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To cite this article: Pål Nygaard (2020): Engineering way lost: Norwegian engineers' reactions to challenges from Americanization and industrial democracy, *Management & Organizational History*, DOI: [10.1080/17449359.2020.1758148](https://doi.org/10.1080/17449359.2020.1758148)

To link to this article: <https://doi.org/10.1080/17449359.2020.1758148>



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Published online: 26 May 2020.



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# Engineering way lost: Norwegian engineers' reactions to challenges from Americanization and industrial democracy

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## ABSTRACT

This article investigates how the Norwegian Engineering Association responded to challenges from Americanization and industrial democracy in the period from 1945 to 1980. This period was the heydays of the engineering way to top management positions in Norway. The engineering way was justified with reference to the engineers technical 'Fachkompetenz'. As in many countries, Norway became subject for an institutional push toward Americanization of management the first decades after WW2. This process challenged the engineering way to management by propagating the need for management education. In Norway, there was not a smooth and swift process of Americanization of management and business. Rather, the Norwegian trajectory is a complex set of international and national influences and agendas. Primarily, Norwegian management practice was from the 1970s shaped by a political push for industrial democracy that was initiated by the Labor party and the labor movement in the 1960s. The process of introducing industrial democracy challenged both the traditional engineering way and the American way of making managers in Norway. This article unpacks how the Engineering Association responded to the challenges from Americanization and industrial democracy.



## KEYWORDS

Americanization;  
engineering; profession;  
management; history

## Introduction

After WW2, Norway had an ambition to industrialize and modernize its economy. This was a 'unique, unprecedented task calling for exceptional breadth and creative analytical ability on the part of the men [sic!] who administer Norway's industries' according to the Norwegian governments special advisor Eliot Dunlap Smith (1953), provost at Carnegie Institute of Technology. What was the best way to make managers fit for this task? The American special advisor presented recommendations that challenged the traditions of managerial qualification in Norway. Smith's report was part of a wider institutional push toward Americanization of management in Norway, as was the case for most of Europe in the first decades after WW2 (Kipping and Bjarnar 1998).

This institutional push has spurred an extensive international academic debate over the degree of Americanization globally. This debate has predominantly focused on

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changes in management systems, models and education institutions and programs, i.e. the outcomes of the changes (Guillén 1994; Amdam 1996; Gourvish and Tiratsoo 1998; McGlade 1998; Kipping and Bjarnar 1998). To a lesser degree has the process of Americanization in management education been put under scrutiny as object of inquiry in itself. A central insight from the extant literature on Americanization is that preexisting institutional frameworks and cultures generated tensions resulting in various hybrid forms of renewed management systems, models and educational programs (Kipping, Üsdiken, and Puig 2004; Djelic and Amdam 2007). This article will take the perspective of engineers, who were an essential part of the preexisting institutional framework in Norwegian management when the institutional push for Americanization started.

In Norway, Americanization was not a straight-forward process that created a new system for management education nor practice. Rather, the first decades after WW2 was a complex phase in Norwegian management history in which a multitude of efforts and initiatives to build up new, or change existing, management education or management development programs were taken (Nylehn 2011). Some were explicitly inspired by American-style management education, but not all. The most prominent example of the latter was a political push toward industrial democracy that started in the 1960s (Byrkjeflot et al. 2001). The push toward Americanization and industrial democracy challenged the engineering way to top management positions. This article will unpack how the engineers reacted to these two challenges.

The outcome of the complex changes Norwegian management underwent from 1945 to 1980 was that the engineering profession lost its dominance over top management positions to business economists. This article will not answer why this change happened, but rather focus on how the engineers responded to challenges prior to the engineering way to top management positions in Norway was lost. The article is structured as follows. In the first section, the article will describe the context of how the engineering way to top management positions became dominant in Norway, and how engineers justified their grip on top management positions. In the second section, the approach, sources and methodology is outlined. In the third and main section, the of how the engineering profession reacted to the challenges from Americanization and industrial democracy is presented. Finally, the Conclusion will summarize the findings, discuss their broader implications and outline directions for further research.

## **Context: two waves of engineering influence and education**

Historically, Norwegian engineers' knowledge base and practice were influenced by UK and Germany through two waves of inspiration prior to the push toward Americanization. In the first wave, Norwegian entrepreneurs imported British industrial technology and knowledge in the 19<sup>th</sup> century as part of an attempt to promote industrialization (Bruland 1991). In turn, this inspired a concerted effort by strategic actors to convince the Norwegian government of the need for technical education in Norway.

These actors of various backgrounds with common interest in industrialization established the Polytechnic Society, and open organizations for people interested in industrial and technological issues. Consequently, technical colleges were established in the biggest Norwegian cities, whose candidates, by the turn of the century, had gained dominance as industrial managers (Benum 1975). The candidates from these technical colleges

created the Engineering Association, an organization exclusively for engineers with technical education. The Engineering Association and Polytechnic Society collaborated in many areas.

This path detached the Norwegian management tradition from its British origins in two ways. Firstly, the British assumption that managers were ‘born, not made’ was not part of the Norwegian importation of machines and how to do industrial production from the UK (Locke 1988). To some extent, this can be explained by the relative absence of Norwegian nobility historically, and the particular importance of a Norwegian bureaucratic elite in the 19<sup>th</sup> century (Sejersted 1993). Higher education and meritocratic principles was thus early established as the base for Norwegian elites.

