Verkefnastjórnun á Íslandi

Saga, staða og framtíð verkefnastjórnunar á Íslandi

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Project Management in Iceland.
History, status and future of project management in Iceland

The Association of Chartered Engineers in Iceland
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Formáli

Erfitt er að tímasetja fæðingardag nútíma verkefnastjórnunar nákvæmlega. Henry Gantt kemur fram með Gantt-ritin sín vel þekktu í upphafi tuttugustu aldarinnar, fyrirtækið DuPont uppskar mikla athygli 1957 fyrir tækni til að tengja saman verkþætti og reikna út bundnu leiðina (critical path) og enn ein mikilvæga aðferðin, sem kallaðist PERT, er kynnt til sögunnar ári síðar .Árið 1965 eru alþjóðasamtök verkefnastjórnunarfélaga (IPMA) stofnuð til að styrkja framþróun þessarar ört vaxandi fræðigreinar og þannig mætti áfram telja. Allt merkir áfangar en ólíklegt verður þó að teljast að frumkvöðlarnir hafi áttað sig á hinni ótrúlegu velgengni verkefnastjórnunar. Á okkar dögum hafa mál skipast þannig að verkefnastjórnun er í senn fagsvið, þar sem fjöldi fólks sérhæfir sig í að leiða og stjórna verkefnum, og fræðasvið með kröftugum rannsóknum og útgáfustarsemi. Jafnvel enn áhrifameiri er hin svonefnda „verkefnavæðing“ (projectification) samfélagsins en verkefni eru nú um stundir öflugasta hreyfiafl iðnaðar og viðskipta í þróuðum hagkerfum.

Í þessum þremur greinum, sem allar byggja á rannsóknum, er fjallað hvernig verkefnastjórnun þróaðist frá því að vera aðferð til að ná utan um verklegar framkvæmdir til þess að verða sjálfstæð fag- og fræðigrein. Þá er litið fram á veginn og framtíð fagsins leidd fram í áhugaverðri sviðsmynd. Í greinunum kemur greinilega fram sá ævintýralegi uppgangur sem verkefnastjórnun hefur notið og hvernig að þessi velgengni mun halda áfram í fyrirsjáanlegri framtíð. Ennfremur eru sýndar nýjar aðferðir til að mæla efnahagsleg áhrif verkefna en höfundar eru hluti af fjölþjóðlegu rannsóknarteymi sem þróaði þessa aðferð og beitti henni meðal annars á Íslandi. Fyrrnefnd aðferð þykir miklum tíðindum sæta og sýnir svo ekki verður um villst hvað verkefni eru mikilvæg á okkar tímum.

Höfundar greinanna eru reyndir fræðimenn og brautryðjendur við að kynna nútímalega verkefnastjórnunu með kennslu, rannsóknum og virkri þátttöku í atvinnulífinu. Það er mikill fengur að því að svo áhugavert og mikilvægt efni aðgengilegt sem heilstætt greinasafn.

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Preface

It is difficult to pinpoint the exact birthdate of modern project management. Henry Gantt presented his well-known Gantt-charts at the beginning of the twentieth century and the DuPont company received a lot of attention in 1957 for a normative method for connecting project work tasks and calculating the “critical path”. A few years later, projects were decomposed according to the WBS method, and in 1965, the first international organization, the IPMA, was established as a forum for project managers. The list goes on. All of these, and more, can be considered important milestones in the history of project management. However, it is unlikely that the early pioneers could have imagined the incredible success which project management would enjoy. Nowadays, project management is both a profession, in which many people specialize in leading and managing projects, and a scientific field with powerful research facilities and publishing media. Even more influential is the so-called "projectification" of society, which is currently the most powerful driving force in industry and trade in developed economies.

These three research-based articles discuss how projects and project management evolved from being a normative method to becoming an independent profession and an academic discipline. The present situation is explored and, finally, the hypothetical future of the profession is presented and discussed. The articles clearly show the adventurous journey that project management has made and how this success will continue in the foreseeable future. Moreover, a new method for measuring the economic impact of projects is presented - the authors are part of a multinational research team that developed this method and applied it in the context of Iceland and other countries.

The authors of the papers are experienced scholars and pioneers in introducing modern project management through teaching, research and active participation in the business community. We hope that making this important material accessible as a comprehensive collection of articles will be of great benefit to all readers.

The articles were published in The Icelandic Journal of Engineering (2019). The research mentioned in article 2 was also published in International Journal of Project Management. (Volume 36, Issue 1, January 2018, Pages 71-82).

The Evolution of Project Management in Iceland: The Path to a Profession

- Paper 1 of 3 in a series on the history, status and future of project management in Iceland

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Ágrip

Upphaf verkefnastjórnunar um miðja 20. öld fólst í þróun aðferða innan fræðasviðs aðgerðarannsókna, til að gera áætlanir fyrir tímabundin og afmörkuð viðfangsefni. Síðan þá hefur verkefnastjórnun þróast ört og í dag er hún viðurkennd sem mikilvæg alþjóðleg atvinnugrein með fræðilegar grunnstoðir, skilgreind hæfniviðmið, alþjóðlega staðla og tilvísanir í bestu starfshætti. Ísland er athyglisvert dæmi um það hvernig ný atvinnugrein verður til í þróuðu vestrænu samfélagi. Á Íslandi hefur orðið til blómlegur vettvangur fyrir verkefnastjórnun. Þessa þróun má meðal annars merkja með framboði vandaðra námslína á grunnstigi og framhaldsstigi háskóla, en einnig í vaxandi eftirspurn eftir faglegum verkefnastjórum á flestum sviðum atvinnulífsins, bæði opinberrar starfsemi og einkageirans. Hins vegar er einnig athyglisvert að þegar kemur að svokallaðri verkefnastjórnsýslu er Ísland skemmra á veg komið en hefðbundin viðmiðunarlönd eins og Noregur, Bretland og Svíþjóð. Hér er meðal annars vísað til þess að í þessum viðmiðunarlöndunum má finna skýr og samræmd viðmið við gerð áætlana og undirbúning ákvarðana um að ráðast í stór opinber innviðaverkefni. Verkefnastjórnunarfélag Íslands gæti tekið enn sterkara leiðandi hlutverk í að fara fyrir þróun fagsviðs verkefnastjórnunar á Íslandi.

***Lykilorð**: Alþjóðleg þróun, verkefnastjórnun, faggrein, þróunin á Íslandi.*

Abstract

The birth of project management as discipline during the mid 20th century was not the birth of a profession, but rather an important enhancement of planning techniques to tackle temporary and time-limited endeavors. Project management has since evolved and matured to be currently recognized as an important international profession with unique accredited procedures, international standards, best practice references and theoretical platforms. Iceland is an interesting example of how the path to a profession is paved in a developed Western society. Entrepreneurs channeled international development into business-driven projects, and the academia followed the suit. Iceland currently has a thriving forum for project management as a professional discipline. This development is arguably best displayed by some impressive educational programs that were developed by path-finding consultants,

within universities and post-graduate study lines, and in the increasing demand for professional project managers in most areas of public and private sectors. However, it is also noteworthy that in one specific domain Iceland is atypical among countries often seen as international benchmarks, e.g. Norway, the UK and Sweden, and that is the fractional public project governance framework, which might also explain why the Icelandic Project Management Association has not yet fully actualized its full potential as a professional leader for project management in Iceland.

Keywords: *International development, project management, profession, Icelandic development.*

Introduction

Project management is sometimes said to have emerged in the 1950s when techniques like PERT and CPM were developed. This development was driven by the demands of the militaries, and various industries, where there was a need to reduce development time, increase efficiency in management, and build up more capability in establishing, planning, executing and controlling increasingly complex projects. Projects have, of course, been planned and executed throughout history, but in the first half of the 20th century management science emerged with the time and motion studies—attributed to people like Fredrick W. Taylor—as a major feature of scientific management. The Gantt chart was an example of this new way of thinking, and it became well known as a production planning tool in the 1920s, and then became a popular way of representing project schedules graphically. The period of 1950 to 1979 began with the emergence of systems project management, with emphasis on holism, hierarchy, boundaries and interfaces. This was initiated through network planning and the introduction of CPM by DuPont as an activity-oriented tool for the planning and controlling of construction projects and PERT, an event-oriented network scheduling system, applying statistical calculations as a part of the Polaris missile program in the USA (Morris, 2013). There was also an increased concern for people at work, and project management started to gain recognition as a specific profession. Peter Morris (2013) defined Brigadier Bernard Schriever as the father of modern project management. Schriever led the Atlas program, during which the first intercontinental ballistic missile was developed and tested in 1956. Schriever applied concurrent engineering and defined the role of the project manager as a person with both technical and budget authority for the project. Gaddis (1959) wrote a paper in the Harvard Business Review entitled, "The project manager", where he shared his thoughts on this new, important role.

An important milestone on the pathway to becoming a profession was the establishment of the first professional project management associations. The International Association for Project Management (IPMA) was founded in 1965 (under the name "Internet"), the Project Management Institute (USA) in 1969, and the Association for Project Management (APM) in 1972. Emphasis on the project manager´s interpersonal skills became much stronger in the 1980s, including emphasis on the need to define more accurately the competences of project managers. The knowledge bases of the professional project management associations emerged in the 1980s with the introduction of PMBoK by PMI in 1980, and the APM body of knowledge in 1991. The project management associations introduced certification programs, based on their competence baselines. PMI started with its PMP certification in 1984, APM introduced its program in 1986, and IPMA started with its certification program in 1998.

Between 1980 and 2000, due to technological advancement worldwide communication became easier and cheaper, and this influenced the project management discipline. Graduate level educational

programs, specializing in project management, had already been introduced by the 1980s, and in the mid 1990s, dozens of university degrees in project management were available (Morris, 2013). Their number grew the following years and Carbone & Gholston (2004) report that many colleges and universities offer project management educational programs. Ingason & Jonasson (2008) reported that in 2008 there were 5 graduate level project management programs in 12 Universities in Europe (some were taught in cooperation between few universities), 7 graduate level programs in 7 Universities in the USA and 5 graduate level programs in 5 universities in Australia. Gradually, project management gained recognition, with fast-growing professional associations and their doctrines of best practices. Interest in project management grew stronger and this interest extended to the notion of seeing project management as an approach to enterprise management. Program management was introduced in the 1990s, as well as maturity models, and portfolio management emerged in the 2010s (Neal and Harpham, 2012 and Lock D., 2013).

A certain time shift can be defined in 2006, when IPMA published the 3rd version of its competence baseline and expressed the behavioral and contextual competences for project management as specific competence dimensions, side by side with the traditional technical competence dimension. Another important milestone was the publication of international standards, ISO10006 in 2003 on Quality management systems—guidelines on quality management in projects, and more importantly, the ISO21500 in 2012—guidance on project management. It is also worth mentioning the Agile movement with its roots in IT projects, and the view that projects should be deployed in incremental iterations rather than by a linear process. The critical milestone in the development of Agile project management as a discipline, was arguably the publication of the Manifesto for Agile Software Development in 2001 (www.agilemanifesto.org, March 8th, 2017). The iterative and autonomous approach of Agile project management is in some principles different from the roles and techniques of traditional linear or compressed project management, but, in spite of this, it is now being included in the practical doctrines of PMI, APM and IPMA.

The development of project management as a profession in Iceland followed a similar pattern even though this evolution took place a little later in time compared to the timeline in figure 1. Icelandic engineers participated in the first IPMA world congress in Vienna in 1967, to learn about the CPM method. This method was then applied in the Icelandic construction industry by a limited group of practitioners. Another milestone in the progress of project management in Iceland was the foundation of the Icelandic Project Management Association in 1984. From the beginning, this association has actively participated in IPMA, and Nordnet—the collaboration platform of the Nordic project management associations—and the development of project management in Iceland has thus been influenced greatly by the development of IPMA and Nordnet.

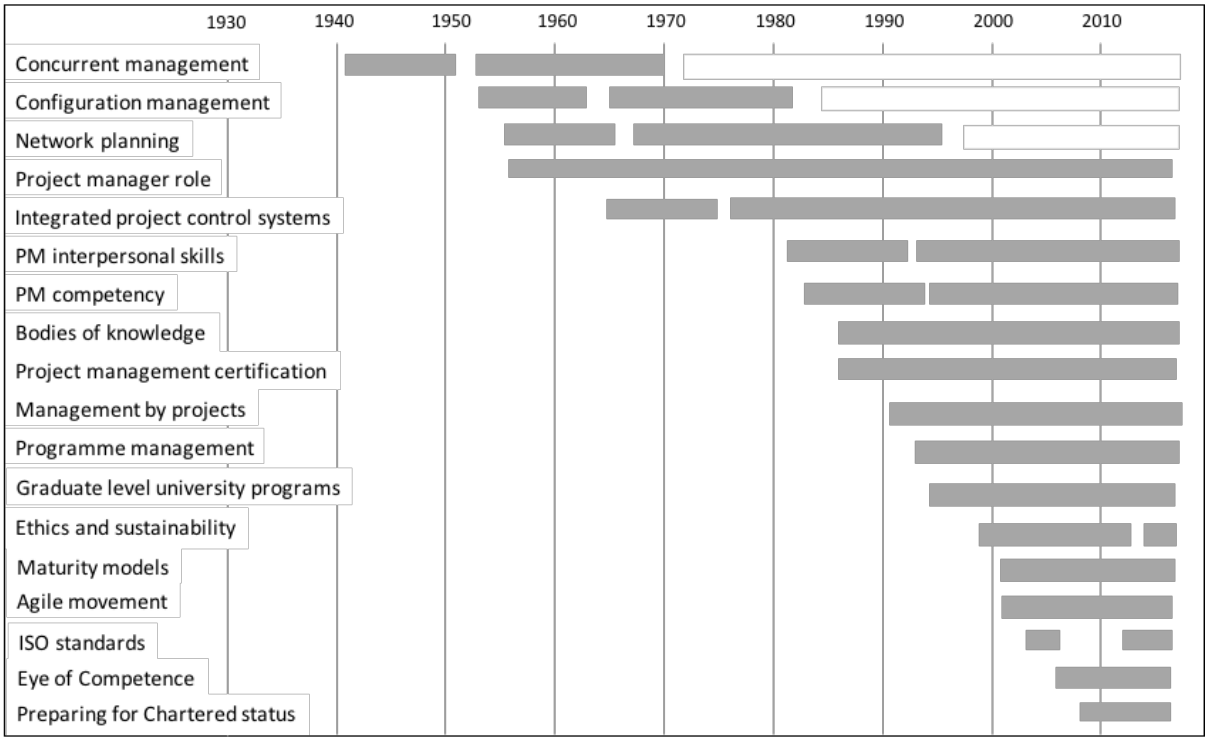

Figure 1. The timeline of Project Management (loosely based on Neal and Harpham (2012) but extended by the authors).

In this paper, we will look at the development of the project management discipline in Iceland. We will mirror it in the development of project management worldwide, but more importantly we will relate it to ideas about how a profession emerges and gains strength through certain steps. We will thus try to shed light on the present status of project management in Iceland and lay the foundations for further work in this area with the intention of assessing the importance of project management within the Icelandic economy.

The research questions we intend to answer in this paper are:

1. How did the project management profession emerge and evolve in Iceland?
2. What are the historical milestones and influencing factors in the development of the project management profession in Iceland?
3. What is the present status of project management as a profession in Iceland?

To answer these questions, our theoretical overview will focus on the building blocks of professions and how they evolve, and how project management reflects these ideas. Our research method will be to accumulate written and verbal references about the progress of project management in Iceland and compare these with the general ideas about how professions evolve, project management in particular. Examples of specific projects will be given; they have been selected by us as they are considered, in one way or another, to represent important milestones in the evolution of project management in Iceland.

We will discuss our findings and speculate on how project management in Iceland might evolve in the near future.

