ENVISIONING PRODUCTS TO SUPPORT THE AGILE MANAGEMENT OF INNOVATIVE DESIGN

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Abstract

Create a Product Vision is a challenge recognized for innovative design and it is a mandatory practice in the agile project management approach. The Product Vision Management Method (PVMM) was conceived to support this activity but it was tested with undergraduate students only. The aim of this paper is to present the results of two applications of the PVMM in a large worldwide company of consumer products. The aim of the analysis was to evaluate if the PVMM's deliverables fit the theoretical requirements of product vision, the compliance with the agility principles, or agility essence, and the designer satisfaction. The results reinforce some of the agile characteristics as guidance for innovation, collaboration, creativity, requirements progressive elaboration, iteration and value adding to customers. Among the conclusions are the identification of improvement opportunities to the method and new perspectives about how to create a product vision in innovative product design.

Keywords: Design management, Design methods, Project management, Agile, Product vision

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1 INTRODUCTION

The concept of Product vision has been used by the theory of Design Management since the beginning of the 90's. This concept was originated within the Strategic Planning Theory (Mintzberg, 1987; Collins and Porras, 1991; Christenson, 2007), and then it was applied in other theories, e.g. Product Development (Brown and Eisenhardt, 1995; Thornberry, 1997; O'Connor and Veryzer, 2001; Crawford and Di Benedetto, 2000), Design Management (Hekkert and Van Djik, 2001; 2011) and Participatory Design (Laitinen et al. 2008, Meristo et al. 2009).

Recently, Agile Project Management (APM) Theory has also embraced this concept. APM is a new management approach designed specifically for innovative product designs. According to this approach, the concept of Product Vision is used to describe the limits and conditions which product development should occur (Highsmith, 2009). It is a succinct and high-level description of the project`s final product(s), preferably in a graphic form (Benassi and Amaral, 2011).

The development of product vision is considered one of the factors that contribute significantly to a superior NPD performance (Lynn and Akgün, 2001; O'Connor and Veryzer, 2001; Crawford and Di Benedetto, 2000; Thornberry, 1997; Brown and Eisenhardt, 1995). The vision created must be challenging and induce the team to find innovative solutions (Chin, 2004; Highsmith, 2009).

Benassi, Ferreira Jr and Amaral (2011) evaluated several methods aimed to create product descriptions views. The authors searched for these methods on the academic literature regarding the Agile Project Management, Design Management, Participatory Design and Customer Involvement knowledge areas. After having identified the gaps, the authors proposed a method to support the creation of the product vision called Product Vision Management Method (PVMM). The method was developed especially for innovative products (Benassi and Amaral, 2011), and stands out for the inclusion of the most relevant elements of the other methods taking into consideration the APM approach. The authors conducted a pilot test of the PVMM in a controlled situation, as a part of an undergraduate course. The positive results stimulate the application in real cases. Therefore, the aim of this paper is to present the results of two applications of the PVMM in a large multinational company of consumer product.

2 PRODUCT VISION REQUIRENMENTS AND DEFINITION

Brown and Eisenhardt (1995) showed its relationship to innovation in products. Subsequently, Lynn (1999) and Lynn and Akgün (2001) reviewed the components of the "project" vision and identified a correlation between a clear and robust vision of what should be the product and successful developments. Recently, Tessarolo (2007) published a theoretical model to evaluate de performance of internal (multifunctional teams) and external (customer and suppliers) integration compared to overall NPD performance. The author found that the best results in terms of speeding up development cycles are obtained when it is present a clear and well-defined vision of the product. He concluded that the product vision is essential to ensure effective internal integration, which result was further confirmed by Anantatmula (2008).

In addition to strengthening the project performance correlation, Christenson and Walker (2004) identified the product vision components and requirements. In summary, the product vision must capture the essential goals, should describe the desired future state and project objectives, should be motivational, must convince the stakeholders, should be credible, must be consistent with the culture and values, and lastly should be demanding and challenging.

