Agile project portfolio management, new solutions and new challenges: findings from four agile organizations

Abstract. During the last couple of decades, agile methods have spread from software development start-ups to large, established organizations across different industries. The traditional project portfolio management processes build on certain premises about agreed-on deliverables, resources and deadline. These premises are not applicable to agile projects. Therefore, accommodating agile methods in project portfolio management (PPM) has become a key question. On this backdrop, we use four large companies with a background in traditional forms of managing projects and portfolios to investigate how agile transformation demands change in ways of thinking. By using the rethinking project management framework as our theoretical grounding, we deconstruct the companies' PPM practices in elements of thought from a classical and a rethinking project perspective. We study how these elements manifest and interact across project, portfolio, and management levels and how they produce desirable and undesirable consequences. Finally, we suggest how scaling agile to the project portfolio level demands new ways of thinking and operation.

Keywords: Project portfolio management, agile at scale, agile transformation, rethinking project management

1 Introduction

Project portfolio management (PPM) has been on the research agenda for many decades (Baker and Pound, 1964) and has guided thinking about how to bridge business strategy and project
management (Meskendahl, 2010). In this regard, the PPM literature offers a rich stream of classical and well-established PPM models, such as Stage-Gate models (Cooper, 2008) and portfolio selection models (e.g. Archer and Ghasemzadeh, 1999) based on waterfall thinking (Boehm, 1988). Recently, PPM literature have challenged this waterfall thinking (Martinsuo et al., 2014, Hansen and Krammergaard, 2014) suggesting that PPM success may depend on organizations’ ability to effectuate both deliberate and emerging strategies. Emerging strategy is particularly important in turbulent environments (Kopmann et al., 2017), for instance, with fast paced changes in technology domains and business landscapes (Van Oosterhout et al., 2006, Birkinshaw, 2018). Recently, a stream of research inspired by the agile manifesto has entered the agenda on top management journals, defined as agile at scale (Rigby et al., 2018). The agile manifesto values (1) people and interactions over processes and tools, (2) working software over extensive documentation, (3) customer collaboration over negotiation (4) responding to change over following a plan (Rigby et al., 2018, Fowler and Highsmith, 2001).

Whereas research on agile project management has been on the agenda for three decades (Dybå and Dingsøyr, 2008, Takeuchi and Nonaka, 1986, Diegmann et al., 2018), research on how to scale agility to the portfolio level is much younger and less developed (Berkani and Causse, 2019). We find this literature emerging under various labels, such as agile at scale (Rigby et al., 2018), agile development at scale (Dingsøyr et al., 2019), large scale agile frameworks (Conboy and Carroll, 2019, Dikert et al., 2016), portfolios of agile projects (Sweetman and Conboy, 2018, Sweetman and Conboy, 2019), agile transformations (Paasivaara et al., 2018, Sommer, 2019, Conboy and Carroll, 2019), and agile project portfolio management (APPM) (Stettina and Hörz, 2015, Stettina and Schoemaker, 2018, Horlach et al., 2018, Horlach et al., 2019). To guide organizations in scaling agile practices to the PPM level, these studies draw on
various models and methods from practitioner-oriented literature (e.g. Vähäniitty, 2012, Krebs, 2008, Leffingwell, 2007) and commercial frameworks like SAFe (Leffingwell, 2007), LeSS (Larman, 2010, Larman and Vodde), DaD (Ambler and Lines, 2012), Nexus (Schwaber, 2015) and Spotify’s scaling model (Kniberg and Ivarsson, 2012). These models, methods, and frameworks offer a sophisticated variety of terms and techniques to replace traditional portfolio management practices. Adoption of these practices can be seen as a journey towards higher maturity where organizations should strive for adopting the defined practices (Turetken et al., 2017). From this perspective, researchers call for changes in mindsets (Rigby et al., 2018), and changes in organizational structures, mandates, financial structures, performance measures, delivery processes (Sommer, 2019, Rigby et al., 2018) and even culture (Holbeche, 2019).

The number of companies aiming to scale agile practices is found to grow very fast these years (Alliance, 2018). In addition, the topic currently takes the agenda in leading management journals (Rigby et al., 2018, Rigby et al., 2016, Barton et al., 2018). Some years ago, agile was associated with software development and IT companies, but now organizations from other industries are starting to go through agile transformations. Thus, scaling agile practices now includes a new group of organizations, which, in contrast to companies like Netflix and Spotify, are not “born agile” (Rigby et al., 2018). Research shows that scaling agile has proven much more challenging in these so-called legacy companies as their bureaucracies and ways of doing things are well-established (Jovanović et al., 2017).

Despite valuable contributions reporting on lessons learned (Birkinshaw, 2018, Rigby et al., 2018), Dikert et al. (2016) state that almost 90 percent of the papers were experience reports, and that theoretical grounded research examining the impact of scaling at the portfolio level is lacking (Sweetman and Conboy, 2018). Our research offers theoretically guided findings from
a multiple case study of four organizations, which during the last three to four years have adopted agile practices at the portfolio level by drawing on agile frameworks as Spotify’s scaling model (Kniberg and Ivarsson, 2012), SAFe (Leffingwell, 2007) and Half Double (Svejvig et al., 2019). Our research aims to understand the implications of scaling agile to the PPM level in legacy companies. We do so by shedding light on how these agile practices interact with existing organizational practices and ways of thinking. Also, following the advice from current research (e.g. Ang and Biesenthal, 2017, Conboy and Carroll, 2019, Hansen and Svejvig, 2018), we investigate the project portfolio level by applying a multi-layered approach looking across the three hierarchical levels that Stettina and Hörz (2015) find to be key. These levels are the management, the portfolio and the project levels, where the project level is understood broadly; this also included the program level. As our theoretical frame, we use the rethinking project management (RPM) framework by Svejvig and Andersen (2015) to deconstruct the four case companies’ PPM practices into classical and rethinking elements of thought. We analyze how these elements, covering traditional and agile PPM practices, interact across the three hierarchical levels mentioned, and we apply the research questions (1) How do PPM practices manifest in legacy companies aiming to scale agile? (2) What are the consequences of interactions across hierarchical levels? (3) How should organizations change thinking to become more agile at the PPM level?

