Systemic Practice and Action Research
https://doi.org/10.1007/s11213-024-09701-2

RESEARCH

Merging Worklife Organizational Innovation and Educational Programs: Promoting Continuous Adaptations to the Global Economy

Trond Sanne Haga[1] · **Johan E. Ravn**[2] · **Oier Imaz Alias**[3] · **Davydd J. Greenwood**[4]

Accepted: 4 October 2024

Abstract
This essay honors the accomplishments of Morten Levin both by analyzing some of the key innovative educational programs he created and by extending the elements of that analysis to two other cases, that of Aker Solutions and the Mondragon Cooperatives. We acknowledge that the relationship between higher education institutions and manufacturing-service-public sector organizations is multiplex and has undergone multiple transformations over the decades. It is also affected by the national political economy and the scope and diversity of the higher education sector itself. Creating sustained and yet dynamic relations among these actors in service of both higher education and the efficacy and innovativeness of worklife organizations is a significant challenge which all the cases we present have addressed with some success. What the efforts have in common is a democratizing action research built on an ethos and worldview of the benefits of collaboration and co-creation, and organizational capabilities built on Actor Network strategies to promote collaboration and innovation as a way of adapting to the rapidly changing world conditions effectively. We argue that there are many more such examples in existence and that a key role for action research is to document them, show how more collaborative and adaptive organizational processes are possible and show how neoliberal New Public Management is an authoritarian "wrong turn" with dire consequences. Ultimately, this essay is an argument against the "iron cage" view of bureaucracy as always coercive and stultifying and show that it is not bureaucracy but the authoritarian approaches to creating coercive bureaucracies that destroy organizational collaborations and innovation.

Keywords Morten Levin · Education-work life interactions · Enabling bureaucracy · Ethos · Actor-network theory · Dynamic adaptation and innovation

✉ Trond Sanne Haga
Trond.haga@akersolutions.com

[1] Aker Solutions Stord, Stord, Norway

[2] SINTEF, Trondheim and Nord University, Bodø, Norway

[3] Mondragon University, Mondragon, Spain

[4] Cornell University, Ithaca, NY, USA

Published online: 14 October 2024

Introduction

While this essay is intended to honor Morten Levin, we have used an analysis of his educational programs as a way into a deeper, comparative analysis of the relationships between organizational bureaucracies and innovation programs. Morten Levin was well known as a key contributor to the deployment of action research in a wide variety of organizational contexts including creating a space for it in his home academic department at the Norwegian University of Science and Technology (NTNU) and for supervising many PhD students in the field. He was also a leading action research author and co-author publishing journal articles, books, handbooks and participating in numerous international conferences. His critical writings on the organization of universities are also widely known. In this, Levin joins other action researchers who are critical of university management practices, organizational design, and of the teaching of social science as a spectator activity. How he put these concerns into productive action makes him unique. He applied his views to reconstructing some university programs or creating new ones and bringing action research closer to the core of universities and their missions.

We lay out some of Levin's key contributions, but to continue his efforts, we broaden the focus to include other processes in different organizations for achieving similar goals and encourage readers to keep moving in these various positive directions. Levin's models were significant innovations in taking an action research approach into higher educational institutions because these institutions are not designed to provide multi-disciplinary, externally engaged active pedagogy of the type that action research and business innovation depend on. Levin developed his programs as test beds for restructuring higher education along ongoing collaborative lines because he saw the need to transform the social sciences to make them relevant scientifically and operationally to the needs of companies and organizations in dynamic global environments. Framing the challenge, he took on more broadly, it is how to develop systemic capacity to handle rapid changes in working life through worklife/educational institution ongoing collaborations.

This analysis also suggests a change in strategy in industrial democracy work. In previous generations of business development, the state of the art for organizational learning was thought to be some version of democratically inspired Socio-technical Systems Design (Emery et al. 1960, Eijnatten 1993, Trist and Murray 1993, Klemsdal et al 2017). This involved making greater use of the knowledge and experience of all the members of the work organization to design and enact smarter and fairer processes and organizational arrangements. It was a view of organizations re-arranging their internal resources to meet challenges in innovation and market share. While several university professors were involved in developing and promoting it, the focus was not on reforming the relationship between higher education and manufacturing and service organizations but on reforming the non-university organizations themselves. Morten Levin's work widened the perspectives and was structured around linking higher education degree programs and manufacturing and service organizations in a more integral and reciprocal way.

The specific argument we make involves ruling out achieving this goal by setting up separate organizational structures in worklife and educational institutions to fulfill these functions. We rule out that kind of institutionalization because such organizational structures tend to produce coercive bureaucracies and routinize such processes unproductively. They soon lose track of the dynamic connections between education and work life. We advocate building in these dynamic capabilities as core features and skills of both the worklife organizations and the formal educational institutions they interact with. Creating

capacity for ongoing adaptive innovation is more than an internal challenge to companies or educational organizations. The solutions are to be found in the intersection between educators/researchers and companies/organizations driven by specific adaptive needs. This requires treating their relationship from a systems perspective that goes beyond the limitations of individual worklife organizations and expands to include educational institutions and other relevant external systems.