The types of visions have been identified by Reid and Brentani (2010). According to their typology, there are three visions: Organizational Vision, Technology Vision, Market /Product Vision. Nonetheless, there was still a lack of a clear and complete definition of product vision in their work.

The definition of Product vision adopted in this paper follows the definition proposed by Benassi and Amaral (2001): " Product Vision is a high-level description, it is succinct and preferably in graphic form of a product that does not yet exist and will be delivered on a project. This view may contain product dimensions as form, function, possible states, modules and the interface between them, requirements and goals. In addition, it must have the following properties: define the scope of the product, be challenging and provide motivation to the team".

Taking into consideration the definitions and discussion in the literature, a list of components or requirements for a successful description of product vision is presented in Table 1.

Table 1. Product vision requirements list

Requirements	Description
Realistic	Be based on something real and meaningful to the organization and can be communicated and shared
Motivational	Generate motivation and collaboration by highlighting its value proposition
Credible	Be relevant and describe a goal that can be met
Demanding and challenging:	Be demanding and challenging at the same time
Capture the tacit knowledge	Capture tacit knowledge (know how, mental models and beliefs)

3 PRODUCT VISION AND AGILE PROJECT MANAGEMENT

The Agile Project Management (APM) was originated in software development area. The motivation for the development of APM were the difficulties in managing web and innovative software projects in which there was less predictability (Agile Alliance, 2001). Currently it has been demonstrated the feasibility of applying the APM concepts on product development (Conforto et al., 2014). According to the authors: "APM is an approach based on a set of principles, which aims to make the process management simple, flexible and iterative projects. The idea is to adapt existing project management practices for application in dynamic environments with specific projects governed by innovation, high levels of uncertainty and complexity."

One big difference of APM is the replacement of the project definition (traditional Project Scope Statement) by a Product Vision. This change aims to create a preliminary design, in the very early stages of the project, where the degree of uncertainty is high, and set the working guidelines for the design team (Highsmith, 2009).

The main differences between the traditional project management and APM were synthesized from the Agile Manifesto (Agile Alliance, 2001), Highsmith (2009), Chin (2004) and Conforto and Amaral (2010) as an agility essence criterion (Table 2).

As previously mentioned, Benassi and Amaral (2011) evaluated product vision methods, especially for the context of the application of agile project management in product development processes. Subsequently, they proposed the PVMM. Next section details the research methodology of this paper, explaining the use of the PVMM in a worldwide company.

4 RESEARCH METHOD

The main objective of this research is evaluate the perception of the designers of a multinational company of the use of PVMM method. The evaluation was focused on three questions: Did the method generate a product vision? Is the vision generated by PVMM addressing the APM principles? Were users satisfied with the method?

We conducted a thorough case study in a large multinational company of consumer products (Voss, Tsikriktsis and Frohlich, 2002). The selection criteria of the company and project were: (a) the company should develop new manufactured products (physical) projects; and (b) the new product design should be classified as radical innovation (new technology) or platform (Chin, 2004).

The unit of analysis is the NPD initial phase. The data was collected through structured personal interviews, documents generated during the PVMM application, and direct observation of the researcher recorded in his logbook.

Three questionnaires were used to identify the perception of the project team as the application and benefits of the method. The respondents choose alternatives between 1 (totally disagree) to 10 (Totally agree). The dimensions evaluated were:

- Dimension 1 - Product vision requirements. To evaluate the ability of the method of generating a product vision according to the attributes described in Table 1.
- Dimension 2 - Agility Essence. Assess how much the PVMM is aligned with the set of agility principles described in Table 2.
- Dimension 3 - Influence on designer's work. Assess the feasibility of using the method: Designer overall satisfaction (personal satisfaction), Designer willingness to reuse PVMM (desire to apply it again); Designer recommendation (willingness to recommend the use in other projects)

Data analysis was performed based on a joint assessment of the average of the opinion of the users and by and agreement index. The agreement index (James, Demaree and Wolf, 1993; LeBreton and Senter 2008) indicates whether the opinions of designers converge or not. If there is an agreement, it is necessary only to consider the average. LeBreton and Senter (2008) indicate the limit of 0.75 to be considered the existence of agreement when using new questionnaires (not tested extensively). The presence of values above this limit indicates that respondents agree in their opinions on the variable analysed. Values below mean that there is no consensus among respondents regarding the variable. An average of 7.5 was the lowest average considered sufficient to conclude that the PVMM had a positive effect on the variables.

