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Cultural differences between plan-driven and agile-driven project management practices: A conceptual study

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CULTURAL DIFFERENCES BETWEEN PLAN-DRIVEN AND AGILE-DRIVEN PROJECT MANAGEMENT PRACTICES: A CONCEPTUAL STUDY

Resumo

A falta de alinhamento cultural é uma das principais razões pelas quais a introdução de novas metodologias para gerenciamento de projetos deixa de trazer resultados, particularmente em abordagens orientadas nas pessoas como é o caso de metodologias ágeis ou hibridas. Este artigo oferece uma análise teórica usando o modelo de valores competitivos para identificar o tipo de cultura organizacional que melhor suporta cada tipo de metodologia de gerenciamento de projeto. Os resultados demonstram que práticas orientadas para pranejamento são suportadas por culturas de hierárquica ou de mercado enquanto praticas ágeis são suportadas por culturas de clã ou de adhocracia. Portanto, a análise cultural proposta neste artigo pode auxiliar gestores de projeto na implementação de novas práticas.

Palavras-chave: Gerenciamento de projetos, Gerenciamento ágil de projetos, Gerenciamento tradicional de projetos, Cultura organizacional, Modelo de Valores Competitivos.

Abstract

Lack of cultural fit is one of the main reasons why the introduction of new project management methodologies fails to bring results, particularly in people-oriented approaches such as agile and hybrid. This paper offers a theoretical analysis using the competing values framework in order to find the organizational cultural type that best fit each project management methodology. The results demonstrate that plan-driven practices are supported by either a hierarchical or a market culture whereas the agile practices by either a clan or an adhocratic culture. Therefore, the suggested cultural analysis can assist project managers on the adoption of new practices.

Keywords: Project management, Agile project management, Plan-driven project management, Organizational culture, Competing values framework.

1 Introduction

Project management practices are activities that support a temporary effort undertaken to produce a particular result (Project Management Institute, Inc., 2013). Scholars recognized the critical notion that the project management practices are deeply embedded in the cultural context where a given project takes place (Mueller, 2015; Solli-Sæther, Karlsen, & van Oorschot, 2015). That is because the collection of knowledge, values, norms, and beliefs shared by a group shapes cognition and motivation (Chiu & Hong, 2006), and, therefore, shapes how the team manages the project.

If organizational culture determines the project management implicitly as an ethos (Schein, 1996), conversely, when organizations adopt a specific project management approach (e.g. Scrum), an explicit cultural drive for the practices is assumed. An example of this tension between organizational culture and project management approaches came from a survey conducted with 3880 individuals from a broad range of industries in the global software development community (VersionOne, 2015). The study showed that respondents consider that the biggest barrier to further adoption of agile project management (APM) is the ability to change the organizational culture (55%).

Although the culture mentions in the literature on the differences between plan-driven and agile approaches are usually discussed regarding specific practices, overlooking that culture can operate as a lens changing how something is interpreted (Rees-Caldwell & Pinnington, 2012). Considering that, this research aims to answer the following question: is it possible to predict if a certain organizational culture type enables or hinders the adoption of plan-driven and agile project management methodologies?

This study address this question by understanding the organizational cultural basis of the practices adopted by plan-driven project management and APM, using a value-based approach for organizational culture (Hofstede, 1980), to be more precise, the competing values framework (Quinn & Rohrbaugh, 1981). In sum, the paper explores the possibility of using the organizational culture types proposed by Cameron and Quinn (2011) as a guide to indicate the project management approaches that are likely to be more successful on each organization culture type.

In this paper, we first present the theoretical background of the project management methodologies and organizational culture. Then, we outline the methodological approach. Next, we present the results. The paper ends with our discussion and conclusions.

2 Conceptual Background

2.1 Plan-driven and agile project management

For many years, the approach aligned with the PMI (Project Management Institute), presently called plan-driven, has been considered doubtless the best practice for project management. More recently, an approach called agile offered an alternative way of thinking about project management (Agile Manifesto, 2001). Table 1 summarizes the main differences between the methodologies.

Table 1:
Key Differences Between Plan-driven and Agile Project Management Methodologies

Categories	Plan-driven	Agile
Fundamental assumption	Systems are fully specifiable, predictable, and are built through meticulous and extensive planning	High-quality adaptive software is developed by small teams using the principles of continuous design improvement and testing based on rapid feedback and change
Management style	Command and control	Leadership and collaboration
Knowledge management	Explicit	Tacit
Communication	Formal	Informal
Development model	Life-cycle model	The evolutionary-delivery model
Desired organizational structure	Mechanistic	Organic
Quality control	Heavy planning and strict control. Late, heavy testing	Continuous control of requirements, design, and solutions. Continuous testing

Note. Source: Dybå, T., & Dingsøyr, T. (2008). Empirical studies of agile software development: A systematic review. Information and Software Technology, 50(9-10), 833–859. doi:http://doi.org/10.1016/j.infsof.2008.01.006

The differences pointed at Table 1 suggest that the two approaches are in opposite extremes of any dimension, but that is not the case (Almeida, Conforto, Luis da Silva, & Amaral, 2015). Collyer, Warren, Hemsley, and Stevens (2010) interviewed 31 project managers from 10 varied industries, and the result led to the conclusion that plan-driven project management approaches (such as the waterfall) are less suitable in changing environments. While plan-driven approaches emphasize the complete anticipation, the agile ethos draws on the premise that less initial planning and an evolutionary process is more efficient (Dybå & Dingsøyr, 2008).