Theory

The basic attributes of a profession were described by Abraham Flexner almost 100 years ago, as explained by Bowie in 1991. A profession possesses and draws upon a store of knowledge. It secures a theoretical perception of the phenomena with which it deals. It applies its knowledge to the practical solution of problems. It strives to add to and improve its knowledge. It passes on what it knows to novice generations, not randomly but deliberately and formally. It establishes criteria of admission, good practice and conduct. And finally, it has an unselfish spirit. Wilson (1932) discussed the question "what is a profession", and wondered if business could be called a profession, according to the definitions of Flexner. According to Wilson, this was not the case. Wilson, a Harvard professor, suggested that to fulfill the definitions of Flexner, theory and practice should be harnessed together and driven side by side, rather than one following the other. He suggested that in time, business would develop and become rather more of a science than it was in his day.

In 1964, Harold L. Wilensky published his paper "The professionalization of everyone." He pointed out some limitations to professionalization—knowledge or doctrine too general, vague, narrow or specific—for an exclusive knowledge base. He described the process towards professionalization through a set of steps—training school, university school, local association, national association, state licensing law and code of ethics. The question, whether management is a profession, was asked by Edgar Schein, professor at Sloan School of Management at MIT in 1968, in his article entitled "Organizational Socialization and the Profession of Management." To answer this question, he defined some of the basic characteristics of professionalism. Professional decisions are made by means of general principles. They imply knowledge in a specific area in which a person is an expert, not a generalized body of wisdom. The professional's relations with his clients are objective. A professional achieves his status by accomplishment. The decisions of a professional are assumed to be on behalf of his client and independent of self-interest. A professional typically relates to a voluntary association of fellow professionals and accepts only their authority as a sanction of his own behavior. And finally, a professional can be said to be an advising agent who is supposed to know better than his/her client what might be good for him. This can put the client in a vulnerable an exposed position, which has led to the development of codes of ethics and professional conduct, to protect the client. Edgar Schein reflects on these different characteristics and concludes that, on several bases, management is a profession, but, on other bases, it has not yet progressed to become a full profession. Abbott (1988) wrote about the theory of professions. He defined professions in a general way, as exclusive occupational groups applying abstract knowledge to particular cases. But Abbott claimed that the most important aspect of professions are the control of knowledge, skills and work tasks. An important contribution here was to shed light on how occupations define their right to control the provision of particular services and activities, hence inter-professional competition. Abbott analyzed the nature of relationships between professional occupations and how they are shaped over time.

In view of Abbott's findings, one might wonder about the status of project management within general management theory, and the role of professional associations in shaping project management as a profession. In recent years, the role of professional associations in defining project management as a

profession has in fact been given much attention. Crawford (2004) explains how the project management professional associations originated as communities of practice - informal gatherings and forums for networking, exchange of ideas and information. Communities of practice (Wenger and Snyder, HBR 2000) are formed when people doing similar things realize they have shared interests. They understand that there are opportunities to improve their practices and their performance by sharing knowledge and experience. The members are informally connected by this shared expertise and passion, some meet regularly, but others communicate through digital networks. Wenger and Snyder (2000) conclude that what characterizes a community of practice is that it´s purpose is to develop the members' knowledge capabilities and that it is held together by passion, commitment and identification with the group's expertise. The project management professional associations as we know them today began as communities of practice, according to these definitions. All of this has led to the development of project management as an independent discipline and an ongoing discussion on if project management could, or should, be regarded as a profession.

Definitions of a distinct body of knowledge and of standards based on that body of knowledge are ways of marking professional territory (Morris et al., 2000). Assessment and awarding of qualifications provide a process whereby professionals are recognized as meeting the standards and references of a profession by demonstrating mastery of the body of knowledge and either minimum or graduated levels of proficiency or competence (Dean, 1997). A body of knowledge, standards, and related assessment and qualification processes can therefore be seen as essential building blocks in the formation and recognition of a profession. Furthermore, it is assumed that a profession provides an important service in society (Dean, 1997).

Crawford (2004) defined building blocks of a profession as a five-level system. The foundation of this system is research, on which a body of knowledge and standards are based and demonstrate the plan and structure of the profession on which the professional standards are based. Education and training support the standards and at the top of the system are qualifications, based on the standards. The difference between a body of knowledge and a standard is not always easy to define. Crawford (2004) pointed out that in the field of project management, there is a strong link between the definition of a body of knowledge and the development of standards. Jonasson and Ingason (2013) wrote about professionalism in their book Project Ethics stating that being a professional is not just a career path, but a combination of education and training that promotes a sense of motivation and a moral sense. They assume that a professional is very loyal towards clients and has a positive attitude towards the profession. Representatives of traditional professions are expected to be competent and live lives that do not undermine their work and professional abilities in any way. They are expected to make their decisions on morally justifiable grounds, to protect the interests of the relevant shareholders, and to be aware of the interests of different stakeholders. Last but not least, a professional is expected to provide high level service to society.

Based on these different inputs, we can present a summarized view of the building blocks of a profession. This gives an overview of the common characteristics of a profession, and defines the path towards professionalism, where the profession grows and matures through the addition of new building blocks, and gains political, social and legal recognition in the process.

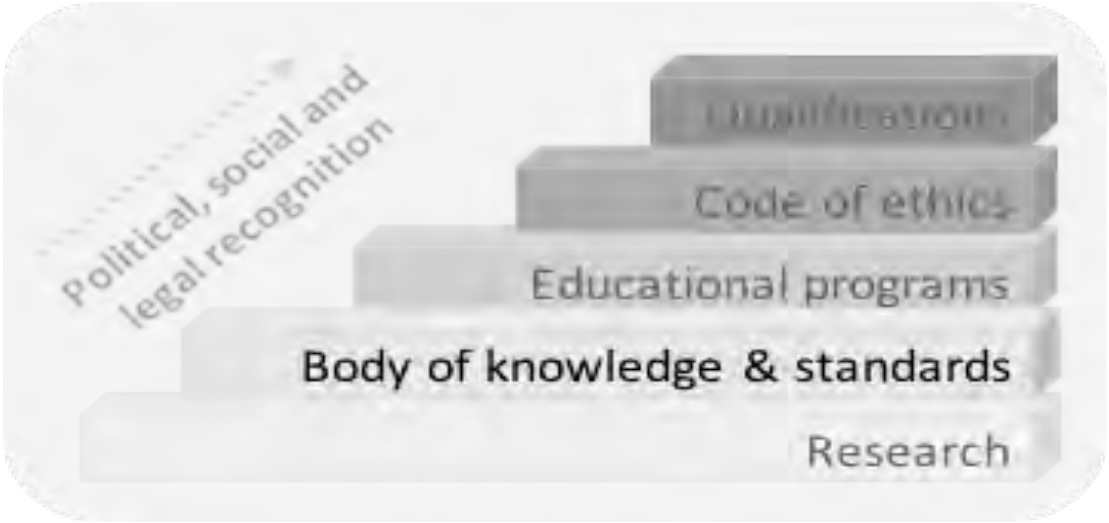

Figure 2. The building blocks of a profession.

The traditional view of what constitutes a profession has somewhat been modified in recent years. Muzio et al (2011) pointed out that there are new patterns of professionalization in project management and related occupations. Such “corporate" professionalization departs in many ways from the traditional paths. Examples of new features of this corporate professionalization are organizational membership, client engagement, competence-based closure and internationalization. Konstantinou (2015) discusses the redefined role of the project practitioner and concludes that due to the situated nature of project knowledge, the project practitioner can have an important role in defining and legalizing the knowledge that is important both for the practice and the profession. He points out that newer professions often operate within large organizations, where work does not strictly involve the application of predetermined bodies of knowledge, but is rather based on human interaction.

But is project management a profession? Peter Morris and his colleagues discussed what distinguishes professions from non-professions (Morris, 2006). Based on the assumption that an occupation has particular ‘traits’ that distinguish it from other occupations, they identified the fundamental characteristics of professions as having to meet formal educational and entry requirements, as having autonomy over the terms and conditions of practice, as having a code of ethics, and as having a commitment to service ideals and a monopoly over a discrete body of knowledge and related skills. It is their conclusion that project management is a ‘semi-profession’ or ‘emerging profession’ at the moment, as it draws very little of its legitimacy by reference to/by virtue of its contribution to the public good, or by adherence to an overarching ethical code (Morris et al, 2006). Although there is a strong sense of aspiration amongst project management practitioners and their representative associations towards professional status, this remains a matter of debate, and has been questioned by Zwerman and Thomas (2001). They maintain that although project management has been moving towards satisfying various criteria indicative of professional status, it is still some distance away, and achievement will require significant effort on the part of the professional associations and members. Two key organizations have attempted to achieve a more unified and global approach—the International Project Management Association (IPMA) and the Project Management Institute (PMI). A common dilemma for the project management associations is the fact that recognition of project management as an

occupation is problematic, as it is seen by many as an aspect of general management. Zwerman & Thomas (2001) concluded that for project management to become a “profession”, it requires a concerted effort by its practitioners and professional associations in pursuing this objective. An action list is given in order to reach this status, e.g. to elaborate significant, independent, academic educational programs with an associated set of research programs, and to create and enforce a code of ethics for all practitioners using the title Project Manager, and last but not least, to win political, social, and legal recognition of the value of regulating project management for the good of society.

The development of public governance in the context of projects is important. A political and economic dogma called New Public Management (NPM) surfaced in the late eighties which assumed that politicians are inherently venal and likely to abuse their authority to enrich themselves and their friends, leading to high-cost, low-quality products (Hood, 1995).

One of the doctrines for ensuring public interest via NPM is the use of an elaborate structure of procedural rules designed to guarantee integrity, transparency and professional service to the public. This makes sense, as it is impossible to manage without reference to a conceptual set of rules for forming a governance framework. Only what we know can be managed and controlled. Over the last two decades, a change can be seen in the received principles of public accountability and administration (Winch, 2010). The rise of governance and NPM has also influenced project management as a discipline. Some notable signs of this advancement are the dramatic, manifold increase in the number of accredited project managers, the establishment of international institutions serving project management, and the creation of bodies of knowledge describing in detail the project management theoretical framework (Hodgson and Muzion, 2012:113).

A different and somewhat provocative perspective regarding the professional associations and their bodies of knowledge is put forward by Whitty and Schulz (2007), who wrote about the impact of puritan ideology on aspects of project management. They argue that project management behaviors are driven by significant memes that originate from various project management bodies of knowledge, especially the PMBok by PMI. They conclude by stating that scholars and practitioners should break free from the tyranny of these puritan memes that hinder them from evolving in the discipline in a free and unconstrained manner. A similar warning was in fact offered by Morris et al (2006), who concluded that there may be a danger of getting into self-fulfilling prophecies if the field relies on the project management associations to tell the academics what to think and teach.

Gaining recognition and acceptance of the changes required of both professional associations and practitioners seems to be a crucial challenge facing the professionalization effort for project management. Research has a significant role in this context, and the general perception is that there is a considerable gap between theory and practice in project management. Peter Morris (2014) wrote about project management as "a profession with a hole in its head." According to him, as project management is practice-oriented discipline, academics do have difficulties in presenting it as a whole, and therefore he proposes that the academics become more involved in the actual practice. The International Project Management Association IPMA has shown initiative here with its annual research conferences, where the objective from the beginning has been to encourage a discussion between practitioners and

academics. This already started with the first IPMA research conference in Berlin in 2013 on "Project management, theory meets practice." The aspirations of the project management community to progress further on the path towards being a fully accepted profession are best seen in the UK, where the Association for Project Management, the largest national member association of IPMA, has since 2007 aimed at achieving a chartered status for the project management profession and reached an important milestone in that quest in April 2017, when it became the chartered body for the project profession ("Royal Charter | APM", 2017). APM claims that all stakeholders will benefit from this. A chartered status is an internationally recognized mark of quality and provides the profession with a platform to raise awareness of project management skills, improve standards and develop practice. It offers assurance to users of project management services, provides a framework for improved performance in projects, and raises the profile and value of project management.

Evolution of project management in Iceland

The history of projects in Iceland is, of course, much longer/older than the history of project management as a dicipline. We will divide our review of the evolution of project management in Iceland into three categories: Practical application, Educational progress, and Organizational support.

The Development of Practical Application of Project Management in Iceland

To give a some further examples of important projects in Iceland in the 20th century, we will build on an assessment by a the Association of Chartered Engineers in Iceland (ACEA) in 2002 of the three greatest engineering achievements in each decade in Iceland in the 20th century (Mbl, 2002). We have also added some more recent projects, based on the same criteria, based on suggestions from an group of engineers who have served in leadership roles within the ACEA). It was tempting to add more projects that we ourselves deemed as important in the context of the development of project management in Iceland. This temptation was, however, resisted for the sake of a methodalogical clarity. Table 1 shows examples of important projects in Iceland during the first half of the 20th century.

Table 1. Examples of important projects in Iceland in the period 1900-1960.

Project /Programme	Year of delivery	Brief description
Telephone line Reykjavik - Seyðisfjordur	1906	A telephone line between Reykjavik (the capital) and Seydisfjordur on the east coast (Fréttablaðið, 2006). 14.000 telephone masts were installed with a total distance end to end of 614 km and the project was concluded in only 4 months in the summer of 1906. This was a large project in a society that was rather underdeveloped in comparison with its neighboring countries at that time.
Vifilstada-hospital	1910	A hospital for tuberculosis patients that was buikd in Vífilsstadir. It was designed by by Rögnvaldur Ólafsson. After the decline in tuberculosis patients in 1973, all respiratory patients began to receive treatment at the hospital.
Cold water distribution system in Reykjavik	1909	The cold water distribution system in Reykjavik started operation in 1909. ("Vatnsveitan 100 ára", 2009). Providing water to the city from Gvendarbrunnur water reserves. The design and planning took two years and the construction took place from the beginning of summer 1908 until October 1909. This was the largest construction project in Iceland at that time.

Reykjavik harbour project	1917	The project to build a new harbour in Reykjavik was put out to tender in 1912 and a major milestone was reached in 1917. ("Saga Reykjavíkurhafnar - Faxaflóahafnir", 2013) This was a large project, a technical challenge and crucial in the development of Reykjavik as a capital.
Reykjavik Sewage System	Between 1911-20	The building of a Sewage system for Reykjavik City.
Loftskeyta-stöðin / The Reykjavik Radio Transmisson Station	1916-1918	The construction of an Reykjavík Radio Transmission Station began in 1916 with the support of the Marconi Society in London. Land was obtained from the town of Reykjavik at Melar, which was then considerably outside the town. In the spring of 1918 construction and finishing of the equipment was completed and on May 8 they took over the station on behalf of the government. It was then opened for public use on June 17. The station was equipped with the best equipment available, a 5 kw spark transmitter that received power from the oil engine and a spare transmitter that went for batteries. Receivers were two, crystal receivers, one with a lamp amplifier. Antenna masts were two, 77 meters high and with the capacity to transmit 750 km during the day and up to twice that during night. The station took care of all communications with ships the external world when telephone lines were not working. All service took place on morse.
Síldarverk-smiðja ríkisins in Siglufjörd	1930-1945	The Icelandic Govenment builds three Herring Smelters in the town of Silgufjörd SR30, SRN and SR46 which was by far the biggest one. However, during the period of 1911-1926 there had been seven privately build herring smetlers in the village.
The National Radio (RÚV)	1930	RÚV began radio broadcasting in 1930 and its first television transmissions were made in 1966. Coverage reached almost nearly every household in Iceland. RÚV has been a member of the European Broadcasting Union since 1956.
Telephone line connection to Europe	1906-1935	One short wave submarine channel connection from Scotland via Faeroy islands (opened in 1961). In 1935 the connectetion opened to London and Copenhagen. This involved building two telephone centers, a receiving station and a transmitting station (Morgunblaðið, 1935). Crucial project for connecting Icelandic society with the external world.
Swimming Palace (Sundhöllin) in Reykjavik	1937	Sundhöllin on Baronsstigur, Reykjavik was the largest indoor public bath in Iceland. Designed by architect Guðjón Samúelsson and opened in 1937.
Ljosafoss Power Plant	1937	Operation of the Ljósafoss station began in 1937. Two turbine units were installed with a combined capacity of 8.8 MW. The third turbine was installed in 1944 with 6.5 MW capacity.
District heating in Reykjavik	1943	In 1939-1943, most of the houses in Reykjavik were connected to a district heating system, and serviced by geothermal water from a borehole in Reykir in Mosfellssveit, some 12 km from the city center (Mbl, 2002). This project lead to enormous financial savings and positive invironmental impact when oil and coal were replaced by geothermal water for district heating.
Installation of a electrical distribution	1940-1949	The project aimed at providing the whole population of Iceland with electricity.

system in rural areas		
The Miklabraut „avenue“ in Reykjavik		Miklabraut is still one of the main transportation routes within Reykjavik city. It links the East part of the city with the West part.
Fertilizer plant in Gufunes	1954	A law on the fertilizer plant was ratified in the parliament in 1949 and the US funded post WW2 Marshall Plan provided the necessary economical means to finance the construction. The plant equipment and layout was designed by US engineers, but all civil work and engineering was designed and constructed by Icelandic engineers and contractors (Mbl, 2002). The electrical power was producedby the Irafoss power station, specifically built for this purpose. This can be seen as the first example of power - intensive industry in Iceland.

