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BEYOND BUDGETING AND AGILE SOFTWARE DEVELOPMENT: A CONCEPTUAL FRAMEWORK FOR THE PERFORMANCE MANAGEMENT OF AGILE SOFTWARE DEVELOPMENT TEAMS

Research-in-Progress

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Abstract

Around the same time as the emergence of agile methods as a formalized concept, the management accounting literature introduced the concept of Beyond Budgeting as a performance management model for changing business environments. Both concepts share many similarities with both having a distinctly agile or adaptive perspective. The Beyond Budgeting model promises to enable companies to keep pace with changing business environments, quickly create and adapt strategy and empower people throughout the organization to make effective changes. This research in progress paper attempts to develop the Beyond Budgeting model within the context of agile software development teams. The twelve Beyond Budgeting principles are discussed and a research framework is presented. This framework is being used in two case studies to investigate the organizational issues and challenges that affect the performance of agile software development teams.

Keywords: Agile Software Development, Team Performance Management, Beyond Budgeting

1. Introduction

Continued uncertainty and rapid changes to business and technology environments have meant that a software development team's ability to respond to changing user or customer requirements has become increasingly critical. As a means to respond to these changes, the software development community has moved from a traditional, plan-driven, structured approach to more agile development methods. Agile software development (ASD) approaches such as eXtreme Programming (XP), SCRUM, Dynamic Systems Development Method (DSDM), and Feature Driven Development (FDD) have been proposed as solutions to improve a software team's ability to embrace and respond to the changing requirements. The emergence of these new methods has had a huge impact on the way software is developed worldwide (Conboy and Fitzgerald, 2004; Conboy, 2009; Dybå and Dingsøy, 2008). These newer methods of producing software are not always compatible with traditional management control models (MCMs) (Boehm and Turner, 2005; Bogsnes, 2009; Qumer and Henderson-Sellers, 2008). As agile methods grow in popularity, it is important that the management control in the organization be set up to complement an agile way of working. With as high as 69% of organizations now claiming to use agile methods (Ambler, 2007), organizations need to examine how their current processes, structures and mechanisms are affecting the performance of ASD teams. An open frontier for current research is to explore and better understand, from the team perspective, the downward influences affecting team performance (Mathieu et al., 2008). Little research has addressed the challenges faced by the organization or the ASD team when adopting an agile method (Abrahamsson et al., 2009; Mangalaraj et al., 2009, Nerur et al., 2005).

An innovation from the accounting literature called, "Beyond Budgeting", has shown great promise as a performance management model for a changing business and operating environment (Bogsnes, 2009; Davila et al., 2009; Drury, 2008; Ferreira and Otley, 2009; Hansen et al., 2003; Hope and Fraser, 2003; Poppendieck and Poppendieck, 2010). This model is conceptually similar and appears to align well with agile methods (Ambler, 2008; Bogsnes, 2009; Highsmith, 2006; Poppendieck and Poppendieck, 2010). In order to understand how traditional organizational practices are affecting the performance of ASD teams in large organizations we will explore the performance management of ASD team through the lens of the Beyond Budgeting model. This research in progress paper introduces the Beyond Budgeting model and offers a conceptual research framework. The framework is being used in two case studies to investigate the organizational factors affecting the performance of ASD teams. These case studies will also serve to further develop the complementarities between the Beyond Budgeting model and ASD teams. The outcome expected from this research is twofold:

1. We hope to gain a deeper understanding of organizational and management issues and challenges that affect the daily operational performance of ASD teams within a large organization.
2. We will conceptualize the Beyond Budgeting model relative to ASD and further develop the complementarities between the Beyond Budgeting model and agile methods.

This research in progress paper is the first step in framing the Beyond Budgeting model in the context of agile methods. The twelve principles cover a wide range of organizational management and control and the literature review required is extensive. The goal of this research is not to examine any individual construct or aspect of the Beyond Budgeting model in depth, rather it is to take the model as a whole and explore its applicability within the domain of ASD. While this requires an original large and wide-ranging literature review, it is an important first step in establishing the validity of using the Beyond Budgeting model as a performance management model for ASD teams.

The paper is divided into three further sections. The following (second) section explores current thinking on performance management models and introduces the Beyond Budgeting model. The third section refines the model and develops its theoretical basis in relation to ASD. The final section provides pointers to the way the conceptual model can be used for further empirical study.

