ABSTRACT
“Big science” has prompted scientific collaboration, ultimately leading to multidisciplinary, co-operative science. This has paved the way for organizational “champions”, leading experts with the ability of driving organizational change. This study investigates the involvement of how “champions” contributed to the rapid failures of the 1980s case of the cold fusion initiative NCFI in Utah, and the 2000s case of BBMRI.se, the Swedish node of a biobank harmonization initiative, and how these two examples would become “failed scientific megaprojects”. This descriptive comparative case study has utilized available literature and documents covering the two megaprojects, with some supplemental interviews. The study shows that “champions” indeed enable research but simultaneously also risk becoming the downfall of the collaborative endeavors that have been set up. Moreover, this study has been able to uncover and analyze some of the most common types of organizational failure found in the two failed scientific megaprojects investigated. The common lesson inferred from both cases is that the unquestionable trust placed into some of the “champions” led to a lack of procedural transparency and professional candidness, ultimately leading to a loss of trust from their respective funding bodies.

1. Introduction
A recurrent theme in most organizations are the stories about their heroes and champions (Ross 2016). Their stories are perhaps even more present now in the age of “big science”, but are they always synonymous with “success” (Dougherty and Hardy 1996; de Solla Price 1963)? Throughout the latter part of the twentieth century, the aggregated scientific research has largely become more applied and more oriented toward short-term achievements (Etzkowitz and Leydesdorff 2000). At the same time, science has come under increasingly more pressure to justify its societal and/or economic worth (Dooms 2010; Bozeman, Dietz, and Gaughan 2001;
Mulej et al. 2013; Camarinha-Matos and Afsarmanesh 2006). To this end, scientific knowledge production saw a shift toward a more context-driven, problem-focused, and interdisciplinary orientation that offered broader forms collaboration. This would largely blur the boundaries of science as it became increasingly more common for multidisciplinary research teams to collaborate in a more profound and extensive manner (Gibbons et al. 1994). Ultimately, this would give rise to the development of scientific megaprojects and research infrastructures (discussed in more detail later in this study). This also provided opportunities for organizational “heroes,” or rather “champions”, to emerge. These “champions” can be understood as “accumulators and bearers of information needed to bring about a possible innovation in which the problem or the solution is not well understood” (Beath 1996, 348). They are pioneers and leading experts who have the ability of driving and/or overcoming resistance to organizational change (Patten 2010). However, “champion”-involvement may also impact negatively, and even ruin, the business endeavor (Kentrus 2017; Rese, Gemünden, and Baier 2013). In this sense, studying failure may sometimes be more pertinent than to study success, since “failing forward” is a well-established concept that indicates that there is wisdom to be drawn by looking at past mistakes (Heath 2009; Maxwell 2000). For instance, Thomas Edison claimed he had not failed a thousand times when inventing the light bulb, but rather that it has been invented in one thousand steps (Caravan 2019).

The aim of this study is to investigate the roles that “champions” played in the failure of two well-publicized scientific megaproject infrastructures, and discern what insights can be drawn from these cases in order to ensure that past mistakes are not repeated.

On this note, a “large-scale” research infrastructure is herein defined as a research infrastructure that has acquired a total financing cost of at least €1 million (US$1.1 million) (including the nonrefundable portion of VAT) (FWO 2015). Conversely, a “megaproject” is defined as an endeavor characterized by “large investment commitment, vast complexity (especially in organizational terms), and long-lasting impact on the economy, the environment, and society” (Brookes and Locatelli 2015, 58). While many megaprojects cost over US$1 billion, this is not a constraint in defining a megaproject, as they are rather defined by other characteristics, such as development time, number of stakeholders involved, their transformational abilities, and the impact they carry for millions of people (Flyvbjerg 2007).

2. Literature review

2.1 The growth of collaborative multidisciplinary research

In her presentation of the history of the modern physical sciences, Nye (1996) contended that the western concept of “big science” began in the 1940s, where it served to gradually expand tiny, makeshift laboratories into
bustling research institutes. At the same time, she added, the move toward “big science” served to replace the scientific amateurs and generalist savants of the early Victorian era with the professional specialists of contemporary physical science.