Since agile works with continuous design, with an iterative and incremental process, early and continuous customer involvement is critical (Mann & Maurer, 2005). Customers can provide the project goals and constant feedback through the life cycle of the project. The progress of each project version is evaluated by the client, what dramatic reduce misunderstandings about what features are priorities (Mann & Maurer, 2005). These practices are particularly pertinent in projects with high degree of innovation where is hard to precise each aspect of the product (Amaral, 2013).

Table 1 also shows that agile methods favor a tacit, people-oriented approach. Traditional methods, on the other hand, would favor a more systematic and standards-based behavior. These aspects are closely linked with the team and organizational values and therefore refer to the question of organizational culture, as defined by Schein (1984).

Tolfo and Wazlawick (2008) analyzed the cultural aspects of XP through case studies and identified a set of aspects of the culture that needs to be present for this methodology's efficiency and that were not present in the companies analyzed. They concluded that it is possible to identify aspects of the culture that "may facilitate the adoption of XP" (Tolfo & Wazlawick, 2008, p. 1966). Similar analyses came to the same conclusion as in the study conducted by Livari and Livari (2011).

If this is true, then it is possible to identify values and attitudes studying the culture of the organization and then use this knowledge to guide the adoption of new practices (Tolfo, Wazlawick, Ferreira, & Forcellini, 2011).

Recent studies that analyze the culture of agile teams have contributed to the understanding of how the organizational value influences the project team. In a deep study applying grounded theory to teams, Hoda and Murugesan (2016) show that teams do not follow agile theory guidelines in practice because of values and attitudes rooted in the group. They conclude that team culture directly influences the adoption of these practices.

The challenge, however, is how to use these cultural aspects to support the professionals involved in the implementation of agile methods. An alternative is to explore the tools already available in the organizational culture literature.

2.2 Organizational Culture

Schein (1984, p.3) defines organizational culture as "…the pattern of basic assumptions that a given group has invented, discovered, or developed in learning to cope with its problems of external adaptation and internal integration, and that have worked well enough to be considered valid, and therefore, to be taught to new members as the correct way to perceive, think, and feel in relation to those problems".

Schein's definition does not only include the common notion that culture is a set of value that shape how an organization interpret and act upon the environment but also explains how these values are created and transformed over time. Once the group members` experiences with methods that have worked in the past influence the organizational culture, those methods will be understood as the "right way of doing things." If that is the case, upon introducing new practices, managers must promote a safe environment to challenge the old habits and to enable members to learn the new desired behaviors. If managers do not take into consideration the cultural aspects of operational changes, there is a high chance that conflicts will arise.

Since organizational changes, such as the adoption of new products, services, and process, happen through projects, two reasons may explain why projects fail.

First, the desired change, the project vision or scope, may not be supported by the prevailing organizational culture. In this case, resistances to change can show up because the desired results are contradictory with existing commitments. For example, developing a new type of product may be threatening for a team that has never developed something similar in the past.

Second, the project management methodology may also lead to resistances, not because the project vision is challenging, but rather because the team is not used to the management practices in place. In these cases, the project management culture can be considered the set of value that shape how the team interprets and act upon the project environment. Each methodology has basic assumptions about what it takes to manage projects successfully. Plan-driven supporters argue that extensive planning, codified processes, and rigorous reuse of information are essential to accomplishing project goals. On the other hand, APM advocates argue that due to the rapid pace of information technology changes and the dehumanizing effects of detailed plan-driven development, companies should adopt less bureaucratic methods for dealing with project complexities (Boehm, 2002). Consequently, upon changing project management methodologies, resistance can show up due to contradictions between the different cultures aspects that support each type of methodology.

The competing values framework (CVF) offers a model for analyzing how different value assumptions shape strategies, structures, and process.

2.3 The competing values framework

The competing values framework (CVF) explains the conflict among these various cultural values types. According to the CVF theory, the lack of agreement among organization theorists comes from different perspectives about what it takes to promote organizational effectiveness. Based on the CVF, Cameron and Quinn (2011) have introduced the Organizational Culture Assessment Instrument (OCAI) that can be utilized by organizations to access where they are positioned in the framework and understand their dominant culture type. Figure 1 shows a description of each culture type described by Cameron and Quinn (2011) regarding leader type, value drivers and associated theory of effective. It also shows the competing values dimensions that are used to build the CVF.

