

On the Future of Project Management Innovation:

A Call for Discussion Towards Project Management 2030

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Abstract—Rethinking Project Management (PM)* has been a recurring theme for some time [1]–[9]. In context of the current era of Digital Transformation, which is also referred to as the time of VUCA (Volatile, Uncertain, Complex and Ambiguous) it seems fair to assess if the current PM curricula match the needs of the market, both public and private. Professional bodies like IPMA† and PMI‡ similarly re-assess such which then leads to new editions of their standards to emerge. The current paper provides a short overview of the current developments of the profession. As well, it identifies related recent, current and ongoing research addressing similar questions regarding the success chances and rates of projects in light of the use and application of various PM methods. It aims to propose a new approach to learn using “Research through Project Management” (RtPM). Understanding the impact PM can have on the manner in which products, services, processes and systems are being developed, and the manner in which PM is performed. The authors propose the profession of PM will need to develop itself different from the way it has been conducted to-date and refer to it as “Towards Project Management 2030”, having the profession develop itself in a much more continuous manner. The paper ends with suggesting how to organize such ongoing research on, learning of and adoption by PM in practice embracing lifelong learning.

Keywords—Project Management; Program Management; Portfolio Management; Strategic Management; Personal and Professional Development; Innovation; Reflective Practitioner; Reflective Professional; Lifelong Learning; Learning Organization; 21st Century Skills; Value Creation.

I. INTRODUCTION

The current era of *Digital Transformation* is also referred to as the time of VUCA (Volatile, Uncertain, Complex and Ambiguous). It is clear and evident that in this era much is changing. Moreover, the only constant is change. Especially when it comes to the crossroads of technology, engineering and management disciplines as can be read any form of trend reports, for example, from top consultancy companies or from the financial institutions proving recommendations to their clients [10]–[12]. Such VUCA environment, is bound to have an impact on the manner in which products, services, processes and systems are being developed, how research and development are

being organized, innovation is managed, and PM in all of the above is performed [13]. Innovations are for some time already and will be more and more an undertaking where many collaborating entities, forming a network, work towards common goals [14]. Vice versa there is a discussion emerging about the “Projectification of Society” as reported and described in [15], [16] and [17], as through the use of projects and project management (PM) many changes in society are being realized. In light of both developments, it seems more than prudent that PM will need to develop itself towards ‘*Project Management 2030*’.

Bakker clarified in [18] there are multiple definitions of PM used and there is no full consensus even amongst all major bodies. As is also recognized in practice through open discussion in networks [19]. The definition that Bakker adopted, be it in the context of engineering projects, was a definition for PM originating from Turner [20]:

“A project is an endeavor in which human, financial and material resources are organized in a novel way to undertake a unique scope of work, of given specification, within constraints of cost and time, so as to achieve beneficial change defined by quantitative and qualitative objectives”.

However, over time and through practice, we have come to understand that not always all project specifications are known upfront, and in context of the emergence of more agile PM methods (see [21] and [22]), we have chosen to adopt another definition by Bakker [18] and as set forth by the Association for Project Management (APM) in the UK:

“Projects are unique, transient endeavors undertaken to achieve a desired outcome”.

Note that this definition also keeps with the mentioned “Projectification of Society” discussion on the development of PM that suggests a need towards more Program Management and Transition Management as further stated by Rotmans in [23]:

“The role of the project manager tilts along with the society. There is need for transition managers who give direction to a process while allowing room for others”.

* Where in this article the wording *Project Management* is used, it should be read with a broad and holistic view as to include but not limited to concepts such as program management, portfolio management, innovation management, change management and strategic management.

† International Project Management Association (IPMA).

‡ Project Management Institute (PMI).

The purpose of the current paper is not to enter into a discussion of definitions. However, it is needed to each time have some level of common understanding of the frame of reference used, and whereas indeed PM itself is also subject to needed change and continuous innovation in PM is likely to be needed. In particular, in the perspective of the ever ongoing and recurring discussions regarding project success and failures, despite all research done to date on the many key factors driving successes and failures to date, rather than repeated every 10 years the author(s) suggest a continuum and ultimately continuously, from Plan-Do-Check- Act (PDCA) towards 'Plan-Do-Check-ADAPT'.

In that respect, much change has come about in research-, development-, innovation- and project- management approaches in the past 30 years, including such approaches as 'open innovation', 'living labs', 'co-creation', 'scaled agile frameworks', 'design thinking', 'research through design', and many more. Yet, at the same time, society continues to be confronted with a limited albeit slowly increasing yield of all of these project undertakings in terms of success rate and/or value created as described in [24]. Which opens the question how we do learn, a theme much broader than just PM as discussed in a whitepaper by Richardson & Dixon [25]. How do we learn in this 21st Century and apply all that knowledge in the broadest sense to such projects undertakings in society, or can we accelerate the improvement of success rate, or will PM have different or more precise meanings in future or even become obsolete as some agile evangelist suggest?

As result of this contemplation, the current paper is intended as a "discussion paper" with the aim to propose a new approach to learn using "Research through Project Management" (RtPM) and give direction to the future research agenda on PM in all of its flavors in context of the increasing world of VUCA. A discussion on the future of PM referred to by the authors as "Towards Project Management 2030" is developed.

II. RESEARCH FRAMEWORK & METHODOLOGY

Authors' research framework and methodology has been based on three pillars:

- A state-of-the-art review [26] of the literature in order to offer new perspectives on issues related to the PM profession and theory development in research and practice, e.g. [1]-[9], addressing current matters with some retrospective reflections and highlighting areas in need of further research (Section III).
- An umbrella review [26] of findings from previous workshops conducted and/or IPMA DNRG workshops attended by the authors focus on PM and rethinking the factors driving the development thereof (see [27] and [28]), (Section III).
- The own experience of the authors as research scientists and/or project managers, aiming to contribute to the evidence-based practice of good project management.

III. CURRENT STATE AND RELATED WORKS

To set the stage for such further discussion on the future research agenda, the current paper uses information and data found in literature, but also in public news, blogs and events with practitioners as it relates to PM. The current paper also provides an initial view on findings from data obtained from Pelk's recent and ongoing research on "Agile in R&D Organizations: Projects in Post Phase-Gate World" [29], which is conducted using a grounded theory approach.

A. Retrospective Discussion: Looking Back 30 Years Ago

Thirty years ago, Jeffrey Pinto [30] described the world in similar fashion, as the environment had become more dynamic with increasing uncertainties in technology, budgets and development processes.

