The Building Blocks of *Agility* as a *Team’s Competence* in Project Management

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Executive Report  
Project Management Agility Global Survey

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Please contact us with your feedback! You can contact us to give your feedback and share ideas and experiences related to this study. We are looking for dedicated professionals to join our community of practice and participate on our research. Contact us if you are interested.

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Project Management Agility Global Survey
MIT-CEPE

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Executive Summary and Survey Highlights

“Agile Project Management” emerged in the past decade, supported by the development of a set of practices, tools and techniques encapsulated in so-called “agile methods” or “lightweight” methods, as a counter to the traditional “waterfall” management approach. This movement first gained converts in the software industry, driven by projects at information and technology companies, in fast competitive markets, with fast changing technologies, innovation-driven clients, with business uncertainties, etc.

Today’s economy increasingly reflects these characteristics in every sector. Innovation, time-to-market and customer experience are becoming the new business paradigm. Customers have more options, competition now is global, market and opportunities are highly dynamic, forcing organizations to be more flexible and able to recognize changes and opportunities in order to remain competitive. In this context, the use of agile management approaches is becoming another option to deal with constant change and innovation. This survey has confirmed the use of agile management practices in different industry sectors beyond its traditional application in the software development industry.

The survey findings further clarify what is the meaning of agility in project management context. Being “agile” is not simply the use of so-called “agile methods”. On the contrary, it is more a “team’s competence” that goes beyond practices and tools and that relies on people’s skills, culture, abilities, experiences and diversity, to be able to work in a very dynamic and innovative project environment. This is a competence that may be useful in many different contexts and industry sectors.

In order to develop “Agility as a team’s competence”, it is necessary to use the appropriate practices, tools and techniques combined with “agility critical factors” that are inherent to the organization structure, project type, team characteristics, market characteristics, etc. To maximize “agility as a competence”, it is indispensable to be able to recognize these elements and combine and adapt them properly.

One important element that emerged from the survey is the development of “hybrid” methods by combining “agile” and “traditional” approaches. This highlights the positive aspects of combining different management practices for different project challenges and contexts. The ability to combine different approaches quickly as needed for different projects in the organization’s portfolio will be one of the next organizational challenges to be able to deal with more innovative projects.
Agility Theory

We are living in an era of fast technological changes, democratization and dissemination of information and knowledge. The ability to innovate, create new products, services and improve the existing ones is considered critical to every organization in order to remain competitive and profitable. The search for constant innovation has transformed “change” from an exception into a rule and the terms “Enterprise Agility”, “Product Development Agility” and “Project Management Agility” will become a common goal for project and program managers, strategists and executives. Organizations are facing radical changes in project and program management and are struggling with the evolution from an “execution-based and command-control” approach to more decentralized, collaborative and self-managed development.

Developing new products, services and software will certainly be more dependent on a combination of team members’ skills and abilities, client and suppliers’ involvement, and market knowledge. These must be supported by appropriate management practices, tools and techniques in a favorable and inspiring project and organization structure.

It is important to understand that “agility” or being “agile” is not merely an adjective or a given method or practice, it is a matter of competence, or more precisely, a team’s competence in the project management environment. Therefore, to build this competence properly, organizations and decision-makers have to consider several aspects and elements, e.g., culture, organization structure, management practices, tools and techniques, business environment, people’s experience, skills and abilities, ideologies, motivation, etc.

Figure 1 shows some of the key elements related to “agility” as a competence according to the findings and results drawn from this global survey. Some of these “practices” and “factors” are not new to organizations. However, the way organizations see “agility” should move from a mindset focused on a collection of tools and practices to that of an indicator of the project team’s competence.

Figure 1. Synthesis of some of the key practices and factors related to the Agility performance identified in the projects surveyed.

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Survey Demographics

Professionals from around the globe answered the survey. The population was formed by professionals associated with the Agile, Program, Project, PMO, Innovation and NPD Communities of Practice in PMI and the Lean Program Management group at MIT. Figure 2 shows the geographical distribution of the complete questionnaires received (n=856).