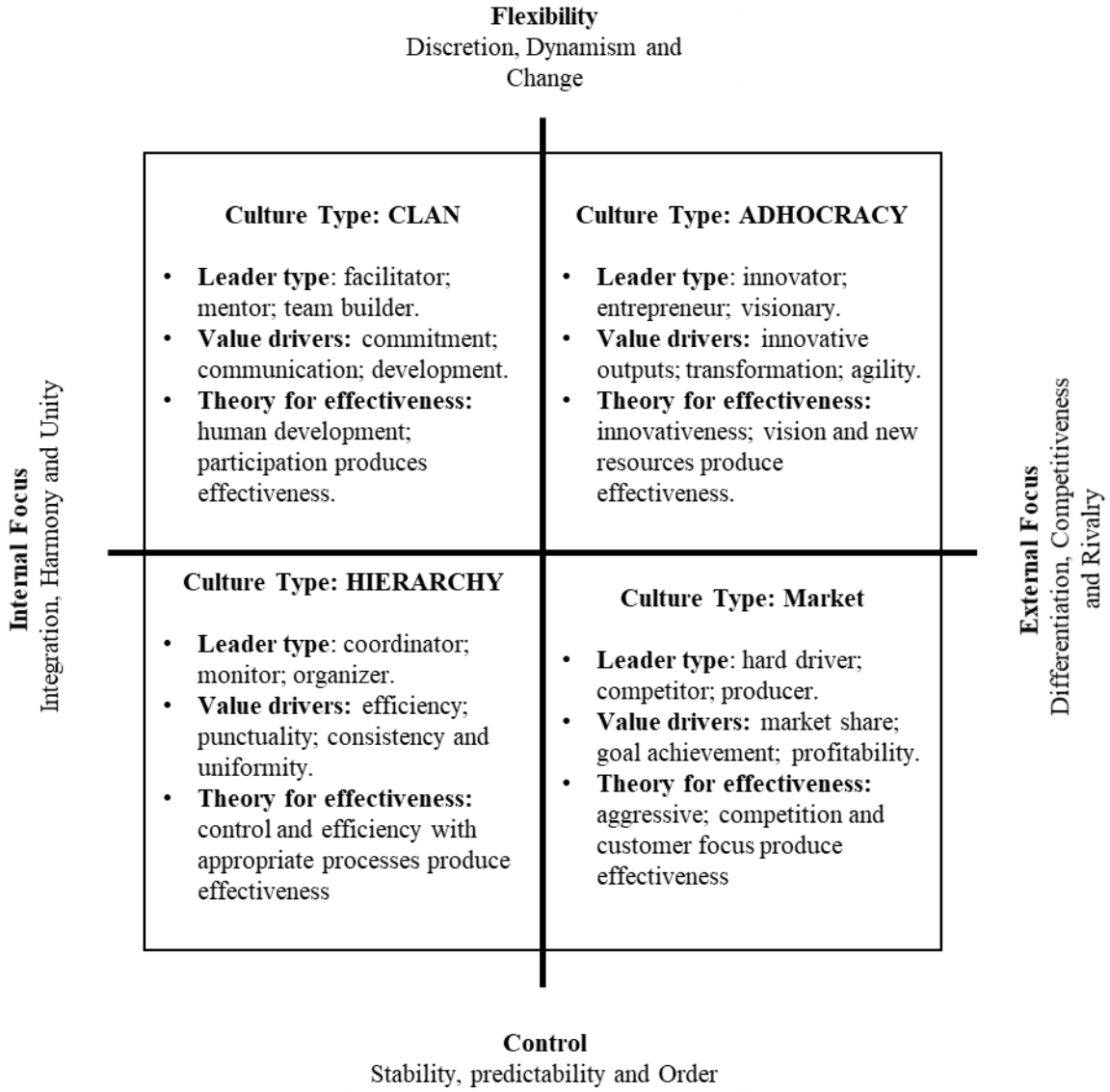

Figure 1. Competing value framework
Source: adapted from Cameron, K. S., & Quinn, R. E. (2011, p. 53). Diagnosing and Changing Organization Culture: Based on the competing values framework (Third Edition ed.). San Francisco: Jossey-Bass.

The first set of competing values, shown in the horizontal x-axis, is related to organizational focus, from an internal focus, which leads to integration, harmony, and unity, to an external focus, which leads to differentiation, competitiveness, and rivalry. The second set of competing values, shown in the vertical y-axis, is related to structural preferences, from an interest in order, stability, predictability, and control to an interest in flexibility, dynamism, discretion, and change (Quinn & Rohrbaugh, 1981). The four quadrants formed by the combination of these two dimensions represent four different types of organizational culture: Clan, Adhocracy, Hierarchy, and Market.

