

PROJECTING THE FUTURE: NEW PRODUCT-PROJECT DEVELOPMENT:

THE PROD-JECT MANAGEMENT SYSTEM

ISMAIL ALBAIDHANI
DEPARTMENT OF ECONOMICS AND
MANAGEMENT SCIENCES, UQAC

ALEJANDRO ROMERO-TORRES
SCHOOL OF MANAGEMENT, UQAM

BRAHIM MEDDEB
DEPARTMENT OF ECONOMICS AND
MANAGEMENT SCIENCES, UQAC

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Abstract: Several new theoretical models suggest integration between the creativity and implementation activities for a comprehensive innovation cycle and complete project phases. However, organizations need more guidance to improve the project/product success rate. Therefore, the empirical research discussed in this paper revealed that the two variables (idea creation & Project delivery) are actually linked and could be considered for possible integration. A new and more practical management system ProdJect was also unleashed that detailed how the two variables could be operated with detailed processes, systems, roles and organizational design. The ProdJect management system offers a detailed and comprehensive purpose-to-impact cycle, giving a new and unique evaluation model for the project and product development type that looks at effectiveness, relevance, and overall sustainability instead of focusing on limited aspects of work such as time, cost and scope.

1. Introduction

Several new theoretical models suggest integration between the creativity and implementation activities for a comprehensive innovation cycle and complete project phases. They serve as good conceptual models (Hobbs, Aubry, & Thuillier, 2008; Martinsuo, Hensman, Arto, & Kujalo, 2006; Thomas, Williams, Cicmil, & Mullaly; 2010), yet, still require to be further detailed into a more practical management system for companies, industries, and even for countries to be able to use effectively. On the one hand, project fail rate could be largely attributed to the state of mind of many organizations that approach new projects trying to predict all its details (scope, time, cost and stakeholders) from the conception stage, not sighting several unknown variables in an increased organizational complexity (Matta & Ashkenas, 2003). And on the other hand, innovation failure could be reasoned to organizations vague approach that tend to focus only on the creative part with neglecting taking it to the realization stage. Organizations are seeking new frames that provide flexibility and structure to navigation fluidly through complexity. Especially in exploratory innovative journeys when little information is known about the project. Therefore, this paper enquires to address some of today's modern organization challenges in creating new value while delivering the result. The goal is to analyze the complementary and shared traits found in both areas (Innovation and Project) to address the challenges, limitations, contradictions as well as the complexity each area has on its own. Identifying a unique area within projects that were rarely discussed in research when organizations are managing vague, ambitious, and outside the box exploration missions with little clarity on the scope, timeline, and resources. Our focus is where the degree of originality in the innovation ideation is very high, while the discipline and agility for project implementation are also high. This paper is structured as follows: next section presents the theoretical background and the Prod-Ject model. The third and fourth section detail respectively the research methodology and the results. And finally, discussions for applications and modifications are presented in the last section.

2. Theory background

2.1. Literature review

New theories are emerging to challenge traditional project processes and organization as well as the definition of innovation management system by attempting to design-think the innovation and the project systems, phases and activities (Albaidhani and Romero-Torres, 2018). These new research argued and proposed new theoretical models, using some aspects of the system dynamics loops to move away from the waterfall sequential process blocks that could limit our ability to imagine and paint a new framework of project collaboration through the use of the process ontology (Chia, 1997; Rescher, 2012). The focus of these new theories was to analyze the complementary and shared traits found in both areas (Innovation and Project) to address the challenges, limitations, contradictions as well as the complexity each area has on its own, as shown in

Figure 1.

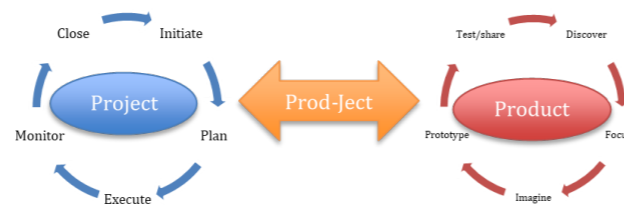
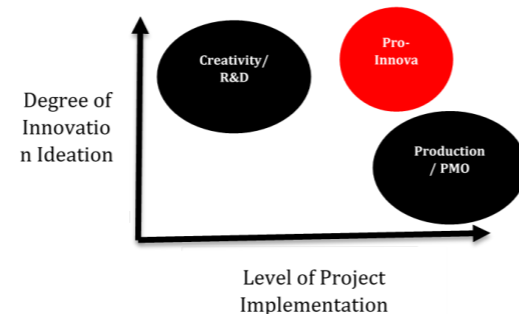


Figure 1. The interaction between Project and Product development (Project-Innovation)

This new research identifies a unique area within projects that were rarely discussed in research that is when organizations are managing vague, ambitious, and outside the box exploration missions with little clarity on the scope, timeline, and resources. As a framework that is best used when the degree of originality in the innovation ideation is very high, while the discipline and agility for project implementation are also high (see figure 2).

Figure 2 -
Project
Innovation
(Pro-Innova)
Unique
Position



The project innovation new theoretical models help analyze the interrelation between the two areas to potentially aid innovators in their struggle to materialize their ideation cycle while assist project leaders to make sense of their delivery work (Creating a purpose-to-impact full cycle). At the macro level, they help balance the forces from the two polar disciplines within the organization, industry, and country. However, it is worth noting that major work is still required to zoom down from the theoretical framework into a more practical management system that details how Project Innovation could be operated with their detailed processes, system, roles and organizational design. This would include a comprehensive resource competency study to avoid straining existing resources by doing more than one task they used to perform, e.g., project managers becoming innovation leaders with responsibilities they didn't know or had before and vice versa.

In this light, we collected empirical evidence to detail the project and innovation cycle, and assess its viability at the organizational level. This research and the proposed management system were mostly driven by the notion that it should ultimately create relevance to the field of practice (Blomquist et al., 2010). Hence the survey came to test the viability and practicality of some of the proposed project innovation conceptual models in an attempt to bridge the current gap being observed between management theories and the field management practice (Mintzberg, 2003). This gap is even more apparent in the field of project research with the ongoing tension between the practitioners' point of view on what a best practice is and consequently the creation of the body of knowledge for project management versus the project research and theories (Cicmil & Hodgson 2006). The research took a brief view on top-down traditional system on how rational structures in projects and innovations and how best they could be managed (Andersen, 2006); (Dvir and Lechle, 2004); (Pinto and Slevin, 1989), nonetheless the main focus of the research was on the process by studying the past, present and future of how the projects and innovation processes

relate to the entire organizational structure (Legris and Collette, 2006); (Lindkvist et al., 1998); (Lundin and Söderholm, 1995); (Sutterfield et al., 2006) with a special attention to the practice by relating the process through the bottom-up identification of a local situated actions (Hällgren and Wilson, 2007); (Hodgson, 2004); (Simon, 2006). Overall, paradigm belief theory (Guba & Lincoln, 1994) and constructivism discipline were guiding this research work, assuming that there isn't just one-way of the truth as it is relative and highly dependent to its context, opening the concept for interpretations. This belief allowed for us to freely study the nature of the relationship between two traditionally different areas of research (Project & Innovation). It also allowed for the proposed concepts and models to be open, adaptive and contextual to the type of work and industry the reader may belong to.