In this sense, the genesis of “modern” megaprojects through multidisciplinary science can arguably be traced back to the latter period of WWII and the Manhattan Project (Fuller 2009; Capshew and Rader 1992). To this end, the aggregation of multidisciplinary collaborations would eventually evolve into coordinated research infrastructures built to serve broad scientific communities (Taubes 1993). In the 1970s, scientific development moved toward developing science-based technology and in the 1980s, there were “distributed facilities” that sought to utilize techniques and infrastructures more efficiently in the framework of larger (often international) programs (Pego Guerra and Zhang 2001; Baxter 2006; Mody 2016; Ulnicane 2015). In 1992, the OECD created the Megascience Forum to outline mechanisms and guidelines to help foster collaboration in building and operating large-scale research infrastructures (OECD 2010). These dealt primarily with large single-site facilities often found in physics and astronomy. It should be emphasized that scientific collaboration in the area of “big science” has been an important resource for (especially European) science since the 1950s (Hallonsten 2012; Jacob and Hallonsten 2012; Galison 1992; Mody 2011). The need for research infrastructure became pressing in the 2000s, following, in Ziman’s (1994, 122–123) terms, a “sophistication” of technologies (i.e., an increase in the complexity of instruments) and the “collectivization” of science (i.e., the default understanding that collaboration is a result of deliberate choices in order to achieve a synergy effect). This would ultimately prompt the European Commission to draft a European R&D Policy outlining the uses of research infrastructures (Papon 2004). Meijer, Molas-Gallart, and Mattsson (2012) contended that the evolution of research infrastructures has been contingent on a complex set of organizational, managerial and governance changes.

Moreover, a research infrastructure can be single-sited, distributed (i.e., encompassing collaboration with several actors spanning across several physical locations) or digital, and may be part of a national or an international network (Sumathipala 2014; OECD 2014a, 2014b). To this extent, physical proximity has become less relevant for scientific collaboration, as have territorial borders, whether they are regional, national and/or linguistic (Hoekman, Frenken, and Tijssen 2010). Instead, research infrastructures, have in a sense, come to symbolize the epitome of collaborative knowledge production (Slaughter and Leslie 1997; Godin and Gingras 2000; Zapp and Powell 2017). This means that the main characteristic of research infrastructures is that they are designed to rely on teamwork rather than scientific competition (Wagenknecht 2016). However, with large-scale research
infrastructures, the roles of “champions” have come to play an important role (Mody 2016; Lang et al. 2012; Ulnicane 2015; Lundvall and Borrás 2005).

2.2 Champions

“Champions” as such may take on many different functions and shapes. While “champions” have long been utilized within the corporate sphere, they have also filled an important function in the academic world as their influence may serve as “catalysts” to various initiative/ventures (Wolfe 2006). To this point, Daft, Murphy, and Willmott (2010, 459) asserted that “idea champions provide the time and energy to make things happen”. They continue to explain that “champions” are defined by their struggle to overcome natural resistance to change. As Rosania (2001, 54) states, “champions are people who serve their organizations as advocates, wholeheartedly associating themselves with a cause or principle”. Thus, a “champion” will need to convince others of the merit of the new idea although one should stress that a “champion” does not necessarily need to be inherent to the organization itself, as a “champion” may instead act as an influencer on its behalf. To this end, research has shown that “champions” by and large have significantly different preferences to that of “non-champions” (Shane 1994).

The technology policy brought on by the expanding multidisciplinary knowledge production has in this sense represented a shift from broader philosophical considerations to a more instrumental focus on national prestige and economic objectives (Lundvall and Borrás 2005). As these factors came into play, policy-makers have often made use of technology policy in order to promote “national champions” in specific sectors (Ulnicane 2015; Lundvall and Borrás 2005). These “champions” often play a crucial role in shaping the knowledge production, and under the auspices of the universities, they will often take on entrepreneurial roles as well as important economic functions (Ulnicane 2015). On this note, a “champion” should not be confused with a “scientific entrepreneur”, even though they may share certain similar traits. As Miner (1996) suggests, a “scientific entrepreneur”, usually takes on a much broader role and has a greater understanding of risk-taking. A “scientific entrepreneur” is usually more impressionable to new ideas, while at the same time interested in introducing new concepts and visions to an organization. A “scientific entrepreneur” also relies more on business acumen. In contrast, Shane (1994, 397) contends that a “champion” is different in the following sense:

