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Characterization of an Agile Coordination Office for IST companies

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Abstract

Typically the Project Management Office activity is linked to the management and coordination of plan-driven projects, also known as waterfall or traditional projects. However, with the advent of agile methodologies in organizations of software development (the case of many information systems and technologies (IST)) no longer value the traditional PMO. It needs to be changed according to the agile values, so the organizations can extract benefits from such structure. These need to be fundamental changes in the responsibilities, practices and roles that a PMO should have. Also, it seems appropriate to rename it to something more descriptive and we chose to name it Agile Coordination Office (ACO). This paper presents the initial proposal of the ACO based on the existing literature. We propose the ACO to assume a behavior mainly supportive, due to the empowerment that every agile development team must have by definition. In addition, the architecture of this ACO aims to cover the various levels of management, from project and program up to the portfolio management. This division also reduces the complexity of ACO's implementation process and gives flexibility to rearrange the ACO over time.

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1. Introduction

The increase in the number of projects that are simultaneously carried out by an organization has made project management more complex [1]. In response to this problem emerged the concept of Project Management Office (PMO), whose purpose is the management and centralized coordination of all projects on its jurisdiction [2]. The range of PMOs is broad, there are several types and models which mainly vary in their level of control and influence over their projects [3]. These structures were initially designed in a context where almost every project were strongly plan-driven i.e. projects based in waterfall processes.

In 2001, a new way of software development emerged with the writing of the Agile Manifesto, in which the fundamental values for the agile software development were published [4]. Namely the prioritization of individuals and iterations over processes and tools, functional software over exhaustive documentation, customer collaboration over contractual negotiation and response to change over following up a plan.

Nowadays the number of agile approaches available is quite extensive with Scrum being, currently, the most used [5]. Each of those methodologies has its own level of prescription, roles, values, principles and good practices. Although the adoption of these agile approaches is quite common, the literature on agile project management structures is limited. The practical literature found about this topic focuses mainly on the role that a so-called PMO can have in the transition of traditional to agile, and not in how an agile PMO should support the multiple management levels over time. Plus, the absence of the PMO in most agile methodologies literature creates a vacuum regarding its responsibilities in an agile context [6]. Furthermore, agile governance is indicated as an area that has not been widely researched, with a small but growing research base [7–10].

This article starts with a discussion about the PMO significance versus the rise of agile and by recognizing a gap in research. In section two, we present a literature review on relevant concepts to the research and a review on agile PMOs, including some implementation cases. Then we describe our research methodology. Next we describe our proposal to an agile coordination office. Finally, we discuss the paper's contribution and our plans for future work.

2. Literature Review

2.1. Relevant Concepts

A project management office (PMO) can be defined as a management structure which the main goal is to standardize the project-related governance processes and facilitating the sharing of resources, methodologies, tools and techniques. The responsibility of this entity can range from supporting project management to actually manage directly one or more projects [2]. However, the name PMO is used to designate different things that operate in different levels of management commonly perceived in multiple types of PMOs: project, program and portfolio management level [3]. In this paper it is assumed that a PMO should have responsibilities in all management levels.

A project is a temporary effort undertaken with the goal of creating a unique product, service or result. [2]. A Program is comprised of multiple related projects that are initiated during the program's life cycle and are managed in a coordinated fashion. [11]. A Portfolio is a collection of projects and/or programs and other work that are grouped together to facilitate effective management of that work in order to meet strategic business objectives[12].

In 2015, according to the Chaos Report Standish Group' [13] 39% of the agile projects were successfully completed while only 11% of the waterfall projects achieved the same outcome. The adoption of agile methodologies still on the rise and there are plenty of candidates with different guidelines, practices, roles and responsibilities [14].

But when it comes to the application of agile, there are various aspects of project management that change and literature comparing the two types show the fundamental differences in distinct perspectives [15,16]. The agile practices assume a more adaptive and incremental approach of continuous improvement and testing based on rapid feedback and change, contrasting with the less flexible waterfall approach where systems are fully specifiable and planned in advance. Also, as agile has less documentation, much of the transmission of knowledge happens through informal communication. The need to keep getting feedback and responding to change (internal or external to the organization) implies a much closer engagement of all stakeholders. This allows the new agile PMO to become more supportive instead of assuming a position of command and control [17].