2. The Beyond Budgeting Performance Management Framework

In recent years there has been a move from the bureaucratic, hierarchical organization, considered ineffective in the context of increased competition brought about by globalization, deregulation, the emergence of powerful developing economies, and development in information technologies, towards flatter, leaner and more responsive structures (Berry et al., 2009). Many have questioned the industrial era management and government systems and called for a new model for the knowledge economy (e.g. Manville and Ober, 2003; McFarland, 2008). Others have

questioned the budgeting process and its value as a management control mechanism in the post-industrial era (Bogsnes, 2009; Cassell, 1999; Dugdale and Lyne, 2006; Howell, 2004; Kennedy and Dugdale, 1999; O'Brien, 1999; Schmidt, 1992). The literature in the area of performance management systems (PMSs) and management control systems (MCSs) increasingly recognizes the need for research to be based on more coherent theoretical foundations (Broadbent and Laughlin, 2009; Chenhall, 2003; Covaleski et al., 2003; Ferreira and Otley, 2009). The tendency to focus only on specific aspects of control systems, as opposed to a more comprehensive and integrated approach has led to spurious findings, ambiguity and a potential for conflicting results (Chenhall, 2003). There have been calls for a more integrated approach which includes the interdependency between different control mechanisms operating at the same time in the same organization (Abernethy and Brownell, 1997).

The Beyond Budgeting performance management model was first introduced in 1997 as an alternative to the traditional command and control type performance management models, which were usually based on budgetary control mechanisms. Beyond Budgeting is more orientated towards fast changing operational environments and utilizes a sense and respond type of control mechanism, which allows an organization to keep pace with fast changing environments (Fraser, 2001; Hope and Fraser, 1999; Hope and Fraser, 2003; Hope and Fraser, 2003a; Hope and Fraser, 2003b; Hope and Fraser, 2003c). The emergence of this new concept coincided with the emergence of agile methods and both concepts share many similarities with both having a distinctly agile or adaptive perspective (Ambler, 2008; Bogsnes, 2009; Highsmith, 2006; Poppendieck and Poppendieck, 2010). The model consists of six leadership principles and six process principles when taken together and used in a holistic manner help improve performance management within an organization (Bogsnes, 2009; Hope and Fraser, 2003). Table 1 lists the twelve principles as they are outlined in the Beyond Budgeting literature.

Leadership Principles	Process Principles
Customers: Focus everyone on improving customer outcomes, <i>not on hierarchical relationships.</i>	Goals: Set relative goals for continuous improvement; <i>do not negotiate fixed performance contracts.</i>
Organization: Organize as a network of lean, accountable teams, <i>not around centralized functions.</i>	Rewards: Reward shared success based on relative performance, <i>not on meeting fixed targets.</i>
Responsibility: Enable everyone to act and think like a leader, <i>not merely follow the plan.</i>	Planning: Make planning a continuous and inclusive process, <i>not a top down annual event.</i>
Autonomy: Give teams the freedom and capability to act; <i>do not micro-manage them.</i>	Controls: Base controls on relative indicators and trends, <i>not variances against a plan.</i>
Values: Govern through a few clear values, goals and boundaries, <i>not detailed rules and budgets.</i>	Resources: Make resources available as needed, <i>not through annual budget allocations.</i>
Transparency: Promote open information for self-management; <i>do not restrict it hierarchically.</i>	Coordination: Coordinate interactions dynamically, <i>not through annual planning cycles.</i>

Table 1. The Beyond Budgeting Performance Management Model (Bogsnes, 2009)

The next section looks at each principle individually, offering a brief description of how each principle can be contextualized within an ASD environment and listing some possible questions, which are being used during case study research to examine the affect organizational practices have on the performance of ASD teams.

3. Theoretical Development

3.1 Customer Focus

Focus everyone on improving customer outcomes, *not on hierarchical relationships.*

Focusing on customers rather than hierarchical relationships is the focus of an ongoing debate in the accounting literature (Caker, 2007; Guilding and McManus, 2002). Hope and Fraser (2003) argue that organizations need to focus their teams on improving customer outcomes rather than having the teams focus on a hierarchical relationship within the organization. The Beyond Budgeting management model, when taken as a whole, incorporates

accountability through a transparent control system. This allows for a priority to be on customer focus and not on hierarchical relationships (and accountability *for* customers, not *to* customers). With the introduction of ASD processes, the role of the customer and the customer focus of the ASD team take on a new significance. In ASD projects the team interacts closely with the customer (Lohan et al., 2010). A close customer-developer relationship is important for success and the highest priority of the ASD team is to satisfy the customer (Highsmith, 2004). In order to gain an insight into the level of customer focus of an ASD team we need to examine how much the team knows about their customer, the level of customer involvement, the quality of customer requirements received and how customer feedback is received and used within ASD teams. To gain a better understanding of the customer focus of the ASD team the following questions need to be addressed:

- How knowledgeable are the team members of their customers' working environment?
- How involved are the customers in the development process? How are customer requirements handled?
- What level of customer feedback does the team receive and how is this used?

3.2 Organization

Organize as a network of lean accountable teams, *not around centralized functions.*

Accountability theory suggests that perceptions about our audiences and related rewards or sanctions serve to direct decisions and effort allocations when we face decisions or choices (Frink and Ferris, 1998). Contingency theory posits that organizational units can be mapped into a spectrum ranging between a "mechanistic" or centralized structure and a more decentralized, flexible and "organic" structure as the uncertainty and dynamics of their business environments increase (Mendelson, 2000). In the traditional command and control orientated organizational structure, which is characterized by a rigid hierarchy, information flows upwards through the hierarchy. Greater decision rights are associated with a higher level of hierarchy (Radner, 1992). At the opposite end of the spectrum in what Mendelson (2000) calls information age (IA) architecture, decentralized decision-making is supported by a fast moving, information rich environment. The organization is designed to maximize value by giving pertinent knowledge to those responsible for decision-making and also with the aim of pushing that decision-making down to those who are closest to the action (Chang et al., 2003; Christie et al., 2003). The implicit assumption here is that the more decentralized an organization is, the more employees participate in the decision making process. Although there is no single generally accepted measure for assessing individual or group participation in decision making in organizations (Glew et al., 1995), measures such as spending decision rights and operating decision rights have been used in previous studies (Inkson et al., 1970). Teamwork and team autonomy is at the heart of ASD and the team itself decides how work is coordinated (Boehm and Turner, 2004). Team members have considerable leeway in how they deliver results, but they are accountable for those results and for working within an established governance framework (Cohen et al., 2004; Highsmith, 2004; McAvoy and Butler, 2009). Agile practices such as stand-up meetings or collective code ownership reinforce a team's accountability during the project (Highsmith, 2004; Larman, 2004). The objective here is to understand the level of decision rights the ASD team actually has regarding its day-to-day activities and the accountability attached to those decision rights. To do this the following questions need to be examined:

- What level of decision-making rights does the team have regarding: Operational metrics (quality metrics, velocity rates, etc.)? Development methodology used? Spending on equipment, training programs etc.?

3.3 Responsibility

Enable everyone to act and think like a leader, *not merely follow the plan.*

There is a large body of literature from leadership theory that characterizes the optimal behaviors or demeanors of leaders in particular contexts (Avolio and Gardner, 2005; Fry, 2003; Rafferty and Griffin, 2004; Yukl, 2008). Therefore the statement "*enable everyone to act and think like a leader*" carries with it a certain amount of ambiguity. However, Hope and Fraser (2003:p151) clarify this somewhat by saying that the objective is to create a more entrepreneurial business whereby leadership is devolved and the aim is that "*everyone in the organization... [carries] ... personal responsibility for his or her part in it*". This is called a devolved and adaptive approach to management and is in contrast to the traditional budget based centrally planned model (Hope and Fraser, 2003). Research on management teams has shown that this form of enablement or what Srivastava (2006) labels

“empowering leadership” is positively related to both knowledge sharing and team efficacy, which, in turn, are both positively related to performance. Empowering leadership is defined as: behaviors, whereby power is shared with subordinates and, that raise levels of intrinsic motivation. Examples of empowering leadership are: leading by example, participative decision-making, coaching, informing and showing concern (Arnold et al., 2000; Srivastava et al., 2006). Heifetz et al. (2009) echo the empowerment sentiment and argue that in the current environment and in a future post recession environment of urgency, high stakes, and uncertainty leaders will require new skills that will involve “giving people at all levels of the organization the opportunity to lead experiments that will help it adapt to changing times”. Empowered, self-organizing teams are fundamental to agile methodologies (Baskerville 2002; Fowler and Highsmith 2001; Highsmith and Cockburn 2001) and as ASD teams embrace the concept of self organizing, leadership should be diffused rather than centralized (Morgan, 2006). During an ASD project all team members are expected to take on a leadership role. Moe et al. (2010) found that that leadership can be shown by several team members and does not necessarily refer to a single individual with formal authority. For example in scrum projects, the scrum master role is revolved with each team member taking their turn (Highsmith, 2004). Bearing this in mind the following questions are proposed:

- How is coaching less experienced team members carried out within the team?
- In what way do team members take on leadership roles during a project development cycle?
- Does the team accept responsibility for a project outcome as a unit?