They provide autonomy from the rules, procedures, and systems of the organization so that innovators can establish creative solutions to existing problems. They gather organizational support for the innovation by building coalitions between managers in different functional areas of the organization. They create loose monitoring mechanisms that allow innovators to make creative use of
organizational resources. They establish mechanisms for making consensus decisions on innovations. They use informal methods to persuade other members of the organization to provide support for the innovation, and they protect the innovation team from interference by the organizational hierarchy.

Moreover, “champions” are more often utilized for the concept of the “third mission” of the universities. This concept, put in simple terms, is a vision, or a desire, for universities to extend their role beyond merely teaching (first mission) and researching (second mission) to also make a socio-economic contribution (third mission) as well (Göransson, Maharajh, and Schmoch 2009). Although there is generally support for the understanding that “champions” promote innovations, research also shows that their ability to succeed is generally contingent on his/her personal traits (Snyder 2007). To this end, “champions” are also prone to being affected by the principal-agent problem, which in this context means that they are likely to pursue their own interests under the guise of pursuing that of the organization (Coakes and Smith 2007; Jenssen and Jørgensen 2004; Shaw et al. 2012; Hendy and Barlow 2012).

2.3 Organizational failures

An organizational failure can be understood as it failing to achieve sustainability and subsequently failing to deliver on its promised goal (Cannon and Edmondson 2005; Meyer and Zucker 1989). To this extent, Spacey (2016) contents that there are 14 types of organizational failures, which are described further in Table 1.

3. Methodology

This study has employed a descriptive comparative case study, in which generalizable knowledge about the phenomenon concerning champions and megaprojects are carefully scrutinized and articulated throughout the exemplification of two failed cases, NCFI and BBMRI.se (Mills, Durepos, and Wiebe 2010; Rogers 2014). Although the operations of the two cases were ostensibly distinct from one other, the two cases were selected on the basis that there were similarities in terms of the support they garnered from their respective governments, the hype they espoused and, ultimately, the way the “champions” in each respective organizations contributed to their demise (Larsson et al. 2018; Larsson 2019; Hamilton 2011; Taubes 1993).

The study relies on written documentation, such as publications and white papers and, in the case of BBMRI.se, interviews (on account that the instigators behind that initiative were, unlike that of the cold fusion case, still living and able-bodied at the point in time this study was conducted and therefore could be interviewed).
4. Case presentation

4.1 NCFI – cold fusion

In March 1989, two electrochemists based at the University of Utah, Dr. Martin Fleischmann and Dr. Stanley Pons, claimed to have unlocked the key to cold fusion, a result previously believed to be unattainable (Shamoo and Resnik 2015; Simon 2002). Essentially, this meant that seawater/heavy water containing large amounts of hydrogen isotope deuterium ($^{2}$H$_{2}$O) could, in a relatively simple manner, be used to supply enormous quantities of energy without any harmful waste products (Fleischmann and...
Pons 1989). Reports had originally surfaced at the university that something “big” was about to happen (K. Caldwell, research professor at the University of Utah. Interviewed by L. Engwall, 13 June 2005). Soon thereafter, the news of cold fusion had researched the media waves with the discovery of cold fusion finally being announced at a press conference by Fleischmann and Pons approximately one week later in the presence of the university president, vice-president for research, as well as several prominent news personalities (Engwall 2005). The concept of cold fusion was in itself seen as a viable technology and was, as a project, deemed to carry practical consequences of vast significance, in spite of the fact that many contemporary scientists had accused Fleischmann and Pons’ work to be unsatisfactory in its documentation (Shamoo and Resnik 2015; Simon 2002; Walling and Simons 1989).