Developing a capability for ongoing organizational change, innovation, and capacity building is both an organizational and educational challenge. To illuminate the challenges in doing this and to discuss elements necessary to finding solutions, we present three cases with different starting points in education and companies:

- The creation of action research training programs through university, research centers, and business collaborations, initiated by Morten Levin.
- The creation of a flexible and dynamic local technical education system involving business-driven collaborations in developing the necessary training programs.
- The establishment of a framework for further and continuing education as permanently dynamic and collaborative systems.

Our aim is to examine more about diverse ways to accomplish this dynamic interaction by analyzing some exemplary cases. Starting from Levin's innovations which we document briefly, we offer two comparative cases that help signal some of the ways to move forward toward continuous adaptations in the dynamic global environment. The purpose of this comparison is not to build a theory of higher education/organizational change processes but to discuss various ways institutional and organizational resources, given a good understanding of institutional dynamics, can be mobilized and used creatively to build collaborative and mutually beneficial relationships between higher education and organizational development. We use the three cases to show that such spaces exist and to suggest that more alternatives to the conventional ways universities interact with industry exist.

We use the cases in line with Herbst's idea of "demonstration experiments". Demonstration experiments uncover alternative organizational possibilities that are demonstrable in practice (Herbst 1993). The three cases are different in many ways, but it is still possible to see parallels between them. All three offer co-generative interaction between education and organizational development across organizational structuress. In making a brief comparison and extracting ideas and perspectives for going forward, we identify three core aspects central to all three and which will be useful to consider in other similar projects. A procedural aspect shows itself through the ways concepts and practices of Actor-Network Theory can help explain the success of such initiatives. From a more structural perspective, we examine how concepts of "facilitative bureaucracy" rather than a coercive "iron cage" model works to enable these dynamic relationships. A focus on meaning and sensemaking shows how a solidary worldview and a collaborative ethos supports solidary practices that are important and enabling and sustaining efforts like these.

Key to this analysis is a needed reset in the use of the term "bureaucracy" as an explanation of organizational weaknesses and failures. The "iron cage" metaphor, attributed to Max Weber, evokes how people have allowed themselves to be trapped in structures they themselves have created, with bureaucracy treated as the crowning example, leading to a blanket condemnation of bureaucracy itself. Following Adler and Borys (1996) we insist that the vast majority of organizations in our societies are bureaucratic but that some work effectively to promote collaboration and innovation while others do not. Key to

understanding what Adler and Borys named "enabling bureaucracies" is to examine how such bureaucracies permit or promote innovative change processes and for us to learn how to strengthen processes that move in this enabling direction.

To achieve these analytical goals, we mobilize, in addition to the concept of enabling bureaucracy, concepts derived from Actor-Network Theory (Latour ed. 2005) and from the cultural frameworks based on ethos and worldview (Geertz 1957).

ANT emphasizes actors' maneuvering in and using networks within organizations to mobilize and apply resources to a variety of purposes, including ones not anticipated by organizational leaders. (Latour 2005; Callon and Latour 1981; Callon et al. 1986). Fundamental to ANT is understanding society as a network of actors who pursue their aims and mobilize resources through networking. All the actors can influence the network and the other actors, of course, some actors more than others. A core networking strategy is "translation". Translation is a key process in which a focal actor seeks to convince other actors to join the team to pursue a specific goal, thereby forming a coalition (actor-network) and mobilizing needed resources. Translation is the social enrollment process through which this focal actor brings other network actors to understand that their interests are represented in a good way by this actor's framing of interests and objectives.

The importance of ethos and worldview is that it is a key ingredient in determining whether a bureaucracy will be enabling or coercive. All bureaucracies are also operated by members who operate within an ethos and worldview that configures their sense of how the world really works. A bureaucratic ethos and worldview based on social responsibility, legality, equal treatment and transparency differs from a bureaucratic ethos and worldview characterized by automated responses, absolute application of rules, self-assertion and self-protection. The examples we give in this article are ones where the ethos and worldviews promote or at least permit innovation and change within bureaucratic systems. This entire analysis is counterposed to the use of the "new public management" "audit culture" approach to management—based on distrust, indifference to persons and their situations, and an overarching concern for the earnings and efficiency of the organization. The values and procedures it uses create bureaucracies that never are enabling (Behn 2001; Wright and Shore 2024).