In the second wave, the Norwegian engineering candidates in the late 19<sup>th</sup> century started to travel to German technical *Hochschulen* in order to prolong their technical education (Brandt and Nordal 2010). This became a common educational path for Norwegian engineers. In 1910, the Norwegian Institute of Technology (NTH) was established. NTH was structured along the lines of the German technical *Hochschulen* (Brandt and Nordal 2010). Some critical voices were raised during the first half of the 20<sup>th</sup> century, claiming that management education, as inspired by Taylor’s scientific management theory as well as the evolution of American business schools, should be part of the curriculum (Hellern 1963; Hanisch and Lange 1985). These voices were, however, exceptions confirming the heavy influence of Germany on the Norwegian Engineering profession.

In part, the industrial development of Norway at the turn of the 20<sup>th</sup> century contributed to the international influence on management development and practice. During this period, a new breed of industrial companies evolved accompanying electrification and advances in science and technology. Predominantly these companies were partly financed, owned and dependent on cooperation with foreign investors and companies in order to meet the capital-intensive requirements of mass production as well as access to foreign markets (Andersen 2005; Henden et al. 2008). This feature of Norwegian industrial development was formative of Norwegian management traditions in two ways. Firstly, the transnational interaction of business development and trade became the main hub for the transfer of managerial competencies. Secondly, the relative smaller scale and scope of the structure of Norwegian companies did not create the same administrative challenges as faced by large American corporations. Accordingly, Norwegian engineers perceived developing advanced technology, and promoting smooth and rational industrial production, as their main managerial challenges.

Through these two waves of international influence, the Norwegian engineers gained dominance in industrial management based on their technical competence. Moreover, as late as 1936 the Norwegian state established the Norwegian School of Economics (NHH), NHH was also structured largely akin to the German *Hochschulen*. Thus, both NTH and NHH were what Engwall, Kipping, and Üsdiken (2016) has called stand-alone *Hochschulen*, i.e. were dedicated to the education of a single profession. The ‘Fachkompetenz’ obtained through such education provided moral authority for managers according to Locke (1996) in his comparison of the German and the American management model. Byrkjeflot and Halvorsen (1996) have similarly argued that ‘Fachkompetenz’ historically have structured the Norwegian management system.

While the Norwegian engineers were educated at a high scientific level through NTH, this education did not include management courses. When it came to management competencies, Norwegian engineers predominantly held the view that these were best obtained through learning by doing, and climbing the organizational ladder, which was quite similar to German model (Kipping 1998). As such, making managers was different in Norway prior to WW2 than the US model, which was characterized by a general body of management knowledge distributed through formal management education, but also different than the British belief that managers are 'born, not made' (Locke 1988).

The difference between Norway and Germany was that the Norwegian engineers did not have the same struggle against the old elite culture as German engineers did (Gispen 1989; Kocka 1990; Byrkjeflot et al. 2001). Likewise, Norwegian engineers did not have to overthrow an elite of Oxbridge humanists in their rise to managerial positions. Thus, the Norwegian engineers could more uncontestedly claim their scientific knowledge base as the foundation for the justification and legitimation of managerial authority.

These two waves of international influence, and their subsequent amalgamation into the contingent context of Norwegian society, set the stage for my analyses of how Norwegian engineers responded to the push for Americanization and industrial democracy after WW2. The decades after WW2 were shaped by a third wave of international influence on Norwegian management traditions. In this period, Norway and European countries encountered American style managerialism by being recipients of Marshall aid and the subsequent establishment of productivity centers (Amdam and Yttri 1996). In addition, from the 1960s politicians in Norway pushed for establishing industrial democracy in Norway, a push that was formative by shaping the regulations of industrial relations (Byrkjeflot et al. 2001). Thus, in the 1950s and 1960s, the engineers and their Engineering Association was forced to rethink its stance of how to make managers. This process will be examined in the core of this article. The next section briefly introduces the approach used for this examination.

### **Approach: framework, sources and methodology**

The framework for the analyses in the main section is the generalized systemic difference between the American and German way of management education and development as depicted by Locke (1988); Locke (1996) as well as Byrkjeflot (2001); Byrkjeflot and Halvorsen (1996)). They fundamental difference between the German and the American management system is in their analyses whether or not management education is the cornerstone for management qualification. The German management system was grounded in 'Fachkompetenz', in which the engineering way to top management positions was based on engineering education alone, plus practical experience in organizations and businesses related to technical activities. The American management system, on the other hand, was grounded in management as a generalized science that was provided through higher education institutions, typically the business schools. Such management education became the main way to management positions in the US regardless of the organizations or businesses specializations.

In line with Locke, Byrkjeflot and Halvorsen this article will speak of an engineering way to management positions based on 'Fachkompetenz' based on an engineering education without management education, and an American way to management positions based

on some form of management education. The latter entails an opening to speak of limited and hybrid forms of Americanization (Kipping, Üsdiken, and Puig 2004), as well as an opening for the existence of more than one American management system and variations in the models Americans tried to diffuse abroad (Üsdiken 2004). This was the case in Norway in 1945. In 1945, the engineering way in Norway was based on 'Fachkompetenz'. This German-inspired system was challenged by the institutional push for Americanization that propagated supplementing the existing engineering way to management positions in Norway with some sort of management education. Moreover, both the traditional engineering way to management and the American way was from the 1960s onwards challenged by the political push for industrial democracy. This article's approach is to unpack how the Engineering Association responded to these two challenges.

In terms of data, this article is predominantly based on primary sources. The archival material consists of minutes from the Norwegian Engineering Association's weekly board meetings and yearly representative meetings. These minutes provide insights into strategic discussions, but also into reports and memos prepared for these discussions. In addition to the archival material, this article builds on published reports from the NTH, reports made on behalf of the Norwegian government, as well as the Norwegian weekly technical journal published by the Engineering Association and the Polytechnic Society in Norway. In addition, two research reports investigating the engineering education at NTH and how it matched the competence needs in Norwegian business conducted by two Norwegian psychologists play an important part in my analyses.