In the first decades of 20th century Icelandic society underwent fast development, and was transformed from a being an undeveloped agriculture and fishing community - and one of the poorest country in Europe - to a developed society. Industrialisation of the fisheries and the Marshall Plan aid following World War II brought about great changes for Iceland and the Icelanders has now became one of the richest nations in the world. The examples of project and programmes above shows some of the milestones on this path and give an idea of the development in Iceland in the first half of the 20th century.

In the period of 1961-2000 some large steps were taken in the harnessing of hydro and geothermal power, mainly in order to provide power from local resources to the public and to facilitate the build-up of power intensive industry in Iceland. The National Power Company was founded in 1965, and from the beginning, the company has played a crucial role in the development of project management in Iceland. A contract was made with Alusuisse in 1966 for power from the Burfell power station. Burfell hydro power station was a project of a magnitude previously unknown in Iceland. It was the first time a power station had been built in a glacier river, and this was a major step in the harnessing of hydro power in Iceland. Previous power plants had been smaller, and they had been financed with owners´ capital, or by borrowing from local banks. Burfell hydro plant was financed through a loan from the World Bank. The World Bank had strict conditions regarding consultants and contractors. To begin with, Icelandic consultants and contractors were too small and inadequate to fulfill these conditions, but the demands by the World Bank put pressure on the Icelandic organisations to make necessary improvements in order to fulfill these demands. As a consequence, Icelandic contractors and consultants who wanted to be eligible to participate in these projects made some major improvements regarding their technical and project management ability, and they were direct participants in later hydro power projects, such as Hrauneyjafoss and Sigalda. Burfell power station was, for example, the first project where project planning software was applied in Iceland, and the application of CPM was a key to delivering the first phase - installing the first turbine - on time and on budget (E.S. Ingibergsson, personal communication, February 3, 2017).

Table 2. Examples of important projects in Iceland in the period 1961-2000.

Project / Programme	Year of delivery	Brief description
Burfell power station	1969	In 1969 the hydro power plant in Burfell was commissioned. This was the first time a glacier river was harnessed in Iceland and innovation and development was needed to solve some important technical challenges, e.g. to protect the power station from ice in the river. The demands by the World Bank led to increased focus on professioal project management (E.S. Ingibergsson, personal communication, February 3, 2017).
Reykjanes-braut „high-way“ (Route 41) to Keflavik International Airport	1965	The road was orginally build in 1912 but was finally paved in 1965, becoming the first paved raod in Iceland. The road was a two lane single carriageway with a concrete (not-asfalt) surface. The road links Reykjavik capital with the KEF international airport.
Laugardalshöll sports hall.	1965	Laugardalshöll is an indoor sporting arena located in Reykjavík, Iceland. The capacity of the arena is 5,500 people. Hosted for instance the 1995 World Men's Handball Championship
Sundahofn Harbor Reykjavik	1968	Since 1968 this has been the most important import-export facilities in Iceland. The port handles some 230,000 TEU.
Bridges on the Skeiðarár-sand	1974	The Skeiðará river was the toughest obstacle in the construction of Iceland's Circle Route #1. The circle was closed in 1974 by a 904 m long bridge which is still he longest bridge in Iceland.
Svartsengi geothermal power station	1976	In the first phase of the Svartsengi geothermal power station, superheated geotremal steam was used to heat fresh water, which was pumped to the villages of Grindavik and Njardvik for district heating. This was the first geothermal power station of its type in Iceland. The world famous "Blue Lagoon" was created as a by-product of this power station.
Krafla geothermal power station	1978	In 1978, the first large scale geothermal power plant (60 MW) in Iceland was commissoned in north-east Iceland. This was Krafla power station. It was built on top of an active volcano which did in fact erupt a number of times during construction and the first years of operation. (A decade eariler a small power plant of 3 MW had been build in the Bjarnarflag area). The first time in Iceland that electricity was produced (large scale) from geotheral power, a milestone in the harnessing of geothermal energy in Iceland.
Skyggnir Earth Station	1980	The Skyggnir Earth Station came online which enabled telephone calls to other countries via satellite. Direct dialling to other countries became possible for the first time.
New terminal at Keflavik International Airport	1987	In 1987, a new terminal at Keflavik International Airport (Leif Eiriksson Terminal) was commissioned, the. It was the largest construction project in Iceland at that time and was criticized because of extensive cost overruns in its final stages. (Gestsson, 2014). The terminal has been under construction and development ever since.
Nesjavellir geothermal power station	1990	In 1990, the Nesjavellir geothermal power station was commissioned (Morgunblaðið, 1990). It was a project that had been in the research and planning phase for a very long time. It was considered very successful and for the most part delivered on time and on schedule. Nesjavellir power station is an efficient combined cycle power station.

Hvalfjordur sub-sea tunnel	1998	In 1998, a tunnel under Hvalfjord was commissioned. This was the first and only sub marine tunnel in Iceland. The project that was privately financed was considered to be a great success, having been delivered on budget and well ahead of schedule.
Perlan (the Pearl)	1991	Perlan is a prominent landmark in Reykjavík and situated on the top of Öskjuhlíð hill. What was originally a cluster of six hot water tanks was in 1991 converted to a public venue and a restaurant.
Installation of a digital cellular telecommunication systems	1994-2000	The system enables the use if GSM applications.

The years 2001-2017 have been characterized by great fluctuations in the Icelandic economy and a major financial collapse in 2008, followed by steady growth, with tremendous expansion of the tourist industry.

Table 3. Examples of important projects in Iceland in the period 2001-2019

Project / Programme	Year of delivery	Brief description
Karahnjukar Hydro Power Plant	2007-2009	Kárahnjúkavirkjun, officially called Fljótsdalur Power Station, is designed to produce 4,600 gigawatt-hours (17,000 TJ) annually for Alcoa's Fjarðaál aluminum smelter located 75 km away to the east in Reyðarfjörður. With the installed capacity of 690 megawatts (930,000 hp), the plant is the largest power plant in Iceland. The project involved damming the rivers Jökulsá á Dal and Jökulsá í Fljótsdal with five dams, creating three reservoirs. Water from the reservoirs is diverted through 73 km (45 mi) of underground water tunnels and down a 420-metre (1,380 ft) vertical penstock towards a single underground power station. The smelter became fully operational in 2008 and the hydropower project was completed in 2009.
The Kárahnjúkar Dam		Kárahnjúkastífla enables five dams and is the largest of its type in Europe, standing 193 metres (633 ft) tall with a length of 730 metres (2,400 ft) and comprising 8.5 million cubic metres (300×106 cu ft) of material. The project was been heavily criticised for its environmental impact and its use of foreign workers.
Alcan Aluminium Smelter in Reydarfjordur	2007	The Alcan aluminium smelter in Reyðarfjordur is the largest of three aluminium smelters in Iceland. Following an international tender process the Bechtel Corporation and Mannvit's subsidiary HRV Engineering as Bechtel-HRV were chosen to design and build a 346,000 tpy aluminium smelter in Reydarfjordur, Iceland on an EPC basis.
Harpa music and conference center	2009	In 2009, the Harpa music and conference center in the center of Reykjavik was commissioned. It was planned and designed before the financial collapse of 2008. After the collapse it was decided not to stop but to finish the house. Harpa won the Mies van der Rohe Award for Best Arcitecture in 2013.
CarbFix	2007	CarbFix is a research project led by Reykjavik Energy, that aims at developing methods and technology for permanent CO2 mineral storage in basalts. It was founded in 2007 by Reykjavík

		Energy, CNRS, the University of Iceland, and Columbia University.
Hellisheidi Power Plant	2009	The Hellisheidi Power Station is the largest geothermal powerstation in Iceland and the second largest in the world. It is located in the Mt. Hengill area n Southwest Iceland. It gets its energy from 30 drill holes each approx. 2000 m deep. It has now a capacity of 303 MW of electricity and 133 MW of hot water, aiming at 400 MW which would make it the most powerful power station of its kind in the world.
Vadlaheida-tunnel	2018	Vadlaheidargong is a toll tunnel in the north of Iceland along Route 1, just east of Akureyri. It passes between Eyjafjordur and Fnjoskadalur. It is 7.4 km (4.6 mi) long. The tunnel was planned to open at the end of 2016 but due to massive leaks of both hot and cold waters it had to be postponed.

The Development of Project Management Educational in Iceland

The first documented indication in Iceland of the evolution of project management as a formal professional discipline can be traced back to 1967, when Egill Skuli Ingibergsson, an electrical engineer and later the Mayor of Reykjavik City, participated in the first International European Internet Congress in Vienna (E.S. Ingibergsson, personal communication, February 3, 2017). The topic of the conference was the CPM method, and Mr Ingibergsson returned back to Iceland with the new ideas and started to offer courses in CPM planning.

In 1974, Petur K. Maack returned from Denmark with a PhD degree in operational engineering. He became a faculty member at the newly founded faculty of engineering in the University of Iceland where he designed a course on operational management, and where project management was briefly addressed. In 1975, an official course on project management was hosted by Stjornunarfelagid (“The Management Society” Alþýðublaðið, 1975). This is the first documented course on formal project management offered in Iceland.

In 1981, Daniel Gestsson went to Pittsburg, USA to study public administration and project management at a university level. At that time the situation in Iceland was, according to Mr Gestsson, such that the politicians “had all the power“ and they were “not too keen on giving too much power to professionals“ ("Viðtal við Daníel Gestsson", 2014). In 1982, Mr Gestsson participated in a project management conference in Stockholm, organised by the Nordic project management associations ("Nordnet“). There he met Dr Morten Fangel, who agreed to come to Iceland and give courses on project management ("Viðtal við Daníel Gestsson", 2014). In 1984, Dr Fangel gave his first course on project management in collaboration with the Center for Continuing Education at the University of Iceland, and after that he has offered project management training in Iceland on a regular basis.

In 1998, the first university course in Iceland specifically focusing on project management was offered at undergraduate level by Tryggvi Sigurbjarnarson, a faculty member of Industrial and Mechanical Engineering at the University of Iceland. In the year 2000, a full academic position in project management was created at the University and Dr. Helgi Thor Ingason took on the position. In the same year, project management was taught for the first time as a special course at Reykjavik University by Thordur Vikingur. In 2003, a 24 ECTS diploma course on project management called “Project

Management and Leadership" was offered for the first time in Iceland ("Saga námsins | Verkefnastjórnun og Leiðtogafærni", 2016). This program focused equally on the intra- and interpersonal aspects of project leadership and on the more technical aspects of project management. The program has been one of the most popular continuing education programs in Iceland ever since.

In 2005, a Master of Project Management (MPM) program was offered for the first time in Iceland as a graduate level executive management program. The courses focusing on the management of projects with a very strong focus on the psychological aspects of project leadership. The MPM program has been offered ever since and is now hosted at Reykjavik University. The establishing of the MPM program was arguably an important milestone in the development of project management as an academic field in Iceland. It has always focused on up-to-date aspects of PPP (project, program and portfolio) management and put heavy emphasis on behavioral, organizational, and cultural aspects of responsible management. MPM graduates are more than 300, and many of these have leading roles in organizations in various business sectors in Iceland. In 2007, the MPM program organized its first annual graduation conference, where 30 students presented their final theses on project management and related fields. The MPM program has also had a strong focus on research and graduates are write a thesis in the fourth and final semester and present their work at the annual conference on what is now called "The Project Management Day" held in cooperation with the VSF. In 2008, the first international publication by an MPM graduate was published when Hildur Helgadottir, published her MPM thesis in the International Journal of Project Management (Helgadottir, 2008) on the ethical dimension of project management. Since then many other MPM graduated have been published either in the proceedings in project management conferences or in international peer-review journals. Project management programs on graduate level are now offered in three Universities in Iceland.

In 2003 Thordur Vikingur Fridgeirsson published his first textbook on project management titled *Verkefnastjórnun á tímum breytinga* ("Management in Times of Changes and Agility" (Fridgeirsson, 2003). This was the first book on project management published in Icelandic and in 2008, the same author published his second book on project management *Áhætta, ákvarðanir og Óvissa* ("Risk, Decisions and Uncertainty" (Fridgeirsson, 2008). In 2011 and 2012, a new series of project management textbooks in Icelandic was published. The four books were titled *Stefnumótunarfærni* (Strategic Competences) (Ingason H. & Jonasson H., 2011), *Leiðtogafærni* (Leadership Competences) (Jonasson H. & Ingason H., 2012), *Skipulagsfærni* (Project Management Competences) (Ingason H. & Jonasson H., 2011) and *Samskiptafærni* (Communication Skills) (Jonasson H. & Ingason H., 2012). These books were later translated and rewritten in English and in 2019 the international publisher Rutledge/Taylor and Francis the series for the global market. The books are Project: Leadership (Ingason & Jonasson, 2019), Project: Communication (Ingason & Jonasson, 2019), Project: Strategy (Ingason & Jonasson, 2019), and Project: Execution (Ingason & Jonasson, 2019). In 2011, the diploma program "Transparent leadership and sustainable project management" was registered by the Danish project management association on behalf of IPMA. The registration, that is only granted after a thorough scrutiny of the program, further strengthened project management education in Iceland.

In 2015, the MPM program was accredited by APM, the British project management association, and in the same year the first PhD thesis on project management was defended at an Icelandic university (Fridgeirsson, 2015). This research project revealed that cost overruns are the rule rather than the

exception in publicly funded construction projects and that there is room for extensive improvement in terms of project selection and planning. In 2016, the macro-economical value of project management in Iceland was assessed, based on a method that had been applied in Germany one year earlier.

The Development of Project Management Organisational Support in Iceland

The Icelandic Project Management Association (VSF) was founded in 1984 and Daniel Gestsson became the first chairman (Gestsson, 2014). One of the first assignments of this new association was to participate in a Nordic project by Nordnet, to develop a list of project management concepts in the Nordic languages. In 1987, a Nordnet conference was held in Reykjavik on "The spectrum of project management." It was an interesting event, because it was held as a collaboration between IPMA and PMI, the Project Management Institute of the USA (Gestsson, 2014).

In 1991, a handbook on publicly funded construction projects was issued by the Ministry of Finance. It was written as guidelines for all the ministries to follow in all construction projects undertaken under their providence. Later, regulations on official construction projects were written and formally approved by the parliament. In 1997, the first IPMA certification took place in Iceland, with help from the German project management association (Gestsson, 2014), and in 1997, the first project management office was established in an Icelandic organization, in this case one of the three largest banks in Iceland, Islandsbanki (Bjornsdottir, 2007).

In 1994, the IPMA launched an effort to coordinate the education of project managers and introduced its willingness to develop a certification program for professional project managers. The Icelandic Project Management Association (VSF) participated actively in this effort and Iceland became one of the pioneer countries (Gestsson, 2014). In Iceland, currently, only one person, Sigurdur Ragnarsson for Harpa Music and Conference Hall, holds a IPMA-A certification, 82 people hold IPMA-B certification, 184 people hold a IPMA-C certification and 1755 hold a IPMA-D certification (VSF, 2019).