Given the fact that the Exxon Valdez oil disaster in Alaska the same year was still fresh in many people’s minds, the environmental issue had become a pressingly relevant topic (Close 1992). This, in turn, made the endeavor more interesting for the media and public to follow, which consequently garnered much public and academic attention. This set a premise for a long and epic journey in which the cold fusion project ventured from its inception at the University of Utah and worked its way to Congress. The endeavor saw heterogeneous collaboration between scientists from different backgrounds. Moreover, through every step was followed by the media and an enthusiastic public (Voss 1999; Gieryn 1999). Moreover, Fleischmann and Pons were both well-respected and well-publicized scientists, which would consolidate their (albeit temporary) status as “champions” of cold fusion (Mullins 2004; Dewdney 1997). Thus, a research center, National Cold Fusion Institute (NCFI), was finally set up on 14 August 1989, following a US$4.5 million investment by the state of Utah (Joyce 1990; Lewenstein 1992).

The ambition was to secure additional funding from the state legislature and the United States Department of Energy (DOE) (Kozima 2006). Primarily, the cold fusion initiative can be defined as an early-day research infrastructure (i.e., before the term as such was widely used) in that it attracted experts in physics, chemistry, engineering and metallurgy to collaborate in a way they had not done before (Joyce 1990; Acc. 529 2019). As its operations were restricted to the University of Utah, one could consider it tantamount to an early day “single-sited” research infrastructure (Sumathipala 2014).

However, after a successful start, the project’s credibility came under scrutiny. The DOE organized a special panel to review cold fusion theory and research, and concluded in November 1989, that the results did not present enough convincing evidence that beneficial sources of energy would result from the phenomena ascribed to cold fusion (Kirkland 2010). The NCFI responded by inferring results of 92 groups of researchers from 10 different countries reporting corroborating evidence, but still refused to submit any evidence of their own,
citing that doing so might have endangered their patents (Huizenga 1993). Still, the DOE would stand by their decision to refuse additional funding (Mallove 1991). Following this, the NCFI and the notion of cold fusion was heavily derided and mocked by the scientific community at large, citing its lack of credibility (Rousseau 1992).

Along with the dwindling funding and ensuing financial discrepancies, the NCFI was finally forced to shut down on 30 June 1991 (Close 1992; Acc. 529 2019). The University of Utah would ultimately drop all cold fusion-related research in 1998, after spending over US$1 million (Wired News Staff 1998). In the aftermath of the NCFI’s closure, some damning allegations ensued, claiming that Fleischmann and Pons either wittingly or unwittingly had committed research fraud (Simon 2002). One of the chief arguments were that the concept of cold fusion seemed improbable, even in theory, since Fleischmann and Pons’ assertion heavily relied on the unlikely event that “extreme pressures inside the palladium lattice would help enhance fusion of deuterium” (Collins and Pinch 1998, 72). Furthermore, Fleischmann and Pons found their work questioned on account that they were electrochemists rather than nuclear physicists, calling their competency in the field into question. Whether or not Fleischmann and Pons actually committed research fraud (deliberately or otherwise) is a topic of much contention, although fact remains that much false hope was built in the wake of cold fusion (Collins and Pinch 1998).

Nevertheless, subsequent research in later years has concluded that at least some of the criticism against Fleischmann and Pons was “premature and adverse” while leaving the possibility of “cold fusion” in concept to one day become realized (McKubre 2015; Brooks 2016). While the hype concerning cold fusion soon petered out after the heydays of the NFCI, the occasional researchers are still holding out hope of one day succeeding in what Fleischmann and Pons failed to deliver. One contemporary example is the “Energy Catalyzer” (or “E-Cat”), a purported cold fusion thermal power source that was presented in 2011 by Italian entrepreneur Andrea Rossi and the now late Italian physicist Sergio Focardi (Liu and Liu 2019; Ritter 2016). However, similarly to Fleischmann and Pons’ endeavor, this contention has been met with much skepticism amidst lack of experimental evidence while also lacking a firm theoretical basis in current scientific theories that would credibly explain the workings of the device (Zyga 2011).