The paper is structured as follows. First, we review Morten Levin's educational innovations. After examining the dynamic developments Levin created, we move on to provide brief analyses of two other similar approaches to meeting these challenges, one from Aker Solutions in Norway and the other from the Mondragon Corporation in Spain's Basque Country. None of the three is presented as a perfect or ideal solution but as examples of some of the ways a dynamic, adaptive interaction between worklife organization and higher education can be achieved. The larger goal is to seek out even more ways to accomplish this dynamic goal. Finally, we discuss the implications of the three cases for the wider debate on the relationship between companies and educational institutions for the three cases under analysis.[1]

[1] Data forming the basis for findings and discussion of the cases are based on direct observation and various modes of participation (program and project development, instruction at and participation in programs, orchestration of needs and interests into joint formats, and participation in work processes, meetings, workshops and conferences) and desktop research of relevant documentation. In the Aker Solutions case, research has been complemented by an ongoing action research project in the company that started in 2020. In the Mondragon case, several in-depth interviews have been conducted with members of cooperatives engaged in the innovation programs referred to, corporate managers and coordinators, and researchers in the faculties of engineering and business.

A Review of Morten Levin's Educational Innovations: SUM, INPRO, and EDWOR I and II

From his position as professor at NTNU in Trondheim, Morten Levin initiated and directed a number of different educational programs, most of them at the doctoral level. They differed from each other in terms of form, content, size, and participation, but they were all based on action research and were largely constructed as teamwork efforts in arenas only partly within the NTNU premises and involving partners outside NTNU recruited from both academic and professional circles. Taken together, the approach was about building competence and development capacities for a variety of *impermanent learning coalitions* (Gustavsen et al. 2001, Levin et al. 2002, Levin 2003).

An effect of the Levin-initiated programs was a significant production of action researchers. Although several of the programs recruited internationally most of the students were Norwegian and the population of trained Norwegian action researchers increased significantly.

SUM

The SUM project was created as an addition to the Norwegian Research Council's major investment in a program entitled "BUNT",[2] which started in 1989 and ran for four years. The BUNT program's objective was to increase competitiveness among small and medium-sized companies by taking advantage of new technologies. BUNT's method was to take several hundred experienced business consultants through an extensive training program where they learned how to assist companies in developing through the adoption of new technologies. Levin, with Max Elden, developed an application of the concepts of formative and summative evaluation for the BUNT program. These ideas were positively received by the funders along with the evaluation dimension, SUM was also to carry out research on innovation, technology transfer and organizational learning in the companies.

A large part of the work in SUM was carried out by six fully funded PhD candidates. SUM was the first doctoral program in action research in Norway and perhaps anywhere. SUM was successful as an educational program. All six candidates defended their theses during 1993 and 1994.

In Norwegian innovation policy in the latter part of the 1980s, there was a strong focus on technology, but it had become clear that pure technology-push models did not reach the smaller companies. At the same time, it was not clear if a consultant-driven method would be able to increase their willingness to invest in new technologies. The SUM model argued that the BUNT program participants must have the ability to learn from their experiences along the way, identify the learning needs, and then develop and offer ways forward for these companies. As Levin described SUM: "How about shaping the evaluation as action research, and making the whole effort an action research Ph.D. program in disguise?" (Levin 2003, p. 224).

[2] BUNT was an acronym for "Business development with new technology" (in Norwegian).

INPRO

The INPRO (INtegrated PROduction system) program was Levin´s next major action research PhD program, this time a cross-disciplinary one located within the Norwegian process industry. The objective was to create transdisciplinary knowledge built on engaged cooperation between engineers and social scientists. In this project, Levin used his ability to understand industrial and societal challenges, formulate ideas in collaboration with actors from many different sectors, and then organize and lead the implementation of initiatives in line with these ideas.

The INPRO program funded nine doctoral fellowships: two in engineering cybernetics, two in chemical engineering, and five in organization and management. These PhD candidates and their supervisors worked closely together to develop a better understanding of operations in processing plants while also pursuing individual PhD projects. The program included as partners nine of the largest process industry companies in Norway, as well as the Federation of Norwegian Process and Manufacturing Industries (PIL) and the Norwegian Oil Industry Association (OLF). All the companies and organizations participated as partners in the doctoral candidates' research and in the academic discussions within the program.

EDWOR I and II[3]

Near the end of the Norwegian R&D program Value Creation 2010 (VC2010[4]), an opening for two new PhD scholarship programs for relevant candidates was announced to the research units involved in the program. Levin's group contacted the Work Research Institute (WRI) in Oslo and agreed to create a joint application for funding. The proposal argued for a collaboration between the two research units to create a common and broader platform for two action research doctoral projects. That proposal was turned down, but the funders liked the basic idea and awarded a small sum to develop it further. This was to be the start of the doctoral programs "EDWOR I and II".

Supported by this small grant, Levin developed the idea into a broader and more comprehensive framework. He argued that the entire national work research network should be invited to create, own and run a joint doctoral program geared towards action research and organizational development. And then, Levin made a successful double move. He contacted many distinguished professors in his international network to invite them in as co-responsible designers and leaders of an action research-oriented doctoral program based in Norway. He also contacted all the modules in the entire national work research network to invite them in as co-owners of a national doctoral program with major participation from many distinguished professors from the international action research environment.