We are very thankful to all professionals of these 76 countries that contributed to this survey. Below is the list of countries represented in the sample in order of contribution (number of respondents).

United States  94
Brazil  339
India  12
Canada  11
Mexico  12
Italy  12
Australia  11
Switzerland  12
Spain  12
Germany  12
France  12
United Kingdom  12
Nigeria  12
United Arab Emirates  12
Saudi Arabia  12
Argentina  12
Peru  94
Greece  339
Russia  12
Romania  12
Poland  12
Pakistan  12
Malaysia  12
Colombia  12
Chile  12
Turkey  12
Singapore  12
Portugal  12
Netherlands  12
China  12
Austria  12
Puerto Rico  12
Philippines  12
New Zealand  12
Ireland  12
Iran  12
Finland  12
Dominican Republic  12
Belgium  12
Sweden  12
Serbia and Montenegro  12
Oman  12
Mongolia  12
Lebanon  12
Kuwait  12
Japan  12
Egypt  12
Ecuador  12
Denmark  12
Costa Rica  12
Bulgaria  12
Bahrain  12
Yemen  12
Uruguay  12
Ukraine  12
Trinidad and Tobago  12
Sudan  12
Sri Lanka  12
Qatar  12
Paraguay  12
Panama  12
Norway  12
Mauritius  12
Malta  12
Luxembourg  12
Israel  12
Hungary  12
Honduras  12
Guatemala  12
Ghana  12
Ethiopia  12
England  12
El Salvador  12
Bosnia and Herzegovina  12
Akrotiri  12
Afghanistan  12

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Survey Demographics

Considering all valid responses (n=856), 52% of the companies have 1,000+ employees.

![Circle chart showing employee distribution](chart.png)

- 52% with 1,000+
- 18% with 500 - 999
- 9% with 100 - 499
- 9% with 50 - 99
- 4% with 20 - 49
- 3% with 10 - 19
- 4% with 5 - 9
- 2% with 1 - 4
- 1% with 0

Figure 3. Companies participating in the survey grouped by size (number of employees).

The companies participating in the survey represent 17 different industry sectors.

![Bar chart showing industry sectors](sector_chart.png)

- Software industry (software development, implementation, etc.)
- Consulting
- Financial services, banking, insurance companies, etc.
- Telecommunications / Information Technology
- Aerospace and defense
- Government
- Construction
- Energy, oil, gas, petroleum products and bio-fuels
- Research and Development institutes, education
- Machinery, equipment and parts of steel, foundries and metal products manufacturing
- Electrical and electronic equipment and products manufacturing
- Health Care Industry (Medical and hospital equipment manufacturing, services, etc.)
- Automotive
- Entertainment (television, newspaper, magazines, etc.)
- Chemicals, pharma-chemicals and pharmaceuticals
- Food products manufacturing (beverages, processed foods, etc.)
- Other (paper industry, textile, rubber, etc.)

The most represented sector is the software industry, followed by consulting and financial services. Telecommunications, Aerospace and Defense, Government and Construction are also represented.

Different Industry Sectors

- 61% Companies with worldwide operations and clients
- 23% Companies with operations in different regions of the same country
- 16% Companies with local operations only

Figure 4. Companies participating in the survey grouped by sector.

More than half of the projects surveyed belong to companies with global operations.

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Survey Demographics

Who is who in the Survey?

The survey respondents’ role or job position in the company includes Project and Program Managers, Portfolio Managers and Team Members.

We also had respondents in C-Level positions, as well as VPs, Product Development Directors, PMO Managers, Business Unit Managers.

Highly Experienced Professionals

67% of the professionals that participated in the survey have at least 7 years of experience in leadership positions in Project and Program related areas (Figure 6)

26% More than 15 years
23% 10 – 15 years
18% 7 – 9 years
20% 4 – 6 years
11% 1 – 3 years
9% Only 2% of the participants have less than 1 year of experience.

Figure 5. Job responsibility/role of the survey respondents.

Figure 6. Survey respondents experience in leadership positions grouped by years of experience.