Hence, it appears the description of the environment has not really changed since then, albeit the term VUCA did not exist in 1987 until the decade thereafter. However, in the eye of the beholder since then, there has been a significant and increasing level of (perceived) VUCA reached in today's world. It opens the question if the referred research done by Pinto ought to be repeated three decennia later to research if the findings thereof still stand or have substantially changed since then, a retrospective approach.

One of the ten crucial factors of thirty years ago reported by Pinto were the clearly defined goals and project mission. In today's world, we evidently have found a manner to work in the absence of such clear goals and are able to work with fuzzier goals using 'Agile Project Management' approaches in particular in software development projects as described in [21], albeit it has been recognized that lots have been done but there is more to do [31].

B. More Recent Discussion: Looking Back 3 Years Ago

At the same time, we can detect as summarized in [24] and [27] that much change and progress are still needed as the yield of project undertakings in terms of project success have been increasing but have not reached such levels of five times nine or carrier grade[§]. Teamwork remains a challenge as also once more reported recently by Oeij [32], describing the use and effects of a so-called 'mindful infrastructure' and the relation between complex projects and defensive behavior. Related thereto, is a very recent systematic literature review on: "Barriers in Information Technology Project Management" [33]. That review, reports that the top 75% barriers either hindering progress of a project or even leading to fail a project are related three of the PMBOK^{**} knowledge areas:

- Human Resources,
- Communication, and
- Acquisition.

[§] A qualification used for example to indicate telecom grade quality and/or availability of computing services of 99.999%

^{**} PMBOK (The Project Management Body of Knowledge). An ANSI-norm for project management, since 1987 and developed by the PMI.

Note that in their research the first two areas together make up more than 50% already of the occurrences of barriers identified in the 75 positively identified studies out of 3,001 studies originally found through keyword search. They conclude that in particular for the Small and Medium-sized Enterprises (SMEs) there is no need to invest in evaluating the efficiency of PM, but to invest in communication and human resources. Interestingly though their mapping of their data onto the PMBOK areas shows that the other areas such as time, risks and costs appear to present no barrier at all.

Recent work from Bronsgeest [34], indicates there is much potential to gain in project undertakings in the Dutch governmental bodies if for example large government project evaluations themselves would be performed professionally as projects in their own right. Compared thereto, Frijns et al. [35] report that, based on 300 *Gateway Reviews* performed on projects- and programs in the Dutch Government, a more balanced approach is required balancing between factors as culture, content, relations and process in future government projects and programs. In another research, they report on the basis of those data that there is even a need for more balance in two types of governance that co-exist; the governance focused on the apparatus or project organization and the governance focused on goal achievement [36].

Another trend, that is emerging, deals with the discussion on so-called value creation through projects. Laursen & Svejvig [37] performed a systemic literature review on the subject of project value creation and its effect on setting the research agenda. They identified that many other fields other than PM need to be taken into account, from benefits management, strategic management, and value management. Hence, rather than to address the issue from a narrow PM perspective do it from a broader and more holistic perspective including portfolio and strategic management amongst others. This also clarifies why in the current paper it is noted that whenever the wording ‘project management’ is used, it should be read with a broad and holistic view as to include but not limited to concepts such as program management, portfolio management, innovation management, change management and strategic management.

The theme “*Towards Project Management 2030*” has been introduced at the 22nd ICE/ITMC 2016 International Conference during a workshop [28]. Purpose of the workshop was to engage the audience that evidently will use PM too in their R&D projects. Otherwise phrased, the workshop was primarily related to the field of PM, but in the context of technology and innovation management.

The participants of the workshop came from many different fields, from aerospace industry, oil & gas industry, automotive industry, telecom, and pure researchers from universities. The participants also spanned the globe, from EMEA, the America’s, and ASPAC. During the workshop, a live questionnaire was used from which some results are shown in Fig. 1. These Q&As relate to the perception of the attendees on how PM is implemented, how scoping is perceived and how information exchange is facilitated. Whereas the number of attendees of the



Fig. 1. Some Workshop Questionnaire Output

workshop was limited (20 attendees), and even not all attendees answered all of the questions, and whereas the results can certainly not be declared to have scientific relevance, the issues flagged are much recognizable from personal practical experience of the authors and most likely too to many other practitioners. As we have turned into the era of Digital Transformation, it is then expected to trigger many more technological-, innovation- and societal- projects and business ventures in the near future requiring an increased need for people with various PM skills and competences. Acknowledging this situation, and to bring the benefits of PM closer to the broader stakeholders and user community in the EU, the CoEPM2^{††} issued in 2016 the Guide on Project Management Methodology providing a light and easy way to implement PM for any type of project [38] which would evidently also serve research projects funded by the EU. In fact, the guide claims it to be “One common PM Methodology open to all EU Institutions, Member States, Contractors, and EU Citizens”.

^{††} Centre of Excellence in Project Management Methodology of the European Commission.

C. Current Discussion: From Nowadays - Towards 2030

Somewhat different from nature is the current research by Pelk [29], which investigates the adoption of the ‘Agile Project Management’ method into the R&D or innovation in products and services in business today (New Product Development).

Pelk outlines the differences between so-called ‘stage-gate approaches’ as originated by Cooper [39] and more contemporary methods such as various ‘agile methodologies’ [21] [22]. To further clarify, note that Stage-Gate© is the phase-gate approach developed by Cooper and recognized around the world for pioneering this particular method. Developed and introduced by Cooper around 1990 it is still very prominent in the area of project management and R&D. Phase-gate approach is a term that associates methods that are very similar to Coopers Stage-Gate© model but to avoid confusion. It is thus a term that attempts to place methods that use gates and stages in a bigger group to more easily identify these. Note that Cooper recognizes developments on methods and that stage-gate is not the only one [40]. For high-level explanation, Fig. 2 and 3 are used. Fig. 2 visualizes the stage gate approach a typical linear approach with long time horizons. In contrast, agile methods use much shorter and repetitive cycles each time delivering a working product as is best visualized in Fig. 3 albeit displaying just one of the agile methods available namely Scrum.