Companies that have a Hierarchical Culture are bureaucratic organizations. Producing and delivering goods to a highly complex and growing society was one of the biggest challenges at the beginning of the twentieth century. Hierarchical organizations solve those problems by focusing on developing an operating system to produce fast, efficient, reliable and predictable goods and services. The sociologist Max Weber proposed seven characteristics to describe bureaucratic organizations: rules, specialization, meritocracy, hierarchy, separate ownership, impersonality, and accountability (Cameron & Quinn, 2011). Therefore, the common set of beliefs in this type of organization is that success comes from coordinating, organizing and establishing clear procedures and decision-making rules (Cameron & Quinn, 2011).

Competitiveness and productivity drive companies with Market Culture. In the 60s, new competitive challenges imposed by increased competition pushed many companies to focus on the external environment and establishing a position with their stakeholders such as suppliers, customers, contractors, partners and other entities. This type of organization operates based on economic market principles and rely on sales, exchanges, and contracts. Therefore, the common set of beliefs in this kind of organization is that success comes from the emphasis on winning, the leaders are result oriented, and there is a strong orientation toward achieving goals and targets (Cameron & Quinn, 2011).

Companies that follow a Clan Culture type are similar to a family-type business. In this kind of culture, there is a strong sense of teamwork and the assumption that the employees share the same values, beliefs, and goals. These characteristics help the companies to face turbulent and rapidly changing market environments when planning is a big challenge. Therefore, the common set of beliefs in this type of organization is that success is achieved by fostering teamwork, participation, consensus, loyalty, tradition, mentoring, individual development and empowerment (Cameron & Quinn, 2011).

Companies with an Adhocracy Culture are always looking for new opportunities; they are innovative and entrepreneurial minded. In the information age, disruptive technologies and startups are constantly taking over and replacing old corporate models, sometimes even changing entire industries. The fast pace of information exchange has created the need for companies to adapt fast to survive. Adhocratic companies solve that problem through face pace innovation and change. Leaders are visionaries, innovative and risk takers. They are often focused on developing new products and services and are always looking for new resources and growth opportunities. Therefore, the common set of beliefs in this type of organization is that success comes from producing products and services that are unique and original to their desired customers (Cameron & Quinn, 2011).

Figure 1 shows that each end of the graph is related to an opposite value from the one in the other end of the same axis (Cameron & Quinn, 2011). Similarly, the assumptions considered by non-adjacent culture types are fundamentally opposites since they do not share any of the two dimensions. In total quality management initiatives, for example, an adhocratic company would easily adopt practices such as anticipating customer needs, continuous improvement and finding creative solutions but it would have difficulties to implement practices related to error detection, measurement and process control. The opposite situation

would happen in case a hierarchical company tries to adopt those TQM practices (Cameron & Quinn, 2011). Therefore, managers can expect resistance when trying to adopt project management practices that are related to the opposite culture type than the one present in the group.

The differences in assumptions found in each culture types do not imply that a certain culture type is better than the others. In fact, each culture type has weaknesses and strengths. For example, hierarchical companies tend to value managerial control and procedural compliance, which are positive characteristics, but in some cases, those characteristic become negative leading to micro-management and bureaucracy. Likewise, market companies lean towards positive values such as individual accountability, and decisive action, which can turn into negatives such as conflict and exclusion. Clan companies value group deliberation and life balance, but in some cases, that can generate indecisiveness and withdrawal. Adhocratic companies value creative action and self-organization which can create chaos and confusion (Quinn, 2015). Thus, even though different basic assumptions support each type of project management methodologies, it does not mean that there is one methodology that is better than the other since both methodologies would inherit the strengths and weaknesses of the culture types that support them.

By understanding the basic cultural assumptions used by each type of project management methodologies, this paper proposes the CVF as a tool to predict if there is a certain culture type that enables or hinders the adoption of that methodology. Also, if it is possible to verify that the assumptions required for plan-driven project management are fundamentally different from the ones required for APM, it would help managers to understand better why companies face resistance when trying to change methodologies. This analysis would also help project teams to adopt management methodologies that have the best chance to work in the existing organizational culture or the contemporary subculture of the project department.

Strode, Huff, and Tretiakov (2009) conducted an empirical study based on a multi-case study of nine software development projects. Their study found six culture factors that are correlated with agile method usage including human development, flexible and participative teamwork, loyalty and mutual trust, people empowerment, orientation to results, and innovative risk-taking leadership. Althought, Strode et al. (2009) don`t associate their finding explicitly with culture types, the identified culture factor suggested that either clan, market or adhocracy cultures can support agile methodologies. Livari and Livary (2011) suggest similar conclusion in a theoretical study that also argues that agile methodologies are most incompatible with hierarchical culture orientation. Moreover, a previous study by Livari and Huisman (2007) has identified that traditional plan-driven software development methods are correlated with hierarchical culture. These studies served as references for the analysis conducted in this paper even though these authors do not explicitly associate the culture type with specific project management practices.