Table 2. Agility essence criterion

Agility Essence	Description
Simplicity	Degree of reduction of the effort needed (more visual methods, simple rules etc.) through thorough research activities that do not produce tangible results, reduced workload with management activities and control.
Learning	Process in which the design teams get, process and assimilate new knowledge about the new product, the team itself, and the methods. Due to the environment of uncertainty, each project should be treated as a unique learning experience. Methods must be accelerating agents of this learning rate
Flexibility	Ability to accept and adapt to changes based on what was learned. It is the reason why one should learn and learn quickly. It is rewarding learning instead of "punishing the change".
Collaboration	Participatory environment where all project stakeholders (customer, leaders and cross-functional team) jointly contribute to the success of the project.
Velocity	How fast the teams learn, incorporate learning and adapt to changes, saving time and improving productivity.
Guidance for innovation	Creation and expression of new ideas in the project environment. In this environment of uncertainty and dynamic, all members of the multifunctional team have to create innovative solutions within its area of operation.
Self-discipline	Degree of team decision-making autonomy, freedom to plan their own work, to structure their own processes, take their own commitments / play according to them, in short, manage themselves.
Progressive requirement elaboration	The requirements emerge as the project team and client learn and adapt to such changes. Allows the project team to balance the need for flexibility by customer with its own need to work planning.
Iteration	Iteration and incremental delivery: the product evolves continually (increase of functionality) within development cycles, revisions and adaptations in order to get customer feedback as soon as possible to what was developed. Planning becomes diluted in each iterative cycle.
Value adding	Customer expectations of service capacity (value delivery), both explicit and non-articulated needs, increasing their satisfaction.

5 CASE STUDY

5.1 The company

The company is a large multinational of consumer good acting in several different countries. Since 1934, the Brazilian plant has been in operation. Today the company employees approximately 2,700 direct personnel distributed among their four production units and three commercial offices.

The company produces more than a thousand different items and has an Integrated Management System, which demonstrates the adoption of policies in the areas of Product Quality and Environmental responsibilities.
The company's product development process adopts a matrix organization structure with lightweight project managers. Cross-functional teams are established for each project with representatives from Product Engineering (required), Process Engineering (mandatory), Production Control Planning PCP (mandatory), Quality (mandatory), R&D - applied research (where applicable), Mechanical and Electrical (when applicable), and support areas such as Purchasing and Cost Management. A project manager acts as the team leader.

5.2 The PVMM method

The PVMM method is composed by the following six steps: Step 1 - Define product scope; Step 2 - Capture product needs; Step 3 - Breakdown product needs in product pre-requirements; Step 4 - Create pre-conceptions; Step 5 - Present pre-conceptions; and Step 6 - Complete Item-delivery matrix. Well-known techniques and forms containing textual descriptions, figures and images that support the construction of a Product Vision are recommended to be developed during the application.
Standard techniques of design and project management literature are applied during Steps 1, 2 and 3. For instance, product scope might be created according to the PMBOK guide (PMBoK, 2008), and the requirements analysis might follow well-known techniques as presented by Baxter (1998).
During steps 4, 5 and 6 less usual techniques should be used. Steps 4 and 5 are aimed to create and present alternatives of conceptions of the product. The term pre-conceptions is used because the goal is not to decide or choose a specific solution (concept), but to identify different paths or design options and identify what is common between them. Indeed, the goal is to identify guidelines or product deliveries that can enable the team develop a common strategy to continue the project. Ideation methods and the development of drawings and/or prototypes assist the team to represent the pre-conception.
The Item-Delivery Matrix (step 6) is one of the key differentiators of PVMM compared with other methods. This matrix was specially designed to deploy the vision into a specific To Do List which describes the "work" necessary to find them. This list serves as a guide about how to materialize the vision. It is a team consensus about what must be done and how to do it. The rows of matrix contains all results (products and deliverables) and actions (workpackages and tasks) needs to find one or more pre-conceptions, arranged according the Figure 1.