In 2001, the first publication of an Icelandic Body of Knowledge on project management was written and published with support from the Icelandic state, on the condition that it would be accessible to the public (Gestsson, 2014). In 2002 the first woman was elected as chairman of VSF (Gestsson, 2014). A research project in 2003 revealed that project managers in Iceland had quite diverse backgrounds (Einarsdottir, 2003). A survey was done amongst members in VSF, and 52% of the respondents were engineers, a lower ratio than was anticipated. In 2010, MPM students did an assessment of the project management maturity in the Icelandic ministries. The conclusion was that there the project maturity was very low — most scored 1 out of 5 with regards to most evaluation criteria — in all of the ministries and much room for improvement (Ingason, 2010).

In 2012, VSF had the IPMA competence baseline ICB3 translated into Icelandic and used as both as the Icelandic competence baseline in project management and as a foundation for the project management certification system. Another milestone for VSF was in 2012, when the association hired its first employee. This was a response to demands for increased professionalism in the operations of the association, which has from the beginning been run mostly on a voluntary basis. In 2013, a handbook on project management was issued by the Icelandic Prime Ministry, intended for use in all ministries when

they are planning and executing projects (Stjórnarráð Íslands, 2013). In 2014, a research conducted by MPM students at Reykjavik University demonstrated that the job title "project manager" in Iceland is frequently used for jobs that have little or nothing to do with professional project management (Guðmundsdóttir & Jónsdóttir, 2014). In 2016, IPMA held its 4th research conference in Reykjavik, with the theme "Project management and sustainability." In 2018 the IPMA ICB4 was published in Iceland by VSF.

Since 2000-2006 interest in Agile project management, and Scrum methods in particular, became noticeable within Icelandic companies, especially among IT professional and software developer. Since then Agile and Scrum has become an integrated part of the project management toolbox of many project management professionals in Iceland.

Discussion

The figure below shows some critical milestones in the development of project management as a formal professional discipline in Iceland. It is based to the overview given the previous chapter of this paper and put in context with the timeline that was laid out in the introduction section.

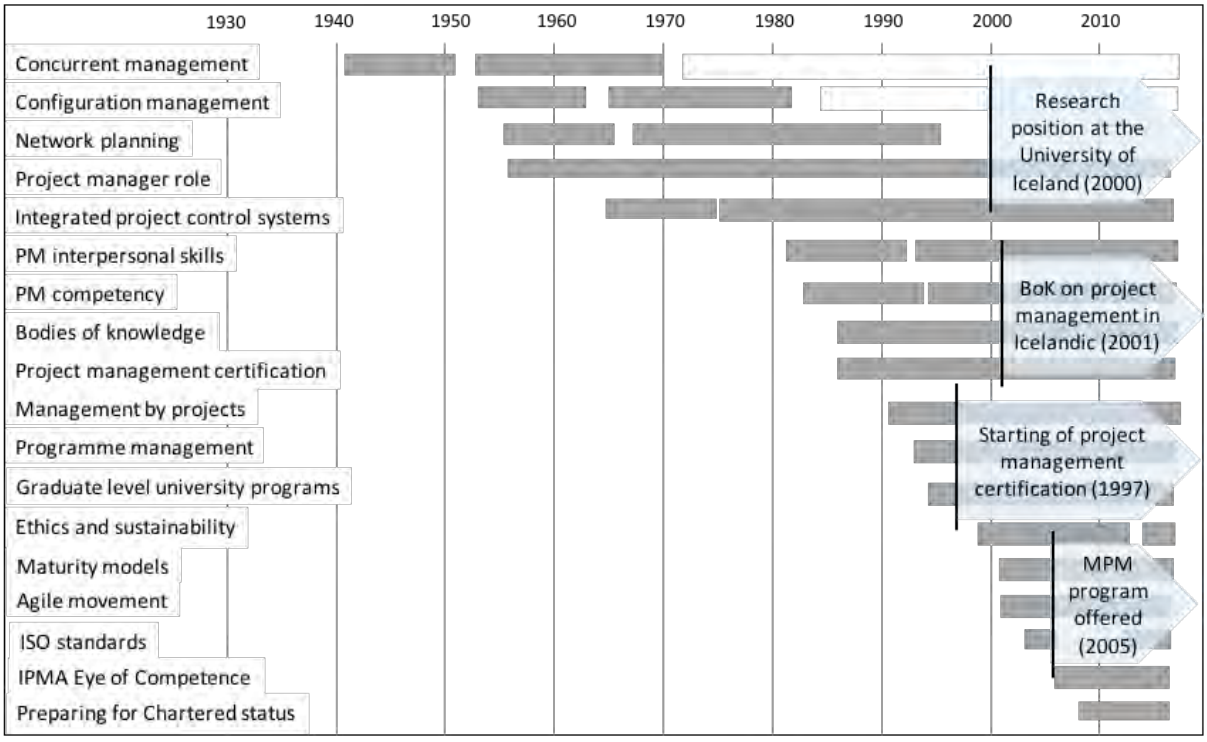

Figure 3. The timeline of Project Management in Iceland.

The idea is to represent the extent to which project management has developed in the direction of a profession based on the norms defined in the theoretical section. It is quite clear that some of the

building blocks of a project management profession have been laid in Iceland. Research in project management was formalized in 2000, when an academic position in project management was created at the University of Iceland. A body of knowledge in the Icelandic language on project management was published for the first time in 2001, however, as early as 1997 there were project managers who had sought a certification in project management in collaboration with IPMA. The year 2005 was a critical milestone in this development, when a graduate level program – the Master of Project Management (MPM) - was offered for the first time. The program was well received, and more than 350 people have graduated and have brought, and will continue to bring, their knowledge to work within the Icelandic society.

As of today, the application of project management has become widespread in all sectors of the Icelandic society. Today there is a wider choice of educational programs, there is a sound body of knowledge on project management, the qualifications of project managers have been defined, and a certification system is run under the umbrella of IPMA. As a matter of fact, Iceland has the highest number of certifications per capita in all of the IPMA member associations. This indicates a clear trend, and that organizations in Iceland really value the international confirmation of knowledge of project management concepts - represented by the lower level certification - and of real project management experience - represented by the higher-level certifications.

There are, however, some crucial elements missing. Firstly, we can state that project management has gained some political and social recognition in Icelandic society through the years. But in many countries, the project governance frameworks have been catalytic in moving the project management forward as a professional discipline (Samset, et al., 2016). This has not happened in Iceland, as references to project management best practices are less evident in the Icelandic governance legislation than in many other developed countries (Fridgeirsson, 2015).

VSF publishes their Code of Ethics - a code of professional conduct for certified individuals ("*Siðareglur | Verkefnastjórnunarfélag Íslands", 2017*) on its web page. The application form for certification includes a checkbox where applicants are asked to confirm that they have read the Code. The way this document was developed is not explained. Personal communication with present and past leaders of the association, however, reveals that it is a translation of ethical guidelines from the UK and Scandinavia, which was published on the web page before 2006 and has remained unchanged ever since (Ottosson T, personal communication, March 16, 2017), (Albertsson O., personal communication, March 16, 2017), (Imsland O., personal communication, March 16, 2017). The relevance of the Code of Ethics is thus very limited, and by reference to Morris et al (2006) it can be said that project management in Iceland draws little of its legitimacy by reference by virtue of its contribution to the public good or by adherence to an overarching ethical code.

In order to quantify the status of project management in Iceland, on its path to a profession, we offer a simple benchmark. We use the different attributes for a profession, as defined in the theoretical section, and grade each of them on a scale 1 to 4. The exercise was performed in December 2017 by the authors of this paper, and a group of 35 master students in project management (MPM) at Reykjavik University,

as a part of a sum-up work session in conclusion of their 3rd of four semesters in the program. The results are shown in Table 4 which also explains the simple grading system.

Table 4. Status of project management in Iceland.

	Scale description: 1 = trivial interest, 2 = some interest, 3 significant interest, 4 = major interest			
#	Attribute:	Description:	Status in UK	Icelandic status
1	Theoretical knowledge base	Specific research activities on project management topics	4	3
2	Continous evolution of knowledge base	Academic publications and scientific attention	4	3
3	Best practices principles	References, standards and bodies of knowledge	4	2
4	Educational support	Certification and postgraduate study programs	4	3
5	Academic support	University study and research programs	4	3
6	Codes of ethics	Defined quality assurance and professional principles towards customer	4	2
7	Occupational interest groups	Presence of influential professional associations	4	2
		Average	*4,0*	*2,6*

For reference, we have assessed the status of project management in UK according to our simple grading system. Our assessment is based on the fact that the Association for Project Management in UK has become the Chartered body for the project profession in UK ("Royal Charter | APM", 2017). The last column of the table shows our assessment of the status of project management in Iceland.

We argue that project management has not yet evolved to become a fully developed profession in Iceland. 'Scope creeps' in projects are common and research has shown that cost overruns are the rule rather than the exception in public construction projects. There seems to be a lack of standardization, and even though project management has gained weight in society, there is a huge improvement potential in all sectors, not least in the public sector, where project management maturity has been measured and found to be very low, and where the government has not played any role in pushing for the implementation of project management governance, even though this has happened in neighboring countries.

From the beginning, the main drivers advocating professionalism in project management in Iceland were motivated individuals who then gradually formed a community of practice that later became the VSF. VSF has continued this development by offering the ICB3/ICB4 IPMA competence baselines in Icelandic and a certification system based on it. The initiative to move the profession still further has perhaps been transferred to the universities that now offer both diploma programs (VOGL, APME) and graduate programs (MPM, MPM/MSc and MSc) in project management. Further, Icelandic businesses and organizations that operate in an international environment, and have to comply to international standards, such as the National Power Company, have had to meet variety loan conditions defined by the World Bank. In recent years, we have seen an expansion of these drivers, with international businesses that operate in the dynamic competitive world market and have had to apply modern project

management to compete and respond quickly to changes in their environment. In a way, this is in line with the "corporate" professionalism defined by Muzio et al (2011). These organizations represent "pools of excellence" within a business environment where there is great room for improvement. Municipalities and governmental initiatives will by means of a more general projectification hopefully lead to better governance that will bring positive results for society in general.

The Icelandic Project Management Association could play a still larger role in pushing the project management profession forward, for instance, by facilitating an open discussion about the profession as such, professionalism, and on the ethical and professional responsibility of holders of IPMA certificates and IPMA members. Such an open forum for discussion about project management can be backed up with efforts to win political, social, and legal recognition of the value of regulating project management for better project management and the common good.

Conclusion

In this paper we have looked some historical milestones in the development of the project management profession within the Icelandic society. We have seen how the profession grew through the practical application of project management methodology, project management education, and organizational support in the for of consultancy and trainings.

The Icelandic example of how the project management profession gets born and how it matures within a society is an interesting example for variety of reasons. Starting off as a rather vague idea on how to use some basic concepts from operation management to manage schedules, developed over a few decades and has now become a sought-after professional discipline with educational frameworks and organizations with professional interests. The application of project management was initially sporadic and led by motivated individuals. Today the scene is different, with project management as one of the key drivers of the Icelandic economy. In the paper “Projectification in Iceland measured, comparsion of two methods” (Fridgeirsson, Ingason & Jonasson, 2019) indicates that monetary value added via projects is little less than one third of the actual economy (Gross Value Added), and that stakeholders from industry and the public domain agree that this evolution will escalate in the near future. All the main universities in Iceland teach project management as an integrated part of engineering and business curriculum, and a thriving post graduate scene exists, with the MPM program at Reykjavik University arguably at its spearhead.

The Icelandic scenario with regards to the development of the project management profession is comparable to that of nations with similar frameworks with regards to what should constitute professionalism. It had been lagging behind by a few years, but in recent years higher project management maturity has been achieved, with the reservation that the public governance framework in Iceland does still not comply with similar charters in Europe (Innanrikisraðuneyti, 2016). However, despite some imperfections, there is clear evidence of the growing significance, importance and impact of project management within the Icelandic society.

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Project Management in Iceland:
Current and Future Importance of Project Management within the Icelandic Economy

- Paper 2 of 3 in a series on the history, status and future of project management in Iceland.

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Ágrip

Verkefni og stjórnun þeirra hefur þróast frá því að vera aðferðafræði við áætlunargerð til viðurkenndrar atvinnugreinar sem skiptir sköpum í samfélagi okkar daga. Þessi grein er önnur í röð þriggja undir heitinni *Verkefnastjórnun á Íslandi* og fjallar um mikilvægi verkefnastjórnunar innan íslenskra fyrirtækja og hlut verkefna í íslenska hagkerfinu. Þá eru birtar tvær íslenskar atvinnulífskannanir sem styðja við greiningu á hvað ætla má að muni gerast með fagsviðið verkefnastjórnun í næstu framtíð.

Greinin sýnir fram á mikilvægi verkefnastjórnunar á Íslandi sem hlutfall af vinnsluvirði atvinnuvega hagkerfisins, þ.e. tekjum að frádregnum aðfangakostnaði. Niðurstöður rannsóknanna gefa til kynna að nálægt þriðjungur af vinnsluvirðinu megi rekja til verkefna. Ennfremur kemur fram að hlutur verkefna mun aukast í næstu framtíð. Niðurstöðurnar eru skilaboð til atvinnulífsins og yfirvalda um þá stefnumótun sem þarf að vinna og útfæra t.d. hvað varðar nauðsynlega fagþekkingu fyrir þarfir samfélagsins á næstu árum. Loks greinir rannsóknin frá tveimur mismunandi aðferðum til að mæla mikilvægi, áhrif og aðra þróun hins “verkefnavædda” samfélags á hverjum tíma.

Lykilorð: *Fagsvið, vinnsluvirði atvinnuvega, áhrif, hagnýting, framtíðarleitni.*

Abstract

The project management profession has evolved from being a simple technical approach to planning to becoming a full-fledged profession that plays an essential role within the global economy. This paper, which is the second of three under the general heading *Project management in Iceland*, looks at the importance of project management within Icelandic organizations and the Icelandic economy. The paper explores the developmental path of the project management profession, looks at the current state of affairs, and identifies possible future trends though two surveys conducted Iceland.

This study reveals the importance of project management in Iceland, a developed Nordic country, as a proportion of its economy. The study indicates that close to one third of the Gross Value Added (GVA) in the Icelandic economy is based on project-related work. The study, furthermore, indicates that the

importance and application of project management will increase in the near future. This sends a clear message to both industry and the public sector on what kind of strategic and tactical alignments and what kind of professional competences are needed for future economy and society. Furthermore, the study describes - and deploys - two methods that can be used to measure the importance and trends within the project management profession and as indicators of what has been named “projectification” of society.

Keywords: *Profession, GVA, impact, application, future trends.*

Introduction

Observing the development of the project management profession from starting off as a rather narrowly defined technical undertaking, to becoming a world-wide profession has been fascinating. The birth of the project management as a formal discipline is traditionally seen as a product of the Cold War (Kerzner, 2009) when the so-called superpowers competed in an arms race to build weapons and other armaments. Large projects were planned and deployed both in the US and the USSR to design bombers, ballistic missiles, submarines and weapon systems. In the US, where the more scientific take on project management is was born, projects were often a complex interplay of a number of stakeholders: the military, government, public institutions, contractors and sub-contractors. The enhancement of the planning procedures led to techniques like the development of the Critical Path Method (CPM) and the Program Evaluation Review Technique (PERT) and other the recognizable early signifiers of project management.

When executives in a search for managerial techniques that could be used to cope with the increasingly volatile business environment, discovered project management, interest in the discipline grew steadily. This interest, further, created the need for references and conceptual clarifications, a process that indicated increased “projectification”, a concept first used in 1995 by Cristophe Midler (Midler, 1995). Originally, the concept referred to a trend that Midler noticed in the Renault car factories and that manifested in the transition from the traditional functional organization in the 1960's to project orientation and coordination in the 1970's. It also referred to the deep impact these changes had on task definitions, hierarchical regulations, carrier management, functions and relationships with suppliers. Since then the term "projectification" has in an organizational context been used to describe the path towards the managerial adaptation, or transformation, of a conventional management to a project-oriented organization. It has also, still further, been used as to descript the growing trend within developed societies to build increasingly on projects and project management for further actualization.