2.2. The Prod-Ject management system

The project management perspectives covered the school of thoughts within each standpoint. They represent some common traits, styles, methods, and ideas (Turner et al., 2010). The nine perspectives grouped into four main project-focused categories: project performance, project business, project people, project solution, contingency, success, behaviour, process, optimization, governance, decision, modelling, and marketing. Perspectives that are the closest to the project and product development research are those linked to the use of contingencies, success, governance, marketing, behaviour, and process within project development. The simple concept of innovating something new is somehow linked to what projects are intended for (i.e. creating something unique). Both are linked to the basic idea of development (Tim Brady & Mike Hobday, 2012). Innovation and change in organizations are often dependent on projects, one-time initiatives to launch new products, and new processes. The project is usually the means by which innovation takes place. Therefore, projects are a key way of organizing innovation and the innovation is a major output of certain kinds of projects. According to the aforesaid defined innovation generations, it is likely that the first generation of R&D push model is associated with the defense projects, due to the required

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science push version of innovation. As the use of project spreads from the military into business, more attention started to be paid to customers under the name of a market pull model. However, the second and third generation innovation models have not affected project management's approaches largely (Rothwell, 1992). The PROD-JECT Management System (Prod-Ject MS) referring to the combination of the Product and Project management for organizations to be more effective in predicting and projecting their future using some defined steps and processes to create and realize new concepts and solutions.

The new management system combines phases from the R&D and new product development cycles (e.g. Idea creation and screening, business and market analysis, testing and others) with some of project management phases (e.g. planning, execution, monitoring and closing), while coming back at the end of the Prod-Ject cycle in a system approach to integrate the impact and success factors (see **figure 3**).

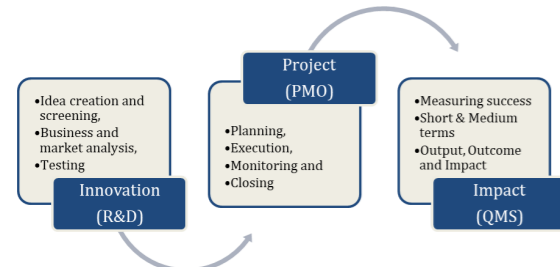


Figure 3. The Prod-Ject Management System

This model suggests a new practical management system that requires zooming into the details of the Prod-Ject new organizational structure, processes, roles, and system to clarify the possible applications of the new management system within organizations at the different sectors.

3. Research methodology

3.1. Method

A mix research method approach was deployed including semi-structured interviews, and ethnographically observed case studies from the aviation industry and trade development sector, which are ranked low in innovation projects i.e. investment in research and development and overall economic performance (McKinsey & Company, 2013). A survey was also conducted to further validate the

interview and case study observations. Consequently, we could potentially validate and help further define the detailed structure, processes, roles, and systems forming a more practical working model, which expands from the theoretical frameworks into a new management system. The research methods were mostly driven by the notion that it should ultimately create relevance to the field of practice (Blomquist et al., 2010) hence, the practical management system came to test the viability and practicality of the proposed theory in an attempt to bridge between the current gap being observed between management theories and the field management practice (Mintzberg, 2003). This gap is even more apparent in the field of project research with the ongoing tension between the practitioner's point of view on what is a best practice and consequently the creation of a body of knowledge for project management versus the project research and theories (Cicmil & Hodgson 2006).

The use of a blend of qualitative and quantitative research approaches in this research was designed to increase the rigor of its findings; each methodology used works to complement and not compete with the other methods, in a way that it should help address some of the gaps and weaknesses that can be found in each method independently.

Overall, paradigm belief theory (Guba & Lincoln, 1994) and constructivism discipline are guiding this research work, assuming that there isn't just one-way of the truth as it is relative and highly dependent to its context, opening the concept for interpretations. This belief allowed for us to freely study the nature of the relationship between to traditionally different areas of research (Project & Innovation). It also permitted for the proposed concepts and models to be open, adaptive and contextual to the type of work and industry the reader may belong to (see **figure 4**).

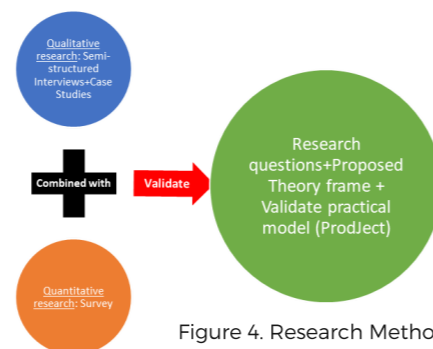


Figure 4. Research Method

The semi-structured interview method was used to confirm or not the researcher ethnographic field observation for the proposed theoretical model and to assess the applicability of the proposed theoretical model. The questions were mostly open needed to allow the interviewees to provide comprehensive and specific perspective. The people interviewed were experienced leaders in projects management and worked in industries closed to the two observed case studies, i.e., aviation and standard development. This method allowed for a direct interaction between the researcher and the research object variables (Aubry & Hobbs, 2011). The interview questions were therefore primarily centered on the application and less on the exploratory part that was used in field case study observation. Five groups of questions (Each with sub-questions) to unleash and validate all aspects of the ProdJect Management System:

- **1.** Questions about the interviewee perception of the industry and organization key challenges. Example: from your work experience in the industry, what are some of the key challenges it currently faces? Same question about their company challenges (This generic question is to confirm (or not) the innovation challenge that was observed).
- **2.** Questions about the current processes and activities with relation to innovation. e.g., what their organization do to create new value (products & services) for its members in the industry? Further follow-up questions will be asked to detail their processes, roles, systems, and structure. These sets of questions are to assess the interrelation between the independent variable "Innovation ideation" processes and spot any linkages it currently has with the dependent variable "project implementation." This question also assessed the viability of a management system through questioning the phases, roles, structure, and systems.
- **3.** Questions about the current processes and activities with relation to project e.g. what does the organization to deliver value (projects & programs) for its members in the industry? Further follow-up questions asked to detail their processes, roles, systems, and structure
- **4.** Questions about the interviewee's view on how best to address and improve the issue of creating value and delivering it to their industry members and stakeholders, e.g. what in your view would be the best working model to improve the innovation and project delivery in the organization for its industry stakeholders and members?
- **5.** Final questions asked about the impact assessment e.g. and so in your organizational case, how would you define if the innovation is successful? And similarly what makes a project successful or not in your view?

The use of an international multi-sector/country survey using an online questionnaire came to validate the observation made from the interviews and field studied cases and to try to understand the processes, roles, and organizations around the innovation project area. The questionnaire was targeted to leaders and professionals who led and participated in projects and innovation from a broad range of industries, and from several countries around the world.

The questions have been tested and standardized to tackle issues related to the research hypothesis:

- Understand key modern organizational management challenges
- Assess the relationship between innovation and projects and the variables (Ideation & implementation)
- Evaluate the proposed ProdJect model in more practical details from processes, organization, roles, and responsibilities
- Understand and define success in innovation projects

The questionnaire was designed in three main sections; the first part is related to explaining the research aims and objectives, assuring confidentiality and requesting consent. The second part is related to demographics to identify the respondents' experience, industry, country and others to allow for the variation analysis to be conducted based on sectorial or regional affiliations. The third and main section is related to assessing the proposed model variables with questions that scale from 1 (Strongly Disagree) to 5 (Strongly agree).