3.4 Autonomy

Give teams the freedom and capability to act; do not micromanage them.

A central issue for organizations today is how to balance top-down control with bottom-up empowerment. Empowering teams has been shown to lead to better productivity, more proactive behavior and higher levels of customer service, job satisfaction, and organizational and team commitment (Kirkman and Rosen, 1999). However, while empowerment is an accepted concept in the management literature there is still debate over the level of control or the degree to which decision-making should be decentralized. Malone (1997) believes that designing effective decentralized systems will be one of the most important challenges facing organizations in the 21st century. Thomas & Velthouse (1990) identified four dimensions as the basis for worker empowerment: sense of impact, competence, meaningfulness and choice. These are the generally accepted empowerment construct dimensions (Spreitzer, 1995; Thomas and Velthouse, 1990; Wang and Lee, 2009). However, some subtle differences exist between team and individual empowerment construct dimensions. Kirkman and Rosen (1999) defined *team* empowerment as having four dimensions which paralleled the individual constructs, namely: impact, potency, meaningfulness and autonomy. As agile methodologies are dependent on teamwork, Kirkman and Rosen’s dimension definitions are most suited to measure a team’s autonomy. Empowerment and autonomy are seen as essential components for agile development (Lee and Xia, 2010). In an agile culture, people feel comfortable and empowered when they have the environment and support they need (Boehm and Turner, 2005). The following questions need to be addressed from the context of working within the team:

- Do team members feel that they, their work and the work of the team is valued?
- Have team members the opportunity to participate in decisions affecting the team?

3.5 Governance

Govern through a few clear values, goals and boundaries, not detailed rules and budgets.

There is a certain amount of ambiguity on the form of Information Technology Governance (ITG) within an organization depending on the strategic role Information Technology (IT) plays within that organization (Henderson and Venkatraman, 1999; Nolan and McFarlan, 2005; Raghupathi, 2007). Henderson et al. (1999) suggests that IT strategy should be articulated in terms of an external domain – how the firm is positioned in the IT marketplace and an internal domain – how the Information Systems (IS) infrastructure should be configured and managed. As ASD teams generally work within the IS infrastructure, it is the governance of the internal IS domain that is of interest here. This consists of three components, namely: 1) IS architecture, 2) IS processes, and 3) IS skills. IS architecture is concerned with the teams choice in defining the portfolio of applications, the configuration of hardware, software, and communication, and the data architecture that collectively define the technical infrastructure. IS processes are

concerned with the teams choice in defining the work processes central to the operations of the IS infrastructure, such as systems development, maintenance, and monitoring and control systems. IS skills are the choices pertaining to the acquisition, training, and development of the knowledge and capabilities of the individuals required to effectively manage and operate the IS infrastructure within the organization. Here again we need to look at the decision rights and involvement of the ASD team in choosing strategy and tactics. Also, as ASD teams operate within established flexible governance frameworks (McAvoy and Butler, 2009) we need to examine the boundary conditions within which they have decision rights and how those boundary conditions are established and communicated. To do this the following questions need answering:

- Are team members involved in strategy development? At what level? How are values, goals and boundaries communicated to the team?
- Does the team have a choice in defining the technical infrastructure or choosing the management tool for any given project? How does this affect team members?

3.6 Transparency

Promote open information for self-management; do not restrict it hierarchically.