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Survey Demographics

Types of Products & Innovation

Almost 31% of the projects studied resulted in the development of a new product as the main output. Thirty-two percent (32%) resulted in the implementation of a software or solution as the main output, and almost 19% resulted in software. In seventeen percent (17%) of the projects the main result was a service, and less than 1% were classified in the “other” category.

Regarding innovation, for projects that resulted in a new product, the innovation was generally concentrated in some components, features or architecture that were new to the company, followed by the same innovation but new for the market. For projects that resulted in the implementation of a software/solution, software, or a service, the innovation was concentrated in some components, features or architecture new to the company, followed by the innovation in the market level for the same items (see Table 1).

The sample studied is composed of projects that aimed to develop a new product, software or resulted in an implementation of a software/solution; Innovation varied from “totally new to the market” to “some components, features or architecture new to the company”.

The heat map (Table 1) illustrates the cross-tabulation between the type of innovation and type of project across the sample.

<table>
<thead>
<tr>
<th>Innovation degree</th>
<th>30.6%</th>
<th>18.9%</th>
<th>32.5%</th>
<th>17.1%</th>
<th>0.9%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Totally New to the Market</td>
<td>3.6%</td>
<td>0.5%</td>
<td>1.1%</td>
<td>1.3%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Some components, features or architecture New to the Market</td>
<td>10.5%</td>
<td>4.4%</td>
<td>7.2%</td>
<td>4.2%</td>
<td>0.1%</td>
</tr>
<tr>
<td>Totally New to the Company</td>
<td>3.0%</td>
<td>2.9%</td>
<td>6.3%</td>
<td>3.5%</td>
<td>0.4%</td>
</tr>
<tr>
<td>Some components, features or architecture New to the Company</td>
<td>13.4%</td>
<td>11.1%</td>
<td>17.9%</td>
<td>8.1%</td>
<td>0.5%</td>
</tr>
</tbody>
</table>

Table 1. Comparison between type of project and innovation degree according to the projects under analysis in the survey (n=856).
Survey Demographics

Project Characteristics

The projects studied can be grouped into three categories in terms of “pace to be completed” (Figure 8). Thirty nine (39%) percent of the projects were classified as having a “typical pace”; 37% were considered “fast, competitive pace” and 15% were classified as having a “market opportunity” (“window”). Both, “fast competitive” and “market opportunity” represent the need to have a fast development project in order to take advantage of the results as well as increase the return on investment.

![Figure 7. Type of customers related to the project under analysis according to the survey participants (n=856).](image)

The projects studied can be grouped into three categories by type of customer (Figure 7). Forty six percent (46%) of the respondents declared that the result of the project was targeted to an “external customer/market”, and 18% was targeted to “external customers” but focused on a specific customer, e.g., on-demand project. Thirty six percent (36%) were targeted to an “internal customer of the company”.

The Duration of the project

The project duration in terms of months ranged from 1 to 120 months. The most representative number of projects (Figure 9) lasted on average 12 months, followed by projects with 24 months, 18 months and 6 months, respectively.

![Figure 9. The most representative projects regarding duration (in months).](image)
The right Management Approach

In our survey we asked the respondents to declare which method they used to manage the project under analysis, indicating their perception of which “theory” or “approach” was behind the management method used.

In our sample, 60% of the projects studied used “traditional” methods, followed by 28% declaring the use of any derivation of “agile” method (Figure 10). The “other” category (4% of the sample) includes methods internally-developed, or other methods such as: Lean, Six Sigma, TOC (Theory of Constraints), Phase-Gate, etc. We disregarded the category “none” with less than 1% of the sample.

The term “Agile Project Management” became known after the creation of the “Manifesto for Agile Software Development” with a set of principles and values (Beck et al., 2001). These resulted from the development of a group of methods called “lightweight”, specially developed for projects carried out in the software development industry. There are several other methods self-named as “agile” available in books, articles, websites, etc.