For the international professors, this was as an attractive project to join (there is no abundance of PhD programs with action research in their countries). For the national network, it was a matter of interest to be co-owners of a program where they could be co-directors, achieve competence development for some of their juniors and not least, enter into collaboration with the international professors who represented a lot of experience, expertise and broader networks.

[3] Enterprise Development and Work Life Research (EDWOR).

[4] See Gustavsen 2001

A good portion of the project money was used to gather both the international staff and the Norwegians for a workshop over several days in the small mining town of Røros in the middle of Norway. There they worked out six different doctoral courses tailored for the program and an implementation model for the entire program that met existing Norwegian PhD curricular requirements. This involved four years × 2; two cohorts). The application was submitted, and the project became a reality. EDWOR was run as two cohorts 2003–2007 and 2008–2011. More than twenty PhDs were produced (see Levin 2003).

Two Comparative Cases: Aker Solutions and Mondragon Corporation

We now transition to the examination of two quite different examples in very different industrial and service settings, the Aker Solutions Stord yard in Norway and the Mondragon Cooperative Corporation in the Spanish Basque Country. In addition to showing the details of some different ways of handling the innovation-academic interface, these cases suggest that there are a wide variety of possible ways to meet the requirements of a continuously adaptive collaboration between private and public sector organizations and academic institutions.

The Aker Solutions Stord Case[5]

For industrial companies in transformation, timely access to the right expertise is critical. At the same time, creating relevant educational curricula—especially further education curricula—is a continuous process. The curricula must always be adapted to the needs of the companies the candidates are employed in. Rapid changes in the companies create an imbalance and challenge the education system which is not equipped to make rapid changes. The need to develop a local, technical education system responsive to the knowledge needs of companies thus became palpable. Getting an education system in place as a stand-alone company is nevertheless difficult. To establish such a system, it is necessary to mobilize both labor market and education stakeholders. This requires a gathering of actors with sufficient influence and resources to implement a system and accompanying initiatives. It means ensuring collaboration among various stakeholders or actors who can contribute to the development and execution of these measures.

The Aker yard is located on Stord, an island at the west coast of Norway between Bergen and Stavanger, in an industrial region that houses several industrial companies. For years it has struggled to recruit qualified personnel. The companies in the area have the custom of working closely together through The Sunnhordland Industrial Network, in operation since the late 1980s. Despite different corporate affiliations, the companies do share a common worldview of "making it work locally".

In 2011–12 all the major companies experienced a shortage of technicians and engineers. They decided to establish a technical education system locally enabling locals to start careers as skilled workers and end up as applied engineers, the type of engineers who were in demand locally (Furu Kamsvåg & Haga 2020). The lack of a local technical college or university college in the needed subject areas was a major limitation. However, there

[5] In the text that follows, we will use the abbreviation Aker.

was a university college already established for training of teachers and nurses. Another limitation was lack of financing for the courses. To get the curricula up and running, a small team of people from Aker and neighboring businesses was mobilized to get schools located off the island of Stord to establish education programs locally and not only that—the teaching also had to be organized so that the students could work and study in parallel.

Funding was the main challenge. The technical colleges and the university college report to different authorities. (county and state, respectively). The colleges were unable to finance the education themselves, so the job of the development team and the manager of the network was to enter a dialogue with the county and national departments of education to obtain funding. New actors constantly had to be onboarded to secure the necessary financing.

Since there is always a struggle for public money, this was not straightforward. To get funding from the county, the local network of municipalities had to be mobilized to obtain funding for the courses at the technical college. As it happened, the only way this could happen was by using funds that had been set aside for regional development. And so, the educational programs were financed arguing that educational programs were in fact regional development. When it came to financing educational programs at the university college, the companies managed to enter a dialogue with the Ministry of Education through the local parliamentary representative. This group managed to get the necessary funds in place to start the training. However, financing the classes at the university college was also a form of bypassing the ordinary financing system for educational programs, being a creative use of funding appropriated for somewhat different purposes.

Over the years, a set of professional education programs (mechanical-, electrical-, automation-, insulation- and robotics and digital engineering) have been established at the request of the companies. At the same time, the training initiatives in the system have been diversified to include a portfolio of specialized courses and education programs aimed at the green transition and measures for people outside the workforce (ref. Fig. 1).

The programs have been created and are directed by the companies through collaboration with several public authorities and schools. They would not have been created without the companies taking on the role of mediator and without a history and ethos of collaboration.