We structure our paper as follows: In the next section, we present the theoretical framework. This is followed by the methodology section and the analysis. We finalize the paper with the discussion and concluding remarks.
2 Theoretical background

Whereas a framework for analyzing philosophical assumptions has been a part of the management and organizational science literature for many decades (e.g. Burrell and Morgan, 1979, Deetz, 1996), such a framework only recently entered research on projects (e.g. Winter and Szczepanek, 2017, Crawford and Pollack, 2004). In this regard, the rethinking project management literature is a significant driving force that proposes new promising directions for the enrichment and extension of project management beyond its current conceptual foundations (Winter and Smith, 2006). We understand the scope of rethinking project management as broad, which aligns with the term organizational project management (OPM), also including programs and portfolios (Müller et al., 2019). One crucial argument stated by the RPM literature is that instrumental and rational assumptions have dominated project management research (Packendorff, 1995, Morris et al., 2011, Walker and Lloyd-Walker, 2016). Thus, we emphasize the need to formulate alternative perspectives to support continued progress still capitalizing on what we already know. In this regard, the framework by Svejvig and Andersen (2015) seems promising as it draws an analytical distinction between classical project management (CPM) and rethinking project management (RPM). On the other hand, we consider the two perspectives to be complementary, the CPM perspective representing what we already know, and the RPM perspective building on and extending this knowledge.

In the following section, we describe the CPM perspective, followed by a description of the RPM perspective, finalizing the section by explaining how we consider the two perspectives an integrated theoretical frame.
2.1 Classical project management perspective

The classical project management (CPM) perspective covers the thought emerging in the 1950s, i.e. technical-oriented project management (Morris and Geraldi, 2011), which was encouraged by the US Department of Defense needed to control the development of the Polaris submarines. This led to the development of methods and techniques, such as work-breakdown structures (WBS), earned value management (EVA), and PERT methods (Cadle and Yeates, 2008). The Project Management Institute (PMI) gathered these methods and techniques in the first of six editions of the PMBOK (PMI, 2017) which became the most used project management standard in the world (Morris and Geraldi, 2011).

The CPM perspective can, as formulated by Svejvig and Andersen (2015), be thought of as consisting of five elements.

The first concept of the CPM perspective, Executability, is indebted to the PMBOK due to its focus on delivery and execution where precise project requirements are defined early in the process, assumingly with a static project front-end (Morris and Geraldi, 2011) meaning that only minor changes to the project requirements may occur.

Linearity and Simplicity hold the assumption that projects follow simple linear lifecycle as this assumingly mirrors the actual terrain “out there in reality” (Winter et al., 2006). Project standards, such as the mentioned PMBOK and the widespread PRINCE2 standard (Office of Government Commerce, 2009), include detailed descriptions of lifecycle models with phases and gates. For example, the PMI standard describes projects with the following implicitly sequential processes: Initiating, Planning, Executing, Monitoring and Controlling, and Closing (PMI, 2013).
Controllability is the assumption that projects are objects that can be controlled and focus on prediction and control, assuming causal explanations (Geraldi and Söderlund, 2018) where challenges are observable and can be managed by optimizing processes. Thus, successful management of projects requires careful planning, scheduling of activities (Packendorff, 1995), and monitoring and controlling that formulated success criteria are realized (Jugdev and Müller, 2005).

Instrumentality is the assumption that tools and methods can be applied as a prescriptive and normative approach to solving problems (Geraldi and Söderlund, 2018). These instruments are understood as objective and truthful and can be applied in the same manner as positivistic research verifies facts through methodical experimentation, controlled observation, and sampling statistics, etc. (Geraldi and Söderlund, 2018).

Temporarity (classical perspective) represents an understanding of projects as temporary endeavors undertaken to create unique products, services, or results (PMI, 2017). Thus, projects have a unique, once-in-a-lifetime task, predetermined date of delivery, being subject to one or several performance goals, including resource usage and quality, and consisting of several complex and interdependent activities (Packendorff, 1995).

Above we have described the assumptions of what we, following Svejvig and Andersen (2015), define as the CPM perspective, which has been dominant for more than sixty years. However, alternative views have existed for some time, and the predominant one, rethinking project management, is described below.
2.2 Rethinking project management perspective

Initially, this alternative project management perspective was proposed by the Scandinavian school of project management (Lundin, 1995, Packendorff, 1995). Later, as we entered the new millennium, the rethinking project management (RPM) movement emerged (Maylor, 2006), namely from a UK-based research network. This reinforced vital concepts in the development of a more holistic and pluralistic understanding of the management of projects (Svejvig and Andersen, 2015). Motivated by the shortcomings of classical project management, the movement found its underlying theory and assumptions to be obsolete (Koskela and Howell, 2002). The RPM perspective can, according to Svejvig and Andersen (2015), be thought of as consisting of seven elements.

The first RPM element is Learnability and is about learning, operating, and adapting effectively in complex project environments through experience, intuition and the pragmatic application of theory (Winter et al., 2006). It is assumed that learning cannot be reduced to memorizing fact-based knowledge and models but should be seen as a mindset of continuous learning with a focus on the ability to learn and adapt in fast-changing environments (Ramsay et al., 1996).

Multiplicity advocates for a broader conceptualization of projects with many practices, models, discourses and theories. Assuming individuals have different learning styles, preferences, and ways of doing work, pluralistic approaches seem plausible (Svejvig and Andersen, 2015). If only allowing a narrow repertoire of practices not adapted to local and individual needs, organizations risk being caught in a specialization trap. At the other extreme, too much pluralism increases the risk of being caught in a fragmentation trap (Söderlund, 2011). However, the human ability to communicate and develop an inter-subjective understanding is assumed to create consensus which can overcome such fragmentation traps (Söderlund, 2011).
The concept of *Complexity* emphasizes models and theories recognizing and illuminating the complexity of management of projects at all levels (Winter et al., 2006). Many types of complexity may be found in the management of projects, but according to Baccarini (1996), two elements may be highlighted: organizational and technological complexity. Organizational complexity deals with the number of hierarchical levels that work spans, and horizontal complexity deals with how work spans units, task and structures (Baccarini, 1996).