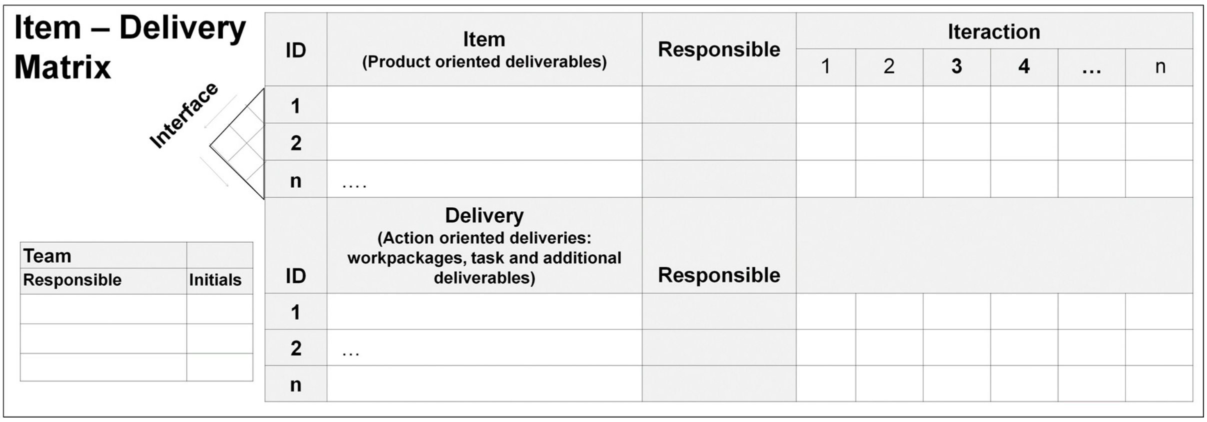

Figure 1. Item - delivery matrix - Source: Benassi and Amaral (2009)

Deliverables are specific result or event that can be verified and needs to be further developed in the project. The first group of lines contain a special kind of deliverables, the product items (superior block at figure 1). The team must list all system, subsystem or component of product which the team believes that will exist, as consequence of vision. The second group of lines must contain workpackages, tasks and other additional deliverables (the action-oriented delivery) which are necessary to materialize the first block of lines, the product item. That is, all necessary work aimed at ensuring that product-oriented deliverables are going to be developed.

The columns bring the information about the relationship between each line and the "iteration", or when the result or task must be complete, forming the project time frame. The cells in left of the matrix should be used to identify the critical interfaces (pyramid), which must be negotiated between team members. Furthermore, the matrix also reserves cells to identify who is responsible to coordinate each result or action.

5.3 The PVMM application

A cross-functional team was formed to participate in both selected projects, with 6 and 7 members respectively. The team was made up of people with experience in product development (3-14 years), and spent a timespan ranging from 4 and 6 weeks. They were strongly engaging because both projects were demanded by CEO and director board.

Three stages were used. The Planning stage aimed to anticipate and promote the resources and information necessary to perform the method as proposed; PVMM application- kick-off meeting and application of the method (Steps 1 to 6) (the researchers acted as participants); and Evaluation.

Step 1 - Define product scope. As mentioned, this step follows the principles of traditional project management theory (PMBOK), so both projects employed a form. The first project aimed to innovate the manufacturing process and to develop new product features. The second project was a radical innovation. It aimed to develop a new platform of products, which would generate a new product family, with innovation in product and process technologies.