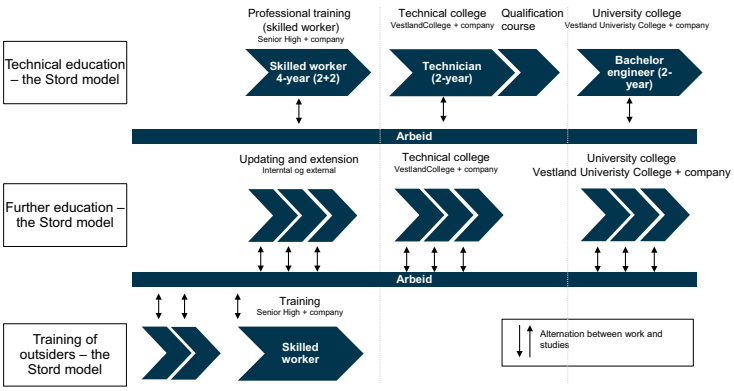

Fig. 1 The Stord-model of technical education and training

Over time, a close connection has been established between the educational institutions, public authorities and the companies. Nevertheless, purposely fixed structures with representation from the partners have not been established. Aker has taken the lead among the companies, clarifying the needs with the other companies and communicating it directly with the principal or mediator in the educational institutions. If there is a need for communication or conversations throughout the year, they will be set up ad hoc. This has been done to ensure flexibility and avoid setting up bureaucratic obstacles. At the same time, this lack of structure opens the door for the companies to make direct contact with higher education authorities without having to consider the larger structures the educational institutions operate within. This gives the companies maximum influence but is also something the educational institutions benefit from. To their credit, the existing bureaucracies in companies, the labor authorities and educational institutions have largely facilitated the development of unconventional solutions rather than using coercive measures to shape them to fit existing systems and structures.

The Mondragon Corporation Case

The Mondragon Cooperative Experience (MCE) 's departure point is unusual in that the relationship between the university and companies is not an aspirational horizon but a constitutive reality. The three faculties of Mondragon University (Engineering, Business, and Educational Sciences) are cooperatives,[6] and the university plays a crucial role in contributing to the creation of quality knowledge tailored to the needs of cooperatives within the larger system. In the case of the engineering school (MGEP[7]), this relationship with companies (cooperatives and non-cooperatives) defines the main features of its mission.

The academic curriculum of the MGEP ranges from vocational training, undergraduate degrees, master's and doctoral programs, and training programs for professionals. All undergraduate degree programs are dual in structure meaning that students in the second and third years are offered the possibility of a voluntary apprenticeship (6 or 9 credits correspondingly) and doing their final degree project (45 credits) in a company. The company must present a training program for the student, supervised by the university, and a professional tutor who works together with the academic tutor. Also, most master's programs offer students the possibility to continue their relationship with the company during the master's program (60 credits). In the 2022–23 course, the doctoral program in *Applied Engineering* had 123 Ph.D. students, most of them funded by companies themselves or supported by public funding within the framework of industrial Ph.D. programs.

These regular interactions between companies, faculties, and research centers provide the opportunity to orient academic and professional practices to shared needs. However, relations are based on an ethos and worldview of mutual trust rather than strategic planning. On a regular basis, the company approaches the faculty with a project; the faculty sends out a call and identifies potential candidates, evaluating a set of preferences previously specified by the students. The students then are interviewed by the company, and the company decides which candidates best fit its needs.

[6] Basque Culinary Center is the fourth faculty of Mondragon University, but it is not a cooperative.

[7] Mondragon Goi Eskola Politeknikoa, MGEP, is the Engineering Faculty at Mondragon University.

On the one hand, the existence of a stable collaboration framework allows the university to offer its students training in a real working environment. A positive side effect is the alignment between the needs of companies and the orientation of the university's research infrastructure, very closely related to Ph.D. students and their associated research groups. On the other hand, companies increasingly value the possibility of attracting students in the early stages of their careers, providing them with a trajectory linked to the company throughout the entire process (i.e., voluntary apprenticeship, compulsory apprenticeship, final degree project, and master's degree project). For example, companies find in this collaboration a viable strategy for talent recruitment. About 1/3 of students doing their apprenticeship in a company end up working in the same company after graduation.

The existence of a stable framework of collaboration benefits companies and faculties alike. But this stable framework is based on a relationship of closeness, mutual awareness, and trust; a shared commitment to be "in it together." Although, strategic planning on shared needs in the mid-long term can occur, it is not as common as these more ad hoc arrangements.

In some cases, companies, faculties, and research centers proceed through the entire cycle collaboratively (definition, planning, implementation, follow-up) (see Fig. 2); they establish permanent committees to define a shared roadmap and funding, integrate this roadmap in their strategic plans and collaborate regarding prospective, new ideas, potential alliances, etc. However, these collaborations proceed mainly on a bilateral basis (faculty-company), resulting in a highly distributed network that cannot be managed (and oriented) as a whole. For example, of the more than 200 partnership contracts established between the faculty and surrounding companies, only 20 allow more mid-/long-term planning. All the rest are established on a yearly basis and depend greatly on idiosyncratic circumstances.