Morris (2012) described the evolution of project management as a move towards system engineering and interest in the “project manager” as an attempt to cope with the human and social challenges of the dynamic system that projects inevitably are. Arguably, the focus on the project as a vibrant organization, rather than as a set of methods, established a turning point in the evolving of the profession. Morris et al. (2012) also describes three major paradigms, or “waves”, in the development of project management as a discipline. The first wave was characterized by normative methods, tools and techniques; the second wave by projects as temporary organizations, with methods to work with risk and contingency, planning, and models that were used to rethink project management.

The third wave has seven characteristics; (1) interest in the history and distinct theory of projects and project management; (2) increased awareness of the importance of context or how a project is a part of the social and sectoral enterprise; (3) interest in understanding how projects and organizations are linked; (4) interest in how strategy and projects are linked; (5) interest in how projects are used as

vehicles to innovate for the future; (6) interest in the role of leadership and the role of human behavior in shaping trust and creating a cooperative atmosphere; and (7) interest in seeing projects as complex, risky and across-the-firm relationships, in an attempt to adopt to uncertainty, manage novel ventures and deal with special challenges through learning and knowledge integration.

Publications in the field of project management also indicates how the profession advanced over time. Three significant journals focusing on project management specifically are: (1) The International Journal of Project Management (IJPM published by Elsevier), (2) The Project Management Journal (PMJ published by Wiley) and (3) IEEE Transactions of Engineering Management (IEE-TEM published by The Institute of Electrical and Engineering Management Technology Council) (Turner et al., 2012). In 1987 there were 6 papers in IJPM, in 2007, the number had risen to 366. In 1987, there were 2 papers on project management in PMJ and in 2007, they were 67, and in IEE-TEM there were no publications in 1987 but 29 in 2007. The diversity of topics had also increased. In IJPM, 45 topics were addressed in 1987, but this number had escalated to 168 topics in 2007. A similar trend can be verified with other journals (Turner et al., 2012). In times when academics are constantly being pushed to publish, it can be assumed that this trend has continued.

The International Project Management Association (IPMA) that was established in 1965 had, by the end of 2013, certified more than 194,000 individuals worldwide (IPMA, 2014). The Project Management Institute (PMI) was established in 1969 and the British Association for Project Management (APM) in 1972.

Also, an essential part of the development of the project management profession, was the issuing of Book of Knowledge (BoK) protocols with guidance of how project portfolios and programs to link strategy and operations. In the UK, the *Association for Project Management* (APM) has issued the *APM Body of Knowledge* that is an up-to-date collection of topics that should be known to PPP practitioners, academics and experts. Detailed protocols in regard to projects and programs for coordinating strategy, tactics and operations via projects, programs and portfolios of projects can also be found in the standards issued by the *Project Management Institute* (PMI). In particular, the PMI has issued standards on project portfolios management (The *Project Portfolio Standard®*), which denotes that a portfolio is a component collection of programs and projects specifically managed as to achieve strategic objectives (PMI, 2012). PMI also issues standards on project programs (*The Program Management Standard®*), providing guidance to manage multiple projects where project feasibility is the key to answering and verifying the proposed direction (PMI, 2006:100). Furthermore, PMI issues standards on projects (*Project Management Body of Knowledge - PMBOK®*) (the latest version being PMI, 2017). Both APM and PMI have grown rapidly on all fronts. In 1992, the number of members of APM was 5,000; in 2010, that number had increased to 17,500. In 2009, the number of members of PMI had risen to more than 300,000 in two decades (Hodgson and Muzio, 2012).

There is little doubt that the project management is an important profession that helps project owners and organizations of all kind to actualize themselves through successful projects. “Projectification” of society and the economy is a factuality even though the actual economic impact has hitherto not been overly well defined.

In Iceland, a similar development with regard to professionalism in PPP management has been taking place it happened there few years later in time—and there are some interesting anomalies, as discussed by Ingason, Fridgeirsson & Jonasson (2019).

The key promoter of the discipline of project management is the *Project Management Association* of Iceland (VSF). VSF was founded in 1984, with the mission to lead and enhance the development of

project management (VSF, 2017a). Arguably, the most notable activity of VSF is the function of certifying professional project managers in collaboration with the IPMA (International Project Management Association). This process has been taken place since 1997 and gone from strength to strength. Currently, 1566 project managers have received certification on all of the four different IPMA levels (A, B, C and D) (VSF, 2017b). The birth of project management as a profession in Iceland was also consolidated by a post graduate study line/ course, Master of Project Management (MPM), established in 2005. More than 300 project managers have graduated through the MPM programme (MPM, 2017).

The project management profession has been gaining an international momentum and Iceland has followed along the same path. Ingason, Fridgeirsson & Jonasson (2019) conclude that project management is on the verge of becoming an established profession in Iceland; a profession with a solid theoretical knowledge base, best practice references, strong educational programs, academic research activities and occupational interest groups. However, in spite of this success and the projectification of the private and the public industries, the economic impact is more or less unknown.

“Success” is also a relative concept, as projects in Iceland, especially public projects, have frequently come under scathing criticism and are subject to controversy and debate. Fridgeirsson (2015) investigated public projects and project governance in Iceland and concluded that large projects have serious cost overrun problems (9 out of 10 projects had cost overruns). In the study by Fridgeirsson (2015), the Icelandic project governance framework is considered to be lacking behind when compared with in countries like Norway and the UK. It is, therefore, an imperative to document information on projects and their management (or lack thereof) not only in the light of their success, but also with regard to how they have failed to pave the way for improvement.

Despite the small population (330.000 inhabitants), Iceland is a prosperous country with a GDP of 50,936 USD per capita in 2015, according to the UN, placing the country in 12th place in the world. In 2013, 78% of Iceland's export value and 59% of imports came from countries within the European Union (Hagstofan, 2016). Economic growth is relatively very strong (7,2% GNP in 2016) and Iceland´s prospects are generally considered favorable (Hagstofan, 2017).

As stated earlier, the economic impact of work done in projects is not fully clear. This is unfortunate, as the monetary worth of projects as a percentage of the larger economy is an important metric to the impact of project management for society. If the impact of projects on the economy is significant, it should be instrumental for government and business leaders to master the profession of project management and the importance of the project management profession should be reflected both in governmental and industrial strategies.

The first serious attempt to outline the economic impact of projects was arguably carried out by Wald et al (2015) and applied first to the German economy. The initial study of Andreas Wald and colleagues provided a platform for studying the Icelandic projectification and the economic impact of projects. The present study is intended to pursue the following objectives:

1. Investigate the relevance of projects and project management for Icelandic industries.
2. State the current economic impact of project related work.
3. Project the trend of the profession in the near future.
4. Describe an alternative method for projecting the trend in the future.

Methodology

With the aim to investigate the proportion of the Icelandic economy that is project based the authors build partly on a method developed by Wald et al. (2015). In addition, a benchmark study among over

than 1300 managers was conducted to explore (1) the current application and impact of project management in Iceland, and (2) how the application and impact of project management is likely to evolve in the near future (next 12 months).

The GVA (Gross Value Added) by Projects in Icelandic organizations/sectors

No direct financial figures are available on the economic impact of projects or the degree of projectification within Icelandic industries. Ideally, measuring the share of project work in the larger economy would build on established macroeconomic measures of added value, such as the gross domestic product (GDP), the gross national product (GNP), or the gross value-added (GVA). The GDP is the total monetary value of all goods and services produced over a specific time period and would be difficult to apply as a metric for projects. The same applies for the GNP, which indicates the value of all finished goods and services in a country in one year by its nationals. Both for the GDP and GNP it would be difficult to isolate projects from the interactive stream of transactions within the economy. However, the GVA is suitable for this study. The GVA represents the monetary value of the goods and services that have been produced, after the cost of the inputs (i.e. raw materials) that can be attributed to the production has been subtracted. The GVA is, in short, a productivity metric that measures the contribution of work to society (or the producer, section region, etc.).

A measure of the output and the value-added of project work seems, therefore, to be the best approach for measuring the share of project work, as it could be directly compared to the total GVA. However, this approach also has its challenges, such as the variety of projects is inevitably reflected in the variety of project outcomes. For example, the output of a project that delivers a product or service with a dedicated market price has very different properties to that of a new product development project or an organizational change project. In theory, all projects should have a value, direct or indirect, for the organization. However, it might be difficult to define a specific (monetary) value to, for instance, an internal change project. This allocation problem mainly results from an unclear time horizon in which a change project delivers measurable monetary results, and from the questions, whether, to what extent and with what degree of quality the change was achieved. In addition, the revenues directly attributable to the projects must be recorded to obtain an output-oriented measure of project work. This data is only available for projects which lead directly to revenues. Internal projects, such as change projects, would be ignored as well as nearly all projects in the public sector. Therefore, any measurement based on the project output seems to be difficult, especially across project types.

For these reasons, Wald et al. (2015) used the proportion of project work as a percentage of total work (measured in working hours) in an organization as the key indicator of the level of projectification. This input-oriented measurement can be applied to all types of projects, e.g. revenue generating external projects, but also internal change projects. It can be applied to all kinds of industries, and it is independent of organizational factors.

A project is an undertaking largely characterized by the uniqueness of the conditions in their entirety. More specifically, an undertaking is defined as a project in the present study, if it fulfills the following conditions:

- A specific target has been defined for the project.
- The project is limited in terms of time (start and end).
- The project requires specific resources (e. g. financial, staff, etc.).
- An independent process organization exists, which is defined as different from the standard organization in the company.

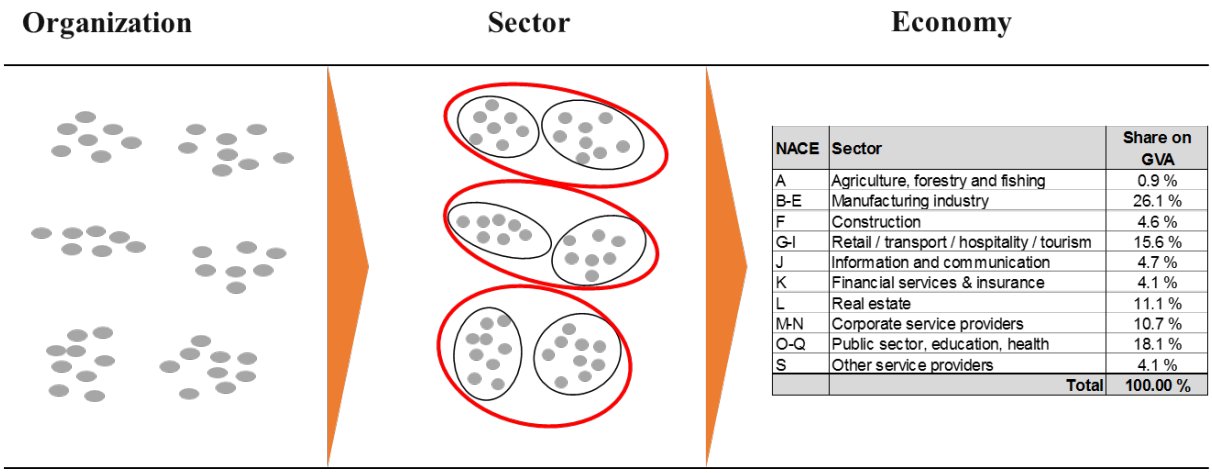
- The project work is based on non-routine tasks.
- The project has a minimum duration of four weeks.
- The project has at least three participants.

Based on this definition of projects, respondents were asked to indicate the proportion of project work, as a percentage of the overall work worked within the organization, in the entire organization. This resulted in figures indicating projectification on the company level. The share of project work of the individual economic sectors (each containing different sub-sectors) was calculated as a mean value. Finally, the share of project work on the level of the entire economy was obtained by adding up the sectors' shares of project work, weighted by the sector's share on total GVA (see Wald et al., 2015 for more details).

Benchmark Study: Current and possible future value project work in Iceland

The benchmark study conducted was used to measure and compare the metrics against the GVA baseline study and run on a regular basis (quarterly) to evaluate how the perception of participant changes over time. The study was designed to verify the alleged importance of project management within organizations by asking a larger sample of participants that are more homogeneous than the sample of participants in the GVA study, in many cases, managers and leaders who passed on the requests for economic figures to subordinates. As the benchmark study was solely conducted among people in high management positions in their companies these two studies will complement each other and give clear indication of the present and future state of project management in Iceland. The definition above of what constitutes a "project" was introduced to the participants, and the sample of 1,356 participants were asked about (1) the application of project management within their organization in compliance of the definition of projects by Wald et al. (2015), and (2) the what they saw as a likely trend in the application of project management in the near future (12 months) within their organization. The survey was embedded in a management survey that is done quarterly by a survey company named Market and Media Research (MMR). Compared to the GVA the method was simpler, it included more participants, and was less costly. The survey measured, among the participant, the overall perception of project management and the application of it as a discipline. As the management survey is ongoing, and conducted four times a year, valuable information on the development of the PPP profession can be observed over time.

The NACE (Nomenclature of Economic Activities) economic sectors classification was used as a basis to ensure international comparability (see figure 1) but it is the European statistical classification of economic activities. Statistics produced on the basis of NACE are comparable at European level and, in general, at world level through the United Nations' International Standard Industrial Classification (ISIC). Despite industrial structural differences between Iceland and Germany, the same 10 industrial sectors were used. For the sake of simplifying the study, four sectors - construction, real estate, corporate service providers and agriculture - were excluded from the survey but their impact estimated by experts instead. The same weights were used in Iceland as in Germany.



NACE	Sector	Share on GVA
A	Agriculture, forestry and fishing	0.9 %
B-E	Manufacturing industry	26.1 %
F	Construction	4.6 %
G-I	Retail / transport / hospitality / tourism	15.6 %
J	Information and communication	4.7 %
K	Financial services & insurance	4.1 %
L	Real estate	11.1 %
M-N	Corporate service providers	10.7 %
O-Q	Public sector, education, health	18.1 %
S	Other service providers	4.1 %
	Total	**100.00 %**

Figure 4. Process of data aggregation (Source: Wald et al., 2015: 26)

A research company was hired to conduct the data collection. A list of questions was sent to participants within targeted organizations, this was followed by emails and then telephone interviews. The population sample included the 1,000 largest organizations in Iceland and the final sample included 142 companies with an average size of 125 employees. All in all, 18 questions were asked on internal and external projects and economic figures on sectors were obtained from the Iceland Statistics (Hagstofan, 2016).

Results

The results from the two studies are introduced separately: First the results from the GVA study will pe presented and then the results from the Benchmark (MMR) study.

Results from the GVA study

The primary research in the GVA study delivered 142 answers on the value of project categorized by the six sectors included in the survey. For clarification, the total Gross Value Added in Iceland in the year 2014 was 1.530.775 m ISK (figure 2).