Furthermore, complexity may also arise from interdependence between vertically and horizontally differentiated work (Sinha and Van de Ven, 2005, Hansen et al., 2017). Technological complexity may arise from differentiation of the number and diversity of input and output, number and separation of actions in time and territory, and the number of specializations requiring that different contractors be involved in a project (Baccarini, 1996).

*Uncertainty* is a concept closely related to complexity – yet distinct (Pich et al., 2002). This concept focuses on uncertainty as regards duration, continuance, occurrence, and liability to change (Dictionaries, 1989). Such uncertainties involve estimates and project parties at various stages of a project (Atkinson et al., 2006). Uncertainty has no objective measures of scope and content, and managers frame uncertainties based on the information available to them (Martinsuo et al., 2014). Such information may be limited and ambiguous and is assumed to be a fundamental condition for a project (Atkinson et al., 2006).

The concept of *Sociability* sheds light on how social and political processes may shape projects, e.g., power structures, emotionality, and identities (Svejvig and Andersen, 2015). Emphasis is on actors’ ability to make sense of their situation, and how this provides different routes and perceptions in project environments. To understand this, scholars may apply a dramaturgical
lens, thereby highlighting how individuals seek to define the situation and put on a performance appropriate for his or her preferred definition of that situation (Smith, 2011).

*Valuability* focuses on a range of overlapping terms, such as project worth, success, value, and benefits (Laursen and Svejvig, 2016). Following Laursen and Svejvig (2016), valuability is understood as relative, not absolute, and may be viewed differently by different parties in different situations (Laursen and Svejvig, 2016). According to this definition, there is an apparent value, subjectively assessed by a user or buyer. Valuability should also be seen as a shift from a narrow focus on delivering products to a holistic focus on creating value (Morris, 2013). Furthermore, valuability leaves the notion that value can be defined and planned at the beginning of a project as this oversees the complexity and uncertainty in the organizations involved (Breese, 2012, Laursen and Svejvig, 2016). Also, valuability demands a shift from project and product centric to value centric, focus on business strategy, organizational effectiveness, and stakeholder benefit realization (Winter and Szczepanek, 2008, Ang and Biesenthal, 2017, Eskerod and Ang, 2017).

*Temporarity* (rethinking perspective) is a concept that considers projects as temporary organizations established by their base organization to carry out assignments on its behalf (Andersen, 2008). The term temporary organization is used to capture the characteristics of project organizations and to separate it from permanent organizations that deal with operations (Söderlund, 2004).

### 3 Theoretical framework: two perspectives

Although the elements of CPM and RPM initially emphasized the management of individual projects, we argue, as earlier mentioned, that this theoretical framework also applies to the
management of portfolios. Thus, we understand our research as a “project study” acting as a gathering notion for studies in, on and around projects (Geraldi and Söderlund, 2018)

Fig. 1. Two perspectives on project studies: Adapted from Svejvig and Andersen (2015)

Following Svejvig and Andersen (2015), and as illustrated in Figure 1, the CPM perspective is understood as embedded in the RPM, meaning that the RPM perspective enhances the CPM perspective rather than discarding it. Thus, we adopt Turner and Müller (2003) argument that the CPM concepts are not wrong — they are just incomplete. On this backdrop, we use this framework for diagnosing and discussing PPM practices in our case organization.

4 Methodology

4.1 Research site

Denoted by the pseudonyms Alfa, Beta, Epsilon, Gamma, each of our cases is one of the largest and leading companies in their industry. To anonymize the case companies, their data are kept general. As shown in the table below, the four organizations share and differ on various characteristics. First, about the commonalities, all have been in business for more than 50 years, thus defined as legacy companies. All started scaling agile practices less than five years ago and have completed the pre-adoption phase, entered the adoption phase, but they still have some
ground to cover in the post-adoption phase. All of the four organizations draw on well-known methodologies to scale agile to the portfolio level. Alfa and Beta have adopted practices from SAFe in combination with Scrum. Epsilon developed its model in-house but is much inspired by Spotify’s scaling model (Kniberg and Ivarsson, 2012). Gamma adopts thinking and practices from the Half Double Methodology (Olsson et al., 2018) and applies a “lightweight” Stage-Gate model. In addition, the content and the size of the portfolios are quite similar. The portfolios are related to internal and external activities within IT and Business Development as well as Research and Development; the range in yearly cash flow is EUR 30-50m.

<table>
<thead>
<tr>
<th>Industry</th>
<th>Alfa</th>
<th>Beta</th>
<th>Epsilon</th>
<th>Gamma</th>
</tr>
</thead>
<tbody>
<tr>
<td>Years in business</td>
<td>100+ years</td>
<td>50+ years</td>
<td>Created through the merging of two companies being in business more than 50 years</td>
<td>100+ years</td>
</tr>
<tr>
<td>Annual company cash turnover</td>
<td>Over EUR 8b</td>
<td>Over EUR 200m</td>
<td>Over EUR 50b</td>
<td>Over EUR 200m</td>
</tr>
<tr>
<td>Type of portfolio</td>
<td>IT and Business Development</td>
<td>IT and Business Development</td>
<td>IT and Business Development</td>
<td>Research and Development</td>
</tr>
<tr>
<td>Yearly portfolio cash flow</td>
<td>Over EUR 50m</td>
<td>Over EUR 40m</td>
<td>Over EUR 50m</td>
<td>Over EUR 30m</td>
</tr>
<tr>
<td>Project and portfolio methodologies</td>
<td>SAFe</td>
<td>SAFe, Nexus, and Kanban</td>
<td>Internally developed model, inspired by Spotify’s scaling model</td>
<td>Half Double Methodology and Stage-Gate</td>
</tr>
<tr>
<td>People involved in agile practices</td>
<td>200+ employees</td>
<td>500+ employees</td>
<td>50+ employees</td>
<td>Approx. 40 employees</td>
</tr>
<tr>
<td>Started scaling agile</td>
<td>2016</td>
<td>2015</td>
<td>2016</td>
<td>2018</td>
</tr>
</tbody>
</table>

Table 1: The four case organizations

Despite the commonalities, Table 1 reveals that the four organizations differ quite considerably in certain aspects, such as annual company cash turnover (ranging from EUR 200m to more than EUR 50b) and the amount of employees involved in agile practices (ranging from 40+ to
The following section describes how the data from the four companies was collected and analyzed.