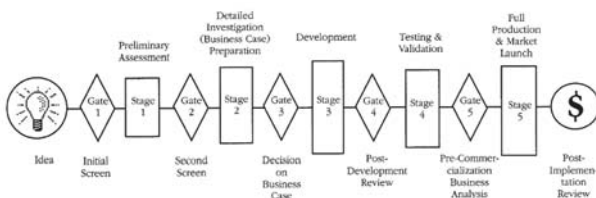


Fig. 2. Cooper's Stage Gate Model [39]



Fig. 3. The Agile: Scrum Framework by Agile for All [16] [17]

Pelk's research is based on a number of interviews with the officers responsible for R&D and innovation in a limited number of companies. Pelk's research case uses a time horizon classification based on three categories A to C: Horizon A is for roadmaps up to 2 years, Horizon B for medium-term, and horizon C for explorative and long-term of 10 years plus. Based on the transcription and subsequent coding of transcribes (cf. the data), some initial findings emerged:

- The first observation is that if the planning horizon increases, the development teams have much more autonomy and independence, whereas if the horizon is relatively short e.g. horizon A, much control is being exercised.
- The second observation is that in the case of a relatively short horizon A, the approach used is the ‘stage-gate method’ and not the ‘agile method’.

Both seem at first sight to be contrary to the initial expectations and reasons for using these two methodologies in their respective expected contexts. However, the data shows a correlation, in that if the trigger for the innovation stems from either a high impact or sudden sense of urgency imposed onto the business a fall back to strong control management happens. Therefore, it appears that the perceived need of micro-management emerges, to ease the sensation of fear by the thought of being in control, to manage the path of resolution of said high impact problem or urgency. These could be your typical crises enforced onto an organization from external events, e.g. ranging from a change of law to typical sudden competitive actions or worse disruption. Alternatively, if the panic is absent, and there is no need driving for micro-management and management is not under stress, then teams are allowed to explore and more trust and faith is put into a team to come up results in a more ‘agile manner’. This continues to raise the question how we do go about with the phenomenon of trust and faith in practice versus what has been researched as outlined by Voortman [41] on how to manage (predictable) expectations. Notice that the horizons as used in the research of Pelk are not the only division of time [42], which described the timelines for innovation in the Dutch railway organization: ProRail. The Chief Innovation Officer, Mr. Chris Verstegen, explains also the use of three horizons but in the context of ProRail [42]:

- Incremental innovations in relative short term of the coming years such as a smartwatch app or RouteLint application,
- Disruptive innovations for the existing rail in 10-15 years such as ERTMS^{††}, smart sensors and big data, and
- Disruptive innovations for the new future rail in 15-30 years, such as hyper-loops and pods swarming.

Hence pending on the context, the horizons of innovation may be quite different. Given the current state of the application of the various PM methodologies, and their contributions to success at large, irrespective of the discussion of the different definitions of success used, it is safe to state we are not yet in the five times nine percentage of success. More research is certainly needed, as is the effective and efficient transfer of such knowledge from both past and new research into practice. In the case of ProRail, the risk of loss of practical existing knowledge has been recognized, leading to the re-introduction of an old construct: ‘the master-apprentice’. At the same time, new young data science specialists (data scientist) need to understand and learn the rail-world.

^{††} European Rail Traffic Management System.

The research findings referenced and the initial observations based on Pelk's research in the current paper do however align with the practical project- and program management experiences of the author(s). Including the awkward absence of the need, or necessity pending on your perspective, to truly trying to gain and realize the project- or program benefits. Which is not new as already referred to in the previous section related to governance and as described earlier by Cooke-Davies [43] stating we are already in search since the 1960's, in search of the holy grail of project success, or sometimes also phrased as the sequence of "done well", "right way" and "right things" [44].

Unmistakably, we have entered a period that will further give rise to the demand on project managers on achieving various objectives. Be it because of factors such as disruptive business model innovations and/or new digital technologies like IoT, Big Data & Analytics, AI, Smart Cities & Factories, Additive Manufacturing, Anything-as-a-Service, and so forth, which will undoubtedly influence our existing "ways of doing things", be it as organizations or public at large driving these and/or our society being confronted with these. It will induce project manner or alike way of working to achieve these.

IV. APPROACHES TO INNOVATING PROJECT MANAGEMENT

The profession and field of PM has been in development ever since it was conceived, which has led to multiple revisions of the PM standards, training and courses. Likewise, research on PM has been there for a number of decades trying to unravel the mysteries of success or failure. The current paper proposes a manner to accelerate such developments using "Research through Project Management" (RtPM), Living Labs and networks thereof.

A. Developments within Professional Bodies

Some trends and changes to come about in the field of PM as recognized and (to be) published by the professional bodies as IPMA and PMI. For some time, these organizations are also embracing PM competence development into their standards

From the IPMA perspective, the report "Trends in Project Management" [16] [17] informs us in the preface about a recurring theme referred to as the *Projectification of Society*, and as with any subject, there are both positive and negative effects that come with it. The report was the result of research done in 2016 through interviews on trends of which the five top trends are shared through the report:

- Projectification,
- Complexity,
- Education,
- Human factors, and
- Woman in project management.

Ongoing projectification is implying there is growing need for PM in whatever form to facilitate any project but also any type of change program or corporate strategic initiatives that are achieved using PM. Moreover, the report mentions that projects, PM activities and services account for substantial and growing part of many a country gross national product.

The reported ongoing projectification will have a continuing effect on public and private organizations and their activities. And in particular, on all people involved and affected including the profession and/or PM discipline as a ubiquitous core-competence and development thereof and use of it all in either a standalone function or alongside/temporary role as 'project manager'.

Within PMI in the Netherlands, an initiative has been started in November 2015 referred to as the "PMI Big 10 Initiative". An initiative started by 10 corporations, looking for a substantial and sustained improvement in practice on PM performance understanding that project complexity will even increase more in light of increased technical challenges, globalization just to name two. Their goal is to drive the curriculum for project managers, which resulted in a white paper on the project manager of 2020 [45].

Similarly, under the larger umbrella of PMI worldwide, the upcoming PMBOK revision and issue of version 6 in Q3/4 2017 clearly shows to include all kinds of *Business Acumen* skills. Here too the project manager is considered to need to evolve as a leader, business expert and strategic thinker to summarize the change in the upcoming version [46]. It is also foreseen to embrace the 'agile side' as opposed to the traditional waterfall context where PMI has been traditionally used.

The above development align too with literature from Napier et al. [47], who suggest research into the skillful practice for project managers to expand their repertoire into:

- Client management,
- Communication,
- General management,
- Leadership,
- Personal integrity,
- Planning and control,
- Problem solving,
- Systems development,
- Team development.