We consider “Agile Management” to be a broad management approach, defined as: “an approach based on a set of principles whose goal is to render the process of project management simpler, more flexible and iterative in order to achieve better performance (cost, time and quality), with less management effort and higher levels of innovation and value added for the customer” (Conforto et al., 2014, p.2)

Key findings

7% of the respondents claimed the use of “Hybrid” methods. According to the respondents, these “Hybrid methods” result from a combination of Agile and Traditional practices, tools and techniques. The use of “Hybrid methods” was observed in industries such as consulting, software, financial services, etc.

Developing “Hybrid” models will become the next challenge for organizations and it will be considered a key competence for teams operating under dynamic and uncertain business environments.

In industries other than software development, the combination of different approaches will become important to help develop a more “flexible” and responsive management approach to deal with the different challenges, uncertainty and complexity of today’s business environment. These organizations are struggling to apply a “pure” agile management approach or even using just traditional practices.
The use of **Agile Management** in different industry sectors

**Figure 11** shows the distribution of management methods used (self-declared) by industry sector. For those using any “agile” method (28% of the sample), the most representative sector is the software industry (37%), followed by Financial services (15%) and Consulting (10%). We also found agile method users in R&D and Education (5%), Entertainment (5%), Government (4%), Machinery, equipment and metal products manufacturing (3%), Aerospace and Defense (2%), and Automotive (2%).

Hybrid methods (n=56) are used most in Consulting companies (25%), followed by Financial services (18%), Software industry (14%), with less use in the Telecommunications and Information Technology (7%), Government (7%) and R&D and Education (7%).

**Key findings**

Companies are struggling to deal with diverse challenges from the various projects in their portfolio. They are considering agile methods as a potential approach especially for more innovative product development projects. In addition, the combination of different approaches in a “Hybrid” method is evolving as a possible tendency for companies from different sectors.

**Figure 11.** The self-declared use of a management method (traditional; agile; hybrid) versus Industry Sector. We did not consider the categories “other (n=9)” or “internal developed (n=23)” or “none (n=8)” in this comparison.
The use of *Agile Management* in different project types

The use of “agile” methods is expanding, albeit slowly, to other product types beyond software (see Figure 12). Traditional and agile management methods are used in almost 90% of projects sampled, with hybrid methods the next most prevalent approach across all project types (see Table 2).

**Key findings**

Agile Project Management (APM) practices, tools, techniques that were originally created for software development projects are being applied elsewhere, especially in projects that require a certain degree of innovation.

“Agile” methods, practices and tools are useful for different types of projects, not only software development.

![Figure 12. Comparison between the use of agile (n=242) and traditional (n=518) methods with the type of project (in percentage).](image)

<table>
<thead>
<tr>
<th>Type of Project (main result)</th>
<th>Traditional</th>
<th>Agile</th>
<th>Hybrid</th>
<th>Other, internal developed</th>
<th>Other, lean, six sigma, TOC, phase-gates, etc.</th>
<th>None</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product</td>
<td>20.3%</td>
<td>6.9%</td>
<td>1.8%</td>
<td>0.9%</td>
<td>0.5%</td>
<td>0.2%</td>
</tr>
<tr>
<td>Software</td>
<td>7.9%</td>
<td>8.8%</td>
<td>1.8%</td>
<td>0.5%</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Implementation of a software</td>
<td>20.1%</td>
<td>8.9%</td>
<td>2.3%</td>
<td>0.7%</td>
<td>0.2%</td>
<td>0.2%</td>
</tr>
<tr>
<td>Service</td>
<td>11.7%</td>
<td>3.5%</td>
<td>0.6%</td>
<td>0.6%</td>
<td>0.4%</td>
<td>0.4%</td>
</tr>
<tr>
<td>Other</td>
<td>0.5%</td>
<td>0.2%</td>
<td>0.1%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.1%</td>
</tr>
</tbody>
</table>

Table 2. Cross-tabulation between the management method used versus type of product (n=856).
The use of **Agile Management** by the degree of innovation

**Figure 13** shows the percentage of “agile” methods use in projects with different degrees of innovation, compared with “traditional” methods.

