Icelandic Journal of Engineering
Verktækni - Tímarit Verkfræðingafélags Íslands

https://doi.org/10.33112/ije.25.2

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

Helgi Þór Ingason[a], Þórður Víkingur Friðgeirsson[a], Haukur Ingi Jónasson[a]
[a] School of Technology, Reykjavik University, Menntavegi 1, 101 Reykjavík

Fyrirspurnir // Correspondance
Helgi Þór Ingason
helgithor@ru.is

Greinin barst 23. janúar 2019.
Samþykkt til birtingar 16. desember 2019.

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.

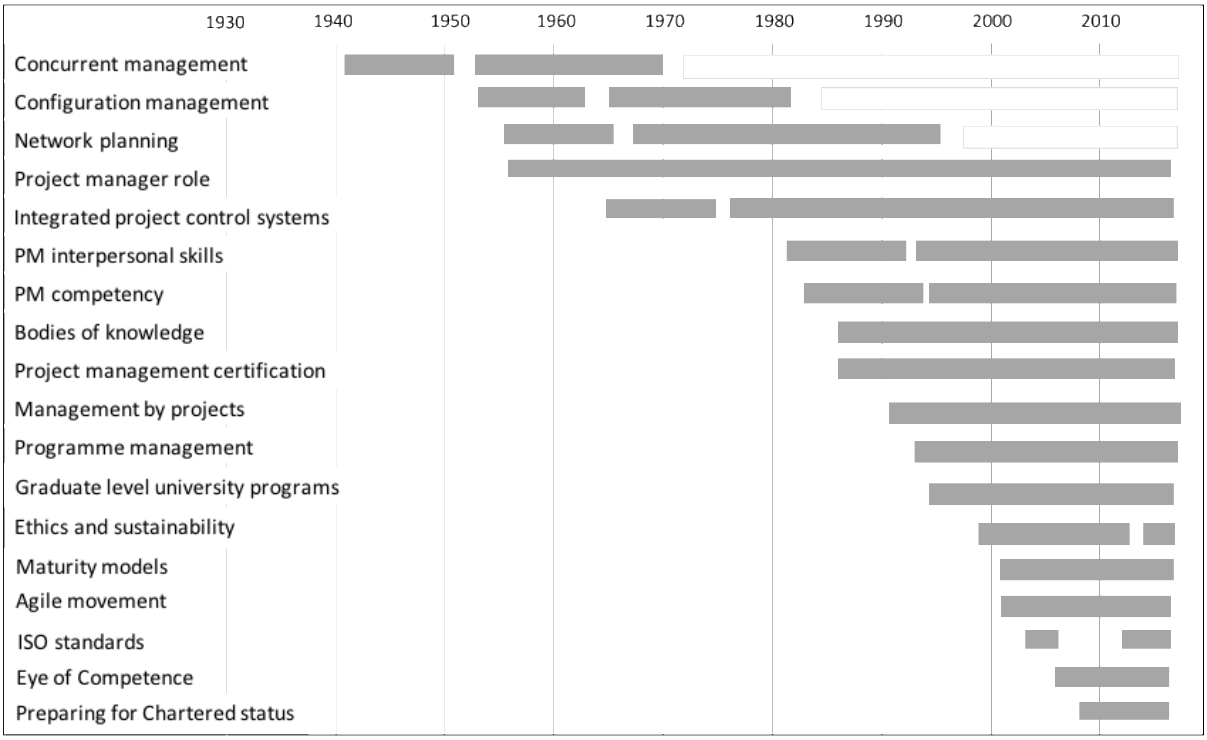

Figure 1. The timeline of Project Management (loosely based on Neal and Harpham (2012) but extended by the authors).

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.