A review of the transparency literature in IS has discovered two distinct constructs of organizational transparency, internal transparency and external transparency (Street and Meister, 2004). External transparency corresponds to the outcome of communication behaviors directed outside the organization. E.g. in supply chain management transparency is discussed as the information exchange between supply chain partners (Lamming et al., 2004), in the marketing literature, information flow from the customer is seen as valuable (Narver and Slater, 1990). For agile development we are only concerned with the internal transparency construct as it is applied to IS development teams. Internal transparency corresponds to the same behaviors as external transparency but is applied within the organization (e.g. Alavi and Leidner, 1999). Street and Meister (2004) define internal transparency to be “*an outcome of communication behaviors within an organization that reflects the degree to which employees have access to the information requisite for their responsibilities*”. Although it is not desirable to have complete transparency and strategic secrets are necessary, deciding where to draw the line between what information must be revealed and what should be withheld is one of the most important judgments leaders make (O'Toole and Bennis, 2009). Agile development methods such as SCRUM and XP foster an environment of operational transparency through regular communication and have been shown to improve accessibility to project information and increase developer's awareness of work going on around them (Chong, 2005). The suggestion for ASD teams is that they should have access to all relevant information needed for them to operate effectively. This includes access to velocity rates, burn down charts, product backlogs, etc. of other ASD teams operating within the organization.

- What level of access does the team have regarding project data?
- What level of access does the team have on the project data of other ASD teams across the organization?

3.7 Goals

Set relative goals for continuous improvement; do not negotiate fixed performance contracts.

Goal setting theory outlines the important dimensions associated with good goal setting (Latham and Locke, 1991). The core of goal setting theory asserts that performance goals lead to the highest level of performance when they are both clear (specific) and challenging. Hope and Fraser (2003) suggest that employees should continually strive for stretch goals that will challenge them. Stretch targets when used in conjunction with other work environment changes (such as empowerment, autonomy, and management support for innovative thinking) have been shown to enhance motivation, performance and creative decision-making (Thompson et al., 1997). To ensure goals are relevant, they should be set by the team, be visible across the organization and be benchmarked against industry best-in-class performance measures, direct competitors or internal prior year results. Relative performance standards potentially increase motivation because the performance bar adjusts naturally to be challenging, yet achievable when there is an appropriate benchmark group (Hansen et al., 2003). In contrast, budget targets derived in traditional budgeting processes often create tension between what upper management identify as desirable and what lower-level managers claim is feasible. The explicit goals that guide a project should be decoupled from the (often unreliable) initial estimates. Instead, goals should be set with a view to affecting the strategy that the manager

chooses to follow (Chesney and Locke, 1991). In practical terms, this entails setting the appropriate behavioral metric to guide the manager's decision (Abdel-Hamid et al., 1999). The goals set should be specific and challenging but it is the performance that should be rewarded (Hope and Fraser, 2003). Loosening the tie between goals and rewards allows hindsight evaluations to take place, which take into account the full context in which the goal is pursued. Factors such as resources, obstacles and market conditions may be included in the evaluation (Locke, 2004). In ASD, tasks are prioritized at the beginning of the iteration and the team identifies the goals they would like to achieve during the iteration (Cohn, 2004). Longer-term goals may include developing new skills or longer term behavioral goals such as improving teamwork and communication. For this principle we need to address the following:

- How are goals (both long term and short term) set for the team? What is the process in place?
- Does goal setting include both technical and behavioral aspects?

3.8 Rewards

Reward shared success based on relative performance, *not on meeting fixed targets.*

Relative performance evaluation (RPE) entails evaluating individual or organizational unit performance relative to the performance of others. Economic theory provides a rationale for RPE based on sharing common external risks (Gibbons and Murphy, 1990). Teams are rewarded not just for their own performance but also for their performance relative to the performances of their co-workers or best in industry standards (e.g. explicit contests and tournaments, bonus schemes, promotion, etc.) RPE can provide incentives while partially insulating the individuals or team from common uncertainty (Dye, 1992, Holmstrom, 1982). Hope and Fraser (2003) suggest that instead of the fixed performance contract, team performance should be evaluated by a peer review group (using relative measures) with hindsight. One of the most popular reward schemes used in the Beyond Budgeting literature is to get rid of individual performance bonuses and operate a group wide profit sharing scheme (Bogsnes, 2009, Hope and Fraser, 2003). Bogsnes (2009) suggests that individual bonuses are counter productive for long term relationships and lead to dysfunctional behavior, such as lack of cooperation or what is termed the crowding out effect (Irlenbusch and Ruchala, 2008). The main premise of the Beyond Budgeting reward principle is that performance evaluation is disconnected from a fixed target (i.e. is relative), is carried out with hindsight and benchmarked against internal or external key performance indicators (KPIs), is based on group performance and is performed by subjective peer review (Hope and Fraser, 2003). Boehm and Turner (2004) agree that the fixed performance contract is not suited to ASD. They believe incentives such as creative award-fee or profit sharing contracts could be used as a rewarding mechanism. As the emphasis in ASD is on cooperation between team members, a reward system perceived as unfair may lead to dysfunctional behavior. Care must also be taken to design a reward mechanism that recognizes performance without destroying intrinsic motivation (Cockburn, 2007). Therefore we need to investigate the following:

- How are performance reviews carried out? Are performances benchmarked? Is the performance review linked to a fixed plan?
- How are the team rewarded? Individually or as a team? How does this affect the team members?