From the literature review performed by Similarly Brière et al. [48], three general categories of competences of project managers emerge, being:

1. Organizational and management competences,
2. PM or technical competences, and
3. Human skills, soft skills or behavioral competences.

In particular, though, human skills, mainly communication, influence, leadership, motivation, negotiation, creativity, ethics, and managing group process or team building are the most cited competences in all studies they reviewed.

Coming from yet another different but related angle, the Enterprise Architecture (EA) discipline, in a recent publication by Bernus et al. [49], discusses the development and trends in the EA profession. These authors reflect on the past 40 years and describe the need to cover the entire business on all levels of management, and instead of a very narrow view to apply a holistic and systemic coverage of the enterprise as an economic entity in its social and ecological environment. Hence, in an ever more networked society, understanding the ecosystem and their stakeholders is becoming more and more important. The same challenge applies to the PM profession.

It clearly underwrites that PM is more than managing the classical iron triangle of time, budget, and scope, nowadays project managers are needed capable of strategic thinking, leadership, change management and communication skills. More focus is needed towards benefit management, which aligns with other recent research as already pointed at in Section II of the current paper.

B. Developments in Education: Lifelong Learning

Development of one's profession as a project manager involves simultaneously broadening and deepening knowledge and skills, further shaped by one's own experience. Compare it to the case where as you will not just become a top-chef in a restaurant by merely reading a cookbook.

There is no single recipe, no silver bullet, which will always work. There are best practices that must be seen as guides at best. Depending upon the real context at hand, choices need to be made on what approach makes the best sense including what PM approach. Over time, a professional will gain and develop a toolbox for himself/herself also much based on the amount of and/or diversity on project contexts the PM has experienced and subject to.

As an example from personal experience of the authors, consider the Delft Design MOOC where the Delft Design Guide is used [50]. For the novice reader/user of Design Thinking possibly a revelation, but in the current paper the authors suggest that this design guide should be considered as mandatory knowledge for those that are involved in requirements engineering, a typical component and phase known in each project and program. It expanded the knowledge of the authors on tools available as a real revelation, yet not typically covered in traditional PM curricula. Keeping with Plattner et al. [51], the authors' suggest to do adopt it into the curricula of PM; whereas reference to the MOOC, was just a short introduction on the subject of eliciting requirement. The current paper will not address all the shades of gray, to the extent to which everything in terms of requirements is or is not clear or must be clear at any moment in time in typical project lifecycles.

Nevertheless, in a certain given context a professional project manager can and/or should be able choose to use the right applicable tools, as would a professional design engineer. To do so effectively, he/she requires "traditional craftsmanship" or more modernly phrased, it calls for the *Reflective Practitioner*. A term introduced in the 1980's [52] and part of the proposal by Winter et al. as the 'Direction 5' for future PM research in [1]. See Fig. 4 displaying their original table. This particular 'Direction' 5 is related to "Theory IN Practice" and is therefore highlighted as it aligns to the personal background of the author. The authors suggest that the reflective practitioner should be better connotated as the *Reflective Professional* as introduced presented in [53] and then the practitioner/professional could and/or even should contribute also to 'Directions 1 to 4'. To close the feedback loop as further to be explained in section IV-D and supporting the 'Plan-Do-Check-ADAPT' cycle as suggested to in section II.

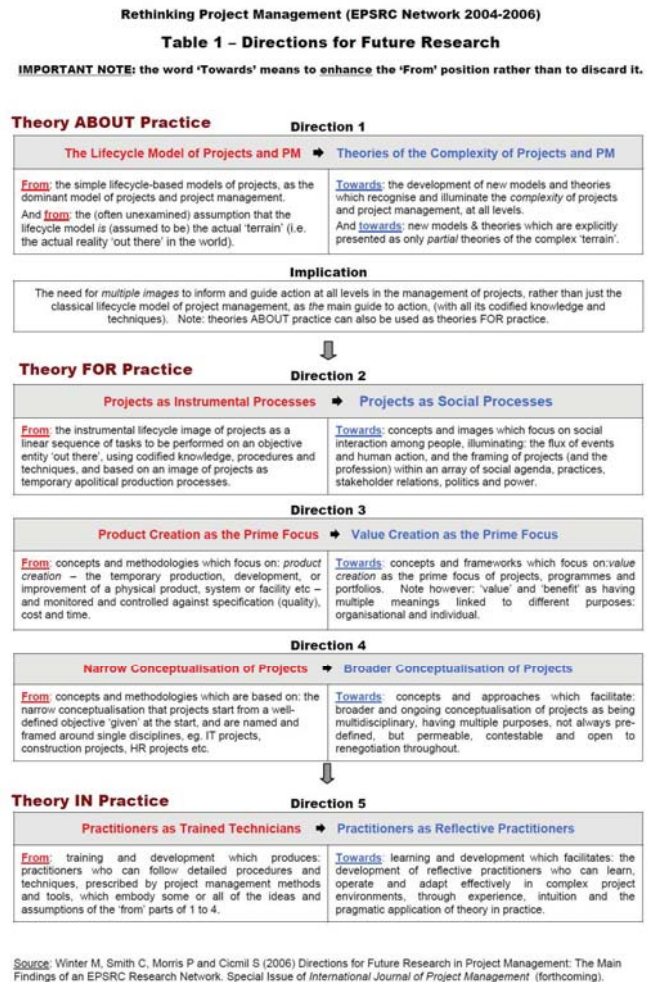


Fig. 4. From Rethinking Project Management

An example thereof has been the introduction of the Gateway Review Method^{§§} at the Ministry of Interior of the Dutch Government by the Bureau Gateway and the insights that were obtained through researching all the data obtained through those reviews. The Gateway Review is a form of peer (read, collegial) review that is used to check whether a program or project is ready for the next stage. It is based on the check of the actual situation, considering the question whether the planned follow-up activities are realistic and achievable, and will lead to the desired successful outcome. The Gateway Review aims to help the Senior Responsible Owner (SRO) to increase the success rates of his or her programs or projects. To emphasize this focus, note that the Gateway Review Method was introduced at the Ministry in the Netherlands with the specific intent of a helping and learning perspective and not from a control perspective as the connotation of the word review typically calls for.

^{§§} The Gateway Review Method was developed by former Office of the Government Commerce (OGC) within the British government.