2.2. Review of agile PMO's literature

In this section, we present a brief review of related work about agile PMOs. We didn't find any reference to a full characterization of a structure like what we consider to be a complete agile PMO (with project, program and project responsibilities). However we found some valuable information in related works that address this theme and some other papers about the transition from the traditional to agile approaches, specifically the role that a PMO can have in that process. These papers also report the experience in the implementation of the so-called agile PMOs. This literature were used to build the first proposal of the ACO presented in the current paper, given the main tips and challenges indicated by practitioners for scaling agile [5].

According to Mike Cohn [6] an agile PMO can contribute in three distinct areas: people, projects and process. He discusses the influence a PMO can have in the transition from traditional to agile processes. So traditional PMO's practices like e.g. managing the inflow of new projects remain but are done in a different way by the new agile PMO. The fundamental changes in practices like this is the nature of the metrics that can be rolled up. Also he refers to the members of the agile PMO as 'keepers of the process' and if they are really engaged with the agile adoption, the PMO can help implementing and spreading the agile practices across the organization. Other authors share this view, stating that the 'keepers of the process' must maintain the agile mindset and redefine the activities to better fit an environment that welcomes changes [18].

The PMI [19] considers that an agile PMO must be value-driven, invitation-oriented and multidisciplinary. Furthermore, because agile creates cultural change, the PMO needs to change through the services it provides.

Augustine and Cuellar [20] propose a PMO that uses lean and agile principles, mainly in the portfolio level. They propose several principles namely, align continuously, manage project throughput and manage system constraints. Those are supported with practices to overcome traditional PMOs' inefficiency in project portfolio management.

In a more practical perspective, we have studied two cases in which agile PMOs were implemented. In the first case described by Tengshe and Noble [21] they report their experience in the transition process of a traditional PMO to an agile PMO. Here the transition followed a top-down approach, it started from the executive level and aimed to support the portfolio and agile project teams. They propose that the agile PMO should have services like agile training and establishing and capturing the appropriate metrics across portfolio and project teams.

The other practical case studied was inspired by Mike Cohn's book, already mentioned in this section. Ken Power [22] reports his organization's experience in implementing an agile office. Unlike the first practical case, here they chose to keep a traditional PMO and implement an agile office as a distinct entity because they still had several teams using waterfall. He proposes some guidelines to implement an Agile Office like the necessity of having the executive management properly engaged and evaluating when the best timing to implement such a structure is.

3. Method

This paper aims to contribute to the advancement of knowledge in this particular area, through the characterization of an Agile Coordination Office answering the research question: How an Agile Coordination Office can be characterized to be useful for IST companies?

For this research, we used several databases and search engines like "Google Scholar", "Elsevier Science Direct" and "IEEE Xplore". For research queries were used terms like "agile PMO", "agile governance", "scaling agile", "agile project management", among others.

We found several related articles but only a few discussed practices and responsibilities of an agile PMO. These were selected and used as grounding to our proposal. In these articles we found 34 practices, however some are common across different references, reducing the number to 19 unique practices, as shown in Table 1.

4. Characterization of the Agile Coordination Office

The ACO is divided in two models, Basic ACO and Advanced ACO composed by three and one module, respectively. The main motivation for creating various modules was to reduce the complexity of the ACO's implementation process. Depending on the reality of the organization that adopts the ACO, the various modules can be combined to best fit the complexity of each organization. This is valuable to avoid an excess of information for

smaller companies, to enable the ACO to be incrementally implemented and/or to rearrange its functions over time according to organization’s changing environment.

This division was made based on the levels of management commonly perceived in the different types of PMOs: Project, Program and Portfolio Management [3]. Between the level of project and program management there are several common practices but they are not all shared. These practices (see Table 1) were retrieved from the literature reviewed, as explained in section 3. The practices were distributed by the modules in which they fit best.