3.9 Planning

Make planning a continuous and inclusive process, *not a top-down annual event.*

Management control is composed of two separate and complementary control processes: strategic and operational planning (Hansen et al., 2003). It is the inability to do adequate long term strategic planning in uncertain environments that is one of the main drivers behind the Beyond Budgeting principle (Hansen et al., 2003; Hope and Fraser, 2003). Rapid change requires strategies that are flexible and creative and strategic plans have become more goal focused and less specific with regard to actions and resource allocations (Grant, 2003). There is general agreement in the literature that in order to adapt to a changing environment, the formal annual calendar-driven strategic planning process needs to be revised (Grant, 2003; Hamel and Prahalad, 2005; Hope and Fraser, 2003; Mintzberg, 1994; Philip, 2007). Rather than having a single top-down fixed plan that determines actions for the year ahead, the devolution of the planning process would allow for a continuous adaptation of short term plans to meet strategic objectives. This devolution and continuous adaptation of the planning process is emphasized in agile

methodologies (Lee and Xia, 2010). The objective is to have a real-time system that is always up to date (Hope and Fraser, 2003). For IS development, the short iteration cycles of agile development practices are well suited to capturing information and monitoring trends for continuous planning purposes (Boehm and Turner, 2005). Each iteration, the team refines its forecast, updates the release plan, the release backlog and cost estimates (Sliger and Broderick, 2008).

- What level of involvement does the team have in the project-planning phase? How adaptable are project plans?
- Are all team members involved in daily/weekly/monthly planning sessions? Are team members involved in long term planning?

3.10 Control

Base controls on relative indicators and trends, *not on variances against a plan.*

It is possible to view planning and control techniques as a spectrum. At one end is a focus on command and control type management, with formalized annual plans and control mechanisms in place to ensure that preset plans are realized. At the other end is a focus on agility where long term planning becomes so unreliable that it is essentially eliminated and the control focus is moved toward rapid response once actual operating conditions are observed (Brown, 1999; Hansen et al., 2003; Malone, 1997). Hope and Fraser (2003) suggest that decentralization is the way forward and in their studies most of the companies have switched their measurement instrument from central control to a more multilevel control, where multilevel control means “*knowing what’s going on and only interfering when absolutely necessary*”. Beyond Budgeting advocates the use of what Simons (1995) and Ouchi (1979, 1980) call clan controls, whereby cultural values and shared norms replace bureaucratic controls (Hansen et al., 2003, Ouchi, 1979; Ouchi, 1980). Operational performance is measured using multilevel controls requiring a multifaceted control system which provides information based on a wide range of key indicators and forecasts. All information is aggregated at different levels and the same information is available at the same time to all those with a relevant interest (Hope and Fraser, 2003). Control in ASD projects can utilize KPIs such as burn-down charts, velocity rates or product backlogs. The frequent and continuous release of working software allows upper management to view all relevant data and intervene only when necessary. Here we need to ask the following:

- How are projects monitored? Are there KPIs for each project? Under what circumstances would intervention by higher-level management be required?