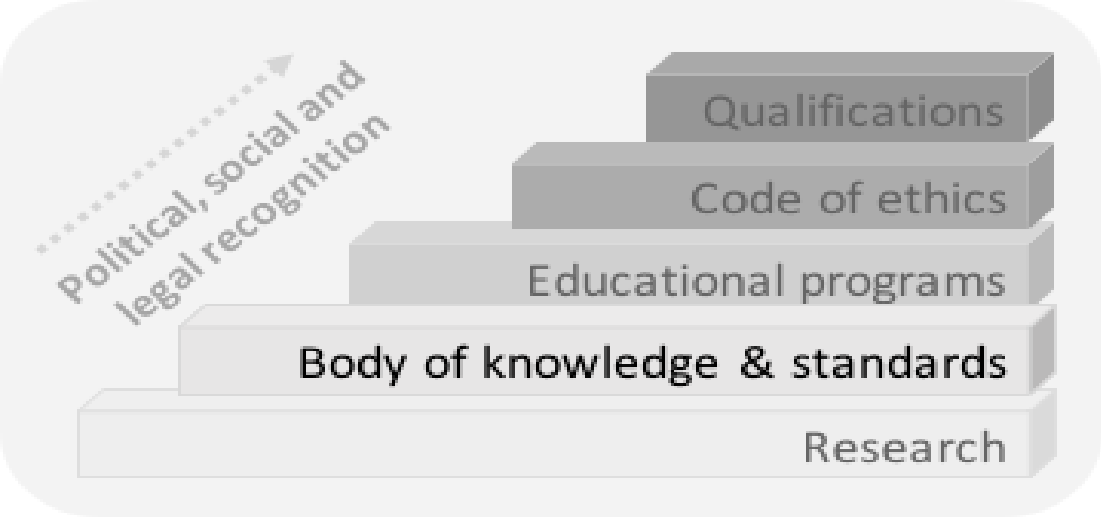

Figure 2. The building blocks of a profession.

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 ACEI). 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 *Áhœtta, 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 *Stefnumótunarfœrni* (Strategic Competences) (Ingason H. & Jonasson H., 2011), *Leiðtogafœrni* (Leadership Competences) (Jonasson H. & Ingason H., 2012), *Skipulagsfœrni* (Project Management Competences) (Ingason H. & Jonasson H., 2011) and *Samskiptafœrni* (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.

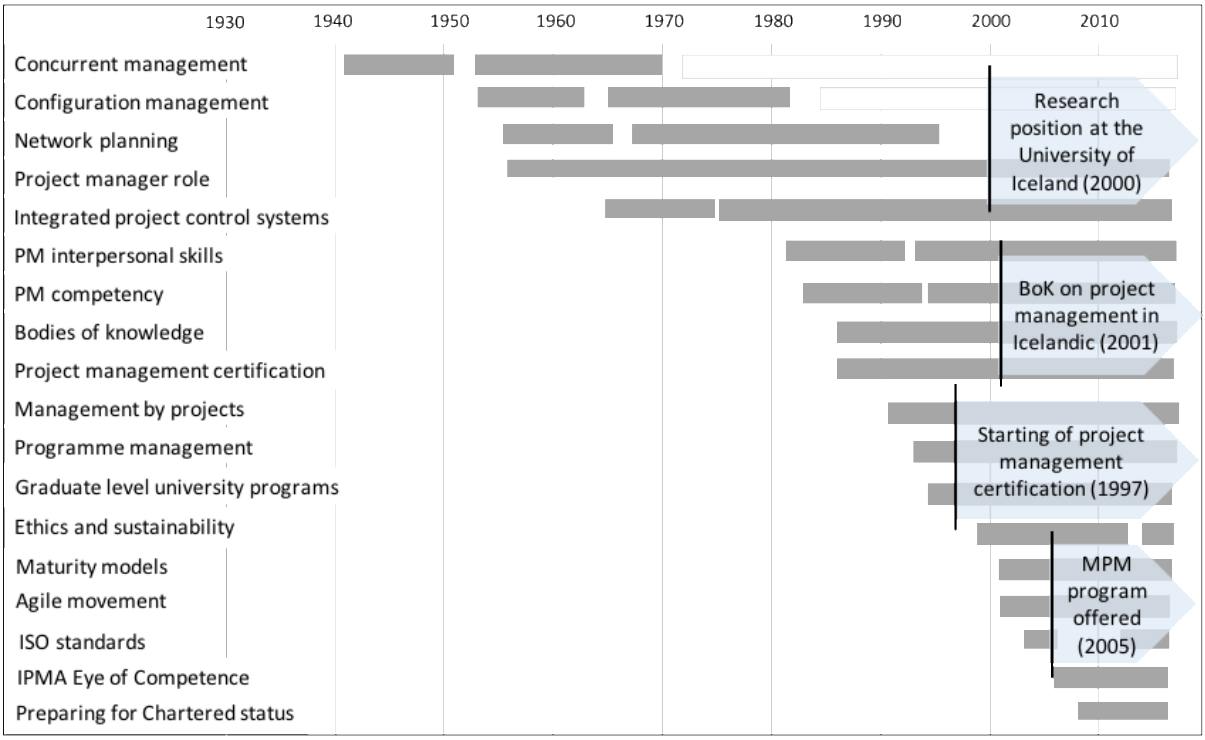

Figure 3. The timeline of Project Management in Iceland.

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.