Using professional associations as objects of inquiry can be particularly fruitful for historical analyses concerning how to make managers, because professional associations are arenas in which actors from the scientific community, higher education and practitioners meet. According to Dimaggio and Powell (1983) professional associations are an important arena for 'the definition and promulgation of normative rules about organizational and professional behavior'. As such, professional associations and their archives can illuminate how different strategic actors interact with each other, as well as debate and define normative standpoints. The advantage of access to professional association's archives is that one can identify differences in opinions between actors, because these sources bring more information than articles in journals, magazines, newspapers, white papers and curriculums.

Using sources from professional associations' archives does, however, involve some methodological challenges. Placing the professional association as object of inquiry raises the question of collective action: are the leading actors in professional associations' strategic discussions and decisions representative of the whole profession, or can these sources only speak for these specific actors' thinking and intentions? Clearly, the few actors mentioned in this article cannot be representative of the engineering profession as a whole, or for that matter of Norwegian managers. They are present in the analyses not as representatives, but rather as key actors shaping the thinking and the way managers were made in the period investigated.

The methodological challenges of the data material that I build my analyze on call for careful interpretation of how these sources can be utilized, and I have done so by using the rules of source criticism, triangulation and hermeneutic interpretation as depicted by Kipping, Wadhvani, and Bucheli (2014). Source criticism raises the question of a sources

trustworthiness by investigating its authenticity, its audience and purpose, as well as the social and institutional setting it was produced within. Triangulation entails bridging information and insights from different sources that either strengthen or questions each other. Hermeneutic interpretation brings awareness to temporal, social and cultural differences from the time and context the source was produced to my interpretation of them as a researcher.

### **The Engineering Associations' response to Americanization and industrial democracy**

The analyses of how the Norwegian Engineering Association reacted and responded to the push for Americanization and industrial democracy is divided into three parts. The logic for distinguishing these three periods is shifts in the Engineering Association's stance on management education and development. These shifts were influenced by processes of Americanization and industrial democracy.

In the first period from 1945 to 1953, the Engineering Association rejected the calls for formal management education to be introduced for engineers. These calls were inspired by the American way of making managers, but not part of the institutional push toward Americanization. The institutional push toward Americanization made its mark on the Engineering Association during the 1950s, especially after 1953 when the productivity center as part of the European Recovery Program was established. Consequently, in the second period from 1953 to 1965 the Engineering Association gradually changed its stance and ended up with setting up an executive management course designed for engineers in collaboration with NTH.

In the third period from 1965 to 1980, industrial democracy made its mark on the Engineering Association's stance on management education and development. The push for industrial democracy challenged the engineers' managerial authority previously based on technical 'Fachkompetenz', but also the relevance of American management theories and techniques. Moreover, the engineers were starting to lose their dominance over top management positions, and their stance on management education and development became less relevant and urgent.

#### ***The Engineering Association's rejection of management education (1945-1953)***

The question of how to make managers was put on the agenda as the Engineering Association initiated a major program revision for NTH in 1946 (Hanisch and Lange 1985; Nygaard 2013). They did so as the president of the Engineering Association Aage W. Owe formally sent a letter to NTH proposing a total program revision at NTH. A few weeks later, secretary-general of the Engineering Association, Bjarne Bassøe, met the principal of NTH. Bassøe told NTH's principal that several sections and members of the Engineering Association had voiced their concern since 'NHH had declared that their candidates would be at least as qualified for top management positions in the industry as engineers'.<sup>1</sup> NHH justified their claim by pointing to their courses in organization and economics. These courses were, however, not identical with American business schools' management courses. Rather, they have been characterized as German inspired business

economics (Amdam 1998). NHH's claims did, however, signal that other competencies than technical 'Fachkompetenz' could justify managerial authority in the industrial sector.

Nevertheless, whether or not to include management courses in the curricula was one of the issues that prompted NTH's program revision. This issue became relevant in the context of Americanization. During WW2, a number of Norwegian engineers were connected to the government appointed industry committee in the US, which mandate was to collect information and knowledge about American industry (Amdam and Bjarnar 1999). The interest for, and knowledge transfer of, American ways of management and industrial organization continued after WW2. Several Norwegian engineers was given travel grants to conduct study trips to the US from 1945 and onwards.<sup>2</sup> Gradually, the Norwegian interest in the American ways was transformed into an institutional push toward Americanization from 1948 as Norway accepted the Marshall aid.

The primary example of the Americanization process was the engineer Rolf Waaler. Waaler was appointed as the first Norwegian professor in organizational psychology at NHH (Bjørsvik and Nilsen 2011). Waaler was an atypical Norwegian engineer, who early on caught an interest in psychology and the human relations aspect of management. He studied psychology at the University of Oslo in his spare time in the 1930s and headed one of the few management courses offered in Norway prior to WW2. After WW2, Waaler received travel grants to visit Harvard Business School and the Henley Administrative Staff College. He was particularly inspired by these visits, and from his position as chair at NHH he started an executive program – the Solstrand courses – targeting top managers in 1951 (Amdam 1998; Bassøe 1961).

Yale-professor E. Wight Bakke cherished the Solstrand courses as 'one of few outstanding examples' in his review of them (Amdam 1997). The Solstrand courses quickly became the most important and high status executive management program in Norway. The first decade, engineers constituted 30% of the Solstrand courses' participants (Amdam 1997). In the first decades after WW2, various versions of short course programs in business and administration were established.<sup>3</sup> Unlike the Solstrand program, which was tied to NHH although acting independently, most of these executive management courses operated separately from the established academic institutions (Amdam and Yttri 1996). As such, the rise of executive management education in Norway the first decade after WW2 had a flare of Americanization since the US was these executive courses' main influence.