**Table 3.** Cross-tabulation between the management method used (self-declared) and degree of innovation (n=856).

<table>
<thead>
<tr>
<th>Degree of Innovation</th>
<th>Traditional</th>
<th>Agile</th>
<th>Hybrid</th>
<th>Other, internal developed</th>
<th>Other, lean, six sigma, TOC, stage-gates, etc.</th>
<th>None</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Product, software, service <em>Totally New to the Market</em></td>
<td>3.3%</td>
<td>2.2%</td>
<td>0.5%</td>
<td>0.5%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>6.4%</td>
</tr>
<tr>
<td>Some component, features or architecture <em>NEW to the Market</em></td>
<td>15.2%</td>
<td>8.5%</td>
<td>1.4%</td>
<td>0.7%</td>
<td>0.4%</td>
<td>0.4%</td>
<td>26.5%</td>
</tr>
<tr>
<td>Product, software, service <em>Totally New to the Company</em></td>
<td>10.0%</td>
<td>4.2%</td>
<td>0.9%</td>
<td>0.7%</td>
<td>0.1%</td>
<td>0.1%</td>
<td>16.1%</td>
</tr>
<tr>
<td>Some components, features or architecture <em>NEW to the Company</em></td>
<td>32.0%</td>
<td>13.3%</td>
<td>3.7%</td>
<td>0.8%</td>
<td>0.6%</td>
<td>0.5%</td>
<td>50.9%</td>
</tr>
</tbody>
</table>

**Figure 13.** Comparison between the use of agile (n=242) versus traditional (n=518) management methods by the degree of innovation.

While traditional management methods are most commonly used, agile approaches become proportionally more prevalent as the degree of innovation in the project increases. The use of hybrid management approaches becomes relatively more prominent for very innovative projects (see Table 3).

Agile Project Management is used in projects with different degrees of innovation.

Key findings

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The use of **Agile Management** and PMO involvement

Almost 60% of the projects studied were totally or partially under Project Management Office (PMO) responsibility or support (**Table 4**). Another 12.5% declared that the project was not under the PMO’s responsibility and 28.4% declared there is no such structure in the organization. Considering the projects totally or partially under the PMO’s responsibility, almost 16% were managed using an “agile” method as shown in **Table 4**.

The majority (37.3%) of projects managed using a “traditional” method was also totally or partially under the PMO’s responsibility. The results also indicate the use of “hybrid” methods with some support or responsibility of the PMO (**Table 4**).

**Key findings**

Agile Project Management is compatible with Project Management Office (PMO) structures.

There are few Agile Project Management-related studies investigating the use of agile methods within the support of a PMO. The two are shown to coexist and these observations suggest an opportunity to explore and better understand the role and contributions of the PMO to the development and use of agile practices, tools and techniques.

**Table 4.** Cross-tabulation between the management method used (self-declared) and the relation to the PMO (Project Management Office) (**n=856**).
Differentiating Agile Project Management adopters

Using Cluster Analysis* we grouped variables related to management practices, tools and techniques in order to identify two distinct clusters in terms of agile characteristics or practices: “Less Agile” (group 1) and “More Agile” (group 2) (see Figure 14).

The difference between groups relating to agility performance was statistically significant for several practices including:

- Use of a more simple management approach to deal with changes, involving less team effort to be able to respond quickly to changes (AC.2).
- The use of visual artifacts (whiteboards, sketches, drawings, etc.) to present the initial description of the project, compared with using only textual documents, spreadsheets or traditional project management software (AC.4). Additionally, the project plan focused only on main results and deliverables without much detail in the beginning (AC.5), indicating the main guidelines, challenges and opportunities in a way that changes were welcome (AC.8).
- Use of iterative development approach, instead of having a detailed plan upfront (AC.6), supported by a consistent delivery of partial results of the project to the client (AC.13).
- The way project deliverables were defined, using value stream mapping, prioritization techniques collaboratively with the client, without demonstrating interrelations or dependencies beforehand (AC.9) compared to the use of work breakdown structures.
- Use of informal, frequent and quick meetings to evaluate the project progress (AC.12) with the support of visual tools for monitoring and controlling project activities (AC.14).
- Group 2 also differentiates in the promotion of self-organized and self-managed team behavior in which team members were accountable to monitor, report and update the status of their activities (AC.15).