This situation is similar for cooperatives and non-cooperatives alike. However, unlike other companies, cooperatives of the Mondragon group have corporate structures and programs at their disposal that are specifically aimed at supporting mid-long-term collaborative efforts.

The Corporate Center, for example, provides resources (e.g., funds, tools) for member cooperatives to implement in-company innovation projects in strategic areas, with the collaboration of facilitators and researchers from other cooperatives of the group, including consultancies and universities. In this modality, cooperatives can apply if they lack their own innovation management model, and they commit to sharing good practices or participating back in other cooperatives' projects. The university collaborates providing expertise

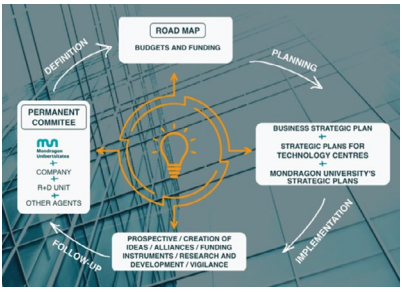

Fig. 2 Cooperative innovation cycle (Source: Mondragon University)

by moving in senior/junior facilitators trained in the design of the innovation process, but also providing expertise to help cooperatives find new technological solutions. Partnership and innovation aim to configure an ecosystem enabling the co-generation of valid knowledge tailored to the needs of member cooperatives.

Key Elements

Creating a capacity for ongoing organizational change, innovation, and adopting and using new technologies is a significant organizational and educational challenge because of the well-known appetite both in management and in educational institutions for organizational stability and "once-and-for-all" solutions. Avoiding this entropic tendency is a key action research agenda going forward as we seek to develop more and better ways for organizations to remain dynamic and collaboratively connected to the relevant global challenges. In our view, the three cases can help us understand better the conditions that allowed for the emergence of these particularly successful actor-network configurations regarding involved actors and structures, networks, co-generation dynamics, and ethos and worldview.

Enabling Bureaucracies

Bureaucratic structures are often quite obstructive. In many cases they are conservative and hostile to change. The "iron cage" metaphor is often used to describe how we get caught in systems of rationalization and bureaucratization designed to produce instrumental rationality, calculation and control. The iron cage describes a formalization of social systems that strive for calculability and predictability in all interactions, reducing subjectivity to goal-rational instrumentality (Weber 2002). Weber also saw how the rational bureaucratic organization could be enabling in a certain sense by giving people overview and guidance when faced with complex webs of rules, procedures and institutions to maneuver in order to realize their goals and interests. This is a dimension of his thinking not often attended to.

We think these cases are an important antidote to or corrective of the powerful tendency to see all bureaucracy as examples of the "iron cage". As explained by Adler and Borys (1996) bureaucracy can alienate and inhibit people from doing their job, but it can also make people better able to carry out their tasks. What makes the impact of bureaucratic formalization enabling or coercive turns on a variety of different conditions.

Morten Levin, for example, understood that enabling bureaucracies require *a broad vision rather than a fixed set of narrow objectives*. Levin did not have a well-defined singular objective for the various programs. Rather he had a broad vision for creating educational processes at the interface between academia and different parts of working life. Such a broad initial agenda facilitated the work of getting the various bureaucracies to find some common ground. Instead of pursuing concrete learning goals, Levin set out to develop new learning arenas, for example, across academic institutes and industrial companies and then he developed actors who had the ability to operate in such arenas.

In the same vein, the Aker case shows the importance of *a* shared understanding of the overall goal because particular needs may vary between companies, but it is the collective understanding that something must be done and that it can be done collaboratively that is important. This forms the basis for tackling the challenge together. In the Mondragon

case, the socio-business policy[8] defines a broad vision of future challenges in the context of which each cooperative can find its own way. However, it provides a shared orientation based on the conviction that a basic agreement on shared technological, organizational, or social challenges operates as the condition of possibility of collaboration among cooperatives with different needs.

Actors and Networks

Morten Levin read and related to both the bureaucratic structures and the sensemaking processes. An example, of working with bureaucratic structures is how five different research institutes and several universities outside NTNU were orchestrated into a coalition to carry out the EDWOR programs. An example of the latter was the sensemaking of the late 1980s in Norwegian working life with its focus on the introduction of new technologies as a core of the innovation policies, there. The SUM program was framed as a response. This serves as a good example of ANT enrollment. The various programs were tailor-made, not in the sense that they were constructed to meet a specific purpose, but they were given their shape through interaction, negotiation, alignment and translations, not only between a diversity of actors from academia and worklife, but also involving managing and orchestrating national infrastructures and processes. And they linked the pieces through a collaborative ethos and worldview.