3.11 Resources

Make resources available as needed, *not through annual budget allocations.*

Complex and turbulent markets require software teams to be highly adaptable. Under such conditions, a major source of sustained competitive advantage is the dynamic capabilities by which a firm “integrates, builds, and reconfigures internal and external competencies to address rapidly changing environments” (Teece et al., 1997). Dynamic capabilities (DC) theory arose from the resource-based view (RBV) of the firm (Barney, 1991) and suggests a buffer between the firms’ resources and the changing business environment. This buffer allows a sense-and-respond approach to be utilized by the development team (Haeckel, 1995; Haeckel, 1999; Haeckel, 2004; Mathiassen and Vainio, 2007). Haeckel (1999) suggests that strategy should be focused on creating and developing mechanisms that enable the responses to change rather than on planning specific actions that implement the stated goals; structures should consist of dynamic networks of modular, collaborative capabilities rather than static hierarchies of tasks and responsibilities, and, governance should be achieved through coordination based on shared values and information rather than dedicated command and control activities. This form of resource allocation mechanism allows ASD teams the freedom to respond efficiently and effectively to changing requirements while operating within boundary conditions and KPIs. Although the RBV and DC theory consider firm resources to include those that are difficult to imitate, from the point of view of the ASD team the priority is to be able to acquire necessary resources required to add customer value on a regular basis. This involves being able to request additional resources which will may not be foreseen at the beginning of the project but which will improve the performance of the ASD team and increase customer value. Traditional budgeting often requires that a project budget be finalized at the beginning of each year, with little inbuilt flexibility. Here we need to gain an understanding of the resource allocation process for an ASD project:

- What is the process for acquiring resources during the various stages of a project?
- How flexible is the resource acquisition process? Can the team request additional resources during the project development phase?

3.12 Coordination

Coordinate interactions dynamically, not through annual planning cycles.

For most organizations, the master budget defines the financial commitments that one process team makes to another for the year. However, when managing without budgets, no such plans exist, so managers must coordinate these commitments according to the pace of market demand (Hope and Fraser, 2003). In organizations that have abandoned budgets, market-facing business units become customers of upstream processes and central service providers, and suppliers to internal or external customers. According to coordination theory, actors in organizations face coordination problems that arise from dependencies that constrain how tasks can be performed (Crowston, 1997; Gosain et al., 2004; March and Simons, 1958). Research has shown that coordination improves when there is social interaction between teams who compete with each other for market share. However, social interaction has no perceivable affect on knowledge sharing among teams who compete with each other for internal resources and a formal hierarchical structure has been shown to have a negative impact on intra-firm knowledge sharing (Tsai, 2002). According to the Beyond Budgeting model, coordination is about integrated performance management, from overall strategies and strategic objectives, to KPIs, actions and forecasts, and further into team and personal goals, evaluation, and rewards (Bogsnes, 2009). Coordination in the context of ASD teams is about interactions and knowledge sharing with other ASD teams who are not competing with each other for internal resources. Practices such as daily stand-up meetings and retrospectives help improve coordination among team members. As more teams within the organization begin to adopt agile methods it is important to gain an understanding of the coordination processes that are in place that will aid in the sharing of knowledge and ideas.

- What level of interaction is there between team members (formally and informally)?
- Are there knowledge repositories used to share ideas and information?

4. Future Work

The questions outlined above under each principle have formed the basis of an interview protocol, which is being used to conduct two case studies within the IT department of two large organizations currently using agile methods to develop software. One of these organizations operates in the oil and gas industry and the other in financial services. Both have IT departments developing systems and applications for internal customers and both have, within the past three years, implemented agile methods. These organizations come from a traditional command-and-control background and both are seeking ways improve the value of implementing agile methods. The case studies are focusing on the ASD teams and interviews are being carried out with project managers, scrum masters and team members from three ASD teams within each case site. As suggested by Yin (2009), multiple sources of evidence are being collected on each site, which includes relevant documentation and artifacts.

By contextualizing the Beyond Budgeting model within the ASD domain and examining its applicability to ASD projects we are beginning to discover areas where traditional management practices are affecting the performance of ASD teams. Traditional organizational structures and processes intended to improve performance may end up impeding the performance of the ASD team. For example, yearly budgeting and resource allocation processes affect the ASD team's ability to embrace change and take advantage of new technologies and new opportunities. Reward systems based solely on individual performance can cause dysfunctional behavior and are not conducive to long lasting cooperative teams. Both organizations being studied have ASD teams developing systems for downstream organization functions, which often do not provide a customer representative to the team. Without access to the customer or the end user, teams sometimes struggle to identify with their customer and as result the customer focus of the team suffers. Using the Beyond Budgeting model as a lens to explore organizational practices that affect the performance of ASD teams is proving a useful way to uncover how these practices are affecting ASD teams. Preliminary results are suggesting that there are specific areas that organizations may need to address to help improve the performance of the ASD teams. Ongoing research will investigate these areas further and suggest ways in which traditional command-and-control organizations can adapt their practices to achieve a more agile friendly environment.

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