Winter's proposal is in analogy to the working model of professional learning described by Simons [54]; this relates to three modes of implicit learning linked to three types of activities: work, research and create. These three can be intensified from an (implicit or explicit) learning perspective and then become: elaborate, expand and propagate. Where elaborating concerns to make explicit the implicit learning while working: what the professionals until now learned implicitly, what is its implicit theory in practice, how did this learning take place. Expanding concerns examining practical theory, taking note of concepts and insights from the literature and critical reflection, and where the professional, through research like activities, expands his knowledge and practice theory. Lastly, propagate or communicate is about contributing to the development of the profession. Consider it a pathway to address the question how do we learn as raised at the end of Section I.

C. Learning using Research through Project Management

Since Winter's proposal, we are yet another 10 years down the road, and it seems prudent to agree to periodically repeat the question and research on these topics to re-assess, to re-frame and to re-define the profession to match the needs in this new era. Such periodical reflection really equals to a re-iterated action to have another learning feedback loop to be executed and closed over time. The theme or concept of "Rethinking Project Management" forms a repetitive discussion as seen in literature [1]–[9]. As does the periodically repeating discussion on skills and competences as for example by Napier et al. [47], who suggest research into the skillful practice for project managers to expand their repertoire into:

- | | |
|-----------------------|-------------------------|
| 1) Client Management | 6) Planning and Control |
| 2) Communication | 7) Problem Solving |
| 3) General Management | 8) Systems Development |
| 4) Leadership | 9) Team Development |
| 5) Personal Integrity | |

Somewhat similar results are reported through survey's from 2002 specific to South East Queensland, Australia by Wo et al. [55]. Based on 113 usable responses identifying that in terms of PM skills, it was found that the ability to communicate, ability to meet project objectives and make decisions are the most important skills needed. Surprisingly, or maybe even not from the perspective of practice from the author(s), were their findings that the ability to complete projects on cost, on time and meeting project's quality are not the most important skills that a project manager must possess. Through their survey, they identified the important issues and skills project managers should be aware of and possess for the near future to be:

- | | |
|---|---|
| 1) Technical skill; | 7) Stakeholders management skill; |
| 2) Industrial Relations / Workplace Health and Safety / Environmental issues; | 8) Cost management skill; |
| 3) Adaptability / Innovation / Flexibility; | 9) Computing skill; |
| 4) People skills; | 10) Risk management skill; |
| 5) Legal understanding; | 11) Time management skill; |
| 6) Client related skill; | 12) Coaching / Transfer of knowledge skill; |
| | 13) Networking skill; and |
| | 14) Business knowledge. |

As stated before in Section II, the author(s) might even consider to go back and re-use/ re-apply the Pinto and Shenhar methodology [30], and even re-used their questionnaires, but then in a more 21st century manner, e.g., online communities. However, the author(s) suggest a different manner to accelerate such the future research and creating value in practice, is to frame the research adopting a Research through Project Management (RtPM) approach, creating in fact a Living Lab environment [56]. Re-using the approach coming from the Research through Design (RtD) school [57] and originating some decades ago [58]. And combining such an approach into network of Living Labs in analogy of the more recent European Network of Living Labs (ENoLL) allowing it to scale [59]. The proposed change thus has to do with reframing the perspective of the lifelong learning concept, from the individual level, to the organizational level, to regional, national, international, hence society at large level. The associated question is not just "how do I learn", "how do we learn", but "how to we learn together". What can and will be learned will most likely be different for and depend on each of the ecosystems, be at a corporate level, a network level or a network of network level and each and every entity in the network(s).

Embracing this change of perspective is visualized in Fig. 5 through a series of diagrams. The first diagram shows a typical singular organizational entity such as a company, in the diagram represented, just for example, by departments A to E. These could be departments such as Marketing & Sales, Finance, Purchasing, IT, Development, Operations, Customer Support but of course also various Management Boards. The second diagram in Fig. 5 depicts the simplified case in a number such entities would work together on a common project / program. Simplified, as not all communications will happen through single points of contacts of each of the entities, but for which tools such as the network collaboration canvas boundary mapping tool exist which came out of the Creative Industry Scientific Programme project PSS101 [14]. Finally, the third diagram shows, simplified too, the case if such networks collaborate with one another. These entities and networks on the one hand execute projects – and programs, and at the same time, research on these can be orchestrated.

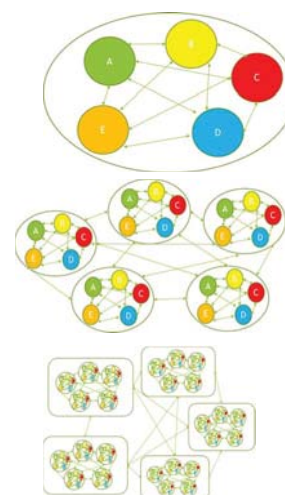


Fig. 5. Network and Level of Networks forming Living Labs using Research through Project Management

D. Learning Feedback-Loops through Research & Practice in Projects and Project Management Profession

Whereas in the normal execution of projects, learnings do take place on the singular project, the authors suggest expanding the learnings. In the concept of the *learning organization*, a single company may derive learnings from all of the projects it does. However, by sharing it with others in the context of a living lab, three levels of learnings can be obtained: for each of the companies, for the community of the living lab, and for the PM profession at large. Hence, we add the capability of *double loop learning* to speed-up the learning process, and therefore expand the impact of such learning and to ultimately increase the chances of success of each project and to maximize the value creation by such projects.

Fig. 6 shows the mechanism of the ‘double loop learning’. *Feedback loops* can emerge from each of the major steps in the project, not just at the end. Evidently, this all depends on such variables as the length or duration and size of a project. The suggestion of the authors is that the project manager of a project actively engages into a learning cycle, as opposed to a mere corrective cycle as also demonstrated in the case described from the Dutch Ministry and the Gateway Reviews.

