerning the role of portfolio management and the notion of trust and communication are uncovered, providing reasonable grounds for future studies.

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1   Introduction

1.1   Research question and significance

Agile methods stress the importance of continuous improvement of working products with limited documentation and little formal planning. The Agile Manifesto (Fowler & Highsmith, 2001), the foundation for agile methods, values response to change over following a plan. In addition, the Agile methodology emphasizes that teams should be autonomous, and management must learn to stimulate this through support rather than by checking for milestones, and trusting teams to get the job done (Hekkala, Stein, & Rossi, 2017). Therefore, agile's dynamic and autonomous way of working can cause those responsible for portfolio management to feel a loss of overview and control. The purpose of this study is to explore how organizations that embrace agile approaches at project level deal with the challenges this poses to control at the portfolio level.

Surprisingly, the notion of control in organizations 'embracing agile' (Rigby, Sutherland, Takeuchi, John, & Org, 2016) has almost exclusively been explored on the level of the individual project or team (Rautiainen, Von Schantz, & Vähäniitty, 2011). Practitioners however do express their concerns: at a *Scaling agile* event in Amsterdam in March 2017, many upper level managers expressed their frustrations and concerns regarding project control within their agile portfolios (Groen, 2017). The difficulty regarding control for portfolio management becomes pressing as firms are seeking ways to sustain agile practices in their competitive environment. This leads to our research question:

> *What are the challenges and responses to control in portfolio management for agile organizations?*

Investigating this issue is of relevance both managerially and academically. As shown by Weill and Broadbent, well-governed IT portfolios lead to superior firm performance, with an increased ROA of 30% (Weill & Ross, 2004). However, widely accepted portfolio management approaches such as COBIT (De Haes, Van Grembergen, & Debreceny, 2013) stress documentation and planning and are not a natural fit with agile practices. Fewer formal controls and metrics at project or team level may lead to a less transparent and more subjective assessment of progress and success, exacerbating the portfolio management issues (Neves, Borgman, & Heier, 2016).

 Our study employs an exploratory multiple case study design, reflecting the limited extant literature in this area as well as the need to study this relatively new phenomenon in its context. The seven case studies have been analyzed based on general descriptive and contextual information, as well as observations and interviews at both project and portfolio level. Data collection is guided by a set of propositions derived from control theory as well as portfolio management literature (section two). Section 3 describes the method in more detail, followed by our findings and implications for practice as well as future research.

In order to understand portfolio management in agile initiatives and methods, it is imperative to consider the mechanisms of control in traditional and agile management. Following this, the topic of portfolio management control is explored, illustrating that portfolio the manager's traditional practices and focus are no longer sufficient for transforming agile organizations. Conclusively, we further develop the investigation regarding portfolio management control in agile organizations, demonstrating that modifications must occur in this area in order support agile methods. These investigations on existing literature generate 4 working propositions which form a foundation for the data collection process. The following literature review elaborates on these topics by highlighting the current contributions, gaps and contrasts in literature.

2   Literature exploration

2.1   Control: traditional vs. agile

When observing control in organizations, Mahadevan, Ketinger and Meservy define control by means of "mechanisms" permitting an organization to proceed towards its goals (Mahadevan, Ketinger, & Meservy, 2015). Administering control mechanisms in order to achieve organizational objectives is relevant for all levels of management and is employed uniquely in traditional and in agile organizations. Traditionally, structured stage-gate or waterfall practices aid control while hierarchy and structure are central. Whereas, in contrast, agile information system development (ISD), approaches stimulate: autonomous control in development teams, customer involvement and flexible "facilitative control practices" (Cram & Brohman, 2010, Page 6).

Additionally, the control relationship between the portfolio management level and the project level of the firm is decisive for reaching this desired output (Mahadevan et al., 2015). Correspondingly, Kirsch defines control with a focus on the role of management and their relationship with employees as they guide individuals to work according to an established strategy and to ultimately attain necessary objectives (Kirsch, 1996). Similarly, Maruping et al. define control as Kirsch did in his 1996 article, while also highlighting control on an agile project-level (Maruping, Venkatesh, & Agarwal, 2009).