It was into this context of limited Americanization that the Engineering Association and NTH launched their major program revision committee. The committee was formally appointed in 1948, and started their work in 1949.<sup>4</sup> Who was part of this program revision committee? The committee consisted of two representatives from the Engineering Association and one from the Architects Association, one professor of engineering and one in architecture at NTH, and one secretary belonging to the Engineering Association. Thus, the Engineering Association was in majority of the program revision committee. Moreover, both the representatives from the Engineering Association held top managerial positions in industrial companies.

The head of the program revision committee was the former president of the Engineering Association: Aage W. Owe. He had been the president of the Engineering Association from 1937 to 1947. In 1946, Owe became CEO of a large industrial corporation. Owe was part of a group of four engineers who all were CEOs, and made up a strategic



quartet with influential positions in several organizations, boards and as strategic advisors to the government (Nygaard 2013). As such, the program revision committee had the perspectives and needs of the industrial sector in mind.

You might think, then, that both the advent of executive management courses, especially the Solstrand courses related to NHH, combined with the program revision committee's majority of industrial engineers in managerial positions, would result in a recommendation for some sort of management education for engineers to be introduced at NTH. The calls for such steps had come from the machine engineers' section, the techno-economic section, as well as individual members of the Engineering Association, and the students at NTH.<sup>5</sup> But these groups who either worried about competition for management positions from the business economists from NHH, or just wanted management education for engineers because they held the belief that management education was the best way to make managers, were to be disappointed when the committee published its report in 1952.

By stating that NTH's task was to 'educate engineers, not technical business economists', the committee in their report rejected such requests. They presented three arguments against introducing formal management education in NTH's degree program: firstly, management was part of subjects where 'it is natural that a significant part of the engineer's education happens during and through practice'; secondly, the 'importance that a student receives personal acquaintance with an industrial corporations organizational structure and to the ways the organization functions in day-to-day operations'; thirdly, the 'advantage of having been laborer himself and getting insight into the workers min-dset and conditions on the workplace'.<sup>6</sup>

The committee did, however, acknowledge the calls for introducing management courses in the curriculum since 'most engineers at some point in their career have to do management work in some form'.<sup>7</sup> They made it clear, though, that the degree program at NTH could not include all subjects, because the program could not be extended beyond four and a half years. A basic scientific foundation in the disciplines math, chemistry, physics and mechanics was given the highest priority. These were the core subjects of engineering, and 'make up the tools he cannot do without during his operation as engineer'.<sup>8</sup> Moreover, the committee made a distinction between subjects suitable for theoretical education and subjects suitable for learning by doing. They laid special emphasis on why they believed management belonged to the latter category.

How did the program revision committee justify that it was better for engineers to be made managers through learning by doing, not through management education? Against the calls for introducing management education, they argued along the same line as the Engineering Association previously had justified that engineers were qualified for top management positions. The core of this line of reasoning was that basic academic training in the core disciplines of engineering education caused a refinement or *Bildung* as Germans call it.<sup>9</sup> This process of making well-rounded people out of the candidates was believed to transform the engineering candidate into a civilized and cultivated personality prone to engage with business and political elites both nationally and globally. The idea of the importance of being well-rounded as a manager was quite common in Europe prior to the American influx of the 1950s and '60s, albeit how these personal qualities were obtained and nurtured varied. In the UK, the ideal was the Oxbridge candidate in humanistic subjects, in France the *grand écoles*, in Germany the universities (Mangset

2015; Gispén 1988; Locke 1988). Even the American business schools held this ideal in the early 20<sup>th</sup> century (Khurana 2007).

Rather paradoxically, the Norwegian engineers construed themselves and their education as a necessary 'Fachkompetenz' for industrial managers, while at the same time claiming that this 'Fachkompetenz' promoted generalist personal qualities. An integral part of the Norwegian engineers' paradoxical self-reflection was extra-curricular activities at NTH in which the candidates engaged in a wide range of activities including familiarizing themselves with cultural canons and current political debates (Kobberrød 2010). In their view, the combination of an education system mainly based on technical 'Fachkompetenz' acquired through lectures and self-studies combined with the extra-curricular activities made them unique as well-rounded and refined persons.

To fully understand the Norwegian engineers' position it is necessary to interpret it in the national context of labor division and professional struggles. The Norwegian engineers were the majority group in management positions in industrial corporations and public technical departments the first decades after WW2. In this first period, the competition to management position from business economists from NHH was not acute. There was, however, an intensified struggle between candidates from NTH and the technical colleges (Nygaard 2013). Candidates from the technical colleges embarked on a quest to be recognized as equally competent as those from NTH. Possessing a higher level of academic knowledge and being more well-rounded was the only distinguishing markers between the two higher technical education levels in Norway. Hence, the first 10 years after WW2 the most immanent threat to the dominant position engineers graduating from NTH had in management was from the candidates from the technical colleges – not from the business economists.

### ***The Engineering Association change of stance on management education (1953-1965)***

In 1953, the year after the report from NTH's program revision committee, the push for Americanization became more institutionalized in Norway. This year, the productivity center was established, labeled the Norwegian Productivity Institute (NPI). NPI channeled funding and acted strategically to develop scientific communities and research and disseminate knowledge in a wide range of areas. For the Engineering Association this more institutionalized push for Americanization gradually resulted in an opening toward a positive view on management education.

After Norway became a recipient of the Marshall aid in 1948, various steps were taken in order to foster more productivity. One of these was the government inviting the provost of the Carnegie Institute of Technology, Elliot Dunlap Smith, to investigate whether Norwegian higher education was attuned to promoting industrial productivity (Smith 1953). During 1953, Dunlap Smith traveled throughout Norway visiting mainly NTH and NHH, as well as some other institutions.