References

Abbott, A. The System of professions: an essay on the division of expert labor. 1988. *Chicago: The University of Chicago Press.*

Alþýðublaðið (1975). Námskeið um verkefnastjórnun, p. 6. Retrieved from http://timarit.is/view_page_init.jsp?issId=235301&pageId=3211070&lang=is&q=VERKEFNASTJ%D3RNUN%20verkefnastj%F3rnun

Einarsdottir A. (2003). VÁÁÁ verkefnastjórans: rannsókn á starfsvettvangi verkefnisstjórans. Verkefnastjórnunarfélag Íslands, 2003(1), bls. 25-28.

Björnsdóttir, A. (2007). *Verkefnastofur í íslenskum fyrirtækjum (Project management offices in Icelandic organisations)* (MPM). University of Iceland.

Bowie, N.: 1991, 'Business Ethics as a Discipline: The Search for Legitimacy', in R. E. Freeman (ed.), *Business Ethics: The State of the Art* (Oxford University Press, New York).

Carbone, T. & Gholston, S. (2004). Project Manager Skill Development: A Survey of Programs and Practitioners. *Engineering Management Journal*, *16*(3), 10-16.

Crawford, L. (2004). Global body of project management knowledge and standards. In *The Wiley guide to project organization & project management competencies* (pp. 206-252). Wiley.

Fréttablaðið (2006). Á tali í 100 ár, p. 20. Retrieved from http://timarit.is/view_page_init.jsp?issId=272530&pageId=3917535&lang=is&q=Sey%F0isfjar%F0ar%20Reykjav%EDk%20til

Friðgeirsson, Þ. (2003). Management in times of changes and agility (Stjórnun á tímum hraða og breytinga), (1st ed.). Reykjavik: JPV publishing.

Friðgeirsson, Þ. (2008). Risk, Decisons and Uncertainty (Áhætta, óvissa og ákvarðanir): Decisons under Uncertainty (1st ed.). Reykjavik: JPV publishing.

Friðgeirsson, Þ. (2015). *Improvement of the governance and management of Icelandic public projects* (Ph.D.). Reykjavik University.

Gaddis, P.O. (1959). The project manager. Harvard Business Review, May-June 1959, Harvard University.

Gestsson, Þ. (2014). *Hálfnað er verk þá hafið er*. *www.vsf.is*. Retrieved 9 March 2017, from http://vsf.is/files/Halfnad%20er%20verk_FINAL_web_263760441.pdf

Guðmundsdóttir, H. & Jónsdóttir, G. (2014). *Starfsheitið verkefnastjóri - Hvaða kröfur eru gerðar til íslenskra verkefnastjóra í starfsauglýsingum?* (MPM). Reykjavík University.

Helgadóttir, H. (2008). The ethical dimension of project management. International Journal of Project Management, 26(7), 743-748.

Hodgson, D. and Muzion, M. (2012). Prospect for professionalism in project management, The Oxford Handbook of Project Management, Oxford University Press, 105-130, Oxford.

Hood, C. (1995). The “new public management” in the 1980s: Variations on a theme, Accounting, Organizations and Society, 20(2–3), 93–109.

Ingason, H. (2010). Þroskalíkan verkefnastjórnunar og staða verkefnastjórnunar í stjórnarráði Íslands. *Árbók VFÍ*, *22*(1), 231-236. Retrieved from http://timarit.is/view_page_init.jsp?issId=356969&pageId=5704245&lang=is&q=%ED%20stj%F3rns%FDslunni#

Ingason, H. & Jonasson, H. (2008). Master of Project Management, the Icelandic Model. In 22nd IPMA World Congress. Roma: IPMA.

Ingason, H. & Jónasson, H. (2019). Project: Strategy. London/New York: Routledge/Taylor and Francis.

Ingason, H. & Jónasson, H. (2019). Project: Execution. London/New York: Routledge/Taylor and Francis.

Innanrikisraduneyti (2016). Report, Verkefnisstjórnsýsla: Markviss notkun fjármuna til samgönguframkvæmda. Retrieved from https://www.innanrikisraduneyti.is/media/frettir-2016/Skyrsla-um-opinberar-framkvaemdir---lokautgafa.pdf

Interview with Daníel Gestsson. (2014). *YouTube*. Retrieved 9 March 2017, from https://www.youtube.com/watch?v=-PzlRjdU5nE

ISO, I. (2003). 10006: 2003: Quality management systems — Guidelines for quality management in projects. International Organization for Standardization.

ISO, I. (2012). 21500: 2012: Guidance on Project Management. International Organization for Standardization.

Jonasson, H. & Ingason, H. (2011). Leiðtogafærni (Leadership Skills) (1st ed.). Reykjavík: JPV publishers.

Jonasson, H. & Ingason, H. (2012). Samskiptafærni (Communication Skills) (1st ed.). Reykjavík: JPV publishers.

Jonasson, H. & Ingason, H. (2019). Project: Leadership. London/New York: Routledge/Taylor and Francis.