In conclusion, although the NCFI as a construct by and large preceded most of the contemporary academic discourse surrounding large-scale research infrastructures, it would carry many organizational and structural themes that would later resurface in latter-day research infrastructures, such as BBMRI.se some two decades later (McCain 1991; Winter and Butler 2011; Storms 2010).
4.2 BBMRI.se – biobanking

Throughout the first decade of the 2000s, there were rapid scientific advances of genomic research in humans (Collins 2004). Successful discoveries of pathologies are contingent on the study of large collections of accurate and well-documented research data from large numbers of populations. These collections are stored in biobanks (or biorepositories) (ESFRI 2006). As such, biobanks are considered vital in advancing public health through the discovery of diseases (Greely 2007; Arbyn et al. 2011; Dillner and Andersson 2011). As of the 2000s, medical scientific research has showed that there has been an increased investment in biobanking in the western world in general and Sweden in particular (Greely 2007; Hansson 2011).

However, a longstanding problem was the lack of congruity of biobanking (Gibbons 2009). Essentially, the term “biobanking” was subject to many different definitions and sample processing was not harmonized in any shape or manner, whether within countries or across national borders (Beier and Schnorrer 2011; Fransson et al. 2015). A consequence of this is that samples depreciate in quality due to the need for reprocessing according to different standards and practices depending on who handles them. In addition to this, different researchers use different software and information processing standards, making data transfers a logistical nightmare in certain cases (Stevens 2016; Botling and Micke 2011). As such, there was a perceived need for biobank harmonization (Gibbons 2009). Nevertheless, the earlier attempts at harmonizing biobanking were neither socially nor ethically robust (Karlsen, Solbakk, and Strand 2009).

However, in 2007, the EU-funded organ European Strategy Forum on Research Infrastructures (ESFRI) launched an initiative, BioBanking and Molecular Resource Infrastructure (BBMRI) (Van Ommen et al. 2015; Zatloukal et al. 2015; Asslaber and Zatloukal 2007). In short, BBMRI sought to implement the harmonization of biobanking and the processes associated with it. To this end, much effort was made toward addressing the issues of harmonizing the cold storage of biospecimens (Hubel et al. 2011). BBMRI existed in different national nodes, and one of the pioneering nodes that garnered the most attention was its Swedish node, BBMRI.se (Larsson 2018).

This node was established in 2009 on the initiative of three Swedish professors, Joakim Dillner, Göran Hallmans and Jan-Eric Litton, who were approached by the Swedish Research Council concerning a request of implementing a national node of BBMRI (Andersson, T., 1 April 2009. Personal electronic communication with J. Dillner, G. Hallmans & J.-E Litton, BBMRI.se WP-leaders). Soon thereafter, an “operation grant” application to the Swedish Research Council followed, outlining the activities and the proposed initial staff members (Swedish Research Council 2009). An agreement between the Swedish Research Council and Karolinska Institutet (KI) was
ratified the following year, in 2010 (Swedish Research Council 2016b). BBMRI.se involved all Swedish universities with medical faculties, i.e., KI, Uppsala University, Umeå University, University of Gothenburg, Lund University, Linköping University and Örebro University (joined 2011), plus one engineering/technology school: KTH Royal Institute of Technology (joined 2013) (BBMRI.se 2015; BBMRI-ERIC 2017).

BBMRI.se was a “distributed” research infrastructure as its operations were spread out across several different universities and localities (Sumathipala 2014; Van Ommen et al. 2015). As such, BBMRI.se was designed as a distributed “hub and spoke” infrastructure, where each hub coordinated activities such as collection, exchange, and analysis of samples and data for the major domains (Klingström 2013). Each biobank or molecular resource and technology center was associated with a specific hub. Public or private partners (e.g., universities, hospitals, companies) provided biological samples, data, technologies or services. Each of these could also be associated with a BBMRI.se hub. This structure sought to provide flexibility, as new members could be connected at any time, and the structure could easily be adapted to emerging needs in biomedical research. In spite of some initial murmurs and internal skepticism in regards to the future of BBMRI.se, the then director claimed that the organization was safe “because the government had decreed it” and that most initial criticism had subsided (Jan-Eric Litton, Personal Communication, 10 October 2012).