In his report to the Ministry of Industry, Education and the NPI, Dunlap Smith reflected on the specific challenges Norway faced due to the special features of being a small and open economy in the periphery, having an industrial structure of predominantly small and medium sized companies, and the fact that these companies were widely dispersed in a country with severe geographical barriers to internal travel (Smith 1953, 1–2). According

to Dunlap Smith, these structural features of the Norwegian economy demanded other qualities from higher education than those pertinent in the US. As such, the report from Dunlap Smith brings new evidence to the analyses of hybrid forms of Americanization (Kipping, Üsdiken, and Puig 2004), since Dunlap Smith as representative did not push a single American management model.

Dunlap Smith distinguished between two basic models for higher education in his discussion on how higher education could increase productivity – an ‘academic model’ and a ‘professional model’ (Smith 1953, 18). The academic model was primarily aimed at educating researchers, prototypically candidates for positions at universities or research institutions. This model promoted in-depth investigation of specific problems, and a long-time horizon on finding a solution to the problem. The professional model, on the other hand, was primarily targeted at multiple and complex problems, where the ability to quickly identify adequate solutions (i.e. not perfect solutions) was nurtured.

For Dunlap Smith, it was a remarkable difference between higher education in the US and Norway that Norwegian higher education did not distinguish education directed toward research and academic careers on the one hand and education directed toward professional practice on the other hand, and only used an academic model in all higher education (Smith 1953, 20). While Dunlap Smith did not recommend to set up business schools with management education like the prototypical American way of management education, he did neither recommend to keep the Norwegian system without management education. Rather, Dunlap Smith recommended that both NTH and NHH introduced management education, because ‘The critical problem is the education of the men who are to become administrators in business, industrial and engineering firms, and members of the branches of the government ministries dealing with business and industry’ (Smith 1953, 26)

When discussing Dunlap Smith’s report, the Norwegian Engineering Association was reluctant to accept his recommendations. In the association’s executive committee meeting the conclusion of the discussion was that ‘the direction laid out by the program revision committee was correct’.<sup>10</sup> The members of the Engineering Association’s executive committee declared that when it came to management education, ‘one should be very cautious, because it is hardly suitable under our condition with programs for these things’. They did, however, leave an opening by stating that ‘additional education could be supported’.

Dunlap Smith’s report was, however, just a first confrontation in a series of events in which the issue of management education in several ways surfaced. In 1955, NPI contacted the Engineering Association with reports from the European Productivity Agency (EPA) about management education, and NPI also initiated a meeting with the Engineering Association on how management education could be introduced at NTH.<sup>11</sup> About the same time, Norwegian engineers and business elites were introduced to the concept ‘industrial engineering’ and various management principles and techniques by EPA and OEEC.<sup>12</sup> Since Norwegians, in common with most Europeans, were unfamiliar with these concepts, the Marshall missions to Europe provided minutes with explanations on how these principles and techniques could raise productivity, and how such principles could be implemented. EPA also organized a conference in Paris in 1955 as part of their attempt to diffuse how to organize and conduct management education. The Norwegian

government and the Engineering Association did not manage to find anyone interested in participating in that conference.<sup>13</sup>

Industrial engineering can be classed as an ideal for combining science and technology with business and administration, i.e. structuring the knowledge base for engineering so that it is more aligned with 'real-world' or business problems, rather than academic ones. From NPI, EPA and OEEC the message was clear: there was a need to introduce management courses, both in higher education and as executive courses. The executive committee of the Norwegian Engineering Association felt a need to justify the engineering way to management the same year. They collected comments and responses from Norwegian academic experts working in the US who reported that engineers in Norway held a higher academic standard than their American colleagues.<sup>14</sup>

Consequently, the institutional push for Americanization that started in 1953 had during two years made the executive committee reluctantly open up for the idea that engineers could benefit from some sort of management education in their way to management – just as long as it was not introduced in the engineering program at NTH. During the years from 1955 to 1960, this reluctant opening was transformed to an enthusiastic effort to establish an executive management course for engineers at NTH. Instrumental for this shift was a psychologist, Einar Thorsrud.<sup>15</sup>

Thorsrud became Director of Human Resources in a Norwegian company in the early 1950s, and had also been part of the pioneering steps toward research in organizational psychology as assistant for Rolf Waaler and American psychologists. In 1958, he was given the opportunity to build up a special institute at NTH dedicated to industrial psychology. This institute was financed partly by NPI and private investment (Nygaard 2013). Thorsrud's first project was to investigate NTH's degree program. In his report from 1960, Thorsrud concluded that the engineering education at NTH was structured in the interests of the professors, not the students. The education provided the candidates with competencies suited for research careers, and was not adapted to prepare them for the work most of them faced after it was over (Thorsrud 1960). The collegium of professors at NTH disliked the conclusions in the report indicating that they did not care whether their students learning was relevant for their professional practice. Actually, they refused to make the report public, and ordered the library to keep it confidential.<sup>16</sup>

In 1961, Thorsrud's report was accompanied by a new investigation into whether engineers' competencies met the needs of businesses. This investigation was conducted by Thorsrud's colleague at his institute at NTH, the psychologist Peter Andreas Holter. Once again, the report concluded with criticism by stating that NTH's engineering program lacked relevance for the kind of work NTH's candidates embarked upon. One of the missing pieces in the engineering education was management education (Holter 1961).

There was overwhelming evidence, Holter pointed out, proving that engineers despised administrative work, and that both themselves and the organizations they worked in appraised that they were poor managers. He ascribed the reluctance to manage – and the poor performance of management – to the prominence of the core engineering scientific disciplines in engineering education (Holter 1961). These two reports, as well as dialogue with the two psychologists, contributed to the change of stance on management education in the Engineering Association's executive committee.