Table 1- Agile PMO practices

| Practices | Authors |
|---|--------------|
| Assist in establishing and collecting metrics | [6,21] |
| Assist in team coordination | [6,19] |
| Assist teams in interacting with other stakeholders | [6,22] |
| Challenge existing behaviors | [6,21] |
| Create an appropriate amount of consistency across teams | [6] |
| Developing and implementing standards | [6,19] |
| Disseminate good practices | [6] |
| Facilitating organizational learning | [19] |
| Manage affluence of new projects | [6,20] |
| Mentoring and coaching the teams continuously | [6,19,21,22] |
| Promote and collect distinct agile metrics | [21,22] |
| Promote continuous alignment with the organizational strategy | [20] |
| Promotion of team communication | [6,19] |
| Provide and configure tools | [6,19] |
| Reduce waste | [6,20] |
| Select and prioritize projects regularly | [20,21] |
| Shared backlog management | [6,22] |
| Support the establishment of metrics for the management of portfolio projects | [6,20] |
| Transmission of knowledge and lessons learned | [6,19,22] |

Figure 1 represents an internal view of an ACO, and the relations that its modules have with each other and with external entities (represented with dotted-line).

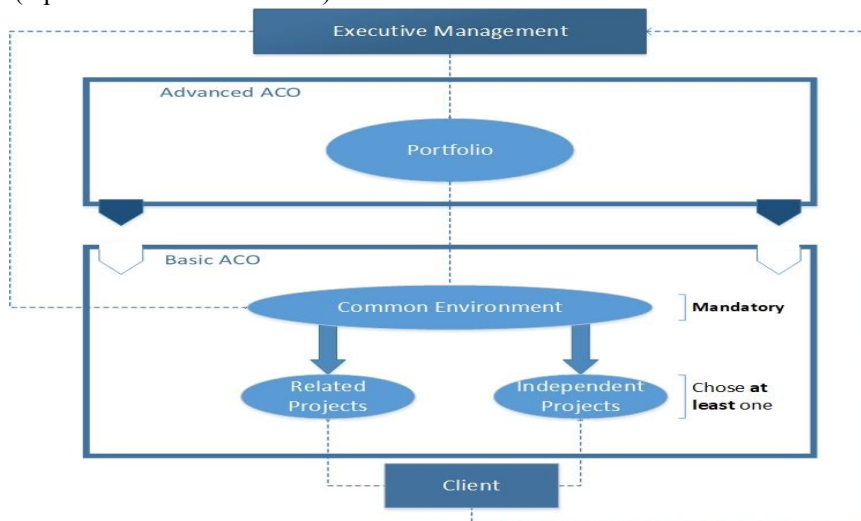


Figure 1. ACO internal view

The modules created are the following: "Common Environment Module" to accommodate the common practices, "Independent Projects Module" to support non-related projects and "Related Project Module" to support programs and large multi-team projects. They were grouped in the Basic ACO and all that is promoted in the Common Environment is inherited by the Independent and Related Projects modules (represented by the light blue arrows in Figure 1). The Advanced ACO is focused only in the support of portfolios.

4.1. Basic ACO

This Basic ACO constitutes what can be called the necessary ACO because it contains the minimal services that an ACO should provide. The Common Environment is mandatory since this module purpose is to group the common ground between Related Projects and Independent Projects modules. At least one of this last two modules needs to be chosen by the organization implementing the ACO because the Common Environment by itself doesn't constitute a proper support, it's just the base to start any implementation.

In the Independent Project Module (IPM) the main goal is to provide a group of practices, roles and other aspects related to the activity of supporting the project managers and the team members i.e. at project management level of small independent projects. Some practices of this module would be the following:

- Promote and collect distinct agile metrics: Independent projects should collect metrics based on different scales to avoid direct comparisons, since metrics such as project velocity are strongly influenced by the context and nature of the project itself. Only the metrics used to portfolio management should be common to all projects, so evaluation and reprioritization can be carried out or in some concurrent related projects.
- Disseminate good practices: Assure the right people are talking. Since the projects aren't related, the ACO should capture and disseminate good practices across teams. This can be achieved through coaches who can simultaneously help multiple teams or move from one team to another, spreading good practices as they do so.

To apply this practices we recommend the creation of a role designated 'Agile Facilitator'. This role can be assumed by anyone with any other role, doesn't need to be a full-time position.