KI was selected as the host university as per the funding agreement with the Swedish Research Council (Skoglund, Drawfarc, and Fransson 2016). Thus, BBMRI.se was headquartered at KI’s localities in Stockholm, Sweden (Skoglund, Drawfarc, and Fransson 2016). At the time of its creation, BBMRI.se was the largest investment ever made into a Swedish medical infrastructure, with an estimated support of SEK 170 million (US$19.6 million) covering the entire duration of BBMRI.se’s existence (Swedish Research Council 2016b; BBMRI-ERIC 2017; Karolinska Institutet 2012). A consortium agreement was ultimately signed in early 2013, which established BBMRI.se as a national research infrastructure (Larsson 2018).

To this end, BBMRI.se enlisted what was known as “national champions”, i.e., “leading scientific experts engaged in the biobanking harmonization effort” (Larsson 2019). These “champions” were allotted their own work package (WP), based on their competence and proficiency, which would also help shape the design of each of the (eight in total) individual WPs (Larsson 2018). Each WP was essentially assigned its own strategic and operational plan based on an overarching plan that sought to meet the overall goals of BBMRI.se. The ambition was to ensure that researchers all over Sweden would be able to use the national facility, while also reaching out to the most proficient expertise across the whole in the country in order to manage and develop biobanking services (Swedish Research Council 2009;
Larsson 2018). BBMRI.se effectively sought collaboration from many different disciplines working toward the same organizational goal. In terms of activities, each WP organized different projects. Some WPs performed investigative tasks while other WPs focussed more on providing service functions (Larsson 2018). The distinction did not appear to have any direct impact on the ability to adhere to the larger goal, the BBMRI.se mission, which was defined as follows (BBMRI.se 2015, 4):

... to create a harmonised, efficient and internationally leading nationwide biobanking infrastructure that will provide a long-term, strategic support for Swedish medical research, healthcare and biomedical industry. The BBMRI.se infrastructure will provide a comprehensive state-of-the-art service to researchers, both regarding sample collection for biobanking projects, as well as regarding assistance with exploitation of biobanks for research. BBMRI.se will develop and provide the tools and the expertise required for creating new valuable sample collections as well as for improving accessibility and usefulness of already existing sample collections.

However, it would ultimately be the “national champions” who formed the direction of each WP and interpreted the main goal of BBMRI.se, as the WP’s goals would more often than not mirror the “national champion’s” own agenda with major financial and organizational disagreements between KI and some of the other member universities accumulating (Larsson 2018). It even went as far as having the KI-based BBMRI.se leadership accused of “fraud” and “illegal activity” in its capacity as “host university” by one of its co-founders on account that it had altered the terms of consortium agreement in a manner that favored the KI-based “champions” and disfavored the “champions” based at the other member universities (G. Hallmans, BBMRI.se WP-leader, Interview, 26 June 2014).

The conflict reached its tipping point in December 2015, when representatives from Umeå University, Uppsala University, and the University of Gothenburg authored a joint statement to the Swedish Research Council, citing maladministration among the management of BBMRI.se by its host university (Hallmans et al. 2015; Karolinska Institutet 2016). Among other things, the allegations stipulated that KI had perpetrated long-term occurrences of arbitrary conduct, wanton disregard, a lack of transparency, KI-centered cronyism and psychological harassment. A subsequent widely reported exposé in the Swedish broadsheets and tabloid press in April 2016, in addition to an external auditing report, divulged that there had been numerous counts of improper distribution of funds (Bäsén 2016; Aftonbladet, 2016; Svenska Dagbladet 2016; NT 2016; Hallandsposten 2016; Skolgund, Drawfarc, and Fransson 2016). Examples of which included funding of housing arrangements for KI-staff as well purchasing advanced equipment intended for KI’s own biobank rather
than for shared BBMRI.se purposes (Bäsén 2016; Kjellberg and Krey 2016; Skoglund, Drawfarc, and Fransson 2016).

This ensuing course of events eventually resulted in the Swedish Research Council declaring its withdrawal of additional funding in March 2016, with the exception of a two-year decommissioning grant (Larsson 2018). This would effectively spell the end for the organization in its contemporary format as of 2018 (Hallmans et al. 2015; Karolinska Institutet 2016; Swedish Research Council 2016a, 2016b; Larsson 2018). Following this event, the Swedish Research Council issued a statement in April 2016 where they would express doubts over any future investments into biobank-related endeavors under their auspices (Swedish Research Council 2016b). However, in late 2017, the formation of Biobank Sweden was announced. This would take on the form of a new research infrastructure for biobanking, but headed by Uppsala University rather than by KI (Beskow 2019). This research infrastructure would integrate the remnants of BBMRI.se as part of the new umbrella, along with national biobank NGOs, industry representatives, regional counties and interest groups (Biobank Sverige 2017; Nordin 2017; Beskow 2019). BBMRI.se’s final mandate expired on 1 April 2018, after which the organization was officially disestablished (Larsson et al. 2018; Larsson 2018).