Control, in an agile project management context, is an imperative contingency affecting the capability of software teams to react to altering user requirements (Kirsch, 1996). According to Maruping et al., under circumstances "of high requirements change," the use of Agile methodology and control modes that stimulate autonomous teams are essential and effective in realizing improved project quality (Maruping et al., 2009, Page 393).

As the autonomous nature of agile teams promote the achievement of success, the relationship between the teams and those involved in portfolio management must stimulate this through the use of proper mechanisms (Hekkala et al., 2017).

Alongside the importance of objectives and the role of management, varying methods of control are employed in studies concerning agile and organizational control; a common classification method employed in research is the control theory.

2.1.1. Control theory.

In alignment with various studies, Harris, Collins and Hevner argue that the control theory is a "study of the mechanisms that can be used to achieve organizational objectives" (Harris, Collins, & Hevner, 2009, Page 403).

Originally, the control theory was developed by Ouchi in his influential studies, as he described four types of control: output control, behavioral control, clan control and self-control (Ouchi, 1979). These types of control are further classified into formal and informal control; informal control including self and clan control and formal control including behavior and outcome-based control. The formal manner of measurement, through behavioral or process controls and output controls, is often employed in organizations to monitor project development.

Process controls influence and monitor the behavior of the employees or team members and how they accomplish their goals, while output controls directly influence and monitor the outcome and what teams should accomplish (Bello & Gilliland, 1997; Tiwana & Keil, 2010). Traditional firms often incorporate process controls through the agency of high levels of documentation and monitoring throughout the development process. However, Bonner et al. claim that innovation is often stagnated due to the implementation of process controls (Bonner, Ruekert, & Walker, 2002).

As agile is said to stimulate innovation through working software and reduced documentation (Rigby et al., 2016), the focus of control may shift in nature and therefore, control mechanisms must adjust accordingly.

Traditionally, portfolio managers attempt to achieve a balance between four goals of: "maximizing the financial value of the portfolio, linking the portfolio to strategy, balancing it on relevant dimensions, and ensuring that the total number of ongoing activities is feasible" (Rautiainen, Von Schantz, & Vähäniitty, 2011, p. 2). Typically, the goals in the areas of finance, strategy, stability, and achievability are conflicting for portfolio managers as they struggle to accomplish these by means of: distinguishing potential projects, ranking project priority, allocation, balancing and, finally, evaluating (Kester, Griffin, Hultink, & Lauche, 2011; Stettina & Hörz, 2015). These traditional practices of portfolio management are further aided through the incorporation of both process and output controls (Mueller, Martinsuo, & Blomquist, 2008).

In Agile portfolio management the traditional practices are altered as a team based structure with flexible projects, frequent reviews and evaluations is advocated (Stettina & Hörz, 2015). The aforementioned implies that portfolio managers are to increase flexibility and reprioritization, as opposed to the fixed and traditional structure of projects determined each year. In Stettina and Hörz's 2015 study, a portfolio manager is interviewed who states that agile teams are self-managed, consequently changing the role for him and other managers who were previously fully in control of projects (Stettina & Hörz, 2015). The adjustment in role and control of portfolio management is due to the independent and flexible nature of agile teams and the reduction in documentation, hence, traditional portfolio control methods are no longer sufficient for agile teams (Moran, 2015).

When shifting from traditional to an agile organization, portfolio management should consider the following aspects of the agile working methods: the iterative nature of the projects which are continuously producing working prototypes, faster pace short sprints, the incorporation of feedback from customers, and within teams, the daily updates and increased verbal communication (Bishop & Deokar, 2014; Saltz, 2015). As a result, management must accept less measurements through phase gate processes and increase emphasis on working prototypes (Fowler & Highsmith, 2001). Evidently, this demonstrates once again that portfolio management must adjust their control based on the agile implementations in their organization.

3   Propositions

A number of studies have established that traditional portfolio management methods and controls clash with agile ways of working (Harris, Collins, & Hevner, 2009; Moran, 2015; Stettina & Hörz, 2015). As initiatives and agile teams become increasingly flexible and self-managed, portfolio managers perform less process control tasks and must adjust their influential role as controller. In addition to this, agile teams rarely report the interim status of work in progress and emphasize communication and presentation of (partially) finished products in the form of demos (Gregory, Barroca, Sharp, Deshpande, & Taylor, 2016), (Miranda & Bourque, 2010). This is in line with the Agile Manifesto which stresses that working software is the primary measure of progress and that communication supersedes reporting as well as monitoring for autonomous teams (Fowler & Highsmith, 2001). In conjunction with Bello and Gilliand's (Bello & Gilliland, 1997) work, stating that process controls include traditional monitoring activities and the use of guidelines, this leads to the first proposition:

Proposition 1: Fewer and less strict process controls are performed when firms are transitioning into agile organizations.