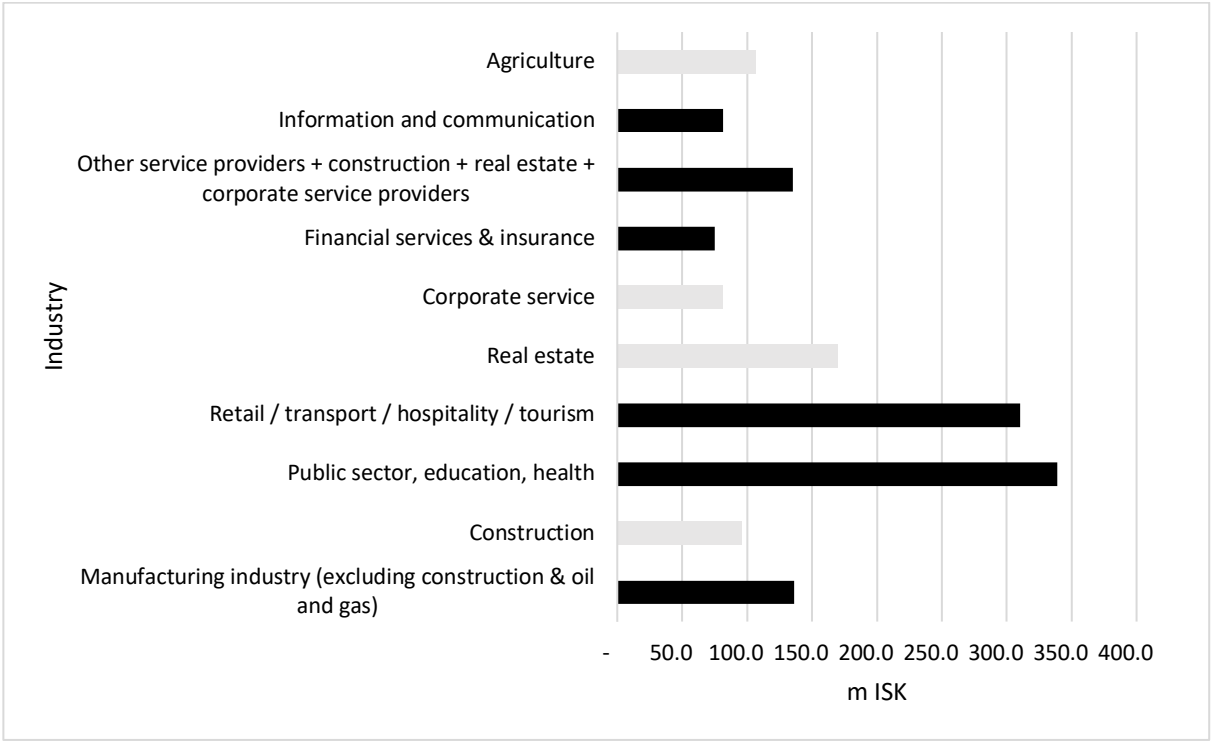


Figure 5. The Gross Value Added (GVA) of Icelandic industries (grey columns = estimated values).

The largest sector generally in terms of Gross Value Added economically turned out to be the public sector, followed by the retail/transport/hospitality sector and then industrial manufacturing. Next, the projects were categorized according to whether they were internal or external projects. The internal projects were then classified into types.

	Internal Projects					External Projects	n
	Organizational / HR projects	IT projects	R&D/New product development projects	Marketing/sales projects	Infrastructure projects	No. of cases Commissioned projects	
Manufacturing industry	14%	14%	20%	**21%**	14%	17%	24
Retail/transport/hospitality/tourism	17%	**22%**	18%	15%	20%	9%	39
Information and communication	20%	**23%**	16%	10%	20%	10%	17
Financial services & insurance	16%	16%	15%	18%	**20%**	16%	9
Public sector, education, health	16%	**20%**	15%	20%	19%	10%	41
Other service providers	14%	**21%**	17%	17%	14%	16%	12
Total	16%	19%	17%	17%	18%	13%	142

Table 5. The ratio (%) of projects classified by project types and external/external projects.

The internal project types ratios are, on average, very similar across the sectors. Among all projects from different sectors, IT and infrastructure projects score highest and organizational and human resource (HR) projects scored the lowest, however, the range is only 3%. The external projects are relatively fewer (13%) and the range is also higher, as the cross industrial differences are 6%. The majority of Icelandic projects (≈ 85%) are internal projects, with IT projects being the most frequent/numerous.

Next is the relative share (%) of work assigned to projects in different industrial sectors at three instances in time—the past (2009), close to present (2014) and in the future (2019). The year 2014 was selected to exhibit the present situation, partly due to reliable information access and partly to be able to compare the results to the German study which was conducted earlier.

NACE Code	Sector	Share of project work 2009	Share of project work 2014	Share of project work 2019 F
A	**Agriculture, forestry and fishing***	4,0%	4,0%	4,0%
B-E	**Manufacturing industry (excluding construction)**	2,6%	3,4%	4,6%
G-I	**Retail / transport / hospitality / tourism**	13,1%	18,2%	24,4%
J	**Information and communication**	39,2%	47,8%	51,2%
K	**Financial services & insurance**	34,8%	34,2%	37,5%
O-Q	**Public sector, education, health**	32,1%	33,3%	40,9%
L	**Real estate**	2,0%	2,0%	2,0%
F	**Construction***	80,0%	80,0%	80,0%
M-N	**Corporate service providers***	60,0%	60,0%	60,0%
S+F+L+ M-N	**Other service providers**	37,2%	42,7%	47,2%
	Total	25,0 %	27,7 %	31,5 %

Table 6. The share of work (%) assigned to projects in different sectors at three points in time.

The average share of projects in according to the GVA in Iceland was 25% in 2009 and is expected to rise to 31,5% in 2019. That is a relative growth of 21%.

Results from the Benchmark study

In the benchmark study the population included 1,356 managers and 768 of these answered (56,6%). The responses were linked to turnover, no. of employees, industrial sector, trade and region. Figure 5 includes the results from the question: *Do you think that the impact of project management will increase, stay the same, or decrease in the next 12-month period?*

Do you think that the impact of project management will increase, stay the same or decrease in the next 12-month period?					
Turnover (m ISK)	Huge increase	Considerable increase	The same	Considerable decrease	Huge decrease
Less or equal to 199	6,7%	39,6%	52,4%	0,5%	0,5%
200-999	8,7%	47,6%	43,0%	0,5%	0,5%
1000-5000	8,8%	54,4%	35,3%	0,5%	0,5%
More than 5000	11,3%	62,3%	25,5%	0,5%	0,5%
# of employees					
Less than 10	5,8%	39,0%	53,1%	1,0%	1,0%
11-49	10,3%	49,4%	39,7%	0,5%	0,5%
50-149	4,9%	60,8%	33,3%	0,5%	0,5%
More than 150	11,8%	63,5%	22,4%	2,0%	0,0%
Occupation					
Manufacturing	9,1%	38,6%	51,5%	1,0%	0,0%
Service	9,1%	56,0%	33,3%	1,0%	0,5%
Retail/wholesale	3,2%	43,2%	52,8%	0,5%	0,5%
Fisheries/food production	5,6%	42,6%	50,0%	2,0%	0,0%
Industry					
Consumer market	7,7%	47,5%	42,1%	2,0%	1,0%
B2B market	10,6%	46,5%	42,4%	0,0%	0,0%
Both	5,7%	52,0%	41,3%	0,5%	0,5%
Area					
Capital area	9,3%	47,1%	42,4%	1,0%	0,0%
Rural area	4,1%	51,2%	43,5%	1,0%	0,0%

Table 7. The total results of questions on the development of project management impact.

To have a clearer picture, the participants believing that the impact will increase are added together. The results are decisive, as approx. 60% of the managers asked, do expect increase of both of the application and importance of project management. Hardly any of the managers asked think that project management will decrease in importance in the immediate future.

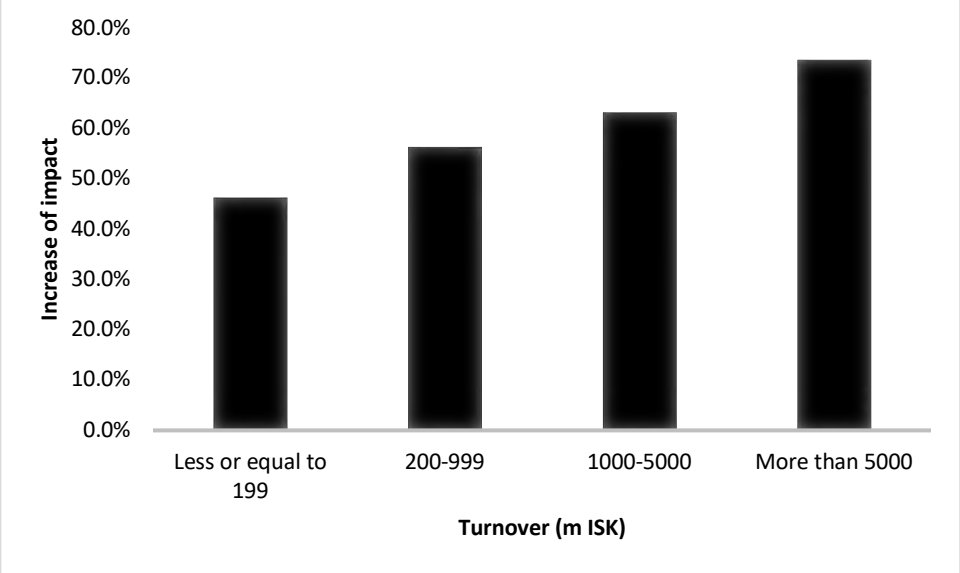


Figure 6. Increase of project management impact in the context of capital turnover (m ISK).

Figure 6 shows graphically how the impact increases as turnover increases (R^2=0,98).

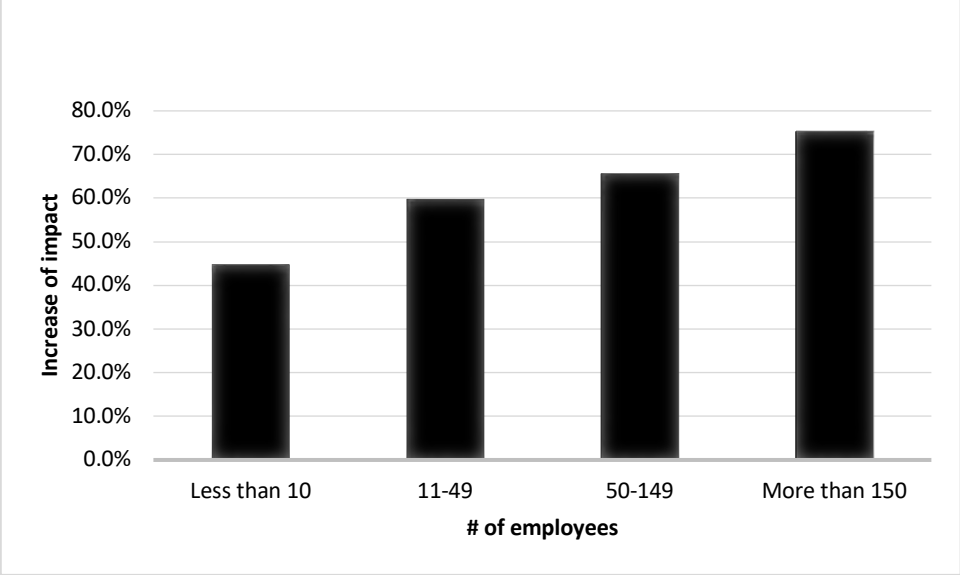


Figure 7. Increase of project management impact in the context of number of employees.

Figure 7 shows graphically how the impact increases as no. of employees increases (R^2=0,98). Table 8 includes the results from the question: *How common or uncommon is the application of project management in your company in the context of the description of the discipline?*

How common or uncommon is the application of project management in your company in the context of the description of the discipline?				
Turnover (m ISK)	Very common	Rather common	Rather uncommon	Very uncommon
Less or equal to 199	7,9%	22,8%	34,4%	34,9%
200-999	14,9%	28,1%	31,4%	25,6%
1000-5000	19,7%	33,3%	28,0%	18,9%
More than 5000	30,2%	42,5%	21,7%	5,7%
# of employees				
Less than 10	6,9%	23,6%	34,4%	35,1%
11-49	16,1%	28,9%	35,6%	19,5%
50-149	13,7%	45,1%	24,5%	16,7%
More than 150	37,3%	44,6%	16,9%	1,2%
Occupation				
Manufacturing	19,0%	31,7%	28,6%	20,6%
Service	19,7%	30,7%	24,6%	25,0%
Retail/wholesale	4,2%	18,5%	47,9%	29,4%
Fisheries/food production	6,0%	32,0%	34,0%	28,0%
Industry				
Consumer market	10,7%	25,4%	36,2%	27,7%
B2B market	19,5%	27,2%	27,2%	26,2%
Both	15,1%	37,4%	28,4%	19,1%
Area				
Capital area	14,5%	32,1%	29,6%	23,7%
Rural area	10,8%	24,8%	33,8%	30,6%

Table 8. The total results of questions on the development of project management application.

The application of professional project management increases with the size of the organization. For instance, only 30,5% of the smallest companies deploy project management, whereas 81,9% of the largest companies do. Professional project management is most widely used within the manufacturing and service sectors, however, least applied within the retail and wholesale sectors. Project management is also significantly more frequently applied in the capital areas than the rural areas; 46,6% and 35,6% respectively.

To gain a clearer picture, the participants who are of the opinion that the application of project management will increase are added together. The results are decisive - particularly in the context of the numbers of employees - as approximately 70% of the managers believe there will be an increase in the application of professional project management within their sector. Figure 8 shows the increase of

projects as a percentage of monetary turnover. And Figure 9 shows the increase of projects as a percentage of the number of employees.

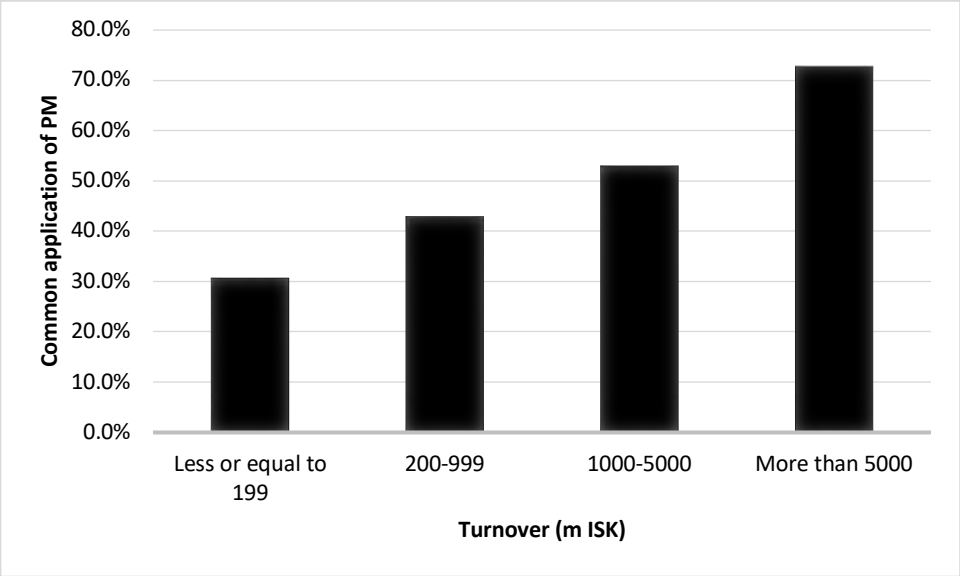


Figure 8. The increase of project commonality in the context of turnover (m ISK).

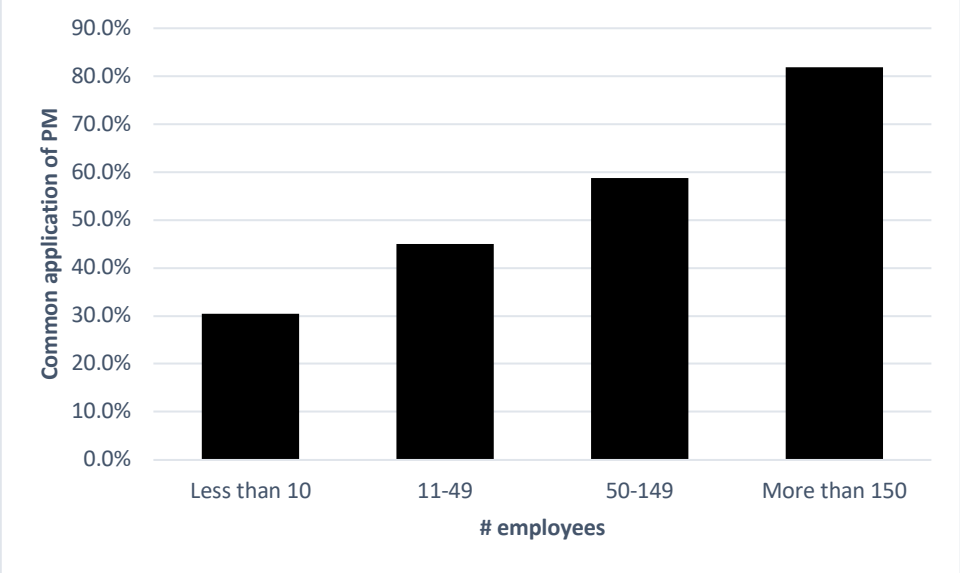


Figure 9. The increase of project commonality in relations to number of employees.