In the Related Projects Module (RPM) can be found the responsibilities that the ACO should have in assuring the share of knowledge and experiences between the related teams, supporting the allocation and reallocation of resources complying the strategic goals of the organization and promoting the coordination between the teams. Practices recommended in this module are the following:

- Promotion of team communication: Promote communication channels between teams so they can coordinate themselves more effectively. Given that agile methodologies are based in informal communication, coordination by feedback is central to achieve inter-team coordination [23];
- Assist in team coordination: Promoting meetings so teams can share their progress, experiences and impediments with each other. Some agile methodologies already have techniques to address this situation (e.g. Scrum-of-Scrums) and the ACO can be a provider of such techniques;
- Shared Backlog Management: At program level or with large multi-team projects it's normal to create a common backlog so the teams can coordinate the work they do. Thus, the ACO can guide those teams by selecting which is the most appropriate work that a certain team should do in the next iteration. There are some frameworks that address this issue (two of the most used are Scaled Agile Framework and Scrum-of-Scrums [5]) that the ACO can use. Furthermore, it collects and analyzes the metrics of different teams so it is in a privileged position to identify when two teams starts to diverge or overlap;
- Create an appropriate amount of consistency across teams: The best way to achieve consistency across teams is through a general agreement among the teams that a particular practice is a good idea. This practice is closely related to the process of sharing of knowledge between teams and is crucial for team coordination, especially in related projects where multiple teams needs to be in constant coordination.

In this case we recommend a role designated 'Agile manager of integration'. This responsibility can be assumed by a singular person however this module deals with multiple teams communicating and working with each other so a team can be more appropriated to do the job.

The Common Environment Module (CEM) has as main goal to group the transversal practices to Related Projects and Independent Projects modules. This module is required in any kind of ACO's implementation. The following practices are recommended by this module:

- Mentoring and coaching the teams continuously: Develop the staff involved through training and mentoring. This can be done through various training and coaching initiatives. The ACO must promote these events to catalyze the process of adopting the agile mentality. At a later stage in the adoption process, the ACO can educate their own coaches.
- Transmission of knowledge and lessons learned: Across the organization individuals face impediments, find solutions and acquire knowledge that can be useful to others. Whether they are in the same team or not, the ACO should assure this sharing happens. Supporting and promoting communities of practice and creating workshops are just two examples.
- Facilitating organizational learning: This tracking is related to the projects itself. The metrics established should be continuously followed to control each team's 'health statuses' and index retrospective findings.
- Assist teams in interacting with other stakeholders: Support project teams in working with other offices such as human resources or with stakeholders like the client. Provide training to team members that handle this interaction (e.g. Product Owners).
- Provide and configure tools: the ACO should not be responsible for making decisions about which tools to use. This responsibility must fall on the development teams themselves, the ACO should only support the team in the process of acquiring and configuring the tools;
- Challenge existing behaviors: Looking for teams who are falling back into old habits or whose old habits are preventing them from becoming agile. This practice is more useful to organizations that have teams transitioning to agile.
- Developing and implementing standards: Providing templates, help establishing any kind of standard (e.g. choosing an agile methodology to a multi-team project). This also include assisting teams with compliance needs.
- Assist in establishing and collecting metrics: Assisting the organization in establishing and collecting end-to-end metrics that can be rolled-up to support the decision making and assure they are not a burden to the development teams. Some examples of this metrics are time-to-market or value delivered rate.
- Reduce waste: All the wasteful activities and artifacts from team's processes should be eliminated, especially in the transition from traditional to agile. The ACO also should avoid introducing anything unless absolutely necessary and help teams look at things they do and not add value to the business.

This module groups multiple practices to support the teams and to keep the agile mindset sharp across the organization thus we recommend two types of roles. The first is designated 'Agile mindset trainer' and englobe mentors, coaches and any kind of professional related to the agile training. This role can be assumed by experienced team members in agile approaches. If the organization has none, external skilled individuals can be a short term solution. The other role is designated 'Facilitator of knowledge transmission' and the complexity of the organization should determine who may assume the job. Organizations with large projects, especially in related projects may need a team to ensure the practices related to knowledge transmission are assured. Smaller scale projects might need only one individual who can even take on both roles.