As the focus on process control in agile working methods is proposed to occur less, other traditional methods of control such as budget controls have high potential to transform as well. The flexibility of agile teams and continuous prioritization of user stories and initiatives causes project managers to face conflicts when negotiating budget to fund their agile team(s) (Shastri, Hoda, & Amor, 2017). Therefore, Drury-Grogan's work proposes to discuss budget regularly after each agile

iteration (Drury-Grogan, 2014). For portfolio management, budget is one of the main processes when managing and selecting initiatives and measuring outcome (Badewi, 2016).

Therefore, agile methods can no longer be supported by traditional budgeting approaches as the traditional manner of defining a budget for a fixed set of initiatives per year must become more dynamic in order to facilitate this new way of working (Cao, Mohan, Ramesh, & Sarkar, 2013), (Lohan, Conboy, & Lang, 2010). The latter results in logical grounds for the following proposition:

Proposition 2: Budget controls within portfolio management are modified when a firm transitions into an agile organization.

Rather than monitoring through process controls and traditional budget controls, for agile methods it is more appropriate for portfolio managers to focus on business and customer value (Conforto, Salum, Amaral, Da Silva, & De Almeida, 2014). This is evident as agile methods integrate the customer through incorporating customer feedback, improving the time to market, and promoting continuous improvement (Highsmith, 2002).

In addition, Alahyari et al.'s work suggests that agile methods are more focused on creating value as opposed to other methods (Racheva, Daneva, & Sikkel, 2009). This would imply that business outcome controls are emphasized as opposed to process controls in agile organizations (Maruping et al., 2009; Nidumolu & Subramani, 2003). Consequently, providing a rational foundation to form the proposition below:

Proposition 3: The portfolio management shifts from process control to business outcome control when transforming into an agile organization.

Outcomes are often regarded as the link between the customer end of the business and control of the agile team's underlying development processes (Sohi, Hertogh, Bosch-Rekveldt, & Blom, 2016). Understanding the overall organizational outcome objectives may also aid in the recognition of which agile methods to implement in the firm's way of working (Tripp & Armstrong, 2014).

While outcome success measurement is implied to be dominant for agile initiatives, the aim of these outcomes are suggested to be related to business value (Maruping et al., 2009; Nidumolu & Subramani, 2003). Furthermore, as business focus and control are said to increase, IT focus control decreases (Mahadevan, Ketinger, & Meservy, 2015). This leads to the suggestion that as the final business related results become central, IT has more of an enabling role for agile initiatives. In Mahadevan et al.'s article, the authors claim that there is an increased focus on the business function as opposed to information system function when agile is implemented (Mahadevan et al., 2015). At the same time, the shift to business value allows for more control concerning outcomes and goals as opposed to processes (Maruping et al., 2009; Nidumolu & Subramani, 2003). Likewise, firms are increasingly aiming to produce value for customers and the organization by incorporating requirements in order to realize these values (Alam, Nazir, Asim, & Amr, 2017). These findings provide support for the following proposition:

Proposition 4: The portfolio management shifts their focus from IT outcomes to business outcomes when transforming into an agile organization.

The focus on business output is further supported by Silva and Oliveira who stress that with the assistance of the agile ways of working, development teams should focus on producing project value relative to the business and the client, which is ultimately the goal to be achieved (Silva & Oliveira, 2016).

4   Research Method

The multiple case study approach, through the exploration of seven cases, has been determined to uncover patterns and to strengthen the reliability and validity of this research (Eisenhardt & Graebner, 2007). The seven firms studied are service firms with headquarters in The Netherlands and have had agile methods implemented into their previously traditional organization. Each case study contains two interviews; one with an individual involved in the portfolio management and one with a product owner or scrum master. Both interviewees are active in the same agile portfolio, which is essential for the data reliability and consistency of this study. Furthermore, the interviews are semi-structured to support the exploratory nature of this study and the interview guideline has been generated based on propositions created in section two. Each interview was conducted at the firm's headquarters with one interviewee and one interviewer at the interviewee's convenience. The interviews were 45 to 60 minutes; recorded, transcribed and analyzed. Each case, composed of two interviews and observations, and was analyzed per proposition.