3.2. Survey Participants

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Participants were selected based on the following criteria to add value to the research questions to validate findings from interview and field case studies:

- Scholar, professional or management role in either small, medium or large sized organization to be able to reflect the reality of modern organizations.
- Sufficient knowledge and exposure to the area of project management and innovation in order to be able to understand and contribute to the different model variables
- Diversity in the participants from the public, private and social sectors and various industries to capture the similarity and differences across the various industries & sectors
- Diversity in the participant's gender, country & region of the world to address the point of gender, cultural and regional variation

The questionnaire was shared with about 500 scholars & professionals with varying project or innovation management background from +60 countries in about 20 industry sectors (Figures 5-10).

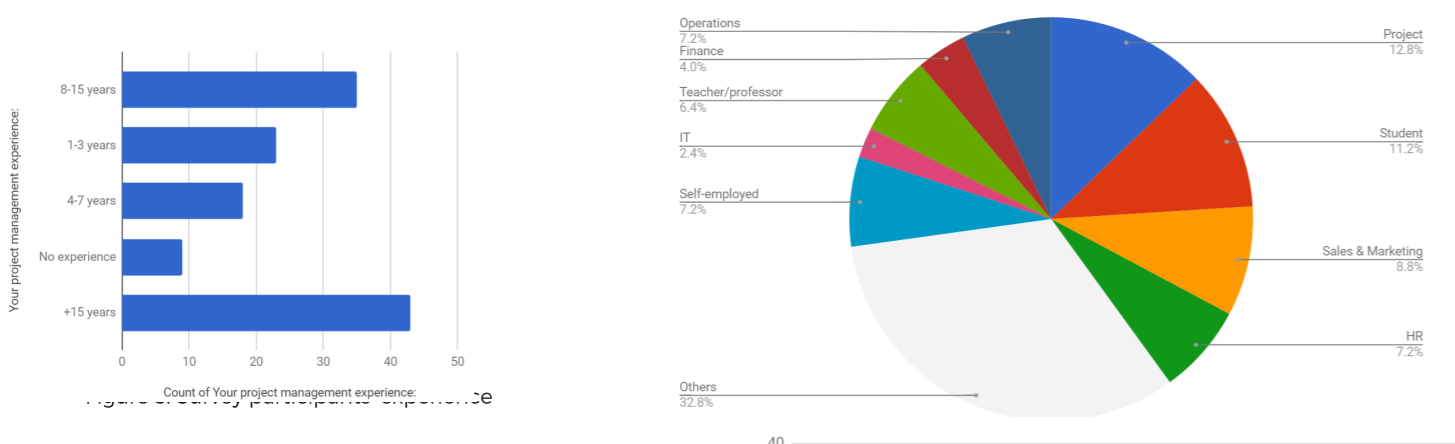


Figure 9. Survey participants' Role

Figure 6. Survey participants' size of projects

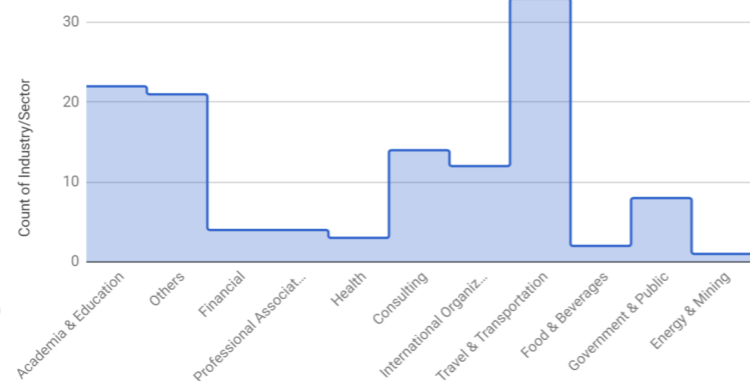


Figure 7. Survey participants' Industry

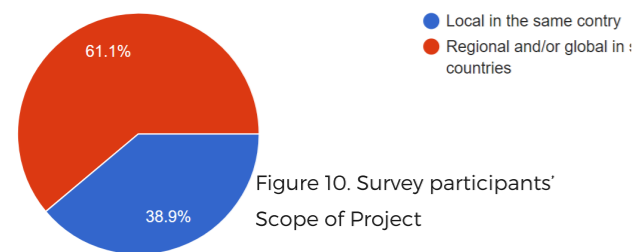


Figure 10. Survey participants' Scope of Project

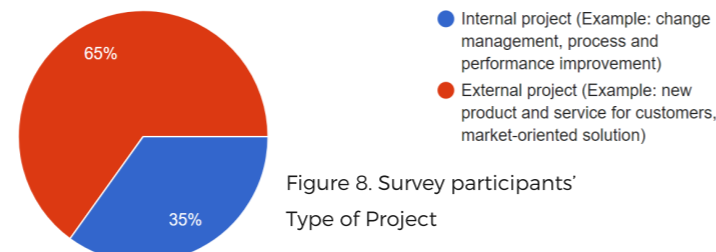


Figure 8. Survey participants' Type of Project

The participants were from industries such as aviation, IT, consulting, education, food & beverages that are based in countries like Switzerland, Canada, the US, Dubai, Singapore, and others (see figure 11). An advertisement at university conferences and on targeted social media was used to reach out to relevant contacts for the online survey, using a web questionnaire tool. Respondents were encouraged to be spontaneous, reflect their realities (No right or wrong answers) and be as decisive as possible. They were also given open-ended commentary areas for a more qualitative explanation to their quantitative rating. The questionnaire remained open for about six months to allow for all the different segments to feed in their viewpoints.

4. Findings

4.1. Aviation industry

The semi-structured interviews and ethnographic observation summarized in the two case studies revealed some interesting findings in the aviation case. The organization seemed to be delivery-driven with many projects and programs that are being deployed for the various aviation value-chain stakeholders around the world. This could be partly attributed to the nature of the industry that is fast-changing and margin-thin when it comes to profitability. Therefore, innovation and creativity placed in a secondary row compared to project delivery unless innovation is driven by forced external industry change.

It was very seldom to observe the organizations linking innovation represented by creating new solutions to the discipline of project implementation and delivery. Few small departments that are succeeding in the development of new and relevant industry solutions are linking the development to the delivery without even noticing, i.e. creating any formal processes to increase and accelerate the best practice. The interviews confirmed that many of the great ideas lose its way due to the lack of the experimenting and implementation discipline. There is currently a vivid lack of creative ideas, i.e. leading to new and relevant industry products, services or solutions, either due to the lack of active engagement with their users or for the fact even good ideas don't get to be implemented. Therefore, many of the ideas create today are self-generated and often face massive resistance within the industry value chain.

The project implementation success rate has dropped (Industry Priority Scorecard) mainly due to lack of engagement of the program teams of the value and impact of the solutions they are deploying for the industry stakeholders. Externally, members and industry stakeholders are showing a great sign of dissatisfaction with the organization work, and relevance to their work (Members engagement & customer satisfaction surveys). There were few examples highlighted in the interviews of successful industry-wide innovative solutions when the owner decided to work on the idea creation with the users and implemented the solution in a pilot approach.