Particularly interesting in this regard is the Aker case. For industrial companies in transformation, timely access to the right expertise is critical. At the same time, creating relevant educational programs—especially adult and further education programs—is a continuous process. The programs must always be adapted to the needs of the companies the candidates are employed in. Rapid changes in the companies, not least due to changing demands from their surroundings, create an imbalance and challenge the education system, which is not equipped for such rapid changes. The need to develop a local, technical education system responsive to the knowledge needs of companies thus became palpable. Getting an education system in place as a stand-alone company was nevertheless difficult and so creating such a system, a framework for interaction between schools and companies, required the development of an Actor-Network, in this case, it was led by Aker. The orchestration and attention to the negotiations involved in the process were anchored both in Aker's leadership but also in the regional companies' ability to collaborate, trust each other, and share in the effort and the results.

From the company side, an orchestrating capacity was needed that was able to identify the competence needs and interests of the companies, translate these into education topics and "make their way" in the various public systems (schools, universities and funding institutions). The needs of companies change, at present in especially relation to the transition to sustainable energy markets and new technology. With the requirement for rapid changeovers, fixed structures will not suffice. On the other side, the educational institutions must be able to shift their education programs into areas new to them. With a jointly owned education system, it has been possible to establish the curricula needed at a given time and later redesign them into new ones. To that end, a tailor-made approach is required, but

[8] For the period between 2021–2024: Automotive, transportation, mobility; capital goods, robotics, manufacturing; smart cities; home solutions, construction, infra structure, energy; food, health and ageing; human capital development.

developed in a co-generative manner. Networking with political and educational bureaucracies: To be able to establish a local, technical education system in a location without technical education beyond senior high school, relationships had to be established with schools and colleges beyond the region. This will also required funding. Relations had to be developed with the public authorities that finance and run the educational institutions. Their buy-in to the project was necessary to maintain and create jobs.

Ethos and Worldview

One important factor with regard to the conditions for enabling versus coercive bureaucracies is the kind of ethos and worldview that prevails among the bureaucracy's actors and the way they understand the mission of their organizations. If the ethos of the people operating the bureaucracies focuses on solidarity, on mutual support, on being "in it together", then bureaucratic structures can be enabling and supportive of constructive and solidary efforts. We argue that the three cases presented here all take place in bureaucratic systems, but ones organized around a solidary and collaborative worldview that facilitates at least some key adaptive actions rather than inhibiting them.

In the Mondragon case, for example, common values and principles are deeply rooted in a shared history. The case of cooperation between the engineering school and the cooperatives of the group shows how a shared commitment to be "in it together" provides a highly flexible and dynamic sequence of interactions of the necessary stability to remain, notwithstanding changing circumstances. Formal structures are necessary means, but extensive institutional capacities do not automatically ensure their use. Still needed are committed actors translating these enabling options into institutional processes. In the end, committed actors are necessary in all cases but their freedom and strategies to act are very strongly influenced by the kinds of structures and networks they must act in. For these reasons the overall ethos and worldview of the organizations certainly matter both for supporting collaborative innovation initiatives and for not cutting them off through coercive bureaucratic procedures of the sort the neoliberal audit culture imposes.

Morten Levin demonstrated that organizations collaboration needs to be *value-based and dynamic*. The preceding elements (shared goals and networking) could perhaps, seen in isolation, as belonging to any shrewd network actor, but there is also a solid value base in Morten's method. While the aims, formats and partners varied across the different initiatives and programs, there were some basic values underlying them all. One of them was action research as a centerpiece. This was not only about reforming the universities' focus on spectator science, but also about developing action researchers who could function as orchestrators of learning and development in arenas outside academia, i.e. in companies and in the public sector. An equally important value was democracy both as a goal and practice in all his programs rather than a static framework. His programs were premised on the idea that working, learning, research and organizational innovation should operate together in all processes.

Levin's efforts worked by backing his efforts with the formal value statements of the structures and programs that he was working with. He took their mission statements and obligations seriously and showed ways that his projects achieved their stated goals creatively and could bring them credit within the national system. This also worked because universities, research centers, etc. are comprehensively bureaucratically organized, but are also poorly integrated organizationally. There remains a good deal of slippage in the system. Here Levin worked within the interstices of the organizational structures of the university and the rules of the Ministry of Education for doctoral programs to produce and fund something they did

not envision but could not easily veto, particularly when Levin was in direct contact with the funders of the national programs. Third, Levin used funds and value statements from these national infrastructures to be sure that the university understood itself benefiting from the projects (doctorates, money, and social partner approval).

Behind all of this are the social democratic structures and practices of the social partners that reinforce an ethos of solidarity and collaboration in meeting shared social goals. That these elements were passed on and adopted by new generations of action/social researchers laid the foundation for exploring new interaction models between businesses and organizations and the university/school system. They were ambitious and successful programs but not yet sufficient to displace the ongoing hegemony of coercive bureaucracies.

Conclusions

It is not bureaucracy itself that is the obstacle to innovation and to dynamic links between educational institutions and industrial organizations. For training and educational programs to be effective, they must adapt to the dynamics of the world around them. Educational institutions must become more flexible, dynamic and interdisciplinary, and move away from standardized, general, and repetitive educational programs, but this is challenging due to the long history of Taylorist organization in academia and now its expansion into neoliberal model in the education sector among many others.