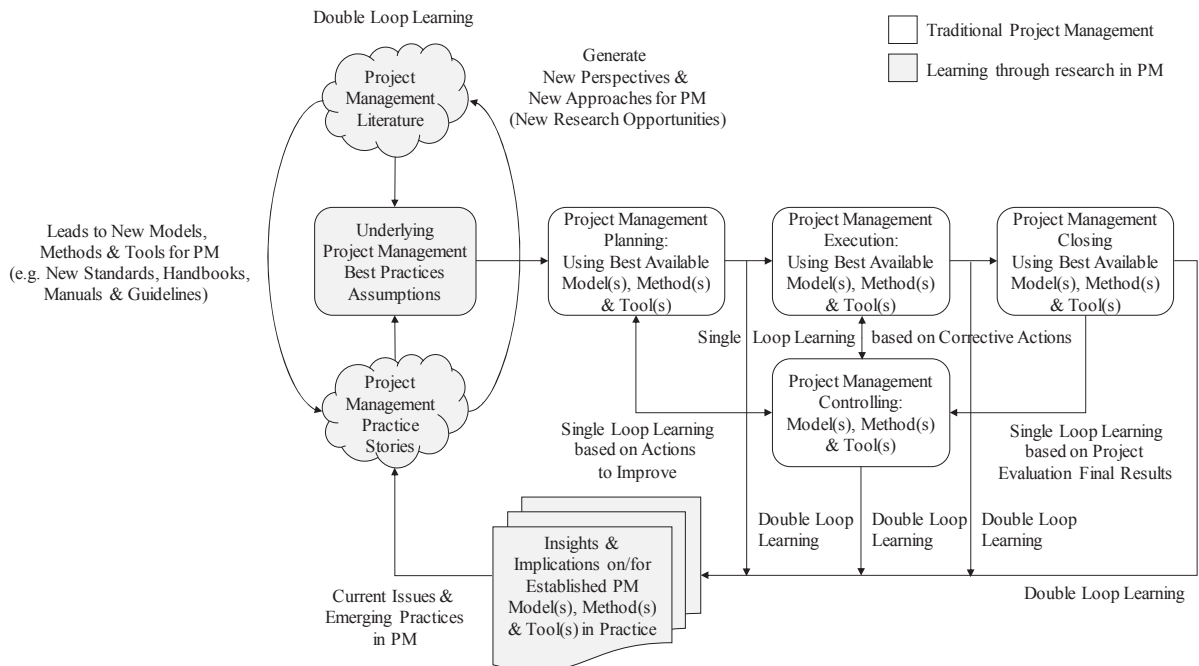


Fig. 6. From Single Loop Learning in Projects to Double Loop Learning in PM Profession

Fig. 7 (on the next page) explains how the construct can be extended into a living lab based on the concept of ‘open innovation’, which can expand the learnings from any singular organization across multiple participating organizations (within the living lab) and with the academic world continuously engaged. This then also serves the academic (research) community as trends and signals that should be continuously monitored and trigger *action-research* initiatives in order to foster collaboration between academia (theory) and industry (practice) - knowledge transfer - and result in the enlargement of the PM body of knowledge and ‘professional’ practice.

Doing so is expected to speed-up the learnings and the adaption and/or development of new models, methods and tools for professional project management. This makes the profession of Project Management a living lab, and leads to *Reflective Project Managers* that closely collaborate with the academics (researchers) to develop the discipline of PM.

In this sense, ‘knowledge transfer’ and ‘networking’ become fundamental skills or core-competences to be developed by the project managers. These skills will serve their community and organizations at large by supporting the social responsible behavior of all persons and organizations involved in a living lab. This vision is currently presented and discussed at the ICE/ITMC yearly conference (www-ice-conference.org), an event, a community, where practitioners and researchers meet, and well used and familiar with the concepts of ‘open innovation’, ‘living labs’ and ‘co-creation’. The next steps are to actually bring the concept of *Research through Project Management* from paper into real-life practice.

V. CONCLUSIONS AND DISCUSSIONS ON FUTURE DIRECTIONS

The future of Project Management changes continuously. Currently with approximately every 10 years, a new theme has been emerging and profiling itself. The future of Project Management enters periodically into the discourse but we suggest leveraging practice through the re-use of the Living Lab concept and mimicking Research through Design into Research through Project Management.

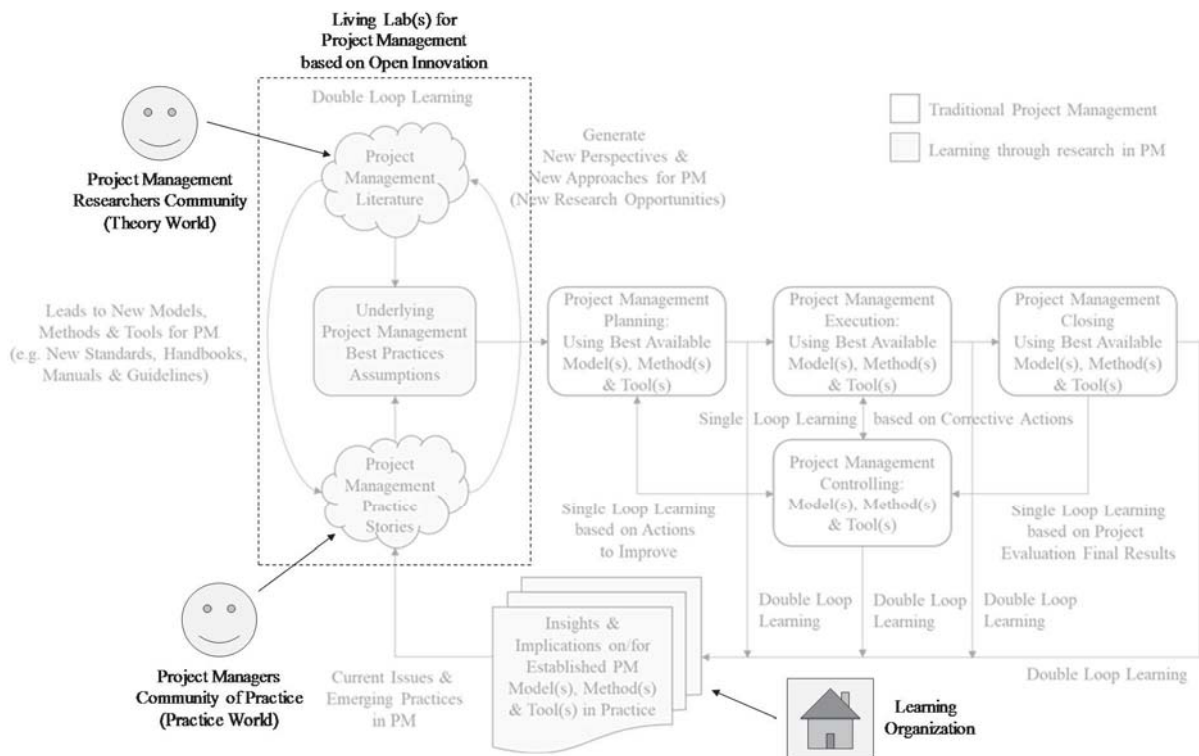


Fig. 7. Learning in a Living Lab Context Based On Open Innovation

Evidently it started with a thought, it is currently a belief or theorem that such acceleration can be achieved through said means, but just doing so and analyzing the results may in due time prove the theorem indeed to be true.