Step 2 - Capture product needs. The team received standard information from marketing personnel, e.g. reports and market analysis. In the first project, the team collected and discussed the available data, creating scenes of the future use of the product, and subsequently a common understanding of the design problem was generated. Due to the high degree of innovation of Project 2, the team considered that marketing information were not enough. To surpass this gap, the team performed a series of actions: (a) identification of new targets/goals; (b) survey of data of secondary markets; (c) increase the Project Charter Agreement with the board (to better understand the stakeholders needs); (d) evaluation of 5 patents related to the scope of the product. The project manager created an integrating theme for the project and challenged the team members to seek completely new ideas, including related products, linked to the theme. This challenge was indeed very productive, because it brought a number of new possibilities for the project, expanding the scope defined initially.

Step 3 - Breakdown product needs in product pre-requirements; Step 4 - Create pre-conceptions; Step 5 - Present pre-conceptions; For the first project, the team members determined that each designer could choose how to present their ideas, e.g. draft, physical elements, models, etc. The proposals were set out in visual frames, as indicated by PVMM. The whiteboard was intensively used for initial presentation of the idea and was completely taken by sketches at the end. Discussions of users' needs were indeed rich and allowed the team achieve some pre-conceptions that together indicated a clear direction for the product. In the case of Project 2, the richness of the information obtained in the previous step was such that the team was able to identify in advance two relevant points. The first was the need to segment the users by age, because there would be very different needs for the same product. The second was the identification of two set of promising solutions. These two points were considered as guidelines of the product vision, which the team should take in consideration for the pre-conceptions development. At the end of the process, the team generated nine innovative conception for both age groups. Two were soon discarded and the result was the creation of a conception of a new product platform, which would lead to a complete new family of products.

Step 6 - Complete Item-delivery matrix. In both projects, the item-delivery matrix was filled with the data of the chosen solutions (pre-conceptions). In the case of project 2 the final solution was consisted of nine systems. The bill of material (BOM) and deliverables were discussed separately for each of the nine systems. During the matrix fulfilment, the team list the deliverables carefully in order to facilitate the general understanding of the organization work and integration during the future project.. The team used a colour pattern, used at project 1, to facilitate the visualization of the correlation between project deliverables, product items and requirements

The result of both projects were presented in gate meetings according to the company's product development process, and it is noteworthy that both projects have been approved for development. In the case of project 2, in about 1 month was generated a mock up of the product, which was presented at international technical meetings of the company, where the project has achieved wide acceptance.

6 RESULTS AND ANALYSIS

6.1 PVMM and the product vision requirements

Table 3 shows the average of each variable analysed for Dimension 1 - Product vision requirements and Dimension 2 - Agility Essence, and the respective agreement index.
The analysis of the evaluation results (Table 1) indicate that a strength of the method is its motivational ability (1b). This variable obtained averages higher than 9.20 and concordance index greater than 0.940, for both projects. These results confirm the field observation in which the researcher witnessed a large involvement of designers during the project.
Variable 1e, Capture the tacit knowledge, can be considered as another strong point of PVMM. Their average ranging from 8.92 to 9.30 and the concordance rates are higher than 0.960 reinforce the finding that there is a tacit component in the generation of product vision. Collins and Porras (1991) indicate that a "guiding philosophy", which is a set of fundamental values and beliefs, should be part of the product vision and not just text description (text or graphic form). Indeed, PVMM encourages the use of metaphors, symbols, analogies, slogans etc., which promotes the transfer of tacit knowledge to the team.
Despite variables 1a, Realistic, 1c, Credible, and 1d, Demanding and challenging, has not obtained all high agreements indexes, their averages are high. Therefore indicating the evidence that the product vision, created through PVMM, meets in general the requirements of a vision.

Table 3. Dimension Product Vision requeriments

Dimension	Variable	Project 1		Project 2	
		Average (μ)	Agreement index (rwg)	Average (μ)	Agreement index (rwg)
Product vision requirements	(1a) Realistic	9,00	0,906	7,94	0,912
	(1b) Motivational	9,90	0,994	9,25	0,948
	(1c) Credible	8,00	0,758	7,17	0,592
	(1d) Demanding and challenging	9,50	0,949	8,42	0,788
	(1e) Capture the tacit knowledge	9,30	0,974	8,92	0,961

6.2 PVMM and agility principles

Table 4 presents the means obtained in the evaluation of Essence dimension of mobility. None of the variables had an average below 7.50, and most presents agreement index greater than the threshold, indicating that these principles of APM are clearly manifest and perceived by the set of PVMM practices.