Figure 11. Survey participants country (The bigger the circle the more participants from the country)

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One region appreciated the concept of linking the idea creation to project implementation to the extent that they assigned the idea generator to lead the project as sponsors to ensure its success for the industry. Nonetheless, this is causing a significant constraint on resources, in particular on the idea generator, causing a demotivation factor to create further new concepts.

Interviews from the industry saw a need to bring the idea generation, especially with users, to become an integral part of the solution delivery in order to overcome some of the issues facing the organization to be positioned as innovative by creating more and relevant value to its global stakeholders.

4.2. Trade and standard development

In the case of the trade and standard development case, the semi-structured interviews and ethnographic observation revealed some other interesting findings. Many experts and technical committees are forming to create new concepts for national, regional or international standards, therefore, the organization and sector are innovation driven by many ideas and concepts that are floating from experts in several industries and sectors in the quest to come up with a standard way of working and doing things. This sector is mostly voluntary, and experts are often self-funded from their employers, industries, or countries hence have no major pressure when it comes to financial or time management.

The observation is that the organization and sector always placed the creative part, i.e. creating new standards away and separate from the project delivery, i.e. publishing and materialization of the standard. The organization works with hundreds of new concepts for potential standardization. However, many are lacking more than three years of discussion within the technical committee members (Standard development stage dashboard). The technical committee has a chair who is often a leading expert in the subject matter and a secretary that assists in the compilation of the feedback. It clearly lacks any principle of project time and scope planning as it's often left to the discretion and good judgment of the technical committee members. This results in problems at the industry and country levels due to the lack of

standardization, which in turn influences the creation of substitute standards that are of less quality and consensus. Even when the standard is delivered after three or four years, it sometimes loses its relevance due to the fast-changing technical aspects, or to enter in a none-ending scope expansion of the standard resulting in further delays and creeps.

There are few successful agile technical committees who delivered on new standards on time with high quality and consensus from their respective value-chain stakeholders. The chairs and secretary of those technical committees were often very charismatic, align and had a very good sense of planning without necessarily linking what they naturally did to the project management principles. The creation of new international standards related to project management, e.g. PMI PMBoK, ISO and others, which were formed by technical experts who also possess good project management expertise, have helped raise the awareness of the possibility to link the two areas i.e. creation with the delivery. Interviewees from the sector are seeing the need to be developed and trained in general management areas aside from their established technical expertise to assist them in better planning and delivering their ideas to their industry stakeholders.

4.3. Practical aspects of the ProdJect Management System

The survey result came to shed more light on the practical aspects of the ProdJect Management System. As showed in the figure 12, it seemed that the highest rate of respondents (about 68 of the 110 responded to this question) either "agreed or strongly agreed" with the third option that both creating new value while delivering results at the same time is the biggest challenge they are faced with their stakeholders in the various, sectors and regions. This was closely followed by another group (62) who saw that creating a new value of relevant products and solutions is what concerned them the most with their stakeholders.

What would you say is your organization biggest challenge (Based on your external stakeholders' expectation)?

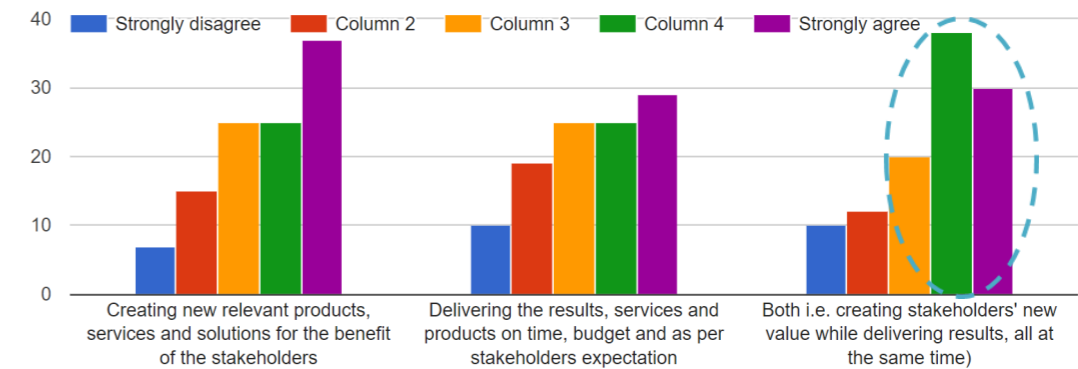


Figure 12. Main Organizational Challenge

The majority of respondents (89 of the 128 disagreed or strongly disagreed that there was not a link between the two) saw a link between the two variables of idea creation and project delivery. Secondly, the major agreement (90 of the 128 agreed or strongly agreed) that both variables are linked in the feature that project and innovation produce a unique and new outcome. This group was closely followed by a second one that identified another feature that links the project and innovation as they are progressive in steps and deliverables. Those who saw the link between the two variables in the unique outcome feature had a more exposure to projects that are of a multi-country nature, with external client and market development focus. They also saw that the main enabler for new ideas to become a tangible reality was in the ability to implement them more than its degree of originality and uniqueness.

The main connecting feature that links project to innovation is that..

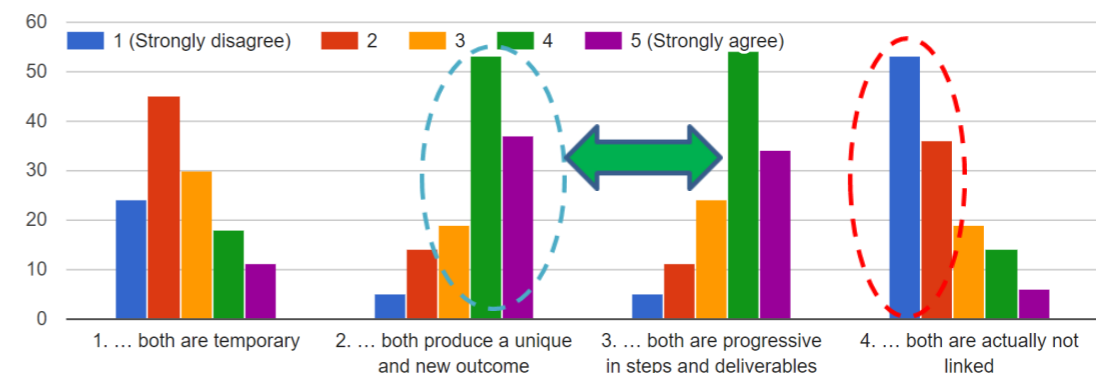


Figure 13. Links between Project and Innovation

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As shown in **figure 14**, 115 of the 128 respondents confirmed by agreeing or strongly agreeing that it is the ability to execute and implement which enables ideas to become a tangible reality. The degree of originality in the proposed idea was seen as less relevant to the realization process in innovation management.

When it came to assessing the success of both variables, "the impact of the final outcome in the form of the effect of the final product or service on the business or society by meeting its original business plan objectives" came as the highest agreed to option with 111 agreement from the 128 who answered this question (as shown in **figure 15**). This was followed very closely by the satisfaction of the customer externally or the sponsor internally, with some more strongly agreeing views toward this option. The lowest agreement came for the option that suggested project success is dependent on meeting the time & financial objectives which is ironic how the majority of organizations (including PMI) measure and define the success of all project types.