5. Concluding analysis

The aim of this study sought to investigate what roles “champions” had in the failure of two collaborative multidisciplinary megaproject infrastructures, and what scientific insights that can be drawn from these cases. To this end, the fate of the two failed scientific infrastructures of NCFI and BBMRI.se serve as relevant cases in a broader perspective as neither of the cases failed due to “passive” reasons, but rather because of perceived misconduct.

As previously mentioned, one may contend that the two cases make for a problematic comparison due to their inherently different aspirations. While the NCFI case effectively sought to challenge the very foundations of physics, the BBMRI.se case sought to revolutionize the collaboration between all the medical universities of a country and ensure the establishment of common practices and technologies. Each of these premises would in and of themselves indeed be Sisyphean tasks. However, the scientific disciplines as such and what each case presented itself to accomplish is, in truth, of lesser consequence. As mentioned in Section 3, the common denominator between the two cases is that each one constituted a megaproject, with each one promising to deliver a solution to a scientific problem that had become a particularly pressing issue in each respective eras.

The environmental and biobanking sciences had come to play a prominent and pioneering role in the United States and Europe, respectively, and were
each products of their time. A unique aspect regarding the NCFI and the BBMRI.se cases is that while research, such as Busenitz and Barney (1997) and Scase and Goffee (1987), generally makes a clear distinction between entrepreneurial efforts and large-scale organizations, these two cases were in fact inherent example of being both simultaneously.

It is true that previous research has provided for the theoretical possibility of a construction similar to the NCFI and BBMRI.se. An example of this can be seen in Beuker’s (2008) study, which posits that actors who are exceptionally knowledgeable and experienced may start a venture without a business plan. Still, this contention is contradicted by Delmar and Shane (2004), who argue that a business plan is indeed a determining factor as a means of obtaining legitimacy in the early instances of a start-up phase. In both cases, the heart of the problem ultimately stemmed from a lack of credibility and a sense of betrayal. To a great extent, this can be attributed to the larger-than-life roles attributed to respective organizations’ “champions”, whose abilities in achieving something extraordinary were ultimately met with an anticlimactic rude awakening. An important difference, however, is that in the case of NCFI, the chief opposition was external to the organization, whereas in the case of BBMRI.se, it was largely domestic from within the organization; i.e., by other “champions” who effectively began seeing the host university’s “champions” as rivals who had left them disadvantaged. Common to both cases were that the management’s critics had effectively called them out as opportunistic and dishonest charlatans. This spread bad publicity and bad-will amid the organization at large and would eventually end the bond of trust each respective organizations had with their respective funding bodies. As the funding bodies would end their support to each respective organizations in the ensuing developments, the NCFI and BBMRI.se each came to a devastating end, as a continued sustenance would become impossible.

Interestingly, however, the development of BBMRI.se appears to have taken on an inverted chain of events as opposed to that of the NCFI. BBMRI.se was the fruition of bringing together leading scientists and forming an initiative and making several subsequent publications. Conversely, the cold fusion initiative began with the publication of the purported cold fusion discovery, which piqued the interest of several other leading scientists/researchers, who wished to join the endeavor. This is exemplified in Figure 1.

Still, neither initiative would ultimately succeed in their endeavors, in spite of a fortuitous premise with scientific and political endorsement. The sciences that were engaged in both NCFI and BBMRI.se were diverse and the organizations themselves were the fruit of a long evolutionary process. This ought to have stressed the importance of the “champions” NCFI and BBMRI.se to have been fully transparent about their operations and intentions. However, it is clear that while the “champions” in question shared a goal to achieve the organization’s objective, they held different conceptions as to what should be done to achieve
said goal. To this end, the lack of procedural transparency and professional candidness were the chief components that came to hamper the perseverance of the two pioneering large-scale megaproject infrastructures.