Discussion

The economic results are interesting, as they indicate that 27,7% of the GVA in the Icelandic economy are contributed via project work. This is somewhat less than in Germany and Norway (Wald et al., 2015, Wald et al, 2016), but nonetheless a significant part of the overall national economy. Moreover, the

participants estimate that this will rise to 31,5% in coming years (2019) which means a relative growth of 21% in work assigned to projects from 2009 to 2014.

Another interesting result is that there is a significant difference in the view of the managers in the context of the size of the organization. Trust in the growing impact of project management increases in positive correlation with the number of employees and capital turnover of the company.

The results are also significant in verifying the importance of project management in the Icelandic economy. Close to 50% of the managers in the different industries agree that the use of project management is common. Again, the same trends are spotted as before. The size of the company shapes the attitude towards the application of project management in compliance with the description of the discipline provided in the survey. To cite an example, 30,7% of managers in companies with a turnover of less than 199 m ISK find project management to be very common or rather common compared to 72,7% among their peers in companies with a turnover exceeding 5000 m ISK. This is a relative difference of 137%. The difference is even more striking when compared to the number of employees.

In spite of significant interest in project management in Iceland and a strong response from industry and academia, other studies indicate insufficient governance platform (Fridgeirsson, 2015). When the economic impact is considered, the call for reforms in the public sector is urgent, a claim that is supported, for example, by the reports published by the Icelandic government (INR, 2016).

Another interesting contribution is how the high-level managers on Icelandic organizations view the importance of projects and project management. Their interest both in the profession as such and in apply project management clearly shows, and their belief in the significance of project management is positively correlated with the size of the organization they manage. All this indicates a progression towards the increased appreciation for the project management profession.

Two very different research approaches were used in the research. The first was a detailed survey of the economic impact of projects through the application of a method that had already been tested in Germany. This method yields a quantitative assessment of the gross added value of project work within the country´s economy, and a prognosis on how this will evolve in the near future. The second was a general survey of a large sample of managers in Iceland, where they estimated the present and future level of projectification of their organisations. But in context the results yield a very revealing portrait of the projectification of the Icelandic economy, which can be viewed in reference to the size, turnover and type of the organisations, as well as other variables. The two research approaches complement each other and could be applied in a systematic way to give a longitudinal view of the evolution of projectification in society. The first part is more complicated and expensive in execution, and could be done with longer intervals, whereas the second part takes less effort and can be used to monitor the evolution more regularly.

Conclusion

This study had four objectives; (i) to investigate the importance of projects and the project management within Icelandic organizations, (ii) to investigate the importance of projects and project management within the Icelandic business community, (iii) to investigate whether the project management profession is becoming stronger or not, and (iv) to describe an alternative method for measuring the impact of projects. All objectives were met, and the research finding clearly demonstrates how instrumental projects and their professional management are for modern societies.

This study reveals that project work contributes greatly in terms of economic value to the Icelandic economy. This correlates with findings in other countries where the economic contribution of project management has been studied. In Germany, 37,7% of the GVA in the economy can be traced to projects, and in Norway this number is 32,6% (Wald et al, 2016). In these countries, forecasts indicate further increased importance of project work in the near future. In Iceland, 27,7% of the GVA can is based on project related work, indicating that the monetary benefits of projects is in 2014 vicinity of 425 billion ISK (0,277 x 1.530.775 m) a year and growing. Forecasted numbers are 31.5 in 2019.

Based on these findings it becomes clear that project management knowledge and professional experience, should play a major role as a part of the overall strategies and tactics in all sectors of the economy and society. In light of the large sums of money funneled through the economy via projects, every improvement, be it big or small, results in financial rewards. It is timely to consider how much projects influence industry, the public sector, the economy and society. This study can also be seen as a contribution to further the development of metrics that can inspire future visions and strategies with regards to the development of the project management profession.

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Project Management in Iceland and Beyond: Expected Future Trends for Project Management and the Project Management Profession

- Paper 3 of 3 in a series on the history, status and future of project management in Iceland.

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Ágrip
Í þessari þriðju grein um sögu, stöðu og þróun verkefnastjórnunar á Íslandi beinum við sjónum okkar að framtíðinni og veltum fyrir okkur hvernig þessi faggrein gæti þróast á komandi árum. Byggt er á nýlegri rannsókn frá Þýskalandi þar sem fjórtan framtíðarstraumar og -stefnur í faginu voru skilgreindar, án þess þó að forgangsraða þeim eða raða eftir mikilvægi. Til að greina mikilvægustu framtíðarstrauma vekrefnastjórnunar á Íslandi var Delphi aðferð beitt og niðurstaðan var sú að fjórir mikilvægustu framtíðarstraumarnir væru (1) Verkefnadrifnar skipulagsheildir; (2) Verkefnastjórnun fær aukið vægi og viðurkenningu á borði fyrirtækjastjórna; (3) Aukið flækjustig og áhrif þessa á verkefnin og (4) Verkefnastjórnun verður viðurkennd faggrein. Rýnihópur sérfræðinga spáði í þessar almennu niðurstöður og dýpkaði þær.

***Lykilorð**: Framtíðarstraumar, verkefnavæðing, Delphi aðferð, skapandi hugsun.*

Abstract
In this third paper under the heading *Project management in Iceland,* future trends in the project management and within the project management profession are investigated and benchmarked against recent research in Germany on the same topic. Fourteen interrelated future trends were identified but neither prioritized nor relatively weighted. To detect the most important future trends of project management in Iceland, a two-round Delphi survey was arranged to rank them according to significance. The four most important future trends are: (1) Project-oriented organizations; (2) Project management being acknowledged and discussed in corporate boardrooms; (3) Increased complexity and how this affects projects, and (4) Professionalization of project management. An expert focus group was established to elaborate on these future trends.

***Keywords:** Future trends, projectification, Delphi survey, design thinking.*

Introduction

The context of this paper

This is the third and final paper in a series of articles headlined as “Project management in Iceland” on the evolution of project management and the project management profession in Iceland, which is a fast evolving, developed, Nordic country. The first paper explored the history of project management in Iceland, how project management has evolved as a profession, and the present situation in Iceland in this regard. The second paper discussed the economic significance of projects within the Icelandic economy in the context of present gross value added through project work, and how this has evolved in recent decades. It also compared the situation in Iceland to that in Norway and Germany, where similar research has taken place in recent years. This third and final paper, will explore the future, meaning how the importance of project work might evolve within the Icelandic economy, how the project management discipline might develop, and what major themes and trends might constitute to be the most important ones in this evolution in the coming years.

Projectification, introduction of the term and what is known — in general

Before we dig deeper into the Icelandic reality, let us start with a short detour by looking at the concept of projectification of society. The concept of projectification was introduced in a paper by Christophe Midler in 1995, in which he discussed research into the evolution of the French car manufacturer Renault between 1960 and 1990. This research showed that the success of the company increased over this period, as it evolved from being a traditional, functional organisation into a more horizontal, matrix organisation. Project managers were given more authority, and the application of project management was introduced as a way of running the business. The organisation took steps in this period towards becoming projectified. Midler et al. were the co-authors of another paper (Lundin, Midler and Wåhlin, 2015) on projectification, and how the projectification of organisations gradually influences societies in such a way that they become projectified. The notion of projectification has thus emerged through the years and projects have become a general form of work in organisations in all sectors of the economy. Maylor et al. (2006) discussed the emerging notion of projectification and argued that the term projectification has extended the definition of a project and emphasised that the establishment of programmes and portfolios has become a mechanism for managing organisations.

An indication of increased projectification of society can be seen in the regular reports on project management published by PricewaterhouseCoopers (PWC). A report from 2012 is based on interviews with people in management positions in organisations all over the world. An overwhelming majority considers project management to be a key success factor in any operation and a precondition for growth. A comparison is given with a similar survey by PWC from 2004, showing how the project management maturity of participating organisations has evolved in the period between 2004 and 2012. The difference is striking—the maturity has increased considerably, and the organisations have become more projectified through this period. In fact, the participants in the 2012 survey planned to increase their maturity even more.

Economic importance of projects

The first proposal to outline the projectification of societies in financial terms was made in 2015, when Wald et al. designed a method for assessing the economic impact of projects and applied this tool to the German economy. The share of project work in relation to total work in an organization is used as an indicator of projectification. This is an input-oriented measurement and can be applied to all types of projects, both external and internal, and it can be applied to all kinds of industries - independent of organizational factors. In this study, an undertaking is defined as a project if it fulfills a set of specific conditions: there is a specific target for the project, it is limited in terms of time, it requires specific resources, there exists an independent organization for the project, the project consists of non-routine tasks, it has a minimum duration of four weeks and at least three participants. 500 private and public organizations in Germany participated in the study, and the results show that the proportion of project work in total working hours in Germany in 2013 was 34.7% and estimated to rise to 41.3% by 2019. The assessment method and the results of this research are thoroughly described by Wald et al. (2015).

Why is it important to understand future development?

It is said that we need to know the past to understand the present and to plan for the future. Planning for the future is of utmost importance in modern times, not only for organizations that want to define their policies and create strategic plans, but also for societies who need to ensure that they build up the necessary infrastructure and support to maintain their competitive advantage and ensure the prosperity of their citizens. The economic weight of projects underlines the importance of enhancing professional project management in all layers of society, and this development must be monitored regularly in a systematic and consistent way to prepare for the future.

In the first two papers of this series, we have shed light on the development of project management in Icelandic society and its weight/importance in the economy at the present time. It is now time to look ahead and assess how things will evolve in the near future, and in this paper an attempt will be made to map the most important future trends regarding project management in Iceland. This information is valuable for organisations who wish to build up their infrastructure and resources to compete in a business environment that is characterised by continuous change and increasing demands. An understanding of future development is also valuable at state/national level, for those who define official policy and set laws and create frameworks for the use of public funds. Last but not least, understanding future development is necessary for educational institutions who need to keep up to speed and review and renew their emphases/priorities and offerings—in order to ensure that they can provide future students with the best possible education and training.

Literature – the future of project management

Morris (2013) gave an overview of how the discipline of project management has developed from the middle of the 20th century to the present time. Stages of this development include the planning and control stage with its focus on early planning and control tools, and the focus on engineering complexity and urgency, and this was the major focus of project management until the late 1970s. Organisation theory and the concept of the temporary organisation was introduced in the 1990s, and this was also the time when the project management associations published the first versions of their bodies of knowledge. Enterprise-wide project management was introduced as a concept in the last years of the 20th century, but around the turn of the century, agility gained more and more attention. According to

Morris (2013), the major drivers in project management at present have to do with social challenges, funding, the need for increased competency in project management, a more value driven approach and leadership.

The major drivers in project management today—as seen by Morris (2013)—are reflected in the way some academics talk about forthcoming trends and emphases in project management research and practice. Project management has reached a certain level of maturity, and the future focus of project management will be more on the organisational context, program and portfolio management (Grau, 2011). This includes effective governance of projects, programs and portfolios, human resource management and a general change in emphasis from specific technical and industrial issues to a broader organisational context (Turner, Anbari and Bredillet, 2013; Pollack and Adler, 2015; Geraldi and Söderlund, 2017). We will also be seeing a refinement of the understanding of success in projects, renewed definitions of success factors and success criteria, a broader conceptualisation of projects and a need to look at the wider picture - as seen from the organisation—rather than the narrow project picture (Turner, Anbari and Bredillet, 2013; Dalcher, 2016). A related, important issue is organisational strategy and its link to project management, together with macro project studies and strategy of project-oriented organisations (Turner, Anbari and Bredillet, 2013; Pollack and Adler, 2015; Geraldi and Söderlund, 2017).

Increased complexity and how to deal with this will also be a major issue for the future (Sveivik and Andersen, 2015; Dalcher, 2016). Last but not least, an increased focus on environmental issues and the enormous challenges humankind is faced with will be an important variable for future research and practice in project management (Morris, 2013; Pollack, Adler, 2015). This is a key message of Morris in his book from 2013 on reconstructing project management, where he talks about global warming and the overwhelming and increasing importance of all its consequences, and claims that project, program and portfolio management will have a huge role in making sure that implementation perspectives are taken into account in the forming of strategy and creation of policy (Morris, 2013).

Useful information about ongoing trends in project management can also be found in the topics addressed at some of the more important project management research conferences. In June of 2017, the biennial IRNOP (http://irnopboston.org, International Research Network on Organizing by Projects) conference was held in Boston. At the conference a total of 81 presentations were given on a wide range of project management themes, where half of the presentations had to do with the organisational perspectives of projects and projects in the context of the organisation. Examples of such themes are leadership and decision making, megaprojects, programs and portfolios, stakeholder management and sustainability in project management, which has become an import topic. Similar trends could be seen in the annual EURAM (www.euram-online.org, European Academy of Management) management conference in Glasgow in June 2017, in Iceland in June 2018 and in Lisbon in June 2019. This indicates how the field of project management has been broadening and will continue to broaden in the coming years and be even more concerned with the management of project-oriented organisations, rather than with the management of individual projects.

A German research group presented a hypothesis about the future of project management in 2025 (Gemünden and Schoper, 2014; Schoper, Gemünden and Nguyen, 2015). This was the outcome of the collaboration of an expert panel of practitioners and researchers, organized by the team. A qualitative research approach was used, and the sample used consisted of a diverse group of 338 international experts, divided equally into project management researchers and international project management practitioners. The participants were asked about their expectations concerning future trends in project management. More specifically, the participants reflected on the following statement: *"Please describe the five trends in project management which you consider to be the most important, and which you expect will be evident between now and* 2025." Analysis of the data produced the following 12 trends:

1. Projectification of societies: Project management will become more widely dispersed in all sectors of societies.
2. Coping with complexity: Increasing complexity in projects because of, e.g., globalization, urbanization and increasingly complex systems technologies.
3. Trans-nationalization of project management with alignment to world markets with consistent standardized concepts.
4. Virtualization of project management: Managing projects increasingly through Information and communications technology (ICT) support.
5. Women in project management; the growing number of women in all stakeholder functions in projects.
6. Professionalisation of project management: The occupation of project management will transform itself into a true profession, presenting the highest levels of competence.
7. Education in project management: The offerings for learning project management by universities, industry and professional organizations will increase on all levels of skills.
8. Project management research: An increasing volume of research on the existence, antecedents and impacts of project management practices, as well as the contingencies and dynamics of cause-effect relationships in projects and project management.
9. Stakeholder management: A more structured analysis of the frameworks for stakeholder management and the effects on project success.
10. Projects as business: Projects will be increasingly seen as an entrepreneurial undertaking to deliver business results.
11. Project management goes to the boardroom; Top management of organizations will become even more focused on the use of projects in achieving organizational goals.
12. Project-oriented organization: In a project-oriented organization, a major part of the value creation is delivered in projects. Project management is a core competence for such organizations and business functions are aligned to foster project management.

The case of Iceland

The Icelandic economic system

The Republic of Iceland is a sparsely populated country with an area of 103,000 square kilometers and a population of 350,000 people. Iceland used to be a part of Denmark, and the country's legislation is still largely based on the Danish legal system. Since the country's gaining full sovereignty in 1944, a close relationship has been developed with the Scandinavian countries. Iceland has been a member of the European Economic Area (EEA) since 1994. Iceland is a prosperous country, with a GDP of almost 51 thousand USD per capita in 2015, according to the UN, the 12th highest GDP in the world. The export

economy is largely based on fisheries, aluminum production and tourism. Iceland is rich in resources with healthy fish stocks, hydro- and geothermal energy, huge water reservoirs and unique landscapes which attract many tourists. In 2013, 59% of import value and 78% of export value came from countries within the European Union (Hagstofan, 2016). Iceland scores highly on indexes indicating equality and human rights. Iceland is in 2nd place on the Gini index of income equality and in 16th place on the Human Development Index (Hagstofan, 2016). The total Gross Value Added in Iceland in the year 2014 was 12.000 million USD (1,530,775 millions ISK, using the exchange rate on Dec 31, 2014).