We also found statistically significant differences in:

- The level of detail of the project’s scope, which is focused on giving a direction for developing the product, not a detailed procedure or group of tasks (AC.7);
- The formation of project team based on the product complexity, level of innovation, not amount of hours for the activities (AC.10);
- How frequently the project team members meet with the project manager and key stakeholders to discuss project related topics (AC.11).

For some agile characteristics, the difference between groups was not considered statistically significant**. This is the case with client involvement in the project (AC.1) and the use of analogies, metaphors in the initial description of the project, focused on the challenges to be solved, not anticipating solutions, tasks or activities (AC.3).

Figure 15 shows the differences in the average use of fifteen agile characteristics used in this study. Almost all the differences in the average use between the two groups were considered statistically significant**.

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Differentiating Agile Project Management adopters

Table 5 summarizes the percentage of agile (n=242), traditional (n=518) and hybrid (56) methods cross-referenced to the “agile characteristics” groups based on the fifteen agile characteristics.

Some projects self-declared using “traditional” methods could be characterized as “more agile” (37.8%) because these projects have been managed using some elements of the agile management practices. The “hybrid” group is more consistent with the characteristics of the “more agile” group.

<table>
<thead>
<tr>
<th></th>
<th>Less Agile</th>
<th>More Agile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agile</td>
<td>18.6%</td>
<td>81.4%</td>
</tr>
<tr>
<td>Traditional</td>
<td>62.2%</td>
<td>37.8%</td>
</tr>
<tr>
<td>Hybrid</td>
<td>30.4%</td>
<td>69.6%</td>
</tr>
</tbody>
</table>

Table 5. Comparison between self-declared management methods (n=816) and those assessed in the groups “Less Agile” and “More Agile”

Managerial Implications

- **Agility is a competence, not a matter of method.** Developing “agility” as a competence will depend on your own “recipe”. It is not dependent exclusively of using an “agile” method “by the book”. Organizations that use traditional methods also can develop a certain level of agility if they have the right set of elements, or “agility critical factors”.

- **Agility is crucial for innovative projects.** At least 37.8% of the projects that use traditional practices were considered “More Agile” (Table 5). This evidence indicates that, deliberately or not, these teams have developed a certain level of agility to deal with constant changes and more innovative projects in the organization.

- **Flexibility is a key element of agility.** You cannot change something that is not flexible. Changes are expected and welcome in highly dynamic project environments, especially when dealing with innovative product development. The project team and the organization have to understand that changes will occur frequently and they need to be ready to respond to them appropriately. Therefore, the ability to learn and to respond rapidly to changes are critical to being more flexible. Proper risk management and change management processes are very helpful for improving flexibility and anticipating changes and opportunities.

- **Simplicity is a “mantra” for the team.** One of the key aspects of flexibility is to keep the processes, practices and tools as simple as possible. The use of visual tools (e.g., whiteboards, drawings, etc.) combined with frequent interactions and informal meetings with the project manager and some key stakeholders will help the team keep a clear vision of the whole process and being more accountable for the planning and execution process. In some projects with high complexity the solution will be having different levels of planning and controlling supported by different tools and techniques.

- **Self-directed and autonomous team:** Promote self-organizing and self-directing behavior in your project team members. These are key abilities in order to use a simpler and more flexible management approach. The team members are active participants in the development and decision-making process and are accountable and co-responsible for the planning and controlling activities.

- **Find your own “recipe”**. The level of diversity in the portfolio is exponentially increasing in many organizations. Having a “hybrid framework” with different sets of practices, tools and techniques and team’s competences will help organizations to succeed in different project contexts.
Differentiating the “Agile” Project Environment
(by agile performance)

Agility Critical Factors (ACFs) favor or contribute to the proper use of the management practices critical for agility (see Conforto, et al., 2014). **Figure 16** shows how the use of ACFs compares between the two groups, Less Agile (group 1) and More Agile (group 2).