3 Methodology

This study aims to bring a theoretical contribution upon studying the cultural basis of the practices applied by plan-driven project management and APM. A theoretical contribution should include four essential elements (Whetten, 1989). The first two, the What and How determine the domain or subject of the theory. The last two, the Why and the Context, explain the reasons for the creation of the theory and establishes the boundaries in which it can be applied or understood.

The What describes the factors considered as part of the explanation of the social phenomena of interest. It has to be comprehensive and parsimonious to define the domain of the theory (Whetten, 1989). This paper takes into consideration the following factors:

- The CVF and its dimensions (organizational focus and structural preference).
- The description of the managerial practices applied by agile and plan-driven project management methodologies.

The How is a description of how the factors analyzed are related to each other. Arrows and boxes diagrams are used to visually represent the outlining patterns of the research (Whetten, 1989). Figure 2 shows the approach employed in this paper:

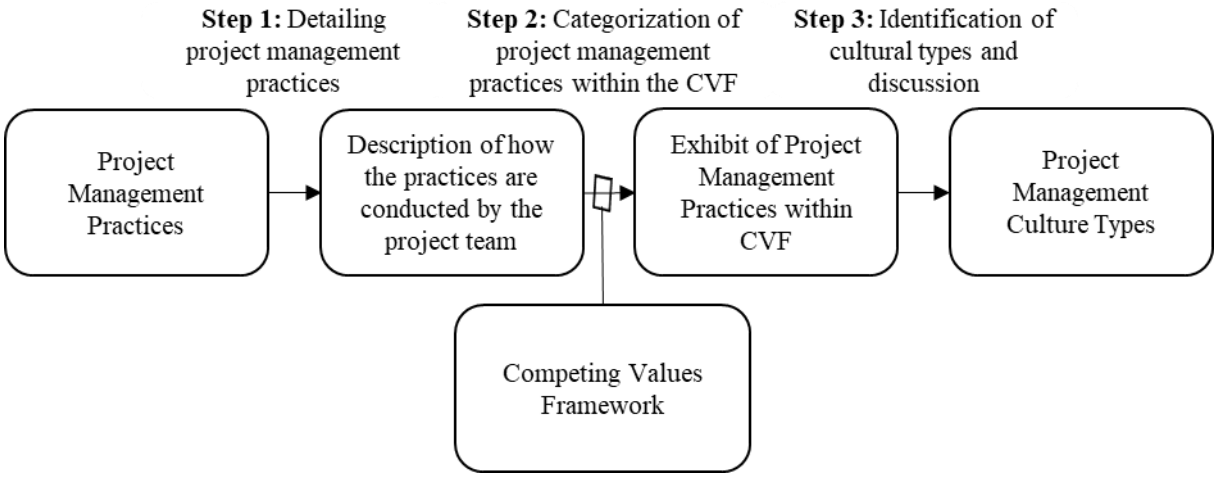

Figure 2. Research mental map

The factors in consideration were proposed and analyzed by the four authors who are specialists and have books and articles published in scientific fields that are relevant for this study. An expert in project management methodologies along with an expert in knowledge management raised the practices adopted by agile and plan-driven methods and detailed how the project team conducts them. Then, two specialists in organizational culture and change management reviewed the particulars of the project management practices and placed them into the CVF. To reduce biases, instead of directly relate the practices to the organizational culture types, the specialists classified them according to their orientation towards organizational focus (internal or external) and structural preference (flexibility or control). Lastly, the practices were visually represented within the CVF for the identification of the cultural basis that supports each project management methodology.

The Why describes the psychological, economic or social dynamics assumptions that justify the analyzed factor and the proposed causal relationship. In a theoretical model, by definition, the proposed relationships have not been tested in vivo. Instead, the model creates a framework for future empirical verification of the theory (Whetten, 1989). This study will develop a logical relationship that can be used as a framework to help researchers and practitioners to understand the impact of the different organizational culture values in the adoption of project management methodologies.

Similar theoretical relationships have been proposed for other management areas such as Lean Manufacturing (Paro & Gerolamo, 2015), Total Quality Management (Gambi, Boer, Gerolamo, & Jørgensen, 2015; Cameron & Quinn, 2011) and Human Resource Management (Cameron & Quinn, 2011). Thus, the suggested framework is intended to explain why many companies face resistance upon adopting and changing project management methodologies.

The Context - the Who, Where, and When - place limitations on the propositions in the theoretical model. It helps to set a boundary of generalization and establishes the limits in which the theory can be understood and applied (Whetten, 1989). We explore these limitations at the end of the article.