From 1961, the executive committee made a substantial effort to build up an executive management course for engineers at NTH.

This change within the Engineering Association was a result of several factors. The push for management education from EPA, channeled by NPI, started the process. From 1955 to 1961, the Engineering Association, NPI, NTH and the business elite met at several occasions to discuss if and how management education should be introduced.<sup>17</sup> From 1958, Einar Thorsrud was receiving more and more attention in this circles, and was usually the main speaker at conferences and meetings on the topic of management. The executive committee of the Engineering Association was particularly convinced by Thorsrud's way of speaking about management education. Thus, when they decided to initiate an executive management course for engineers, Thorsrud was the man they wanted to build this up.<sup>18</sup>

The Engineering Association gave Thorsrud the task of developing an executive management course specially designed for engineers.<sup>19</sup> This executive management course was structured almost identically to the Solstrand program. Both these executive management courses were firmly based on industrial and organizational psychology, and aimed at introducing the candidates to management theories and techniques (Lind 2007).<sup>20</sup> Moreover, the structure and pedagogy of these courses was primarily based on experiential learning; that is combining the candidates' experience with theories and techniques through reflection and discussion of actual cases. Consequently, both courses were structured around modules with teaching in between their work.

### ***The Engineering Association losing their grip on management qualification(1965-1980)***

The executive management course at NTH sponsored by the Engineering Association became short-lived. During the 1960s events contributed to its disappearance. Central to these events were Einar Thorsrud, and the professors at NTH disapproval of him. In 1965, the tensions between Thorsrud and the professors turned into a gridlock. Thorsrud's scholarly development lead to a confrontation with NTH. As an assistant to research conducted by Rolf Waaler, American psychologists and funded by the Marshall mission, Thorsrud had done proper research that could be tolerated at NTH. During the 1960s, Thorsrud moved away from science and into politics in the eyes of the professors at NTH.

Although financed by NPI, Thorsrud drifted away from the American inspiration. As he started to develop his institute at NTH, his main inspiration became the socio-technology school developed by Fred Emery and Eric Trist at the Tavistock Institute in the UK (Rophol 1999; Drenth, Wolff, and Henk 2013, 67). The socio-technology approach fitted well with being located at NTH. Gradually, Thorsrud focused his scholarly interest to a political issue that increasingly acquired a prominent position in Norway in the 1960s, namely industrial democracy (Slagstad 1998; Byrkjeflot et al. 2001). The Labor party aimed at making industrial democracy their next big labor reform after securing workers better pay and job security. Consequently, they turned to the labor unions, employer organization and scholars in order to find out how industrial democracy could be implemented.

In this process, Einar Thorsrud grasped – and was given – a central role as he became the leader of a research project into industrial democracy financed by the biggest labor union and employer organization in Norway. At NTH, Thorsrud's participation in the

research on industrial democracy was deemed unscientific – it was politics. Thus, Thorsrud was given an ultimatum: either give up the research project, or resign from your position at NTH (Blichfeldt and Qvale 1983). In 1965, Thorsrud chose to resign and built up a research institute on industrial relations in order to conduct his research. As a consequence, he also resigned from heading the executive management course for engineers, which was organized through his institute at NTH.

At NTH, the responsibility for the executive management course was given to the economist Gunnar Bøe. Bøe transformed the course to a general course in economics to the Engineering Association's disapproval. The executive committee stated that 'it is important that NTH does not exclusively offer courses in economics'.<sup>21</sup> Consequently, the Engineering Association decided to 'try to contribute to a course in which human resources and management education is at the core rather than Bøe's courses'.<sup>22</sup> They tried to connect with the leading figures with competencies in management and organizations, most prominently they tried to offer the job to Per Soelberg, a Norwegian engineer educated at Carnegie, with help from the Norwegian engineer and sociologist Sverre Lysgaard.<sup>23</sup> However, for some reason, Soelberg did not accept the responsibility to run an executive management course for engineers. The Engineering Association never managed to find a replacement that they accepted, or that was willing to do the job. Consequently, the executive management course for engineers at NTH was wound up during the 1966.

Although not successful, the termination of the executive management course at NTH demonstrated how the Engineering Association had changed its view on management education. In 1965, secretary-general of the Engineering Association Arne Nagell wrote an op-ed targeting the engineers to tell them that 'all engineers will end up as manager one different levels in businesses and organizations'.<sup>24</sup> He criticized engineers who demanded to 'immediately get work and tasks where they can use their technical competence to the fullest'.<sup>25</sup> According to Nagell, it was important to prepare the young engineering candidates for a professional practice in which technical 'Fachkompetenz' did not play the most important part, as the most important part eventually would be to 'take care of people and money'.<sup>26</sup> Hence, the Engineering Association had turned from rejection to propagate enthusiastically for the need of management education.

The importance of the split between Thorsrud and NTH, as well as with the Engineering Association, cannot be understated. During the research project on industrial democracy, Thorsrud developed an approach to management and organization that has since been highly influential in the Norwegian approach to industrial relations (Thorsrud and Emery 1969). This approach can be called the joint-management model to highlight the emphasis on empowering workers by giving them codetermination over day-to-day operations, and even board representation in order to have a say on strategic decisions (Byrkjeflot and Nygaard 2018). In principle, workers and managers joined forces and cooperated. In Norway, the joint-management model fitted neatly with the evolution of tripartite cooperation between the labor unions, employer organizations and the state, which by the 1950s became institutionalized (Dølvik et al. 2015; Alsos, Seip, and Nygaard 2016). The push for industrial democracy was propagated by the Labor party and the labor movement in Norway.