Table 4. Dimension Agility Essence

Dimension	Variable	Project 1		Project 2	
		Average (μ)	Agreement index (rwg)	Average (μ)	Agreement index (rwg)
Agility Essence	(2a) Simplicity	8,60	0,565	8,33	0,737
	(2b) Learning	8,60	0,896	7,50	0,862
	(2c) Flexibility	7,90	0,745	7,50	0,824
	(2d) Collaboration	9,30	0,925	8,83	0,875
	(2e) Velocity	8,70	0,956	8,58	0,957
	(2f) Guidance for innovation	9,80	0,988	9,00	0,880
	(2g) Self-discipline	8,70	0,942	7,50	0,673
	(2h) Progressive requirement elaboration	8,90	0,962	8,50	0,880
	(2i) Iteration	8,40	0,874	8,67	0,888
	(2j) Value adding	8,80	0,870	8,33	0,895

A highlight of PVMM is the ability to promote innovation and creativity (variable 2f). Project 1 average was 9.80 and the agreement index 0.988. Both significantly higher values indicate the great vocation of agile methods to promote these requirements. Methods employing simple rules encourage innovation and creativity by minimizing the time spent on planning and control activities, allowing staff to focus on activities that really add value as exploration and experimentation (Highsmith, 2009; Chin, 2004). Project 2, presented lower values (average 9.00 and agreement index 0.880), this fact might be due the highest degree of design innovation involved in the project. Nonetheless, the numbers remained at high levels.

The variable velocity (2b) was also attended by PVMM. The creation of the Product Vision, for Project 1, was initially planned to occur in four-cycle iterations, however, it was completed in three iterations. Furthermore, deliveries were developed beyond the scope of the Vision phase. Therefore, this result suggests that a robust product Vision generated from PVMM actually contributes to the reduction of development times (Brown and Eisenhardt, 1995).

It is worth mentioning the variable Simplicity (2a) obtained a 0.565 concordance index for Project 1 and 0.737 for the Project 2. Despite having shown a significant improvement in Project 2, this number remained below the threshold, indicating that there is no consensus on the team in relation to this requirement.

Another requirement that is worth to note is Self-discipline (2g) that showed a significant drop of the agreement index from Project 1 to Project 2 (0.942 to 0.673). The index has changed from a high level of consensus for a mismatch situation. An analysis of the answers of Questionnaire 2 shows that this decrease occurs because one of the respondents have scored 3 and another note 5 to the question "PVMM gives freedom to each member plan their own work". One hypothesis for this fact is that as these two designers did not attend the first PVMM application, and the second project presented a high degree of innovation, the item-delivery matrix has been completed in more detail in an attempt to define the scope of the work package clearly and objectively. Nevertheless, this discord indicates an opportunity for improvement of the method.

The variables Learning (2b), Collaboration (2d), and Progressive elaboration of requirements (2h) were highly evaluated (average greater than 7.50 and agreement index greater than 0.862). However, Project 2 presented lower average and index than Project 1. The hypothesis is that this fact is due to the complexity and degree of innovation of Project 2. The progressive elaboration of requirements demanded a high effort of the team in Project 2. The feeling of a lower "Collaboration" in Project 2 might be related by the fact that it was required several individual interventions of experts in the project, due to the complexity of the project and specific-topic.

The variables Iteration (2i) and Value adding (2j) achieved similar and high average in both projects (greater than 8.33). The agreement index also remained stable and high in both projects suggesting that these variables are present in PVMM, regardless of the complexity of the application.

6.3 PVMM and the designers satisfaction

Once the PVMM applications were completed in both projects, the Questionnaire 3 was applied to all participants, which was intended to evaluate the PVMM performance. The personnel who participated in both projects replied to the questionnaire only once to avoid repetition of answers. The averages and agreement index are listed in Table 5.