Even so, the engulfing rule-following recipes created and sustained by neoliberalist ideology and its technology of new public management and the inexorability that the associated governance mechanisms seem to possess should not blind us to examples of organizations, networks and coalitions whose actions demonstrate that coercive bureaucratic governance is not inevitable. The cases presented in this article show how we have both the capacity to and can take responsibility for moving towards more innovative, solidarity-based and sustainable arrangements, even though these still have a basis in existing bureaucracies, even within challenging larger environments. But they also show that to be possible they require the establishment of shared infrastructures enabling different actors to connect in networks of interaction and co-generation, and they show that key networks occur between agencies (universities or companies) and not only within them. For this reason, they are necessarily unstable, because needs evolve dynamically, and, therefore, so too must the networks of interaction and co-generation. The cases show that a degree of adaptability allows universities and companies to respond effectively to reciprocal needs at a given time.

Knowing how to develop and promote these collaborative efforts is a key feature of action research and building and enhancing networks structured around a shared ethos and worldview of collaboration and solidarity is essential. Bureaucracy itself is not an obstacle to innovation and to dynamic links between educational institutions and industrial organizations. The analysis presented here is based on real cases, real actions, and real successes, realized within real bureaucracies, demonstrating how bureaucracies are not necessarily about indifference and calculation, coercion or distrust. True rationality is to pay attention to the cases that buck such inclinations and build effective collaborations and solidarities to solve the complex and very nearly out of control systems problems we humans are facing.

Acknowledgements The authors particularly thank Hanne Finnestrand for skillfully synthesizing the external reviewers' comments into a well-structured protocol for revision. The advice improved the paper to good effect. Any remaining faults are entirely ours.

Author Contributions Trond Sanne Haga, Johan E. Ravn, Oier Imas Alias and Davydd J. Greenwood have all participated throughout the entire writing process, from developing the research question to proofreading.

Funding Open access funding provided by SINTEF.

Data Availability No datasets were generated or analysed during the current study.

Declarations

Ethics Approval Not applicable.

Competing Interests The authors declare no competing interests.

References

Adler PS, Borys B (1996) Two types of bureaucracy: Enabling and coercive. Adm Sci Q 41(1):61–89. https://doi.org/10.2307/2393986

Behn R (2001) Rethinking democratic accountability. The Brookings Institution Press

Callon M, Latour B (1981) Unscrewing the big leviathan: How actors macro-structure reality and how sociologists help them to do so. In: Knott-Cetina K, Cicourel A (eds) Advances in social theory and methodology. Routledge & Kegan Paul, pp 277–303

Callon M, Law J, Rip A (eds) (1986) Mapping the dynamics of science and technology: Sociology of science in the real world. Springer

Emery FE, Trist EL, Churchman CW, Verhulst M (1960) Socio-technical systems, Management Science Models and Techniques. In: Churchman CW, Verhulst M (eds) Management Science Models and Techniques, vol 2. Pergamon, Oxford, pp 83–97

Geertz C (1957) Ethos, worldview and the analysis of sacred symbols. The Antioch Review 17(4):421–437

Gustavsen B (2001) Towards social partnership: trends in Norwegian workplace development programs. Concepts and Transformation 6(2):195–208

Gustavsen B, Finne H, Oscarsson B (eds) (2001) Creating connectedness. The role of social research in innovation policy. Amsterdam, John Benjamins. https://doi.org/10.1075/dowi.13

Herbst D (1993) A learning organization in practice. In: Trist and Murray (eds.) The social engagement of social science. Philadelphia: University of Pennsylvania Press, pp 409–416

Kamsvåg PF, Haga T (2020) Utvikling av eit teknisk utdanningssystem i Sunnhordland. Prosjektnotat SINTEF nr. 102021430–1

Klemsdal L, Ravn JE, Amble N, Finne H (2017) The organization theories of the industrial democracy experiments meet contemporary organizational realities. Nord J Work Life Stud 7(S2):1–15

Latour B (ed) (2005) Reassembling the social: An introduction to actor-network-theory. Oxford University Press

Levin M (ed) (2002) Researching enterprise development. John Benjamins, Amsterdam

Levin M (2003) Ph.D. programs in action research: Can they be housed in universities? Concepts Transform 8(3):219–238

Trist E, Murray H (eds) (1993) The Social Engagement of Social Science, vol 2: A Tavistock Anthology: The Socio-Technical Perspective. Philadelphia: University of Pennsylvania Press

van Eijnatten FM (1993) The Paradigm that changed th Workplace. Van Gorcum

Weber M (2002) The protestant ethic and the "spirit" of capitalism and other writings (trans: Baehr P, Wells G). Penguin Classics
Wright S, Shore C (2024) Audit Culture: How Indicators and Rankings are Reshaping the World. Pluto Press