Since the 1970s, the tripartite cooperation, in combination with state regulations of the relations between workers and employers, have laid significant limits on managers' maneuvering area. All of these institutional and legal arrangements provided an

environment unfamiliar to the preexisting Norwegian management traditions dominated by engineers. Thus, during the 1970s the engineers could no longer justify their managerial authority through technical 'Fachkompetenz' alone, but needed to demonstrate ability to perform within this new system of industrial relations.

The research on industrial relations conducted by Einar Thorsrud and Sverre Lysgaard became popular during the 1970s in broad circles of the Norwegian society. Their research was used by a multitude of interest groups and political parties, but they all had one thing in common: the engineers were picked as scapegoat for everything bad in Norwegian industry. The engineers were obstructing industrial democracy, failing to make companies profitable, and also causing harm to the environment.

This all happened just as the engineers lost their dominant position as top managers in the biggest corporations in Norway, a process that started in the 1970s (Amdam 1997). To what extent management education in some form could have given the engineers' renewed justification is doubtful. The knowledge and competence needed to practice as manager within the Norwegian joint-management model was not part of the various management theories and techniques that were developed within the US context, or part of any management education offered from the 1970s in Norway.

Thus, learning by doing has continued to be an important approach toward making managers in Norway. The predominance of a practice-orientation and experiential learning was first seriously challenged in the late 1980s and the 1990s. At this point, degree programs aimed at qualifying candidates for management positions were developed at institutions like NTH, NHH and BI Norwegian Business School (Amdam 1993, 202–6). Even today, claims are made that the Norwegian joint-management system is absent in the various Norwegian management education alternatives on offer (Aasland and Halvorsen 2018). The labor unions and employer organizations contend that their representatives are forced to train managers in Norwegian companies in order for them to function within the joint-management model. Until Norwegian providers of management education incorporate and provide theories and knowledge of this system, it is unlikely that formal management education can make on-the-job training for managers redundant.

## Conclusion

This article has unpacked how the Norwegian Engineering Association dealt with the challenges from Americanization and industrial democracy, and how this affected their stance on how to make managers, with emphasis on the period from 1945 to 1980. This period was marked by a process of Americanization in Norway, as in many other countries. The Norwegian acceptance of Marshall aid in 1948 led to the establishment of the productivity center NPI in 1953. NPI channeled funding, information and knowledge about American management models and education. This institutional push toward Americanization affected the Engineering Association's stance on management education.

In the first period from 1945 to 1953, the engineers rejected the calls for introducing management education for engineers. The engineering way to top management positions dominated in Norway during these years. Technical 'Fachkompetenz' justified their managerial authority, analogue to the how Robert Locke (1996) have analyzed the German system. This justification rested partly upon the German legacy formative for Norwegian engineering education and the engineering profession. Consequently, the Engineering Association

saw no need to introduce management education. From several sections and students, the Engineering Association received calls for setting up management education at NTH. Partly, these calls motivated the overarching program revision of the engineering program at NTH that the Engineering Association initiated and led in 1948.

During the time program revision at NTH was on the agenda, a number of Norwegian engineers traveled to US through study grants, and Rolf Waaler professor at NHH set up an executive management course with engineers as the majority of students. Despite an increasing attention to American industrial and managerial systems and models in Norway after WW2, the program revision committee argued strongly against introducing management courses at NTH in 1952. The program revision committee claimed that squeezing management courses into the engineering degree program would worsen the quality of the candidates, and that management competencies was best obtained through learning by doing.

The institutional push toward Americanization increased from 1953 with the establishment of NPI and the visit of Eliot Dunlap Smith to investigate whether NTH and NHH programs were attuned to raise Norwegian productivity. Interestingly, Dunlap Smith did not recommend complete Americanization of Norwegian education and business. Rather, he argued that conditions in Norway required other types of management education and industrial organizations than in the US. He did, however, give recommendations for a limited Americanization, and emphasized the need for some sort of management education to be introduced at NTH and NHH. Dunlap Smith's report adds evidence to the extant literature critical of both the existence of *one* American model of management and this American model's smooth global expansion into countries with very different contexts (Üsdiken 2004; Zeitlin and Herrigel 2000; Kipping and Bjarnar 1998; Kipping, Üsdiken, and Puig 2004).

The Engineering Association's response to Dunlap Smith's recommendations was continued rejection of the need for management education. They were more convinced by the program revision committee's arguments for keeping the engineering way to top management as it was, than Dunlap Smith's arguments. During the second period from 1953 to 1965, the Engineering Association gradually changed their stance. They were not immune to the institutional push toward Americanization. NPI, EPA and OEEC propagated the need for management education, and this topic was recurrently put on the Engineering Association's agenda through meetings and conferences. The factor that triggered the Engineering Association to change its stance on management education was the research from Einar Thorsrud, and the dialogue with him on the topic. This process led the Engineering Association to initiate and partly finance an executive management education course at NTH run by Thorsrud in 1961.

The executive management course at NTH was short-lived. In 1966, this course was wound up, and NTH and the Engineering Association did not provide management education after that for a long time. During the 1960s, the political push toward industrial democracy challenged the push toward Americanization. Thorsrud wanted to contribute in the quest for introducing industrial democracy in Norway, which led to the process that forced him to quit his position at NTH and also his role in the executive management course for engineers. During the 1970s, the push toward industrial democracy had stronger impact on Norwegian industrial relations than Americanization, and led to a new management system in Norway attuned to the tripartite system of industrial relations.