How would we all, as an active participant and/or as any sort of stakeholder in projects, from Senior Responsible Owner to mere consumer or taxpayer affected by these, want to contribute to the development thereof? Research through Project Management is suggested as the manner going forward but also building on all of what is there and hence the theme is set as “Towards Project Management 2030”.

Clearly, the purpose of the current paper is to open the discussion on how to develop the profession and to set the future direction for the research. Also, to broaden that research also in light of seen and anticipated trends. And the obvious presented needs in both private and public space and society at large, and the expected more ubiquitous role of the Project Manager 2030 and the Reflective Professional Project Manager stimulating reflexivity between PM models, methods, and tools and real-life practice.

REFERENCES

- [1] M. Winter, C. Smith, P. Morris, and S. Cicmil, “Directions for Future Research in Project Management: The Main Findings of a UK Government-funded Research Network,” *Int. J. Proj. Manag.*, vol. 24, no. 8, pp. 638–649, 2006.
- [2] M. Winter and C. Smith, “Rethinking Project Management,” 2006.
- [3] P. Svejvig and P. Andersen, “Rethinking Project Management: A Structured Literature Review with a Critical Look at the Brave New World,” *Int. J. Proj. Manag.*, vol. 33, no. 2, pp. 278–290, 2015.
- [4] C. Sauer and B. H. Reich, “Rethinking IT Project Management: Evidence of a New Mindset and its Implications,” *Int. J. Proj. Manag.*, 2009.
- [5] B. J. Kolltveit, J. T. Karlsen, and K. Grønhaug, “Perspectives on Project Management,” *Int. J. Proj. Manag.*, vol. 25, no. 1, pp. 3–9, 2007.
- [6] S. Cicmil, T. Williams, J. Thomas, and D. Hodgson, “Rethinking Project Management: Researching the Actuality of Projects,” *Int. J. Proj. Manag.*, vol. 24, no. 8, pp. 675–686, 2006.
- [7] B. Lloyd-Walker, E. French, and L. Crawford, “Rethinking Researching Project Management: Understanding the Reality of Project Management Careers,” *Int. J. Manag. Proj. Bus.*, vol. 9, no. 4, 2016.
- [8] J. Pollack, “The Changing Paradigms of Project Management,” *Int. J. Proj. Manag.*, vol. 25, no. 3, pp. 266–274, 2007.
- [9] M. Winter, C. Smith, T. Cooke-Davies, and S. Cicmil, “The Importance of ‘Process’ in Rethinking Project Management: The Story of a UK Government-funded Research Network,” *Int. J. Proj. Manag.*, vol. 24, no. 8, pp. 650–662, 2006.
- [10] ABN Insights, “Industrial IoT,” p. 24, 2016.
- [11] A. Edmondson, “Hoe Leid je Cross - Industry Innovatieteams?,” *Management Impact*, p. 8, 2017.
- [12] M. Chui, J. Manyika, and M. Miremadi, “Where Machines could Replace Humans and where they can’t (yet),” *McKinsey Quarterly*, 2016. [Online]. Available: <http://www.mckinsey.com/business-functions/digital-mckinsey/our-insights/where-machines-could-replace-humans-and-where-they-cant-yet>. [Accessed: May 2017].
- [13] A. Szpitter and J. Sadkowska, “Using VUCA Matrix for the Assessment of Project Environment Risk,” *Zarządzanie i Finans.*, vol. 14, no. 2/1/2016, pp. 401–413, 2014.
- [14] L. Henze, I. Mulder, and P. J. Stappers, “Understanding Networked Collaboration: Fields and Patches of Interactions,” in 2013 International Conference on Engineering, Technology and Innovation, ICE 2013 and IEEE International Technology Management Conference, ITMC 2013, 2013.
- [15] A. Jerbrant, “Organising Project-based Companies: Management, Control and Execution of Project-based Industrial Operations,” *Int. J. Manag. Proj. Bus.*, no. January, 2013.