Jonasson, H. & Ingason, H. (2019). Project: Communication. London/New York: Routledge/Taylor and Francis.

Jonasson, H. I., & Ingason, H. T. (2013). *Project ethics*. Gower Publishing, Ltd.

Konstantinou, E. (2015). Professionalism in project management: Redefining the role of the project practitioner. Project Management Journal, 46(2), 21-35.

Lock, D. (2013). *Project Management, 10Th Edition*. Farnham, Surrey, England: Gower Pub.

Manifesto for Agile Software Development. Agilemanifesto.org. N.p., 2017. Web. 8 Mar. 2017.

Morgunblaðið, (1935). Talsambandið við útlönd opnað í dag, p. 7. Retrieved from http://timarit.is/view_page_init.jsp?pageId=1228995&issId=103632&lang=0

Morgunblaðið, (1990). "Koldabola bægt frá um fyrirsjáanlega framtíð", p. 2. Retrieved from http://timarit.is/view_page_init.jsp?issId=123455&pageId=1728372&lang=is&q=Nesjavallavirkjun

Morgunblaðið, (2002). Útnefndu helstu verkfræðiafrek síðustu aldar, p. 6. Retrieved from http://www.mbl.is/greinasafn/grein/663198/

Morris, P. (2013). Reconstructing project management (1st ed.). Chichester: Wiley-Blackwell.

Morris, P. W. (2014). Project management: a profession with a hole in its head or, why a change in the culture of academic support is needed for the profession. Engineering Project Organization Journal, 4(2-3), 147-151.

Morris, P. W. G., Patel, M. B., & Wearne, S. H. (2000). Research into revising the APM project management body of knowledge. International Journal of Project Management, 18(3), 155-164.

Morris, P. W., Crawford, L., Hodgson, D., Shepherd, M. M., & Thomas, J. (2006). Exploring the role of formal bodies of knowledge in defining a profession–The case of project management. International Journal of Project Management, 24(8), 710-721.

Muzio, D., Hodgson, D., Faulconbridge, J., Beaverstock, J. V., & Hall, S. (2011). Towards Corporate Professionalization: The Case of Project Management, Management Consultancy and Executive Search. Current Sociology 59(4) 443–464.

Neal, Judi and Alan Harpham. *The Spirit of Project Management*. 1st ed. Farnham: Gower Pub., 2012. Print.

Royal Charter | APM *(2017).* Apm.org.uk*. Retrieved March 17, 2017, from https://www.apm.org.uk/about-us/royal-charter/*

Saga námsins | *Verkefnastjórnun og Leiðtogafærni*. (2016). *Vogl.is*. Retrieved 9 March 2017, from http://vogl.is/sagan

Saga Reykjavíkurhafnar - Faxaflóahafnir. (2013). *Faxaflóahafnir*. Retrieved 9 March 2017, from http://www.faxafloahafnir.is/saga-reykjavikurhafnar

Samset, K.F, Volden, G.H. & Kvalheim, E.V. (2016). Governance Schemes for Major Investment Projects, Concept report no. 47, NTNU, Trondheim.

Schein, E. H. (1968). Organizational socialization and the profession of management. Industrial Management Review, 9(2), 1-16.

Siðareglur | *Verkefnastjórnunarfélag Íslands. (2017). Retrieved March 16th from* www.vsf.is/vottun/sidareglur-ipma-vottadra-einstaklinga/

Stjórnarráð Íslands. (2013). Reykjavík. Retrieved from https://www.forsaetisraduneyti.is/media/utgefidefni/handbok-verkefnastjornun.pdf

VSF (2017). Information received as e-mail from The Icelandic Project Management Association on January 30, 2017.

Vatnsveitan 100 ára. (2009). Efling.is. Retrieved 9 March 2017, from http://efling.is/2009/11/26/vatnsveitan-100-ara

Wenger, E. C., & Snyder, W. M. (2000). Communities of practice: The organizational frontier. Harvard business review, 78(1), 139-146.

Whitty, S. J., & Schulz, M. F. (2007). The impact of Puritan ideology on aspects of project management. International Journal of Project Management, 25(1), 10-20.

Wilensky, H. L. (1964). The professionalization of everyone? American journal of sociology, 70(2), 137-158.

Wilson, E. B. (1932). What is a Profession? The Journal of Business of the University of Chicago, 5(4), 3-7.

Winch, G.M. (2010). Managing Projects in Construction (2ed), Manchester Business School, The University of Manchester, Wiley-Blackwell, Manchester.

Zwerman, B. & Thomas, J. (2001). *Potential barriers on the road to professionalization*. *Pmi.org*. Retrieved 8 March 2017, from http://www.pmi.org/learning/library/potential-barriers-road-professionalization-4855