The “More Agile” (group 2) had statistically significantly greater** presence of these Agility Critical Factors compared with the “Less Agile” (group 1):

- Have the client/market representative and the project team members working geographically close, allowing frequent face-to-face meetings (ACF.2).
- The client/market representative possessed the required knowledge regarding the product’s technology content to be helpful and easily check and validate the partial results and deliverables as outputs of the iterative development process (ACF.4).
- Have all project team members working in the same room (or very close), favoring frequent interactions and face-to-face meetings (ACF.11).
- Having small project teams (e.g., up to 12 members) working on the projects (see ACF.9). Group 1 tended to have project teams with more members that were geographically dispersed.
- Project team’s more positive attitude toward dealing with and accepting changes during the project lifecycle (ACF.12).
- Project team’s autonomy to make decisions (ACF.13). The average level of autonomy is not high in both cases, with roughly 50% of the changes requiring the team needed to get approval from higher management levels (beyond the project manager responsibility).
- Greater technology competences (skills) possessed by the project team (ACF.5) as well as experience working on similar projects, with the same challenges, degree of innovation, complexity, etc. (ACF.7) are both relevant for less and more agile groups.

Other Agility Critical Factors were not statistically significant** between the two groups. These ACFs are equally present for both groups (less agile and more agile):

- Project manager years of experience in leadership positions (ACF.1) and being highly experienced working on similar projects, e.g., innovative projects (see ACF.6).
- Having full allocated project team members working exclusively dedicated to one project at time (ACF.10).
- Having project teams with multiple competences (ACF.8).
- Having highly executive support to the project execution (ACF.14).
- Having the client or market representative available and committed to be actively involved in the project development (ACF.3).

**We applied Analysis of Variances techniques using Mann-Whitney U and Kolmogorov-Smirnov Z tests to test differences in the means between group 1 and group 2.
Differentiating the “Agile” Project Environment (by method used)

Figure 17 shows how the use of Agility Critical Factors compares between projects using agile, traditional, and hybrid management approaches (self-declared).

Comparing Figure 16 against Figure 17 we see similar trends in the presence of the ACFs. Both analyses indicate that there are slight differences in the Agility Critical Factors between groups that declared the use of an Agile, Traditional or a Hybrid management approach.

Managerial Implications

- **Team member competences.** Several aspects that are considered key to developing “agility” are focused on team building. The differences between a “more agile” and a “less agile” team will result from specific skills, e.g., being proactive, having a positive attitude toward changes and challenges; being able to learn quickly; being self-directed; being able to identify threats and opportunities.

- **Experience matters.** The team’s experience is relevant especially when dealing with innovative projects. If the project is new to the company, the team will likely not have previous experience. What counts is the previous experience with similar challenges, risks, and project and business environment.

- **Team proximity and size.** Team’s proximity and size are two critical aspects when applying more simple and visual management tools. However, more important are the constant interactions between team members that will help the team keep aligned with project goals and be able to address different challenges. Proximity and size also contribute to keep the team focused and constantly sharing experiences and ideas.

- **Collaborative development.** A command-control paradigm is limiting in highly innovative project environments. Innovative projects need a collaborative environment and participative involvement of all team members. This is true for all project activities where team members are co-responsible for the the planning and controlling, and the project manager works as a facilitator and orchestrator, not as a task manager.

- **Team’s attitude.** The team has to be able to make decisions on a daily basis and have easy and fast access to decision makers in order to be more effective in the face of a change. The real “agile team” has a positive attitude in face of continuous changes and complex challenges and relies on a more iterative learning problem-solving process rather than a task execution-oriented process.

- **Client, suppliers and stakeholders involvement.** Specially when the team is using an iterative development approach, based on short cycles with ideation, prototyping, test and implementation, the involvement of the client, suppliers, partners and stakeholders is critical for agility. It is important to map the stakeholders and make sure they are being properly involved and making their contribution to the validation of partial results.
Conclusions and Future Developments

The results of this survey indicate that the use of “agile practices” is underway in many settings, regardless of the product type and degree of innovation, and going beyond application in software-related industries.