4.2 Collecting and analyzing data

Using a case study design as proposed by Yin (2009), we provide a holistic understanding of the context of the contemporary phenomenon of interest (Yin, 2009). Defining the PPM level of the four organizations as our unit of analysis, we collected data representing three organizational levels, project and program level, portfolio level, and management level. As shown in Table 2 below, most data consists of interviews, augmented by documents and photos were possible.

<table>
<thead>
<tr>
<th>Level/Company</th>
<th>Alfa</th>
<th>Beta</th>
<th>Epsilon</th>
<th>Gamma</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management level</td>
<td>Business manager (60 min)</td>
<td>Program manager (65 min)</td>
<td>Director of development department (60 min)</td>
<td>Head of development (60 min).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Financial program manager (70 min)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Portfolio level</td>
<td>Financial portfolio level (65 min)</td>
<td>Portfolio manager (90 min)</td>
<td>Portfolio manager and Director of development (55 min)</td>
<td>Agile transformation manager (45 min) Portfolio manager (45 min)</td>
</tr>
<tr>
<td>Project (and program level)</td>
<td>Scrum master (60 min) Product owner (60 min)</td>
<td>Scrum master (65 min) Product owner (65 min)</td>
<td>Project manager (60 min)</td>
<td>Team member (30 min).</td>
</tr>
<tr>
<td>Documents</td>
<td>5</td>
<td>3</td>
<td>5</td>
<td>2</td>
</tr>
</tbody>
</table>

Table 2: Data collected in the four case organizations

Data was collected between March 2018 and October 2019 as semi-structured interviews (Kvale, 2008). The interview guide was rigorous and transparent, grounded in our theoretical frame (Svejvig and Andersen (2015)), as illustrated by the small sample in Table 3 below. Our unit of analysis, and thereby focus of the interviews, was guided by the four PPM domains

<table>
<thead>
<tr>
<th>6.00</th>
<th>Classical project management (CPM)</th>
<th>Ensure specificity, i.e. obtain concrete examples instead of general considerations. (Kvale, 2008).</th>
</tr>
</thead>
</table>
| 6.01  |         Traits of Executability.    | Explain how you deliver execution in PPM and the performance goals that supports this. 
 PPMLiterature example: Executability understood as average project success related to time, scope, resources, stakeholder satisfaction (Jonas, 2010), and organizational impact (Rech et al., 2005). (Svejvig and Andersen, 2015). |
| 6.02  |         Traits of Linearity and Simplicity. | Could you map out the organization’s PPM? 
 PPMLiterature example: PPM described as simple diagram with a number of linear stages and a logically coherent flow from strategy to completed projects (Archer and Ghasemzadeh, 1999). (Svejvig and Andersen, 2015). |
| 6.03  |         Traits of Controllability. | How is the portfolio controlled by management—what monitoring and follow up mechanisms are applied? 
 PPMLiterature example: Formal principles may enable managers to evaluate progress. (Svejvig and Andersen, 2015). |

Table 3: Sample from the interview guide

In general, the respondents were happy to share good and bad experiences from the organizations’ agile transformations. As recommended by Strauss and Corbin (2008), after the interviews, extensive field notes were written and stored in a field diary, facilitating our first reflections on findings. The interviews were recorded enabling us to make transcription of the audio
files. Applying the NVivo software packets and our Coding book (see appendix), we systematically coded the 13 interviews and 12 documents. This process produced 169 codes, each representing a piece of text from the transcriptions of the interviews or a bit from one of the documents. Following Van de Ven (2007), our data analysis was structured by developing and saturating matrixes for the concepts in the two perspectives of the theoretical frame.

5 Analysis

Structured by the two perspectives of the theory, this section applies the CPM and RPM elements to deconstruct the project portfolio management practices in the four agile organizations aiming to scale agile practices. Starting the deconstruction by using the CPM perspective, subsequently applying the RPM perspective, this analysis leads to the section discussing and concluding on the findings from the two views.

5.1 The CPM perspective

We set out with the first concept in the CPM perspective, Executability. A critical motivation for management to adopt agile methods is to boost time to market. Alfa and Bravo measure this execution by the velocity of user stories in each three-to-four-week sprint. Gamma measures so-called actuals and tracks what the projects have predicted every month. Epsilon takes a more high-level approach to measuring execution by evaluating provided and expected value creation every three or fourth months. Thus, management focus on Executability and the demand for status reports on the progress initiatives remain. This clashes somewhat with the notion of delegating responsibility and autonomy to teams as proposed by agile thinking. The project port-
folio level must handle these conflicting demands by balancing providing information on project progress and allowing the projects much freedom. We also find that management focus on Executability may force development activities to lower the quality or innovativeness delivered. To counter these trade-offs, we see the re-occurring negotiation in agile practices as a resolution – not by being faster in giving the organization what is specified, but by identifying and providing more quickly what is valuable for the organization. In addition, we find that agile practices offer a higher degree of ongoing negotiation of what is executed and how fast this should happen. The Executability observed differs from the way it is defined by the CPM perspective, as the projects in the case organizations in large do not have a static and fixed project front-end. Instead, it is permitted that project requirements change.

In more or less in all of the four organizations, we observe traits of Linearity and Simplicity, namely as regards accounting practices at portfolio level. We find this exhibiting so-called “waterfall thinking” with the underlying assumption that the organization can predict the future, and change will not happen; accounting can therefore meaningfully monitor deviations between what the projects were set up to do and what is realized. An Alfa manager explains: “the problem is that the finance people need to know how much we are spending this year. We say that we want to spend EUR 15 million, but then we find that we only can spend 10 million.”. Thus, the organization’s accounting practices consider it problematic that the project predictions “up-front” will change later down “the waterfall.” The manager continues: ”the great challenge there is a great challenge with working agile in all large companies, the idea is good, but there are organizational functions that do not work in an agile way.” Here the respondent refers to the PMO and the financial portfolio management as they have the job of finding and correcting “delta” between what the projects predicted and actuals. A bit surprising, we only find minor
conflicts between the organizations’ Stage-Gate practices (which rely on sequential thinking) and the agile project practices. The organizations seem to find a way to adapt and merge their quite detailed and elaborate Stage-Gate model with their agile practices. In the interviews, Gamma describes that their Stage-Gate models are considered a list of high-level information at a more strategical level. Thus, it is possible – at least in some areas – to combine the need for predictability and adaptability by defining nimble rules for managing the organization’s development activities. Another identified way to cope with management’s demand for predictability is by limiting the time horizon of the plans. For example, in Beta, where the SAFe framework is applied, top management has accepted that there is a plan only for the following ten weeks, and beyond that “we have a forecast for the following six or twelve months, but not a plan. A forecast is easier to change”.