Moving from the relationship and output part of the model variable into more input related questions that were asked to underpin a practical model of how one could potentially combine between the two areas and variables. When assessing the factors to ensure the effectiveness of the model variables, 91 from the 128 respondents agreed or strongly agreed with the third option that suggests collecting and measuring the success criteria set by its stakeholders are the most crucial step to ensure the model effectiveness (as shown in **figure 16**). This was followed by 77 respondents that indicated the integration of the project in the original idea creation or business planning phase is what matter the most. While option one to consider planning as the most crucial factor for effectiveness came last, which yet again challenges existing assumptions that planning should be considered as the most crucial in all project types.

D. The main enabler in making new ideas become tangible reality is

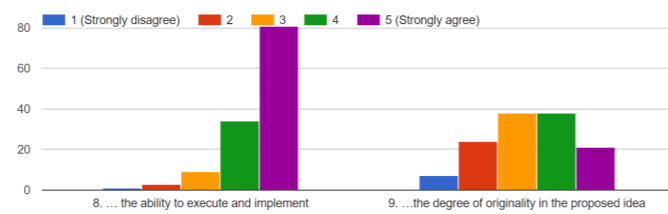


Figure 14. Enablers of Innovation

B. In Innovation-Projects, the most important success criteria is....

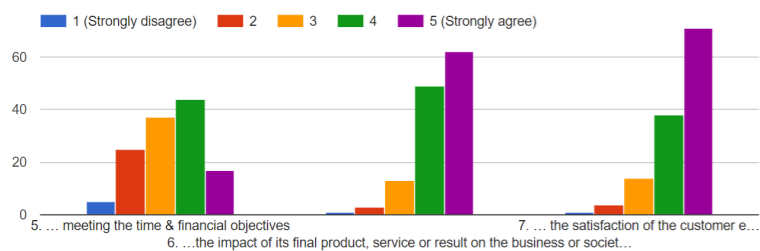


Figure 15. Project Innovation Criteria

E. Innovation-Projects most important success factor is

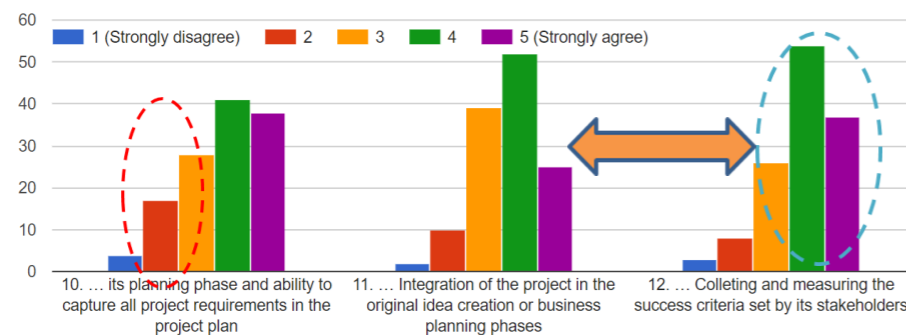


Figure 16. Project Innovation Success Factors

A second question was asked related to the input part of the model with a special focus on the processes and phases breakdown. As showed in the **figure 17**, the majority of the respondents (106 from 128) agreed or strongly agreed that the best breakdown of phases in the innovation projects is the third proposed option that starts with Idea Creation and Feasibility, Project Planning, Project Execution, Project Monitor, and Project Close, and concludes with Idea Impact Assessment. Whilst the majority disagreed with the traditional view and breakdown of projects that begin with Project Planning, Project Execution, Project Monitoring, and ends with Project Close.

Still at the model input, looking more at the roles and responsibilities within such project framework. A question was asked about leadership. The majority of respondents (73 of 128) agreed or strongly agreed with the first option that the Project Manager (PM) leads the project work with the Subject Matter Expert (SME) contribution (see **figure 18**). This was closely followed by the third option that the two PM & SME co-lead the project from start to finish. Whilst the majority of respondents disagreed with the second option that the SME leads the project work with a Project Management Office (PMO) or PM support in the methodology and process.

F. Best breakdown of phases in Innovation-projects to achieve the desired result are... ..

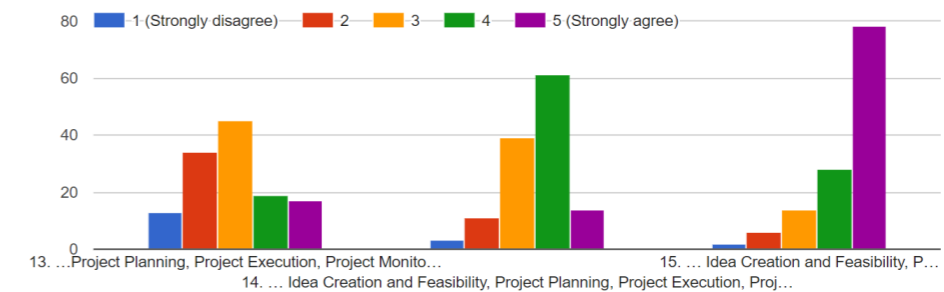


Figure 17. Project Innovation Phases

G. The best innovation-project leadership role would be....

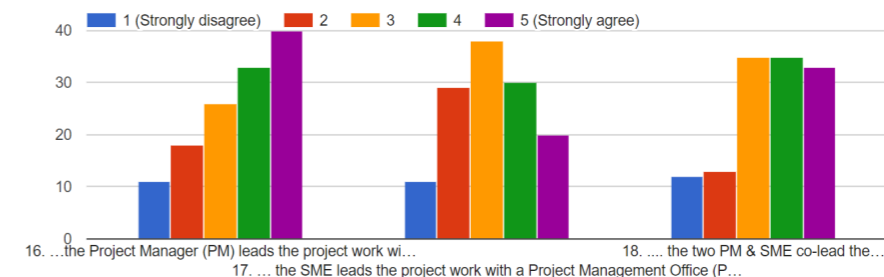


Figure 18. Project Innovation Leadership Role

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Looking at the model best organizational structure, a question was asked to understand the best structure. As showed in **figure 19**, the majority 101 of 128 respondents indicated the fourth option of a matrix structure where R&D, PMO, & NPD are working closely together from the idea creation to final delivery and market assessment is the most suitable setup. Whilst the first option with the existence of an R&D unit in the organization and the total budget investment put into research is voted the least preferable by the respondents.

And the final question was on the impact of the model. Going beyond the input and output levels, we covered in the previous questions. As displayed in **figure 20**, the majority 10 from 128 agreed with the third option that the impact the final deliverable achieved inside the company (Internal) or in the market (External) is the most suitable evaluation matrix. Whilst most disagreed with the first option that proposed the existing traditional way of evaluating projects in most organizations that is to evaluate the compliance of the original cost, time and scope.