The rise of the new Norwegian management system based on industrial democracy was one of several forces that challenged the engineering way to top management. The engineering way to top management positions relied on technical 'Fachkompetenz' as justification of managerial authority. Industrial democracy called for another type of justification. Perhaps NTH and the Engineering Association could have set the premises for industrial democracy and its practical application in management if Thorsrud had been allowed to continue at NTH, since his research was instrumental for the development of legal and regulatory frameworks that formed the joint-management model. Such contrafactual speculations might be futile. Industrial democracy was not the only factor that challenged the engineering way to management. Moreover, economic forces in the form of stronger demands for profitability, manager's accountability to their owners, and increasing globalization was another strong force (Amdam 1997).

Although the process that faded the engineering way to top management positions away during the 1970s and 1980s is an important backdrop for this article, the causes for the disappearance of the engineering way have not been the topic. Rather, this article have focused on how the Engineering Association responded and reacted to the challenges the engineering way to top management positions met during its heydays. By unpacking and tracing the Engineering Association's reactions to Americanization and industrial democracy this article have provided insights into the processes that shaped the Norwegian systems of management and management development. Analytical approaches that focus on processes related to making managers are scarce compared to studies aiming to generalize and compare systems and models for management practice and education (Djelic and Amdam 2007; Kipping, Üsdiken, and Puig 2004).

This article has contributed to the extant literature focusing on the processes by highlighting the engineering profession and the Engineering Association's role and perspective. By unpacking the Engineering Association's perspective and responses, this article has brought nuances and new insights into how processes of Americanization and national institutional and political logics played out. The majority of extant literature on management in the postwar period has focused on educational institutions, the existence of business schools and the American and European institutions such as EPA and OEEC that promoted Americanization (McGlade 1998; Kipping and Bjarnar 1998; Amdam 1996; Locke 1989; Byrkjeflot and Halvorsen 1996; Guillén 1994). Future research can benefit from bringing attention to how professional associations have influenced both national and transnational processes shaping systems for management education and development.

## Notes

1. Memo from meeting between NIF's secretary-general Bjarne Bassøe and NTH's principal Fredrik Vogt 4.11.1946. Appendix to agenda for NIF's board meeting 7.12.1946. Tekna archives.
2. Minutes from meeting between the government and NIF about the ERP 22.10.1948. Appendix to agenda for NIF's board meeting 2.11.1948. Tekna archives.
3. 'Produksjonsteknikk og bedriftsledelse', memo from Secretary-general Bjarne Bassøe to NIF's board, 23.5.1955. Board meeting 16.6.1955. Tekna archives.
4. Minutes from NIF's board meeting 2.11.1948. Tekna archives.
5. Agenda and minutes from NIF's board meeting 28.6.1946. Tekna archives.

6. My translation. 'Innstilling av 25de oktober 1952 fra Studieplankomiteenfor N.T.H.'. Report from the committee for program revision at NTH, published 25.10.1952. NTNU archives.
7. My translation. 'Innstilling av 25de oktober 1952 fra Studieplankomiteenfor N.T.H.'. Report from the committee for program revision at NTH, published 25.10.1952. NTNU archives.
8. My translation. 'Innstilling av 25de oktober 1952 fra Studieplankomiteenfor N.T.H.'. Report from the committee for program revision at NTH, published 25.10.1952. NTNU archives.
9. 'P.M. vedrørende en akademisk tittel for høyskoleingeniører'. Memo prepared for the Norwegian Engineering Association's (NIF) board meeting 7–8.2.1947. The Norwegian Society of Graduate Technical and Scientific Professionals' (Tekna) archives.
10. Minutes from NIF's board's debate about Dunlap Smith's report, board meeting 12.1.1955. Tekna archives.
11. Minutes from meeting 13.5.1955 about management. Appendix to agenda for NIF's board meeting 16.6.1955. Tekna archives.
12. 'Produksjonsteknikk og bedriftsledelse', memo from Secretary-general Bjarne Bassøe to NIF's board, 23.5.1955. Board meeting 16.6.1955. Tekna archives.
13. Minutes from NIF's board meeting 16.6.1955.
14. Minutes from NIF's board's debate about Dunlap Smith's report, board meeting 12.1.1955. Tekna archives.
15. Einar Thorsrud's ideas and research was a recurrent theme in NIF's board meetings from 1959–1965. Minutes from NIF's board meetings. Tekna archives.
16. It is now possible to borrow the report from NTH's library.
17. In 1958 NIF and NTH held a joint conference on the executive education of engineers, and the issue was debated in the weekly board meeting over the next years. 'Executive education of engineers', a summary of discussions between the director of NTH S. P. Andersen and NIF's secretary-general Arne Nagell, prepared for NIF's board meeting 21.5.1958. Tekna archives.
18. Minutes from NIF's board meeting 7.7.1961. Tekna archives.
19. Minutes from NIF's board meeting 7.7.1961. Tekna archives.
20. 'Program seminar in industrial administration', presented at NIF's board meeting 16.11.1961. Tekna archives.
21. Minutes from NIF's board meeting 9.5.1966. Tekna archives.
22. Minutes from NIF's board meeting 9.5.1966. Tekna archives.
23. 'Management education by NIF', memo from NIF's secretary-general Arne Nagell dated 5.5.1967, Minutes from NIF's board meeting 16.-17.6.1967, Tekna archives.
24. 'Fra Bodega-krakk til sjefsstol', copy of article written by NIF's secretary-general Arne Nagell prepared for NIF's board meeting 5.4.1965.
25. 'Fra Bodega-krakk til sjefsstol', copy of article written by NIF's secretary-general Arne Nagell prepared for NIF's board meeting 5.4.1965.
26. 'Fra Bodega-krakk til sjefsstol', copy of article written by NIF's secretary-general Arne Nagell prepared for NIF's board meeting 5.4.1965.

## Acknowledgments

Thanks to referees and editors for useful comments and recommendations.

## Disclosure statement

No potential conflict of interest was reported by the author.

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