- [16] I. Heijtel (Editor), Trends in Project Management 2016 - Het project management aanzien van 2016. IPMA Certificering, 2016.
- [17] Mediaplanet Publishing House, "Projectification of Society," www.overondernemen.nl, p. 12, 2017.
- [18] H. Bakker and J. P. de Kleijn, Management of Engineering Projects - People are Key. Nijkerk: NAP - The Process Industry Competence Network, 2014.
- [19] M. Mullaly, "ProjectManagement.com - All Is Not the Same in the World of Project Management," www.projectmanagment.com, 2017. [Online]. Available: <https://www.projectmanagement.com/articles/374179/All-Is-Not-the-Same-in-the-World-of-Project-Management>. [Accessed: May 2017].
- [20] R. Turner, "Gower Handbook of Project Management - 4th Edition," Gower Handbook of Project Management. 2007.
- [21] K. Beck, M. Beedle, A. van Bennekum, A. Cockburn, W. Cunningham, M. Fowler, J. Grenning, J. Highsmith, A. Hunt, and R. Jeffries, "Manifesto for Agile Software Development," 2001.
- [22] S. Denning, "Explaining Agile and 40 Flavors," 2016. [Online]. Available: <https://cdn.ampproject.org/c/www.forbes.com/sites/stevedenning/2016/09/08/explaining-agile/amp/>. [Accessed: May 2017].
- [23] S. Kooistra, "Jan Rotmans: 'Meer Behoeft aan Transitie-manager' - Over Ondernemen," www.ondernemen.com, 2017. [Online]. Available: <http://www.ondernemen.com/projectmanagement/jan-rotmans-meer-behoeft-aan-transitie-manager>. [Accessed: May 2017].
- [24] R. Bierwolf, "Project Excellence or Failure? Doing is the Best Kind of Learning," *IEEE Eng. Manag. Rev.*, vol. 44, no. 2, pp. 26–32, 2016.
- [25] W. Richardson and B. Dixon, "10 Principles for Schools of Modern Learning: The Urgent Case for Reimagining Today's Schools [White paper]," 2017.
- [26] M. J. Grant and A. Booth, "A Typology of Reviews: An Analysis of 14 Review Types and Associated Methodologies," *Health Info. Libr. J.*, vol. 26, no. 2, pp. 91–108, 2009.
- [27] R. Bierwolf, "Towards Project Management 2030 - Why Is Change Needed," *IEEE Eng. Manag. Rev.*, vol. 45, no. 1, pp. 21–26, 2017.
- [28] R. Bierwolf and C. J. Stettina, "Towards the Future of Project Management 2030," Workshop at 22nd International Conference on Engineering, Technology and Innovation/ IEEE International Technology Management Conference (ICE/ITMC), 2016. [Online]. Available: <http://www.ice-conference.org/Home/Previous-Conference-2016/Workshops.aspx>.
- [29] H. Pelk, "A New R&D Generation - Agile in R&D Organizations Projects in a Post Stage-Gate World (manuscript)," Leiden University, 2017.
- [30] J. K. Pinto and D. P. Slevin, "Critical Factors in Successful Project Implementation," *IEEE Trans. Eng. Manag.*, vol. EM-34, no. 1, pp. 22–27, 1987.
- [31] P. Abrahamsson, K. Conboy, and X. Wang, "'Lots Done, More To Do': The current State of Agile Systems Development Research," *Eur. J. Inf. Syst.*, vol. 18, no. 4, pp. 281–284, 2009.
- [32] P. R. A. Oeij, S. Dhondt, and J. Gaspersz, "Mindful Infrastructure as an enabler of Innovation Resilience Behaviour in Innovation Teams," *Team Perform. Manag.*, vol. 228, no. 7, pp. 334–353, 2016.
- [33] F. Fonseca, P. L. Moreira, R. Pompeu, L. Garcia, S. R. Oliveira, and G. dos Santos, "Barriers in Information Technology Project Management," in 2017 IEEE Technology Management Conference TEMSCON 2017 (in press), 2017.
- [34] W. L. Bronsgeest, "Meer vorm dan Inhoud, Onderzoek naar Evaluaties van ICT-projecten bij de overheid," University of Twente, 2016.
- [35] P. Frijns, F. Van Leeuwen, and R. Bierwolf, "Project Management – A More Balanced Approach," in 2017 IEEE Technology & Engineering Management Conference - TEMSCON 2017 (in press).
- [36] P. Frijns, F. van Leeuwen, and R. Bierwolf, "Governance - What Governance," in 2017 International Conference on Engineering, Technology and Innovation (ICE/ITMC), 2017, p. (in press).
- [37] M. Laursen and P. Svejvig, "Taking Stock of Project Value Creation: A Structured Literature Review with Future Directions for Research and Practice," *Int. J. Proj. Manag.*, vol. 34, no. 4, pp. 736–747, 2016.
- [38] EC, The PM2 Project Management Methodology Guide - Open Edition v1.0, Final Publ. the European Commission, DIGIT Centre of Excellence in Project Management (CoEPM), 2016.
- [39] R. Cooper, "Stage-Gate Systems: A New Tool for Managing New Products," *Bus. Horiz.*, 1990.
- [40] R. G. Cooper, "What's Next? After Stage-Gate," *Res. Technol. Manag.*, 2014.
- [41] P. M. Voortman, *Vertrouwen Werkt*, First Edit. Trustworks, 2012.
- [42] B. van Zonneveld, "'We Maken de Trein én het Spoor Slimmer,'" *Technisch Weekblad*, pp. 6–7, Mar-2017.
- [43] T. Cooke-Davies, "The 'Real' Success Factors on Projects," *Int. J. Proj. Manag.*, vol. 20, pp. 185–190, 2002.
- [44] J. Thorp, "Making IT Pay Off [Excerpt from The Information Paradox]," CIO Canada, 1998.
- [45] PMI, "The Project Manager 2020," 2016.
- [46] PMI, "PMI Standards Updates." [Online]. Available: <https://www.pmi.org/pmbok-guide-standards/foundational-standards-exposure-draft>. [Accessed: May 2017].
- [47] N. P. Napier, M. Keil, and F. B. Tan, "IT Project Managers' Construction of Successful Project Management Practice: A Repertory Grid Investigation," *Inf. Syst. J.*, vol. 19, no. 3, pp. 255–282, 2009.
- [48] S. Brière, D. Proulx, O. N. Flores, and M. Laporte, "Competencies of Project Managers in International NGOs: Perceptions of Practitioners," *Int. J. Proj. Manag.*, 2015.
- [49] P. Bernus, T. Goranson, J. Götze, A. Jensen-Waud, H. Kandjani, A. Molina, O. Noran, R. J. Rabelo, D. Romero, P. Saha, and P. Turner, "Enterprise Engineering and Management at the Crossroads," vol. 79, pp. 87–89, 2016.
- [50] T. Delft, "Delft Design Guide - TU Delft OCW." [Online]. Available: <https://ocw.tudelft.nl/courses/delft-design-guide/>. [Accessed: May 2017].
- [51] H. Plattner, C. Meinel, and L. Leifer, *Design Thinking Research: Making Design Thinking Foundational*. 2015.
- [52] D. A. Schon, "The Reflective Practitioner," *Harv. Bus. Rev.*, 1984.
- [53] R. Bierwolf, "Practitioners, Reflective Practitioners, Reflective Professionals," *IEEE Eng. Manag. Rev.*, vol. 45, no. 2 (in press), 2017.
- [54] R.-J. Simons, "Leren van Docenten: Een Methodiek voor Professionele ontwikkeling," 2016. [Online]. Available: <http://wij-leren.nl/docenten-professionaliseren-uuu-model.php>. [Accessed: May 2017].
- [55] W. Wo, S. Lei, M. Skitmore, and G. Point, "Project Management Competencies : A Survey Of Perspective From Project Managers In South East Queensland," *Queensl. Univ. Technol.*, vol. 2004, no. January, p. 25, 2004.
- [56] C. Mcphee, C. Deutsch, S. Davenport, S. Cummings, U. Daellenbach, C. Campbell, A. B. Masson, and P. Dancause, "Innovation in Living Labs," *Technol. Innov. Manag. Rev.*, vol. 7, no. 2, 2017.
- [57] D. Godin and M. Zahedi, "Aspects of Research through Design : A Literature Review," in *Proceedings of DRS 2014: Design's Big Debates*, 2014, pp. 1667–1680.
- [58] C. Frayling, "Research in Art and Design," *R. Coll. Art Res. Pap. Ser.*, vol. 1, no. 1, p. 9, 1993.
- [59] ENoLL, "History of ENoLL and Open Living Labs." [Online]. Available: <http://www.openlivinglabs.eu/node/1430>. [Accessed: May 2017].