H. Innovation-Projects best org. structure can be assessed in your views by

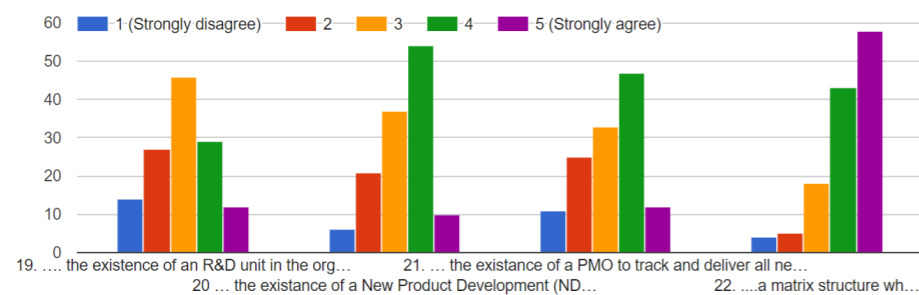


Figure 19. Project Innovation Org Structure

I. The best way to evaluate the impact of Innovation-Projects is to

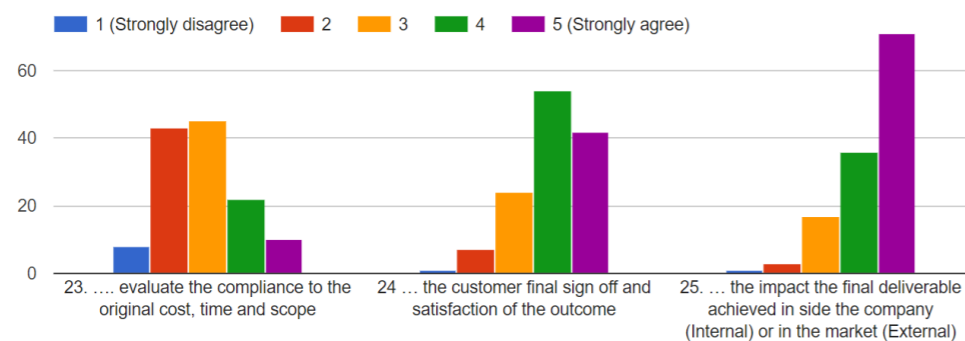


Figure 20. Project Innovation Evaluation

When looking at the above findings from the quantitative-qualitative research work, new organizational structure, processes, roles, and systems to clarify the possible application of the new ProdJect management system within organizations at the different sectors.

The organizational structure of the R&D, which can be called differently depending on the organization e.g. market research or new product development units, is typically looking aftermarket intelligence, scanning and research as well as in few cases the initial development of the concept prototype. The PMOs unit, on the other hand, which can also be called differently like program management, delivery or implementation units, could also be merged within R&D as a new expanded organizational unit named RD&P (Research, Development & Projection), which has the governance accountability for both the market research and development of ideas and concepts as well as the delivery of the final product and result. With a continuous assessment of the impact the innovation project had on the socio-economic levels to measure its contribution to sustainable development, which is seen as a soft organizational link to the Quality Management System unit in the organization (see **figure 21**).

Due to the exploratory nature of these type of organizational missions, the Prod-Ject proposed management system suggests that each innovation project should be the sponsor or customer-centric i.e. developed progressively together with the customer, and therefore we suggest having **two streams of processes** and activities that are running in parallel:

One eye is on the solution and product development process that integrates and starts from as early as the conception stage at the market research or business development phase, passing to the analysis where further elaboration on the idea is being analyzed with the customer, resulting in a blueprint for what the final product or solution would look like.

It then passes through the progressive creation in the crucial design and development phase that produces a portion of the new product (Alpha, Beta, etc.) with a continuous customer validation and contribution to its creative development process before the deployment phase where the final product or solution is being completed and deployed to the customer.

A new extended final phase of this proposed process is to measure the impact of the final product to the end users or beneficiaries, by going beyond the typical outcome performance indicators like the satisfaction and use of the solution, to the impact, the solution has made to the organization, country or industry.

The second important eye of this proposed Prod-Ject management system is happening in parallel to the above-mentioned development activities to ensure the effective delivery of the product or solution through the project management processes, which in this case starts its initiation and planning work from as early as the idea conception phase by gathering information, and resources to create a baseline for the project. It then assumes an important communication, marketing, and coordination internally within the different development units and the customer for their visibility and validation throughout each of the development processes.

Following the closure of the project activities at the product or solution handover to the customer, the project in this Prod-Ject model doesn't close its work and continues with measuring the performance of the project

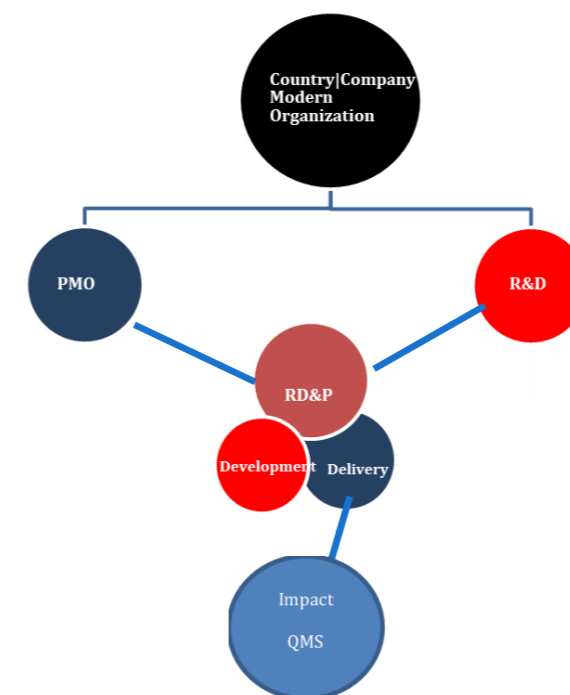


Figure 21. The Prod-Ject New Organizational Design (RD&D)

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focusing on the customer development and creation experience and combining the impact the project deliverable had created for the organization. And since the Prod-Ject is defined as a management system, the last phases loop back to the start and conception of the following idea, hence creating a continuous improvement and incremental innovation cycles (Kaizens) for the organization as part of the RD&P unit and QMS activities. To summarize, the Prod-Ject proposed management model changes the traditional waterfall project management processes and activities that are used currently in most organizations influenced by the biggest body of knowledge created by PMI. The following five-summarized areas explain the Prod-Ject model differentiators:

- 1. It combines the product and solution development with project management processes
- 2. It assumes the start of any project starts from the ideation/conception stage (and not following) in progressive elaboration
- 3. It goes beyond the agile development as it mandates that the customer is the gatekeeper for each of its phases
- 4. It adds a new process phase after project closure and product delivery that is focused on measuring outcome and impact of the project and product.
- 5. And finally, this new Prod-Ject model assumes projects are management systems that end it works only temporarily when the product is handed over but continues in reality within the organizational boundaries and beyond through the impact assessment work that contributes to the incremental product innovation and project performance over time in a system dynamic way.