Therefore, based on the elements proposed by Whetten (1989), the analysis was structured as follows:

- Step 1 – Detailing project management practices
- Step 2 – Categorization of project management practices within the CVF
- Step 3 – Identification of Cultural types and discussion

The determination of the culture types that are more appropriate for each project management methodology, agile or plan-driven, can help professionals to adopt and choose practices based on the uncovered culture values. Depending on the circumstances, it can also help professional to identify actions that can be applied before and during the implementation of new practices to reduce the risks associated with cultural aspects.

4 Results

In this section, we present the results of the study.

4.1 Step 1 - Detailing project management practices

Eder, Conforto, Amaral, and Silva (2015) identified 23 practices that are applied in plan-driven, agile or in both project management methodologies. Table 2 shows these practices.

Table 2:
Project Management Practices

Methodology	Practices
Plan-driven	Collect requirements Control scope Define activities Define product scope Develop schedule Finalize project work plan Sequence activities Verify scope
Agile	Adding detail to user stories sooner Ask for a time commitment Control scope changes Determine target velocity/Estimating velocity Identify and measure slacks Measuring complexity Prioritize requirements Prioritize the work required Project charter
Both (plan-driven and agile)	Control project plan Define project scope Estimate activity resources Estimate the duration of activities Identify the work required for the project State the problem/opportunity

Note. Source: Eder, S., Conforto, E. C., Amaral, D., & Silva, S. L. (2015). Diferenciando as abordagens tradicional e ágil de gerenciamento de projeto. Production, 25(3), 482-497.

Detailing the project management practices is important, so there is a shared understanding of each practice among the specialists. In total, six project management practices were considered in the analysis. These practices were selected out of the 23 practices identified by Eder et al. (2015) because they are applied in both plan-driven and agile methodologies. Since the organizational culture is determined by how the things are done and not by what is done, detailing the main differences in how the practices are conducted in each methodology facilitates the identification of the culture types. Table 3 shows the details of some fundamental differences on the basic assumptions present in each methodology.

Table 3:
Fundamental Differences on Basic Assumptions in Each Methodology

Practices	Fundamental Differences	Approach (CODE)
Control project plan	Based on accurate, timely information of project performance: cost, time and progress. Aim to identify deviations and correct them to follow the plan. Stakeholders are updated formally through meetings and gates. Changes require approval and include corrective actions, preventive actions, and defect repair. (Project Management Institute, Inc., 2013)	Plan-driven (PD1)
	Based on prototyping, demonstrations, sketches and other visual artifacts. Changes in the project plan are incorporated and informed informally (face to face) as the team learns more about the users` true needs. Progress is measured in terms of velocity, which is the amount of finished work in an interaction (time boxed period). (Cohn, 2005)	Agile (A1)
Define project scope	The project deliverables and activities are described formally and dictate how the project will be executed. The deliverables are detailed to provide clarity and avoid ambiguity. Bills of materials and features descriptions are used to indicate the outcome of the project. The requirements are established based on the needs and expectations of the sponsor, customer, and other stakeholders. Any changes to scope are carefully managed and require formal acceptance. (Project Management Institute, Inc., 2013)	Plan-driven (PD2)
	A project vision is described in a challenging way to motivate the team. The outcome of the project is described metaphorically and with visual artifacts which can lead to ambiguity. The goal is not specifying the exact result of the project but to direct the team towards a set of possible solutions. By pursuing a shared vision, the team can make decisions, establish priorities and implement changes that they think will lead to a good return on investment in the project (Cohn, 2005)	Agile (A2)
Estimate activity resources	The estimate is based on the type and quantity of materials, personnel, equipment, and supplies required to perform each activity of the project. It is influenced by resource location, availability, and skills as well as by the sequence of activities. It is closely correlated with cost control processes. (Project Management Institute, Inc., 2013)	Plan-driven (PD3)
	The estimate is based on the number of people required to deliver functional features at a certain speed. Resources are allocated according to users` needs (Hass, 2009 apud Eder et al., 2015), (Cohn, 2005).	Agile (A3)
Estimate the duration of activities	The estimate is based on a detailed macro plan for the entire length of the project (Develop Schedule Process). The accuracy of the duration	Plan-driven

	estimate depends on detailed and precise data about the engineering and design work and the resources allocated to each activity. (Project Management Institute, Inc., 2013)	(PD4)
	The estimate is based on continues deployment on the short term, usually a few days or weeks which requires alignment of the team through daily meetings. Instead of planning the duration of activities, the team uses iterative planning to make deliverables commitments that satisfy the users` needs (Hass, 2009 apud Eder et al., 2015), (Cohn, 2005).	Agile (A4)
Identify the work required for the project	The work is oriented towards activities, milestones and documentation deliverables. All the work necessary for the project, and only the work required, is described in detail to orient the project activities along its lifetime (Project Management Institute, Inc., 2013), (Wysocki & McGary, 2007 apud Eder et al., 2015);	Plan-driven (PD5)
	The work is oriented towards deliverables of features, working prototype or final product instead of completion of tasks. The team members plan their tasks and coordinate their through daily meetings (Schwaber, 2004 apud Eder et al., 2015), (Cohn, 2005)	Agile (A5)
State the problem/opportunity	The scope of the project is detailed as much as possible. It dictates how decisions are made towards the project. The scope is created taking future problems and opportunities in consideration in resonance with the project cost, time and risk assessment (Wysocki & McGary, 2007 apud Eder et al., 2015); (Berggren et al., 2008 apud Eder et al., 2015).	Plan-driven (PD6)
	The project is described by the vision, which can be interpreted broadly and generically. The problems and opportunities are constantly assessed and taken into consideration. The product owner can alter priorities between iterations to steer the project and benefit from those opportunities (Schwaber, 2004 apud Eder et al., 2015), (Murch, 2001 apud Eder et al., 2015), (Cohn, 2005).	Agile (A6)