Instrumentality is about the use of tools and methods to solve specified problems and tasks in PPM and deals with questions such as how organizations prioritize the “best projects.” In particular, we find manifestations of such a classical understanding of instrumentality in Gamma as this organization uses advanced methods to calculate profit margins, costs, etc., for instance, by using Monte Carlo simulation. However, in the three other organizations, instrumentality manifests itself somewhat differently, as the agile PPM and project practices are considered more as instruments to improve adaptability. An Epsilon manager says, “I think agility is the most important instrument for coping with uncertainty.” For example, the organizations emphasize backlogs as a vital instrument to support dynamic and ongoing prioritization. This, more frequent change is appreciated by management, as it enables an organization to adapt to change continuously. However, we observe that constant change in direction can frustrate and
confuse the members of the delivery teams. One Scrum master at Alfa explains, “some stringency would be nice [...] however, a lot of things come in out of the blue [...] that is frustrating”.

The concept of Controllability helps us see how organizations’ control their delivery processes. Several of our respondents state that their “projects” became more disciplined following the implementation of agile practices. The many formalized repeated organizational routines of agile practices (ceremonies) have provided a higher degree of process transparency. These ceremonies visualize performance and compliance and put an ongoing focus on activities of individuals, teams, and programs. We also find that agile practices change the locus of control. For example, the processes that identify and funnel the portfolio become more distributed, challenging the existing control processes conducted by the financial controllers and the PMOs. An Alfa financial manager explains: “In the old days, everything was brought to my attention [...]. Now there could be local initiatives that I’m not aware of. How can I defend the portfolio when I don’t know what is going on?”

We find some traits of Temporarity (classical perspective) understood as an endeavor undertaken to create unique products or services. This is mainly in Gamma which is the only one of the four organizations that has “kept” the traditional way of defining projects. The other three organizations have redefined and reorganized their development processes as “value propositions,” “features,” or “initiatives.” These have unique, once-in-a-lifetime tasks, as suggested by the classical definition of projects, but differ from this definition by not having a pre-determined date of delivery. Lack of fixed delivery dates is a challenge to an organization. Organizations find it difficult to assess when projects have reached their goals, as these goals are continually moving targets. One manager at Alfa explains about this challenge “when we work with such a
degree of agility in terms of the scope of the projects, then we cannot tell if it will be this year or next year, [...], every time we’ve tried, it changed”.

On the other hand, a dynamic perspective on fixed delivery dates has some positive effects, namely handling the initial allocation of resources when there is a change in scope. By organizing projects in static teams, so-called release trains, project participants remain in the project and are therefore not expected to transfer to other projects if a project exceeds its estimated amount of resources. In this way, the employees are understood as permanently working on the projects with the highest priority, instead of focusing resources on getting projects done within a defined deadline. Later, we will return to discussing the concept of Temporarity, however from a Rethinking Project Management perspective (RPM).

5.2 The RPM perspective

Data shows that agility in PPM comes with both decreasing and increasing complexity. One of the most apparent problems seems to be coordination between programs; this is defined as release trains in Alfa and Beta. Coordination between teams is complex due to a considerable amount of interdependencies in the agile way of organizing – work is fragmented and is more distributed. An Alfa manager explains that ”it is difficult to plan and coordinate. There are so many dependencies, crisscrossing. And sometimes you find out at the last minute: oops, we need her input this very minute, but does she have time to meet with us right now”. We find that adopted models such as SAFe and Spotify’s scaling model offer sophisticated and transparent systems to conduct ongoing work coordination via face-to-face meetings at various hierarchical levels. However, we find that such approaches have their limitations as face-to-face interaction is time-consuming, and specialist and management time is scarce. Also, evidence shows that
projects may require documentation. An Alfa project manager explains: “when we our project plans are incomplete, it raises doubts in terms of... did we overlook something?”

Regarding the concept of uncertainty, as briefly mentioned earlier, agile practices are seen by the organizations as an instrument to counter increasing uncertainty. Common to all four organizations is a notion of more pronounced threats and opportunities from more global and digital markets – this produces fast change. A manager from Epsilon states “Uncertainty is here to stay, so we don’t know what our competitors will do tomorrow, we don’t know what our customers want tomorrow, but we have to prepare, we have to be flexible in our mindset.” Several of the respondents relate stories from the “old days”: “When we got an idea, we spent six months on a pre-study. Then we spent another six months assessing whether or not we should go ahead. Then we spent three months wrapping up the project. And then we ran the project for two years and all of a sudden three years from idea to delivery could easily have gone by. There is no way you can compete on these premises now”. Data shows that this change from the old world demands a mindset change, which is difficult if employers are accustomed to working in environments with 100 percent certainty. Two of the organizations cope with uncertainty by only reporting progress on the scope for ten to twelve SAFe weeks ahead. Thus, they abandon their traditional PPM practices where they followed forecasts for six to twelve months in favor of an ongoing dialogue on priorities with customers and negotiation of expectations with the project steering committee. Another observed way of coping with uncertainty is by resource forecasting and not scope forecasting: “Cost is fixed, and time is fixed, but the scope is variable.” Such practices enable organizations to change direction of the project or include new emerging opportunities, which may be called “stretched objectives.” To align whether the course of the project meets expectations, we observed the organizations using a
“confidence vote” in planning meetings thereby trying to assess the level of uncertainty. In addition, uncertainty created by project interdependence is presented at planning meetings, e.g., called Program Increment planning (PI planning). In these planning sessions, participants discuss dependencies and negotiate the various projects and programs.