Table 5. Assessment of the Influence of PVMM on designer's work

Dimension	Variable	Average (μ)	Agreement index (rwg)
Influence on designer's work	Personal satisfaction (3a)	4,63 (*)= 9,25	0,866
	Desire to apply PVMM again (3b)	4,63 (*)= 9,25	0,723
	Willingness to recommend the use (3c)	4,50 (*) = 9,00	0,714

(*)The original scale ranged from 1 to 5. The average values were normalized to a scale of 1 to 10, intending to facilitate the comparison of the results of the three dimensions.

There was a team consensus only regarding the variable Personal satisfaction (3a). Contrary to what was expected, there was no agreement about the desire to re-use PVMM or the willingness to recommend it to colleagues. There were doubts about recommending future applications both for themselves and for other teams.

7 FINAL CONSIDERATIONS AND CONCLUSIONS

The application of Agile Project Management in the development of physical products is still in early stage studies. One of the challenges in implementing this approach is the difficulty of teaching how to create a Product Vision. The aim of this research was to evaluate a Product Vision method, named PVMM. The results are compiled in Table 6. The three dimensions were considered presented or not according to the following criteria:

- Fully attended (RWG> 0.75 and μ> 7.5). Designers agreed that the method had a positive effect.
- Not present (RWG> 0.75 and μ <7.5). The designers agreed that the method had no effect, here defined as 75% on the scale.
- Undefined (RWG <0.75). Those in which there was no agreement, and then it is not possible to say what is the perception of the team.

Table 6. Summary of assessment of the dimensions

Dimension	Variable	Project 1	Project 2
Product vision requirements	(1a) Realistic	Fully attended	Fully attended
	(1b) Motivational	Fully attended	Fully attended
	(1c) Credible	Fully attended	Undefined
	(1d) Demanding and challenging	Fully attended	Fully attended
	(1e) Capture the tacit knowledge	Fully attended	Fully attended
Agility Essence	(2a) Simplicity	Undefined	Undefined
	(2b) Learning	Fully attended	Not present
	(2c) Flexibility	Undefined	Not present
	(2d) Collaboration	Fully attended	Fully attended
	(2e) Velocity	Fully attended	Fully attended
	(2f) Guidance for innovation	Fully attended	Fully attended
	(2g) Self-discipline	Fully attended	Undefined
	(2h) Progressive requirement elaboration	Fully attended	Fully attended
	(2i) Iteration	Fully attended	Fully attended
	(2j) Value adding	Fully attended	Fully attended
Influence on designer's work	Personal satisfaction (3a)	Fully attended	
	Desire to apply PVMM again (3b)	Undefined	
	Willingness to recommend the use (3c)	Undefined	

The results reinforce the analysis of qualitative data. First, it confirms that there were agreement about PVMM as a method that promotes guidance for innovation, collaboration, creativity, progressive development of requirements and meet the iteration concepts and adding value to the customer. Second, people agreed that the PVMM was effective, allowing the description of the project objectives and scope.

The results also pointed out the deficiencies of PVMM, especially regarding simplicity, which appears to have influenced the recommendation aspect. According to the established criteria, PVMM was not considered sufficiently simple by the team. The hypothesis is that PVMM possess a cost-benefit issue. The effort to implement the method does not offset the benefits of satisfaction, motivation, innovation and effectiveness achieved. This result recommend it use to really innovative cases and special projects. For researchers in the field, indicates an aspect that could be improved and topic of new researches. For the professionals and the design management theory, these results indicate that it is possible to create a method to generate a useful Product Vision that meets the necessary requirements, according to the approach of agile project management. The researchers believe that the increase pressure for the creation of innovative projects and reduced time to market, this research topic becomes increasingly relevant.

Recommendations for future work are to develop more detailed theoretical models about the concept of Vision and on their measurements; improve PVMM in terms of simplicity of artifacts; use computing resources as electronic billboards and 3D modeling software; enhance the array item-delivery; apply PVMM in projects of another company.

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