Note. Source: Expanded by the authors based on Eder, S., Conforto, E. C., Amaral, D., & Silva, S. L. (2015). Diferenciando as abordagens tradicional e ágil de gerenciamento de projeto. Production, 25(3), 482-497.

4.2 Step 2 - Categorization of project management practices within the CVF

The two specialists in organizational culture and change management conducted a panel to review the project management practices and place them into the CVF. Each practice was discussed in turn until both specialists got into an agreement about the classification of that practice within the two dimensions of the CVF. Table 4 shows the result of this analysis.

Table 4:
Categorization of Project Management Practices

Practices	Code	CVF				Culture Type
		-x: Internal Focus	x: External Focus	-y: Control	x: Flexibility	
Control project plan	PD1	X		X		Hierarchy
	A1	X			X	Clan
Define project scope	PD2		X	X		Market
	A2	X			X	Clan
Estimate activity resources	PD3	X		X		Hierarchy
	A3		X		X	Adhocracy
Estimate the duration of activities	PD4	X		X		Hierarchy
	A4		X		X	Adhocracy
Identify the work required for the project	PD5	X		X		Hierarchy
	A5	X			X	Clan
State the problem/opportunity	PD6		X	X		Market
	A6		X		X	Adhocracy

Some of the practices were classified as having internal focus (-X) because there are focused on internal resources and on the activities required to perform the project (PD3, PD4, PD5) or because they are focused on promoting alignment and integration of the team efforts (PD1, A1, A2, A5). The remaining practices were classified as having external focus (+X) because they are conducted based on decisions from external stakeholders (PD2) or because they are carried out based on those stakeholders needs, problems, and opportunities (A3, A4, PD6, A6).

Regarding structural preferences, all plan-driven practices were classified as being oriented toward control (-Y) because there are conducted to assure that a predetermined plan is detailed and definite to the team and that it will be rigidly followed (PD1, PD2, PD3, PD4, PD5, PD6). On the other hand, all agile practices were classified as being oriented toward flexibility (Y+) because they allow changes in the project and priorities (A1, A3, A4, A6) or because they indicate dynamism (A2, A5).

The overlapping of these dimensions is the root of the classification of the practices within the CVF and support the cultural types definitions.

4.3 Step 3 – Identification of Cultural types and discussion

Figure 3 illustrates the project management practices within the CVF considering the previous classification by the specialists.