The next concept, Learnability, sheds light on what this change in mindset means and how the organizations manage the uncertainty discussed above. An executive from Epsilon states that he considers the essential element of agility to be learning. “If you are used to the traditional waterfall project, method and culture, then failure is a bad thing. [...] We need to learn from our failure, but do not see it as a failure, instead we see it as learning. If it doesn’t go as we anticipated, it is not a bad thing, but it is still a part of our genes”. Data shows different aspects from agile practices that foster such learning, including “Proof of Concept” (POC). Gamma uses this technique in the first part of a project instead of starting by writing a long requirement specification; the POC has the purpose of providing an early indication of whether this idea is promising. If the organization chooses to pursue the POC, the “project” goes into the portfolio cycles of ongoing feedback. These cycles provide continuous feedback during the entire life cycle of the project. This input suggests a way of increasing learnability in the delivery process and helps projects and programs address what is most valuable for the organization. Learnability is also spurred in the formalized reflection session, the retrospectives, built into the agile methods at Alfa and Beta at the team level and program level. Despite the various opportunities for learning through reflection, more data-driven learning is in demand: “We do not measure end-to-end on the process improvements that we make, so it can be hard to question the value of a business case if you are acting just on a hunch.” Our findings about Valuability show that this is one of the most challenging elements when scaling agile to the PPM level, “the trickiest
part of agile portfolios is how to manage value.” In general, we observe the four organizations shifting from the traditional product and project-centric view to a value-centric one. In Gamma, we find the clearest examples of remaining classical and maintaining project-centric views on value as the organization’s main focus is on schedules and particularly on financial costs in the form of net present value calculations. The three other organizations have approached the understanding proposed by Valuablility in a higher degree. Alfa has almost done away with financial business cases, but this leaves a vacuum in terms of assessing the benefits of a project. A Gamma executive states: “It will be interesting when research provides a solution to this.” And a portfolio manager at Alfa explains his dilemma: “If I do not have any kind of a business case, how can I compare projects?” We see examples of value-centric techniques that turn the attention to business strategy, organizational effectiveness, and stakeholder benefit realization. A step in this direction is observed at Epsilon, where the organization, some years ago, redefined their projects as “value propositions,” thereby making their value-centric focus explicit. When Epsilon launches new development initiatives, “projects” must indicate how they connect to organizational strategy and resources, and how the project targets the pains and gains of the receiver. Measuring the strategic effectiveness of projects is an ongoing evaluation of which projects should continue for the next three or four months, where stakeholders vote in plenum by giving points to each project. Alfa and Beta experiment with applying similar practices, and Beta also experiments with anonymous survey-based voting arrangements.

Sociability, referring to the social and political processes, has an impact on PPM processes, are found at the management level. “Shareholders do not care about agility, they want predictability.” We observed that the views of top management are mixed, and it is interesting that at least
two of the organizations' agile journeys, Alfa’s and Epsilon’s, were launched by visionary managers from the lower levels of the organizations and then spread to more areas of the organizations. An executive said: “My biggest challenge was that we were a part of a global organization and global colleagues frowning when I started talking about agile portfolios.” When we look at the business management and team level, people seem to be satisfied with the agile practices. Business managers feel more engaged, and so do the teams. Epsilon finds that it has come up with a more transparent decision process thereby having solved resource allocation conflicts. Moreover, the new agile methods create transparency about what the organization prioritizes and what resources the projects need.

Traits of Multiplicity are found in data, as implementing agile practices seems to broaden organizations' conceptualization of “projects.” In large, the organizations change their practices as individuals have different learning styles, preferences and ways of working. This pluralism seems not to involve a fragmentation trap, as re-occurring meetings and agile coaches, for example, in Alfa provide “interfaces” and offer a common language. Notwithstanding, in all the four organizations we find evidence of individuals that do not feel comfortable with changing their way of managing projects, and the organizations lack a simple answer to cope with this. In addition, we found examples of projects trapped between the traditional way of thinking about projects and the agile. A project manager explains that “the problem was that in one forum I was told that the scope was fixed. In another forum I was told that the concept required a very high quality no matter the schedule.”

The last element of the RPM perspective considers projects as Temporary organizations established by their base organization to carry out assignments on its behalf (Andersen, 2008).
Interestingly, we find that the agile practices challenge this way of thinking about projects and PPM. First, three of the organizations investigated do not use the word ‘project’ anymore but use, as mentioned earlier, terms like ‘value propositions’, ‘initiatives’ or ‘features’, which in large equal the classical understanding of projects. Second, agile organizations try to integrate projects with the permanent part of the organization that deals with operations. Third, the term ‘temporary’ has been replaced by ‘continuous’, as development efforts will go on as long there are requests for additional value from the business, and it is implausible that these requests will stop. Thus, agile practices challenge the RPM definition of projects turning it upside down, as the portfolio of agile “projects” can be thought of as continuous endeavors to create what the organizations find most valuable. This endeavor is not separate from the permanent organization, as suggested by the definition of Temporary organizations.

6 Discussion

Subsequently, using the CPM and RPM perspective, we analyzed how the perspective elements manifest themselves in our case organizations. Now we will discuss our findings from two angles. First, we will discuss how CPM elements and RPM elements interact across the management, portfolio, and project levels. In that regard, we will, as advised by Conboy and Carroll (2019), consider how various actors, groups, and hierarchical levels may have different practices and views and the consequences of this. Second, we will discuss how the CPM and RPM elements observed relate to the scaled agile practices thereby providing insights into how the organizations’ existing PPM practices – the legacy organization – fits with agile at scale.
6.1 Interaction of CPM elements across project, portfolio and management levels

Table 4 below sums up how the CPM elements manifest themselves across the management, portfolio, and project levels. We found desired as well as undesired consequences of these interactions and have highlighted these with “☹” or “☺” respectively. To distinguish desired and undesired consequences, we use inspiration from by the framework by Smith (1989). Accordingly, based on the perceptions of our research team, we identify consequences that will help or hinder the four companies reaching the goals articulated by management. On this backdrop, we find a predominance of unwanted results of the interaction of the CPM elements. These are:

1. Agile practices at the project level are in conflict with management’s focus on time to market.
2. Agile practices at the project level suffer from management’s intrinsic waterfall thinking.
3. Instrumental use of ROI, for instance to predict precise outcomes, undermines effectiveness in dealing with uncertainty.
4. The portfolio level lacks an overview of the portfolio.
5. Management perception of projects as having fixed goals undermines agile practices at the project level.