4.2. *Advanced ACO*

In this model there is only one module, the Portfolio Module (PM). It's aimed to large organizations that want to work at a strategic level. The practices here mentioned were also collected in the literature about agile PMOs. Some of these practices are very similar to those found in a traditional PMO due to the low impact the agile processes have on this level of management since agile methodologies focus primarily on project level. The practices purposed for this module are the following:

- Select and prioritize projects regularly: Changes in the organization strategy or in the customer priorities should be reflected in the portfolio briefly and this can be achieved due to the adaptive and incremental nature of agile processes. Metrics should be chosen to ensure that reliably measure the projects and

programs performance according to strategic objectives and at the same time to not be an impediment to the agile approaches adopted.

- Manage affluence of new projects: The ACO assists the organization in the admission of new projects to be developed. Thus, the ACO can limit the work being started, avoiding the temptation to start too many projects. To achieve this, the ACO should perform activities such as the evaluation and selection of new projects considering the capacity of the development teams. A ranking system is fundamental to evaluate and compare projects.
- Promote continuous alignment with the organizational strategy: Strategic objectives can be changed in the course of a project, and as such, it is necessary to reframe the metrics to reflect the new objectives. This continuous alignment can be done through the communication across the organization of the strategic intent and by making the ranking and selection of projects visible to everyone interested.
- Support the establishment of metrics for the management of portfolio projects: as stated in the previous practice, it's necessary to establish metrics that evaluate the performance of projects in light of the strategic objectives. Executive management provides the strategic objectives and the ACO must idealize and establish the metrics that best measure them.

To apply this practices we recommend a role designated 'Agile portfolio manager'. It does not need to be run by just one person, this role can be assumed by a team depending on the portfolio size.

4.3. Implementing the ACO

There are multiple ways of implementing the ACO, to cover as many cases as possible we created a few scenarios. For each one, we present a combination of ACO modules that should be chosen (see Table 2). It is noteworthy that the practices in the ACO don't need to be followed by the book. They are only recommendations and just the practices that fulfill the organizations needs should be used. This proposal aims to standardize good practices that support project, program and portfolio management in the agile context, without being too prescriptive. The implementation itself can be seen as an agile project with a prioritized backlog of actions [6,18].

Table 2. Modes of implementation of the ACO

| Scenario supported | Modules to choose |
|--|---|
| Large, multi-teams projects, programs or any group of related projects | Basic ACO (CEM + RPM) |
| Projects independents, Project for different products | Basic ACO (CEM + IPM) |
| Portfolio of Related Projects | Basic ACO (CEM + RPM) + Advanced ACO (PM) |
| Portfolio of Independent Projects | Basic ACO (CEM + IPM) + Advanced ACO (PM) |
| Portfolio of Independent and Related Projects | Basic ACO (CEM + IPM + RPM) + Advanced ACO (PM) |

5. Conclusions and further research

In this paper, we characterize the first version of an Agile Coordination Office for IST companies, thus answering the research question. It is based in practices found in literature that are aligned with the agile mindset, and in practices of traditional PMOs that continue to be useful. It was also made to accommodate the multiple levels of management: from project, up to program and portfolio management. The scope of an ACO is very broad. The practices proposed were organized in such a way that any organization can arrange and rearrange the combination of modules according to their needs at any given time, as the complexity of the organization may change.

During the literature review we verified that the literature focused in supporting agile project management was limited, but what has been found was very enlightening to our research. Some of the practices found were expressed using specific terminology about certain agile methodologies, so we transformed those designations to something more generic, thus making this proposal suitable for any agile approach.

By changing processes at the project level (i.e. agile instead of plan-driven methodologies) the role of an enforcer and controlling PMO loses value. In fact, we concluded that what changes more, comparing to a traditional PMO, is

how the practices and subsequent activities are done and not the practices themselves. So, the ACO should assume a supportive behavior and facilitate ways of applying those practices according to the singularities of agile.

The next step programmed for this research will consist in validating and collecting feedback from real organizations that deal with agile governance. It's expected that the received feedback will be useful to refine this initial proposal, to get new perspectives that have not yet been addressed and to, later on, enable comparisons between the literature and the practitioner's validated ACO, highlighting the contribution of the finished research.