Importance of projects in the Icelandic economy

The initial study of Andreas Wald and colleagues (2015) provided a platform for studying Icelandic projectification and the economic impact of projects in Iceland. The Icelandic study was carried out in 2016 and is well described in our second paper (Fridgeirsson and Ingason, 2017) in this series.

142 companies from all economic sectors participated in the study, and the share of project work in terms of total working hours in Iceland in 2014 was shown to be 27.7%. The comparable figure for the year 2009 was 25%, and the ratio is estimated to rise to 31.5% by 2019. Another interesting finding from this research is that the share of commissioned external projects is only 13% of the total. In other words, the majority of all projects being executed in Icelandic organizations are internal projects; organizational and HR projects, IT projects, R&D and new product development projects, marketing/sales projects and infrastructure projects.

In addition to applying the original tool by Wald, a simple benchmark study with a much larger sample was also carried out to verify the outcome of the original study. In this benchmark study, a random sample of 768 managers in high management positions in Icelandic organizations assessed the status of project management within their companies. The majority, or 60% of participants believed that the impact of project management will increase, and hardly any of them think that project management will decrease in importance in the immediate future. In addition, it was clear that the size of organisation—in terms of the number of employees and/or turnover—was positively correlated with the application of project management.

Method

Delphi survey on most important trends in Iceland

The aim of the study was to examine how project management practitioners in Iceland foresee the future of project management and the project management profession in Iceland. As a frame of reference, the study of Gemünden and Schoper (2014) was applied, where twelve future streams in project management were presented.

A Delphi method was used for data gathering. The Delphi method (or Estimate-Talk-Estimate (ETE)) is a structured communication technique or method, developed as a systematic, interactive forecasting method relying on a panel of experts. The method (Hsu and Sanford, 2007) is used as to collect data from individuals with similar knowledge and experience within the same field of expertise as to reach a

common conclusion. In most cases, 15 to 20 experts are chosen to participate. Delphi is based on a questionnaire for the specified field and answers cannot be traced to the participants. Typically, Delphi is executed in two rounds. Once the first round is complete, the results are processed and used for preparing the second round. Participants are now asked to rank the outcomes from the first round in order of importance. The main advantages of this method are that each participant responds individually and does not see the input of other participants. This ensures that there is no bias from other participants (Hsu and Sandford, 2007).

A questionnaire was prepared, presenting and outlining the twelve future streams. Participants were asked to arrange them in order of importance. Participants also recorded their gender and occupational classification according to the NACE classification which is The Statistical Classification of Economic Activities in the European Community (NACE, 2019). This was done to facilitate comparison in case the survey is repeated at a later stage. The questionnaire was prepared using the SurveyMonkey web application for surveys. The survey was sent to recipients by email with detailed definitions of the 12 future trends, and further explanations of the purpose and structure of the survey. Once the results from the first round were reached, the second round was prepared and sent to the recipients in a similar way. In order to see if there was a decisive difference in the ranking of the trends, only the six top trends from the first round were used in the second round.

The panel of experts that participated in the Delphi survey were selected by the authors and consisted of experienced individuals from many industries. All participants have extensive knowledge of project management, due to their education and experience, and many of them have conducted research in the field. The survey was sent to a total of 34 individuals (12 women and 22 men).

Focus group on the output from the Delphi survey

Focus group is a research method whose purpose is to collect data from a group interaction of people who have experience or are likely to contribute something meaningful regarding the topic under investigation. The method is very valuable in an initial phase of research as to help prepare for the main data collection phase, e.g., as a precursor to the development of a more structured instrument. Focus groups should preferably consist of 6-8 persons. The researcher defines the topic and participants are encouraged to exchange ideas and opinions, giving a deeper perspective to the topic. When people interact with each other, the result can be more powerful than in a one-on-one interview. Focus groups should feel informal but should still be structured to a degree. The moderator is responsible for leading the discussion and questions should not exceed 10 per hour. The secretary at the meeting should take notes and be responsible for recording the meeting if required (Robson & McCartan, 2011).

The decision was made to conduct a workshop as part of a focus group. The reasoning behind this decision was that interviews would restrict the quality of collected information. The aim of the project was to verify the results of the Delphi survey, based on the study of Gemünden and Schoper (2014). Focus groups allow the participants to be creative and to think outside the box. Therefore, the focus group was the ideal method to acquire the required information.

Stratified, purposeful sampling was applied to ensure that the focus group participants represented a number of disciplinary affiliations and work profiles (Lyons, 2000). Out of the eight participants, five were males and three were females. The age distribution in the group was 25 - 54 years. All participants have university degrees at master´s level— MBA, social science, civil engineering, computer engineering and humanities. Three of the participants had completed an executive master´s program in project management (MPM program). The participants represented companies from different business sectors, consulting firms, a financial institution, a civil contractor, an electric power production company, an IT contractor and an aviation services company. All participants had experience in project management, ranging from moderate to extensive. Three of them had an international IPMA project management certification (C or B level) and two of them were coordinating extensive project management portfolios for their companies. Half of the participants had been active in the Icelandic Project Management Association and served as board members.

The focus group met for a 4-hour discussion on chosen topics, for which the participants had volunteered. The focus group discussion was prepared in such a way that it would be issue-driven and theory-based. The group was first introduced to some of the basic concepts of projectification and to the study on future trends in the project management discipline—as we have explained in this paper. Particular emphasis was put on explaining the four trends that scored highest in the Delphi study.

Design thinking methodology was used as a framework for the work session. All participants were divided into two groups that worked on the same subjects. The objective was to engage all participants in contributing and getting on board, and the focus was on sharing thoughts rather than on detailed discussion.

For each of the four trends, the following procedure was applied:

- The particular trend to be discussed was shown on a slide, with one focus question for that trend.
- Silent individual brainstorming for 5 minutes, during which each participant wrote his/her ideas on sticky notes.
- A 25-minute round the table sharing session. The participants shared their sticky notes, one note at a time, and put them on a wall. After all team members had shared their sticky notes, the group started to cluster the data. Common topics or patterns emerged, and the groups defined headlines for the different clusters.
- A 20-minute session where the two groups presented their findings and discussed them. The whole group agreed on a common understanding regarding the trend, before moving on to the next one.

The facilitation of the work session was mainly based on keeping to the timeline. Also, if participants got stuck in a detailed discussion, or if one participant took too much time to share her/his thoughts, a facilitator intervened in the discussion to keep to the timeline. Sometimes the participants ran into difficulties in clustering the data and in such cases a facilitator assisted the group. All results (sticky notes and headlines) were put on a whiteboard, photographed and documented digitally. All discussions were also recorded digitally.

The focus group sample was small, yet it represented a fairly broad selection of disciplines, ensuring that a diversity of variations was possible. The common academic background and project management experience facilitated a sharing of common experience in the group. This accords with the maximum variation criteria elaborated by Lyons (2000). The age distribution was wide, the gender distribution was acceptable, and many different business sectors were represented in the focus group.

Results

The Delphi survey

Table 9 below shows the distribution of participants in the Delphi survey, according to the NACE classification. The *mark is used as to indicate the sectors that were excluded from the survey.

Table 9. Distribution of participants in Delphi survey.

NACE Code	Sector	Participants in 1st round	Participants in 2nd round
A	Agriculture, forestry and fishing*	2	1
B-E	Manufacturing industry (excluding construction)	1	1
G-I	Retail / transport / hospitality / tourism	2	1
J	Information and communication	3	2
K	Financial services & insurance	1	1
O-Q	Public sector, education, health	2	1
L	Real estate	1	1
F	Construction*	4	2
M-N	Corporate service providers*	6	6
S+F+L+ M-N	Other service providers	1	0
	Total (male/female)	17/6	14/2

Table 10 shows the ranking of the twelve future trends (Gemünden and Schoper, 2014) after the first round of the Delphi survey. Defined by a panel of experts.

Table 10. Ranking of the twelve trends in the Delphi survey - 1st round.

Trend	Rank
Coping with complexity	1
Project management goes boardroom	2
Project-oriented organization	3
Professionalisation of project management	4
Virtualization of project management	5
Projectification of societies	6
Trans-nationalization of project management	7
Projects as business	8
Education in project management	9
Stakeholder management	10
Women in project management	11
Project management research	12

The trends ranked 1 to 6 were used in the 2nd round of the Delphi study. The results can be seen in Table 11.

Table 11. Ranking of the twelve trends in the Delphi survey—2nd round.

Trend	Rank
Project-oriented organization	1
Project management goes boardroom	2
Coping with complexity	3
Professionalisation of project management	4
Projectification of societies	5
Virtualization of project management	6

Focus group discussions

The focus questions were based on the top four future trends, according to the Delphi survey, and were as follows:

- Trend 1: **Project-oriented organization**—*How do you see the project-oriented company in the year 2030?* **Rationale:** To explore how the organizational structure of companies might change as a consequence of the foreseen development that a large part of the value creation of companies will be in the form of projects.
- Trend 2: **Project management goes to the boardroom**—*How do you see the support and understanding of top management of organizations for projects and project management developing between now and the year 2030?* **Rationale:** To explore whether leaders and managers of organizations will be involved in projects in a different way in the future, and if so how?
- Trend 3: **Coping with complexity**—*What will be the response to the increased complexity of projects and project management between now and 2030?* **Rationale:** To explore how traditional PM methods will have to change as to deal with increased future complexity.
- Trend 4: **Professionalism of project management**—*How do you see project management developing as a profession between now and the year 2030?* **Rationale:** To explore this development and

speculate how educational institutions and the professional project management associations might best respond to it.

The following are the results from the focus groups—and as explained above—compiled directly from their discussions:

The Project-oriented organization

- **Organizational structure:** There will be changes within companies, whereby the focus will move from departmental structures to more focus on employees and projects. Employees will not be in fixed positions but rather participate in projects as needed for a certain time. More emphasis will be placed on defining employees' competences and skills.
- **Knowledge and processes:** A new generation will be open for new ways and ideas of how with regard to execute projects. 'Gates' and 'phases' will be used more, as well as program management, which will become more consolidated. When it comes to employees, the focus will be more on their flourishing and wellbeing. There will be an increased requirement for employees to have comprehensive skills and a more general knowledge of project management.
- **Strategy:** There will be a clearer link between company strategy and project-orientation. Business strategy and budgeting will increasingly take projects into account where projects and project portfolios can be used effectively as to actualise both strategic and budgeting intentions. Project management will be seen as having a high stand in the value chain and project portfolios will link the shaping of strategy to execution for value. This will lead to more effective use of portfolio management, which will in return result in better utilization of resources.
- **Quality:** Projects will increasingly be well-defined, and documentation will be centralized within organizations. Projects will have pre-defined benefits and not defined by only cost, schedule and quality.
- **Resources:** Resources will not necessarily be part of the organization, but rather be pulled in based on the needs of projects. Project managers will be more specialized, and some might have special expertise of portfolio management.
- **Human factors:** With more use of Artificial intelligence (AI) earned value and critical path will become automatic, but the human factor will be the challenge. Project managers will be challenged to combine people's talents and to effectively get the most out of them.

Project management goes to the boardroom

- **Ownership: There will be more focus on projects where project portfolios will be used effectively, and projects will be ranked according to importance. Managers will have ownership of projects related to the business.**
- **Information sharing:** Projects will have a project sponsor, who will own the project and follow it through as visible and measurable results will be seen as being increasingly important. Each project will be well monitored, and reports will be made to managers.
- **Change management:** Change management will increasingly be used in business strategy implementation.
- **Education:** Boards will demand more knowledge on project management and the focus will be on projects and project management.
- **Portfolio management:** Managers will realize the value of project portfolio management and the concept of value added in the context of PPP management.

- **Professionalism:** There will be a better understanding of what the difference is between a project and what is a day to day job. The importance of projects will grow, and the importance of defining projects with other companies will be increasingly used.

Coping with complexity

- **Cooperation:** There will be more focus on projects as investment and for long-term gain, rather than as a single contract and such cooperation with other companies will make projects more complex.
- **Employees' skills:** In complex projects, emphasis will be on communications and skills. People will have to learn more languages, be more open minded and be able to work with different cultures. This will also call for increased specialization of employees.
- **Technology:** Better software solutions will be available.
- **Flexibility:** Project management will entail more flexibility and new methods. Agile and Scrum will be used more effectively to make complex tasks simpler.
- **Increased analysis:** Projects will be better defined from the beginning and with it will come more thorough analysis of risk and interests of different groups.
- **Benefits:** More emphasis will be placed on benefits and cooperation with those who buy the end product or service.
- **Professionalism:** There will be better supervision of projects where processes and documentation will be stricter.

Professionalization of project management

- **Professional title:** Ethics and standards will be more apparent and project managers might be awarded a regulated professional title.
- **Certification:** There were different views on certification of project managers, but overall the panel agreed that there will be increased demand for certification from the public sector, and this will entail an extra dimension where project managers have more specialised knowledge.
- **Education:** Universities will set requirements for a general knowledge of project management and project management will develop in a similar way as the human resource management has developed. Companies are likely to have a team which focuses on complex projects, in similar fashion as does a human resources management department with regards to staff.
- **Research:** More research will be done on topics with project management as the focus.

Discussion and conclusion

Our findings indicate a noteworthy development, whereby future trends in project management will be characterized by a shift from a focus on conventional, permanent organisations towards a keener focus on the 'temporary organization' of projects and programmes. We also expect a stronger focus on individual project managers and their leadership abilities. This shift will call for more emphasis on comprehensive skills and general project management knowledge at a higher level.

Our findings further indicate that the use of IT-technologies and artificial intelligence (AI) in project planning, organizing and estimation, will make many project management practices increasingly automated. Instead of invalidating the future role of the project manager, it will enhance this role and demand a higher level of leadership competences, such as an increased ability to deal both with intra-

and interpersonal issues on a higher level—i.e. to deal with self-managerial challenges, communication skills and cultural awareness—and the ability to deal with increased complexity. Similarly, agile approaches will continue to be used as methods to better manage complexity through iterations and dynamic approaches to project management.

We predict that project management as a profession will be increasingly valued in future, and that project management standards and ethical codes of conduct will be increasingly important. Project portfolios will link the shaping of strategy to execution, and boards of directors/boardrooms will demand more information on planned and ongoing projects. Managers will serve as project sponsors and have ownership of projects relating to other business areas, and they will be held accountable for project outcomes. There will be more emphasis on projects as investments and for long-term gain.

Our findings are in line with some of the key references detailed in the literature review section of the paper. There will be an increased demand for project management competency (Morris, 2013), the discipline will focus more on the organisational context (Turner, Anbari and Bredillet, 2013; Pollack and Adler, 2015; Geraldi and Söderlund, 2017), and higher levels of complexity will demand the professional ability required to deal with them (Sveivik and Andersen, 2015; Dalcher, 2016).

The predicted trend of the project manager´s role is that it will require independent people who are able to work in a self-reliant manner. This is to some extent the opposite of being a company employee. The future professional project manager will increasingly assume the role of an internal or external consultant on whom the project owner can rely when it comes to executing strategy and getting things done. This trend should be taken into account when defining the professional standards of the project management profession and shaping future educational and training programs for project managers.

As stated at the beginning, this paper is the last of three papers on project management in Iceland. It illustrates how project management and the project management profession has crystalized within the Icelandic society, a small Nordic community known for the independent character of its people, who possess high levels of creativity and strong social capital. It also illustrates how a method from the world of engineering, based on mathematical optimization and operational research has developed into a substantial profession of well-equipped doers/achievers who can work both independently and with others to shape our future.

This study—and the other two articles on the evolving on project management in Iceland—indicate that the discipline of project management will play a significant role in defining organization theory in the future, impact the role of line- and functional managers, and advance organizations towards a more behaviourally-based set up. Project management (project, programme and portfolio management) is the contemporary solution to our future need to deal with complexity through agility and versatility.

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