We only found one desirable effect of CPM element interaction across the three levels, and this is Management and projects felt more in control and empowered.
<table>
<thead>
<tr>
<th>CPM elements</th>
<th>Manifestations</th>
<th>Project level</th>
<th>Portfolio level</th>
<th>Management level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Executability</td>
<td>Pressure to improve time to market or deliver at specific fixed deadlines</td>
<td>Tracking of project deadlines</td>
<td>Interest in ways to speed up execution</td>
<td></td>
</tr>
<tr>
<td>Linearity and Simplicity</td>
<td>Predicting when and what is delivered</td>
<td>Tracking of progress toward what projects have predicted</td>
<td>Intrinsic waterfall thinking</td>
<td></td>
</tr>
<tr>
<td>Instrumentality</td>
<td>Instruments like Return on Investment (ROI) and three-point estimations may be mandatory</td>
<td>Use of instruments to follow up on financial forecasting</td>
<td>PPM understood as an instrument to counter uncertainty</td>
<td></td>
</tr>
<tr>
<td>Controllability</td>
<td>Employees, project, and teams feel they have autonomy</td>
<td>The portfolio level does not feel in control of the portfolio</td>
<td>Business stakeholders feel engaged and in control of the individual projects</td>
<td></td>
</tr>
<tr>
<td>Temporarity (classical perspective)</td>
<td>Project goals considered as continually moving targets</td>
<td>Project goals are tracked and expected to be realized</td>
<td>Understanding some project goals as fixed</td>
<td></td>
</tr>
</tbody>
</table>

**Consequently**
- Agile practices at project level are in conflict with management’s focus on time to market
- Agile practices at the project level suffer from management’s intrinsic waterfall thinking
- Instrumental use of ROI, for instance to predict precise outcomes, undermines effectiveness in dealing with uncertainty
- Management and projects felt more in control and empowered
- The portfolio level lacks an overview of the portfolio
- Management perception of projects as having fixed goals undermines agile practices at the project level

Table 4: Consequences of the interaction of CPM elements across levels

6.2 Interaction of RPM elements across the project, portfolio and management levels

Table 5 below sums up how the RPM elements manifest themselves at the three levels, and we highlight the desired and undesired consequences. We identify five challenges: (1) Use of the
new and sometimes conflicting practices makes linking the hierarchical levels complex; (2) Mixed perceptions toward agile practices, and those not involved seem to be the most skeptical; (3) Traditional PMOs find it challenging to change practices and roles while fulfilling what is expected from them in terms of their assigned responsibility; (4) PMOs do not engage in a broader conceptualization of value; (5) PMOs needs to change current KPI and conventional thinking on project and portfolio success.

However, we find three desired effects or synergies from the interaction of RPM elements across the project, the portfolio, and the management levels; these are: (1) Shared understanding across levels that agile practices are useful in uncertain business environments; (2) Scaled agile practices seem to fit many different learning styles, preferences, and ways of managing projects across levels; (3) Scaled agile practices turn attention toward a broader conceptualization of value across all levels; (4) Scaled agile practices inspire all levels to apply a more comprehensive understanding of project and portfolio failure and success.

<table>
<thead>
<tr>
<th>RPM elements</th>
<th>How concepts manifest themselves</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Project level</td>
</tr>
<tr>
<td>Complexity</td>
<td>The new vocabulary and way of organizing make it difficult for employees not in “born agile” organizations</td>
</tr>
</tbody>
</table>

**Consequently**

© Use of the new and sometimes conflicting practices makes linking the hierarchical levels complex

| Uncertainty   | Seen as a way to cope with a more uncertain business environment. Some employees are uncomfortable with the lower predictability in the agile way of working | Seen as a way to cope with a more uncertain business environment | Seen as a way to cope with a more uncertain business environment |

**Consequently**

© Shared understanding across levels that agile practices are useful in uncertain business environments
<table>
<thead>
<tr>
<th>Sociability</th>
<th>Most employees are advocates of agile practices, only a minor enclave of “traditional” project managers resist</th>
<th>PMO members have mixed perceptions, as the PMO’s new roles are not clearly defined</th>
<th>Stakeholders and top management can be skeptical toward agile practices</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>☭ Mixed perceptions toward agile practices, and those not involved seem to be the most skeptical</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multiplicity</td>
<td>In large, agile practices seem to fit the different learning styles, preferences and ways of working</td>
<td>PMO managers can find it difficult to conform to agile practices</td>
<td>Acceptance of new and broader conceptualization of PPM practices</td>
</tr>
<tr>
<td></td>
<td>☭ Scaled agile practices seem to fit many different learning styles, preferences, and ways of managing projects across levels</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>☭ Traditional PMOs find it challenging to change practices and roles while fulfilling what is expected from them in terms of their assigned responsibility</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Valuability</td>
<td>Ongoing stakeholder involvement provides a focus on value</td>
<td>PMO and portfolio managers apply a financial focus</td>
<td>A turn from strictly financial measures to a broader understanding of value</td>
</tr>
<tr>
<td></td>
<td>☭ Scaled agile practices turn attention toward a broader conceptualization of value across all levels</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>☭ PMOs do not engage in a broader conceptualization of value</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Learnability</td>
<td>Ongoing and short iterations make “learning as we go” more acceptable</td>
<td>Need to adapt controlling and coordination practices to new ways of understanding failure and success</td>
<td>Failure vastly regarded as bad and not as a learning opportunity</td>
</tr>
<tr>
<td></td>
<td>☭ Scaled agile practices inspire all levels to apply a more comprehensive understanding of project and portfolio failure and success</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>☭ PMOs need to change current KPI and conventional thinking on project and portfolio success</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Table 5: Consequences of the interaction of RPM elements across levels*

### 6.3 Integrating CPM and RPM elements and agile practices: a change in thinking required

Now we look more broadly at how the CPM and RPM elements relate to agile practices and discuss ways to integrate these. Specifically, the CPM elements seem to have undesirable effects, such as waterfall thinking and management focus on time. CPM elements tend to represent the “legacy organization” in terms of demand for predictability and instrumental reasoning.
Instead, RPM elements tend to favor agile practices, namely, learnability and acceptance of uncertainty fit well with agile thinking. Thus, if organizations want to scale agile practices, they must rethink their demand for predictability and instrumental thinking, or at least keep this out of domains where they want agile practices. Furthermore, areas with agile practices must adopt learnability and think of uncertainty as a prerequisite in PPM and projects. The implications of our research are as follows. First, the transaction costs of scaling agile to PPM in legacy companies seem very easy to underestimate. The costs of changing PPM and project practices are indistinct, but most likely hidden and embedded in deep and profound assumptions and traditions. Second, changing PPM and project practices in legacy companies are like changing the engine of a flying plane – performance will probably go down for a period as the organization adapts and learns new practices. Thus, leadership in terms of formulating a vision and applying a long-term perspective seems crucial. The four companies we investigated still struggle with legacy assumptions and practices that undermine agile practices – despite the extensive efforts to change the companies. Third, most of the available frameworks for agile PPM seem to be less suitable for legacy companies. Thus, developing new frameworks taking the specificities of legacy companies into account when scaling agile to the PPM level, seems an important task for the future.