As future work we want to keep improving the model, addressing some limitations related to specific contexts (e.g. the coordination of dislocated project teams) and detailing how the ACO activities should differ from a PMO.

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References

- [1] Aubry M, Hobbs B, Thuillier D. A new framework for understanding organisational project management through the PMO. *International Journal of Project Management* 2007;25:328–36.
- [2] Project Management Institute. *A Guide to the Project Management Body of Knowledge*. 5th ed. Pennsylvania: PMI; 2013.
- [3] Monteiro A, Santos V, Varajão J. Project Management Office Models – a review. *Procedia Computer Science* 2016;100:1085–94.
- [4] Beck K, Beedle M, Bennekum A van, Cockburn A, Cunningham W, Fowler M, et al. *Manifesto for Agile Software Development* 2001. <http://agilemanifesto.org/> (accessed October 18, 2017).
- [5] Versione.com. The 12th State of agile report 2018. <https://explore.versionone.com/state-of-agile/versionone-12th-annual-state-of-agile-report> (accessed January 13, 2018).
- [6] Cohn M. *Succeeding With Agile : Software development using Scrum*. Upper Saddle River, NJ: Addison-Wesley; 2010.
- [7] Rautiainen K, Von Schantz J, Vähäniitty J. Supporting scaling agile with portfolio management: Case Paf.com. *Proceedings of the Annual Hawaii International Conference on System Sciences* 2011:1–10.
- [8] Gregory P, Barroca L, Sharp H, Deshpande A, Taylor K. The challenges that challenge: Engaging with agile practitioners' concerns. *Information and Software Technology* 2016;77:92–104.
- [9] Dingsøyr T, Moe NB. Research challenges in large-scale agile software development. *ACM SIGSOFT Software Engineering Notes* 2013;38:38.
- [10] J.H.de O.Luna A, Kruchten P, E.Pedrosa MLG do, Almeida Neto HR d., Moura HP d. M. State of the Art of Agile Governance: A Systematic Review. *International Journal of Computer Science and Information Technology* 2014;6:121–41.
- [11] Project Management Institute. *The Standard for Program Management*. Pennsylvania: Project Management Institute; 2013.
- [12] Project Management Institute. *The Standard for Portfolio Management*. Pennsylvania: Project Management Institute; 2008.
- [13] Hastie S, Wojewoda S. <https://www.infoq.com>. Standish Group 2015 Chaos Report - Q&A with Jennifer Lynch 2015. <https://www.infoq.com/articles/standish-chaos-2015> (accessed January 9, 2018).
- [14] Abrahamsson P, Salo O, Ronkainen J, Warsta J. *Agile Software Development Methods : Review and Analysis*. VTT Technical Report 2002.
- [15] Cobb CG. *Making sense of Agile Project Management: Blancing Control and Agility*. New Jersey: John Wiley & Sons; 2011.
- [16] Nerur S, Mahapatra R, Mangalaaraj G. Challenges of migrating to agile methodologies. *Communications of the ACM* 2005;48:72–8.
- [17] Scotland K, Boutin A. Integrating scrum with the process framework at Yahoo! Europe. *Proceedings - Agile 2008 Conference* 2008:191–5.
- [18] Sliger M. *A Project Manager's Survival Guide to Going Agile* 2007.
- [19] Project Management Institute. *Agile Practice Guide*. 2017.
- [20] Augustine S, Cuellar R. *The Lean-Agile PMO : Using lean thinking to accelerate project delivery*. vol. 7, Cutter Consortium; 2006, p. 1–24.
- [21] Tengshe A, Noble S. *Establishing the agile PMO: Managing variability across projects and portfolios*. Agile Conference (AGILE), Washington, DC, USA.: IEEE; 2007, p. 188–93.
- [22] Power K. *The agile office: Experience Report from Cisco's Unified Communications Business Unit*, Ireland: Cisco Systems, Inc; 2011.
- [23] Dingsøyr T, Rolland K, Moe NB, Seim EA. Coordination in multi-team programmes: An investigation of the group mode in large-scale agile software development. *Procedia Computer Science* 2017;121:123–8.