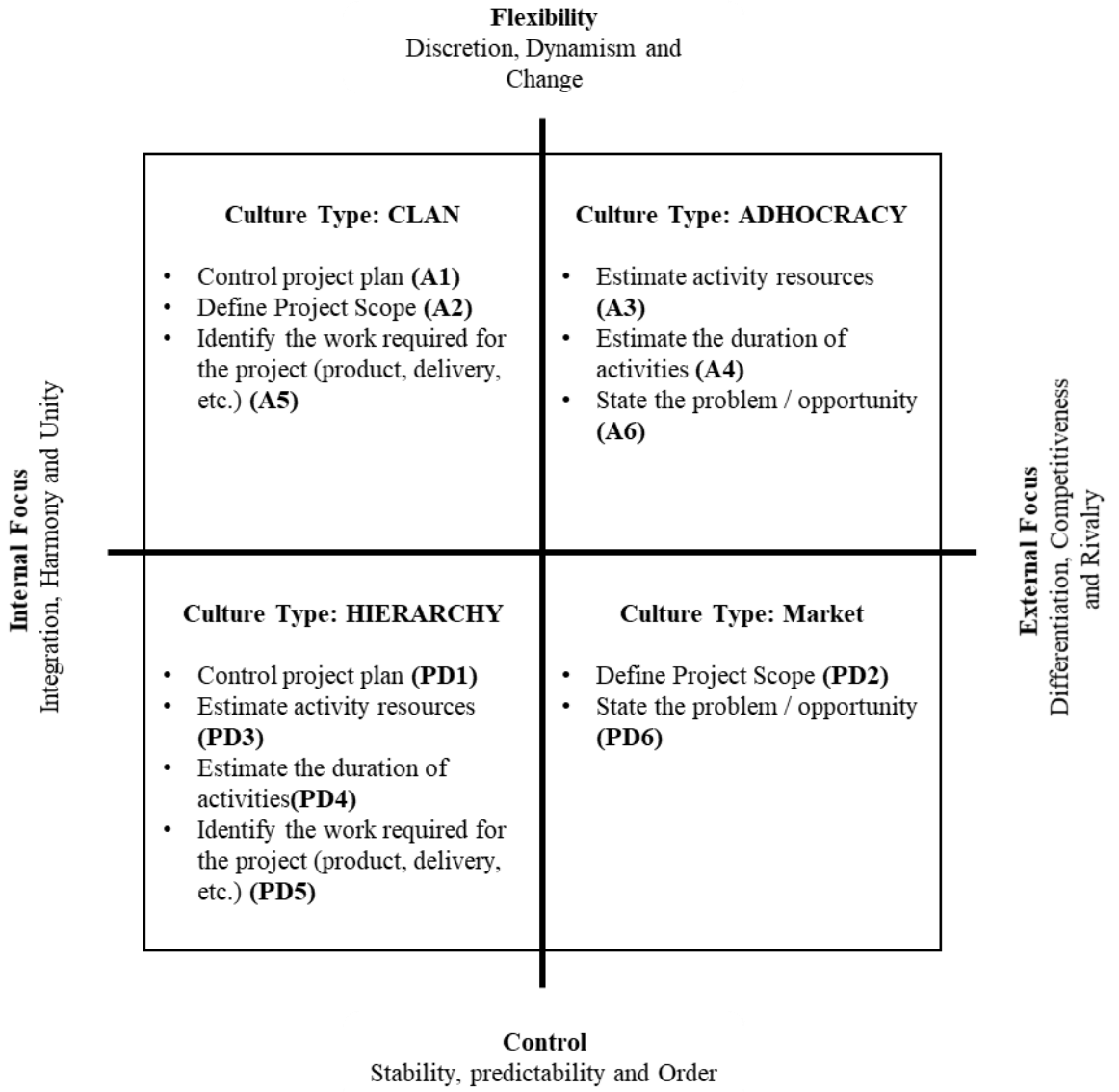

Figure 3. Classification of project management practices within the CVF

The main difference found in the practices is related to structural preferences. All plan-driven practices were classified as being oriented toward control while all agile practices were categorized as being oriented toward flexibility. Although managing projects intrinsically requires control activities to avoid chaos, in agile methodologies, those practices are performed in a flexible way to assure that changes will be incorporated and results will be delivered as fast as possible.

5 Discussion and Conclusion

Can a particular organizational culture type enables or hinders the adoption of plan-driven and agile project management methodologies? Our results of project management practices applied by both methodologies suggest that plan-driven practices are oriented toward control while agile practices are oriented toward flexibility. Also, the analysis demonstrated that both methodologies have practices that are externally focused and others that are internally focused.

While it is possible to argue that orientation for control in plan-driven practices and flexibility in agile-driven ones is not exactly a surprise, the equilibrium in internal-external orientation is. Although a plausible explanation for this finding is that all projects methodologies are applied to coordinate internal resource to take advantages of external opportunities, this is not in line with the literature. Together with flexibility, agile practices considerably contrast to plan-driven ones in the openness to the environment which facilitates interactions with multiple stakeholders, integration of clients into the process and constant feedback from users. This raise question regarding where is the focus of the agile practices.

Also, our findings show that the CVF can be a valuable resource to help professionals to understand how the prevailing culture in their organizations will affect the implementation of new project management practices. The OCAI can be used by these professionals to understand organizational culture values and to identify possible sources of resistance to the adoption of those practices. Future field research may attempt to validate the application of the OCAI as a support tool to facilitate the implementation of project management practices.

The results presented in this paper have some limitations that open up opportunities for future research on this topic. First, the project management practices that are applied only on agile or on plan-driven methodologies could also be associated with the CVF. In this case, since it is impossible to analyze the differences in how these practices are conducted in each methodology, future research can consider the reasons why these practices are not implemented in one or the other. Second, this paper considers that every practice has the same importance (or weight) in the analysis, while in many cases the project management team applies just some of the practices. Third, this project only considers practices from plan-driven and agile methodologies when analyzed individually so hybrid project management methodologies were not specifically considered. Fourth and last, qualitative methods for analysis culture can present inaccurate results because they do not take into consideration the real observed behavior in the workplace.

In conclusion, this study has delivered a contribution to the understanding of how the organizational culture influences the adoption of project management practices. The identification of the culture types that support each methodology does not provide a straightforward, simple answer to the research question. The relationship between organizational culture and project management methodology is complex and is associated with many different aspects of the organization including strategy, structure, and processes. Therefore, future research in this area should instigate what managerial practices can improve the success of project management practices adoption and consequently the success of projects.

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