Drawing upon Spacey’s (2016) depiction of organizational failures, it is evident that the two megaprojects failed on a number of accounts. To begin with, they failed in equal measures on account of “change failure”, inasmuch that they lost support from their respective key stakeholders, such as the University of Utah and the DOE as well as the Swedish Research Council, etc., respectively. There was also clearly a case of “conflict of interest” on account of BBMRI.se, as the WP’s goals tended to reflect the “national champion’s” own agenda, in addition to allegations of alterations being made to the consortium agreement that favored the KI-based “champions” and disfavored the “champions” from other member universities.

For the reason above, BBMRI.se was also accused of “cronyism”, and “self-dealing”, in addition to psychological harassment of its employees, which in turn constitutes a “culture of fear”. The alleged financial spending by the BBMRI.se director and KI appears to indicate “malicious compliance”. While KI, as the host university, was able to use the funds in this manner as per its funding arrangement with the Swedish Research Council, it served to increase the rift between the KI and the other member universities, and eventually, even the Swedish Research Council (Skoglund, Drawfarc, and Fransson 2016; Larsson 2018).

NCFI did not exhibit any such tendencies; however, it did commit at least one serious case of “misuse of statistics”, when it attempted to infer results of 92 groups of researchers from 10 different countries reporting corroborating evidence, while refusing to submit any original evidence.
The fact that the BBMRI.se management was reported to the Swedish Research Council by other member universities indicates “resistance to change” in that these actors disapproved of the direction the organization was taking.

However, both the NCFI and BBMRI.se were to a certain extent victims of the “success trap” in the sense that they were successful in acquiring large degrees of government funding and involved reputable champions who had been successful in their fields and possessed vast social capital. Nevertheless, as time would tell, this luck would turn and the managerial champions ended up becoming a “problem child” of each respective organizations.

While there is no proof to suggest any form of “trained incapacity” in either organization, there are indicators of “tone at the top” in as much that the management in both cases had either disregarded or neglected to act upon prior criticism raised against the organization, addressing the management’s disregard of ethical conduct in various circumstances.

Even though just one organizational failure may be sufficient to bring down an organization, it is worth noting that the results indicate that BBMRI.se had roughly 2.5 times as many types of organizational failures than the NCFI, with an overlap of two failure types. Expanding upon some of the findings uncovered by Larsson (2018), a full overview of the organizational failures can be found in Table 2.

With the emergence of new multi-million dollar megaprojects and/or research infrastructures spanning cross-disciplinary fields, more research into the subject is becoming increasingly imperative. In spite of their ultimate failure as megaprojects, the experiences gleaned from the two cases need not be in vain. For instance, the research conducted on NCFI and cold fusion showed us that multidisciplinary science is indeed synergizing in practice as well as in theory, which has arguably set a precedent on modern-day megaprojects. It has also taught us the impact media attention can have on conveying science and generating interest in a research project if done correctly.

As for BBMRI.se, it illustrated that it was a concept that worked not only in theory but also in practice (albeit sub-optimally and only for a short period of time). This case has also showed us the importance of securing congruence within the organization, especially when there are several different “champions” involved with potentially different agendas and/or ideas of achieving the goals. We can also see that in the case of what would today likely be known as a “single-sited” research infrastructure, such as the NCFI, the fiercest critics are likely external to the organization, whereas in the case of a “distributed” research infrastructure, they are likely to emanate from within the organization from other “champions”.

A thought-provocative proposal for a future study would be to question whether or not either of these cases should indeed be considered scientific “failures”. Surely the fact that the scientific community terminated both of
these flawed programs in a relative short span of time would indicate that there is a functioning element of self-sanitation? On the other hand, it is undeniable that neither of the cases actually achieved what they set themselves out to do and they were the cause for much disappointment and embarrassment for the stakeholders as well as for the scientific community at large. What is applicable to both these failed cases, however, and which also serves as an important lesson and reminder to future “champions”, is to pay closer attention to their surroundings, colleagues and/or stakeholders, and ensure they are operating with full transparency, honesty, and integrity.

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