Cases						
ABN AMRO	Aegon	Achmea	AirFrance KLM	ING	Jumbo	Schiphol Group

Trust & Role of Portfolio Manager

The notion of trust was highlighted by Achmea, Schiphol, ABN AMRO and ING. The portfolio manager must have the appropriate role in the development process and should stimulate the autonomy of the teams by exhibiting that they "*trust the teams.*" Furthermore, one of the interviewees of Air France KLM, highlights the new role portfolio managers should embody as "*chief enabler*" whilst they give up their "*illusion of control.*" Through the use of open communication and dashboards for additional assistance, trust can be increased and portfolio managers reduce their process controls to stimulate their firm's agile way of working.

5   Findings

Our findings support the propositions that portfolio management adapts to agile initiatives by performing somewhat fewer and less strict process controls, by modifying the budget controls and by shifting from IT project/program control to business outcome control, with an increased focus on business value. This addresses the research question: *What are the challenges and responses to control in portfolio management for agile organizations?*

Findings:

1. Process controls somewhat reduced

2. Budget with a team and value focus

3. Outcome control focus increases

4. Business value becomes more central

5. Enabling role of the portfolio manager

Although we found only limited direct support for the first proposition regarding process controls, all firms clearly expressed their reduction of documentation in their development processes, offering strong indirect support. Propositions two, three and four received stronger direct support, with the cases not only offering evidence and examples, but also valuable nuances. This, together with the explored literature, forms a good basis to suggest further exploration and testing of these propositions in future research.

The implications of our results are twofold. First, portfolio management shifts their focal point from process control to outcome control by emphasizing business value and outcomes. The focus on business value and the role of the customer are central in agile working methods (Fowler & Highsmith, 2001; Gregory et al., 2016; Silva et al., 2016). These values and focus in turn suggest an increased importance of business value through customer related outcomes for the portfolio level of the firm. To add to this implication, the budget controls are adjusted to focus on autonomous teams, and in some cases, values instead of detailed upfront business cases. This additional finding further underlines the prominence of business value in agile working methods which portfolio managers are encouraged to stimulate.

The second implication underlines transparent and trusted communication through meetings, demos and, occasionally, elements such as live dashboards. It can be argued that the presence of these elements is essential at all levels of organizations, especially in firms implementing agile methods. This is in line with Stettina and Hörz's work as they describe the culture shift of agile organizations which encourages cooperation based on interactive communication, transparency and trust (Stettina & Hörz, 2015). Similarly, Cram and Brohman highlight the need for communication in order to generate meaningful business outcomes (Cram & Brohman, 2010). Furthermore, dashboards are often supplementary to communication for agile portfolio management in order to stimulate autonomous teams in producing valuable output. Although slightly increasing the use of process controls, dashboards improve portfolio management's overview of their agile initiatives and portfolios growing in maturity.

This implication suggests a role change for portfolio management, as they must support and stimulate the agile way of working. Although this aspect was not explicitly addressed in our propositions, our data suggests that this is an important element in the response of firms. Using the words of an interviewee in the Air France KLM case, the role of the portfolio manager becomes more of "*a chief enabler,*" as opposed to the traditional monitoring manager. This role of chief enabler, encouraging trust, communication and focusing on business value outcome, is viewed as essential and, in line with our literature study, should stimulate the autonomous teams and business value in agile portfolios (Hekkala et al., 2017; Mahadevan et al., 2015; Maruping et al., 2009). We expect this 'enabling' aspect to be a fruitful avenue for further exploration.

Academically, our study responds to the request to further explore agile portfolio management by filling the gap between agile portfolio management and control while providing additional findings on the role of portfolio management in agile organizations. Parallel to previous studies concerning agile working methods, our findings regarding the budget, process and outcome controls maintain the already academically supported role of the customer, autonomous team iterations and demo based communication (Fowler & Highsmith, 2001; Hekkala et al., 2017; Mahadevan et al., 2015; Rigby et al., 2016).

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