The key findings highlight the need to further explore agility as a broader theory and more importantly, as a core competence for project teams operating in dynamic and innovative project environments. Additionally, the results highlight that more than simply adopt “agile practices”, it is important to consider several factors related to project context, organizational culture, etc. It’s critical to have the proper balance between agility critical factors and management practices that will generate higher agility performance and project benefits.

This survey indicates that the use of agile project management practices, tools and techniques might be compatible with supporting organizations such as a Project Management Office (PMO). PMOs are considered strategic for organizations that are pursuing excellence in project, program and portfolio management, so it will be important to further explore their role when developing “agility as a team’s competence”.

The emergent need to be more “agile” and develop “agility” at the enterprise level as well as projects and programs may lead organizations to develop “hybrid” management frameworks by combining different approaches that best fit different market, organization and project characteristics and contingencies. Therefore, developing “hybrid” management models may become the next strategic challenge for organizations as well as developing people’s competences so teams will be able to operate and succeed in dynamic and uncertain project environments. It is important to recognize the value of the different management approaches, practices, tools and techniques available and understand how to employ the right combination for each project context.

Recognizing “Agility” as a project team competence that can be measured and improved is another key aspect to success in highly dynamic and innovative project environments. From this standpoint, developing the right level of agility will not simply mean the adoption of “agile methods”. Although some practices, tools and techniques can measurably improve agility, the big challenge is to combine the more appropriate set of practices, tools and techniques with organizational, project and people factors for different projects in the portfolio or even in the same project but during different phases. Organizations should start by identifying needed agility critical factors (ACFs). With these they can combine agile practices to create “process modularity” that will enable efficient creation of “hybrid” management approaches that produce the right level of agility for a specific program, project or even different phases of the same project.

The survey’s results are consistent with the idea of combining ACFs with agile and traditional management practices to create a more “hybrid” approach (see Conforto et al., 2014) and the hypothesis that “agility theory” can be useful to better understand the correlation between the adoption of certain practices, the ACFs and project and product performance, therefore, addressing questions such as:

- Which agile practices are more relevant to “agility”?
- Does the combination of agile practices and ACFs result in a better agility performance?
- What agility critical factors are more relevant to support the implementation of agile management practices?
- Do “hybrid” management models contribute to agility and product and project performance?

We will continue to explore these questions in future studies extending the findings from this survey.
Research Method

The research was conducted as a part of the Postdoctoral Research Project, coordinated by Edivandro Carlos Conforto, Ph.D, at the Massachusetts Institute of Technology, Consortium for Engineering Program Excellence (CEPE). This Global Research Project had the collaboration of researchers from the University of São Paulo, São Carlos School of Engineering, Brazil.

The questionnaire used in this survey has 56 close-ended questions organized in 4 groups. Group 1 focused on the description of the company, the respondent and the project under analysis. The unit of analysis was a project already completed. The second group of questions (Group 2) focused on the use of management practices, tools and techniques. Group 3 questions are related to the presence of organizational, team or process factors related to project and program management. Group 4 questions focused on aspects related to the “team’s agility performance”. This is the key construct for the “Agility Theory” in the Project Management perspective.

From September 2013 to March 2014 we sent the survey invitation along with a link to the questionnaire to a total of 9,430 potential respondents. We received 1,505 responses in total (16% return). Out of this total, 856 responses were considered valid (complete) for this study (9% of return) representing 76 countries and 17 different industry sectors. The population we invited to participate included project managers, program managers, portfolio managers and team members that participate in one of the Project Management Institute’s (PMI) communities of practice including:

- PMI Agile Community of Practice;
- PMI Innovation and New Product Development Community of Practice;
- PMI Program Management Office Community of Practice;

We also had invited participants from the Lean Program Management group at MIT.

For this specific report we used the raw data (full dataset, n=856) and the analysis employed multivariate statistical analysis, including cluster analysis, analysis of variance and descriptive statistics in order to better understand the relations between management practices, tools and techniques and the presence of agility critical factors and agility performance.

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References
and Additional Reading


Additional Reading