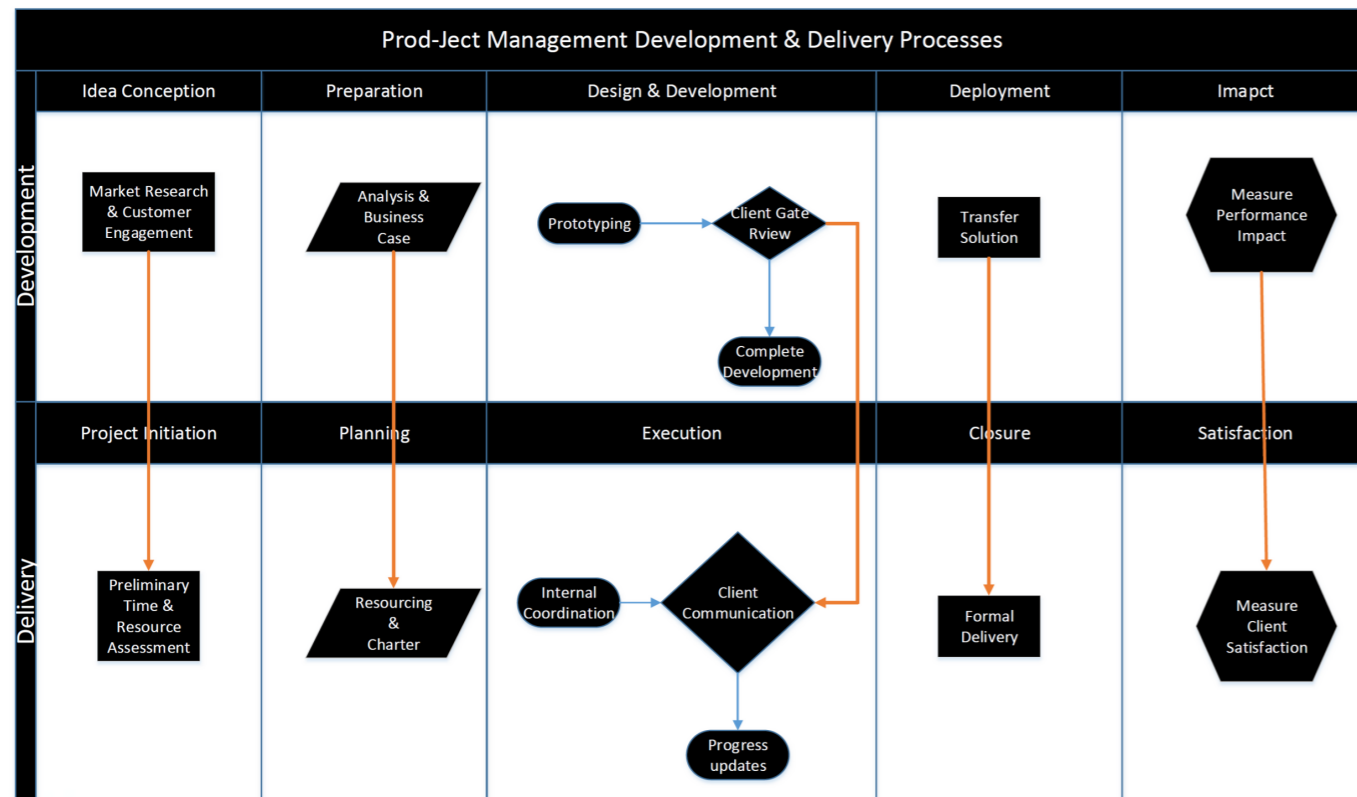


Figure 22. Prod Ject management Process Model

As shown in **figure 22**, the five-proposed process changes in the Prod-Ject management system triggers the need to also rethink the traditional **role of the Project Manager (PM)**. In typical Waterfall and even in Agile projects, the PM is assumed to be the one leading the troops (Resources from the different organizational areas) to deliver the final solution to the customer on time, scope and budget. However, this traditional PM role may not fit in the development and innovation type of projects using the Prod-Ject proposed model since it looks for combining ideation and development expertise as well as project competencies. And therefore the Prod-Ject Management System suggests a complimentary style leadership with a co-pilot principle (Similar to when flying an airplane) that makes each project starts with two Prod-Ject leaders: One who leads the product development, responsible for the solution specification, quality, and impact, and a second co-pilot as the project lead that looks after the resource planning, coordination, and overall client communication together with the product lead. The Prod-Ject team reports in a matrix to both the project lead for areas such as resource usage, timelines and scope deliverables, while they report to the product lead for the design, development specification and quality of production.

As showed in the **figure 23**, the two leads coordinate in co-pilot approach with the customer, where the project lead communicate on the overall scope progression, next steps, timing, and budget, while the product lead speaks to the customer about the progressive creation of the product or solution specification, all the way from its starting prototype, to its alpha, beta and gold stages. The two leads also ensure knowledge transfer to the team and client and the business continuity, especially that such project and development take time and therefore has some more unknown risks in comparison to the widely used traditional pre-scoped and pre-defined projects. At the **system level**, the Prod-Ject management system assumes a system integration between the idea conception, marketing or customer relationship management system (CRM) where new business development leads and initial concepts are usually kept, together with project management delivery systems such

as the Microsoft Project Server, and the outcome of both then creates the KPIs for the RD &P balanced scorecard that measures the prod-ject outputs, outcomes, and impact (see **figure 24**). Finally, to illustrate the importance of pursuing with our proposed theoretical (Pro-Innova) and management (Prod-Ject) framework, it is worth looking at the case of IBM in 1999, they had failed to take to market some new and potential technological product like the commercial router that was originally created by IBM yet Cisco was the one who succeeded in commercializing it within the global markets. In IBM reflection about this case, it found the lack of effective and agile execution with short-term orientation on existing products and market share. The company realized the need for a specific governance and process to enable this idea-to-market cycle. IBM launched the Emerging Business Organization -EBO (O'Reilly et al., 2009). After seeing the impact of such new organization with approximately \$25 million since 2000, the organization has lately developed a new innovation project process known as jStart (see **figure 25**) with the ultimate goal to improve their idea-to-market cycle with a motto and designed processes to "Start Small, and grow fast" with the customer always in mind (IBM, 2016).

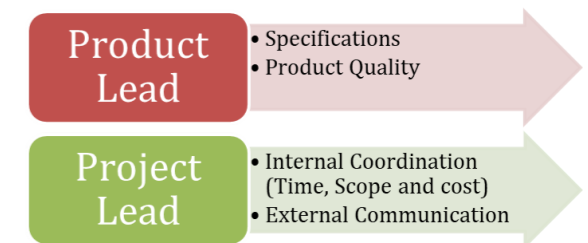


Figure 23. The Prod-Ject Management Roles

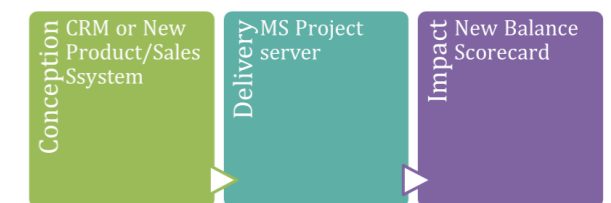


Figure 24. The Prod-Ject Management System tools

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the jStart process

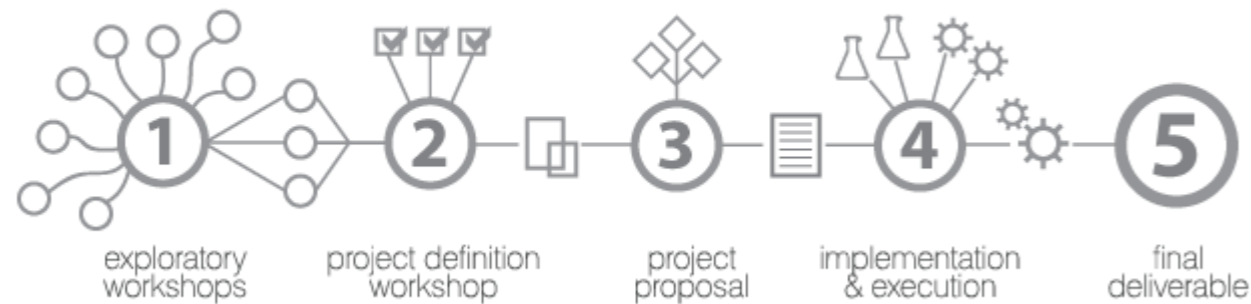


Figure 25. Start Small, and grow fast (IBM jStart, 2016)

5. Discussion and conclusions

Till now, very limited research was done to study the relationship between project and innovation within organizations, the three most notable studies were by Hobbs, Aubry, & Thuillier, 2008; Martinsuo, Hensman, Arto, & Kujalo, 2006; Thomas, Williams, Cicmil, & Mullaly, 2010. They have not specified a model for how modern organizations could practically apply a new management system that will allow them to create new value while still delivering with agility.