7 Conclusion

In recent years, a lot of attention has been given to how scaling agile practices to the project portfolio management (PPM) level challenge organizations – notably in legacy organizations. On this backdrop, we have investigated how scaling agile practices demand change in the way of thinking in four large companies with a background in traditional forms of managing projects
and portfolios. By utilizing the rethinking project management framework as theoretical grounding, we investigated the companies’ PPM practices by deconstructing them in elements of thought from the classical and rethinking project perspectives. We studied how these elements manifest themselves and interact across the project, the portfolio, and the management levels, as well as their desirable and non-desirable consequences. We found that management’s waterfall thinking undermines agile practices at all hierarchical levels. We also found that organizations need to embrace learnability and accept uncertainty as a prerequisite in the areas where agile ways of working are applied. Our results are limited by only looking at companies based in a particular geographic region of countries as other regions most probably have different methods, assumptions, and management styles (Meyer, 2017).

As our theoretical frame favors thoughts of rethinking project management tradition, we encourage other scholars to apply other theories presenting other vital findings on scaling agile to the portfolio level in legacy organizations as the amount of these seems to grow as we enter a more digital and uncertain economy. Notwithstanding the limitations above, we argue that this paper contributes with novel insights into the interplay between scaled agile practices and the PPM practices in legacy companies, and how this calls for change in thinking and ways of doing things.
References


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### Appendix: Coding book

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>EXECUTABILITY</td>
<td><em>Executability</em>: Focus on delivery execution where project requirements are defined early and clearly in the process, assumingly with a static project front-end (Morris and Gerald, 2011), meaning only minor changes may occur.</td>
</tr>
<tr>
<td>LINEARITY AND SIMPLICITY</td>
<td><em>Linearity</em> and <em>Simplicity</em> hold the assumption that projects follow a simple linear lifecycle as this assumingly mirrors the actual terrain “out there in reality” (Winter et al., 2006).</td>
</tr>
<tr>
<td>CONTROLLABILITY</td>
<td><em>Controllability</em> is the assumption that projects are objects that can be controlled and focuses on prediction and control, assuming causal explanations (Geraldi and Söderlund, 2018) where challenges are observable and can be managed by optimizing processes.</td>
</tr>
<tr>
<td>INSTRUMENTALITY</td>
<td><em>Instrumentality</em> is the assumption that tools and methods can be applied as a prescriptive and normative approach to solving problems (Geraldi and Söderlund, 2018).</td>
</tr>
<tr>
<td>TEMPORARITY (TASKS)</td>
<td><em>Temporarity</em> represents an understanding of projects as temporary endeavors undertaken to create unique products, services or results (PMI, 2017). Thus, projects have a unique, once-in-a-lifetime task, predetermined date of delivery, being subject to one or several performance goals, including resource usage and quality, and consisting of a number of complex and interdependent activities (Packendorff, 1995).</td>
</tr>
<tr>
<td>LEARNABILITY</td>
<td><em>Learnability</em> is about learning, operating and adapting effectively in complex project environments through experience, intuition and the pragmatic application of theory (Winter et al., 2006).</td>
</tr>
<tr>
<td>MULTIPLICITY</td>
<td><em>Multiplicty</em> advocates for a broader conceptualization of projects with many practices, models, discourses and theories. Assuming individuals have different learning styles, preferences and ways of working, pluralistic approaches seem plausible (Svejvig and Andersen, 2015).</td>
</tr>
<tr>
<td>COMPLEXITY</td>
<td><em>Complexity</em> emphasizes models and theories recognizing and illuminating the complexity of management of projects at all levels (Winter et al., 2006). According to Baccarini (1996), two types may be highlighted: organizational and technological complexity. (Baccarini, 1996).</td>
</tr>
<tr>
<td><strong>UNCERTAINTY</strong></td>
<td><em>Uncertainty</em> focuses on uncertainty as regards duration, continuance, occurrence and liability to change (Dictionaries, 1989). Such uncertainty involves estimates, project parties at different stages in projects (Atkinson et al., 2006). Uncertainty has no objective measures of the scope and content, and managers frame uncertainty based on the information available to them (Martinsuo et al., 2014).</td>
</tr>
<tr>
<td><strong>SOCIABILITY</strong></td>
<td><em>Sociability</em> sheds light on how social and political processes may shape projects, e.g., power structures, emotionality and identities (Svejvig and Andersen, 2015). Emphasis is on actors’ ability to make sense of their situation and how this provides different routes and perceptions in project environments (Svejvig and Andersen, 2015).</td>
</tr>
<tr>
<td><strong>VALUABILITY</strong></td>
<td><em>Valuability</em> focuses on a range of overlapping terms, such as project worth, success, value and benefits (Laursen and Svejvig, 2016). Following Laursen and Svejvig (2016), valuability is understood as relative, not absolute, and may be viewed differently by different parties in different situations (Laursen and Svejvig, 2016).</td>
</tr>
<tr>
<td><strong>TEMPORARITY (ORGANIZATIONS)</strong></td>
<td><em>Temporarity</em> is a concept that considers projects as temporary organizations established by their base organization in order to carry out assignments on its behalf (Andersen, 2008). The term temporary organization is used to capture the characteristics of project organizations and to separate it from permanent organizations that deal with operations (Söderlund, 2004), including project portfolios (Lundin and Soderholm, 1995).</td>
</tr>
</tbody>
</table>