On the one hand, project fail rate could be largely attributed to the state of mind of many organizations that approach new projects trying to predict all its details (scope, time, cost and stakeholders) from the conception stage, not sighting several unknown variables in an increased organizational complexity (Matta & Ashkenas, 2003). And on the other hand, innovation failure could be reasoned to organizations vague approach that tend to focus only on the creative part with neglecting taking it to the realization stage.

Our ProInnova & ProdJect frames provide flexibility and structure to navigation fluidly through complexity. Especially in exploratory innovative journeys when little information is known about the project.

Our new theory is emerging to challenge traditional project processes and organization as well as the definition of innovation management system by attempting to design-think the innovation and the project systems, phases and activities (Albaidhani, Romero, 2018). The new research argued and proposed new theoretical models,

using some aspects of the system dynamics loops to move away from the waterfall sequential process blocks that could limit our ability to imagine and paint a new framework of project collaboration through the use of the process ontology (Chia, 1997; Rescher, 2012). The focus of the proposed theory was to analyze the complementary and shared traits found in both areas (Innovation and Project) to address the challenges, limitations, contradictions as well as the complexity each area has on its own.

Our research identified a unique area within projects that were rarely discussed in research that is when organizations are managing vague, ambitious, and outside the box exploration missions with little clarity on the scope, timeline, and resources. As shown in Figure 6, our proposed Pro-Innova framework is best at used when the degree of originality in the innovation ideation is very high, while the discipline and agility for project implementation are also high.

The formula ProInnova proposed is simplified in that the increased frequency of new ideas created multiplied by the agile ability to deliver them will result in a greater impact: Increased Idea creation (y) X Agile Project delivery (z) = Greater ProInnova impact (Δyz)

Instead of following a streamlined set of processes as proposed in traditional project management, which aims at reducing variation and failure, the ProInnova and its ProdJect model create a fluid yet framed environment that allows for increased variation, failures and therefore an eventual high impact success.

The research and proposed theoretical model ProInnova creating a full cycle from purpose to impact in order to help analyze the interrelation between innovations and projects shows that ProInnova is a framework that could potentially aid innovators in their struggle to materialize their ideation cycle while assist project leaders to make sense of their delivery work. The model attempts to assist the organization at the macro level to balance the forces from the two polar disciplines within the organization, industry, and country. The ProInnova tries to break down the complexity by bringing between the two areas of the idea creation and project implementation with a special look at 3Cs:

- Creation of new concepts and ideas
- Coordination within the organization to deliver in an effective and efficient manner &
- Communication and engage with all the internal and external industry or global stakeholders for a higher impact with success.

The empirical research revealed that the ProInnova model mains two variables (idea creation & Project delivery) are actually linked and could be considered. A new and more practical management system ProdJect was also unleashed that detailed how ProInnova could be operated with detailed processes, systems, roles and organizational design. The ProdJect management system offered a detailed and comprehensive purpose-to-impact cycle, offering a new and unique evaluation model for the ProInnova ProdJect type of projects that looks at effectiveness, relevance, and overall sustainability instead of focusing on limited aspects of work such as time, cost and scope.

ProInnova and ProdJect findings could be considered as a process innovation that is aimed to help with product innovation to maximize its impact (Lee & Schmidt, 2017). It is also important to note that the proposed ProdJect Management System that covers the propose-to-impact cycle, will need to be further studied when it comes to its third variable (Impact) in the case of success criteria. The survey research finding unleashed that customer/user satisfaction has a heavier weight than the long-term impact that the model proposed.

Another modification to the model will be in its proposed way of project implement newly created ideas. The findings suggest that a more modular, phase-based approach with using pilot experimentation with a select group of users is more appropriate than going into a fully fledged project delivery model which could be resource-risky if the implementation reveals some potential gaps in the original idea.

It was also observed from the interviews, case observations and survey result that the ProdJect framework while proven to be generally gaining consensus across the studied and surveyed sectors & regions as a framework for exploration types of projects that are intended to create unique outcomes that impact for the long term, it nonetheless shouldn't be seen as a "one-size fits all" principle. A careful modification by interpreting the model and how it could best fit the industry or country it will be used for. One example we noticed is while interviewees and survey participants agreed on the link between the two areas, they sometimes interpreted the link differently. This was also confirmed by the ethnographic case observations when innovation projects were used differently between the aviation case that sought to strengthen its organizational project delivery position by engaging the user in the initial thinking and idea creation process, and the case of standard development where creative ideas was the theme of the organization and ProdJect. The empirical research revealed that the ProdJect Management System two variables (idea creation & Project delivery) are actually linked and could be considered. However, it is worth noting that major work is still required to be further studied when it comes to its third variable (Impact) in the case of success criteria. The survey research finding unleashed that customer/user satisfaction has a heavier weight than the long-term impact that the model proposed.

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Ismail Albaidhani

He is currently conducting academic research at the University of Quebec (UQAC) in Canada.

He works as part of the United Nations Agency for Migration in learning and development and works with educational institutions like Stanford University in the US, Nanyang Technological University in Singapore, and the University of Geneva in Switzerland.

He held senior learning and education roles at international organizations such as the IATA Training & Development Institute in the aviation industry, ISO Academy in the trade & quality sector, UNICEF Capacity Development in the humanitarian sector.

He is currently part of the ISO technical committee to draft and finalize the new international standard in innovation management. He also served as part of the Project Management Institute global advisory board in areas related to project management education and learning.

His doctorate and research specialization is in the management of projects with a focus on innovation management from the University du Quebec a Chicoutimi (UQAC), and he holds a master degree in international management from the Geneva School of Economics & Management (UniGe) in Switzerland.



Alejandro Romero Torres

professor at School of Management (ESG) from Université du Québec à Montréal (UQAM) and associate researcher at the research chair on project management. He holds Information Technology Engineering Degree (Universidad Anahuac, Mexico), M. Sc. and Ph.D. in Technology Management (Ecole Polytechnique de Montréal, Canada). In the past 10 years, he has participated as a consultant in several technology implementation projects for different industries (healthcare, government, energy, pharmaceutical, manufacturing, retail, etc.) in Latin America (Mexico, Colombia and Venezuela) and in North America. His research interests are: adoption and diffusion of technology innovations, project governance, technology management and organizational transformation. He has published several articles within technology and project management field.



Brahim Meddeb

Professor of management and Director Laboratoire Innovation (CAISEN) at the Department of Economics and Management Sciences, UQAC - Université du Québec à Chicoutimi.



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