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Evolving and Devolving Institutions: A Perspective on Norwegian Public Policy towards the IT industry 1945-2000¹

1 Introduction

Throughout the IT sector the development, production, organization, and use of digital documents have had a substantial economic impact in advanced political economies worldwide. While constituting part of an advanced economy, the Norwegian IT industry has not been very successful. The end of the 1980s and the beginning of the 1990s proved a disastrous period for the Norwegian IT industry. Among other calamities, the two flagships of the industry, Kongsberg Våpenfabrikk and Norsk Data went bankrupt. Kongsberg Våpenfabrikk, originally a state-owned armament company and manufacturer of the (at least in Norway) famous Krag-Jørgensen rifles, played a central role in the Norwegian high-technology industry after the Second World War. The market areas it supplied included defence, automobile, energy, data, offshore, aviation and aerospace industries. Norsk Data was primarily a producer of minicomputers (a minicomputer is a mid-sized computer between a workstation and a mainframe), and also made a wide range of software applications.

In addition, in Norway it proved impossible to develop the GSM-standard for mobile communication industrially and commercially. The Swedes (Ericsson) and the Finns (Nokia) succeeded. However, the standard chosen for the GSM-system (“Groupe Speciale Mobile” or “Global System for Mobile Communications”) in 1987 was developed by the Norwegian scientist Torleiv Maseng at Elab-Sintef/University of Trondheim, and financed by “Televerkets forskningsinstitutt”, the research department of Norwegian Telecommunications, now Telenor (Sogner 2002, 113; Gran 2004; Thyholdt et al. 2000).

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Contrary to Norsk Data, Kongsberg Våpenfabrikk was restructured. The problem for Kongsberg was not lost markets, but a halt in government funding necessary to service accumulated debts. The Kongsberg conglomerate was split up, and the different activities were continued by new independent companies. The major activity was defence, and continues today in Kongsberg Gruppen or “Kongsberg” only in English. In recent years, Kongsberg has expanded its operations in maritime electronics and systems through organic growth as well as several strategic acquisitions. Civilian activities have been developed especially within areas of technology related to defence activities.

There has been some success in the Norwegian IT industry in the 1990s, but its impact on the economy is small compared to other OECD countries. The high-technology share of manufacturing exports from Norway in the 1990s was less than half of the OECD average and in 1999 only New Zealand, Turkey, Portugal, and the new eastern European members of the OECD exported less high-tech products than Norway, as well as Spain and Italy, which scored marginally lower (OECD 2001, 207). Regarding the average annual growth rate in export value in high technology manufacturing, Norway was only ahead of Japan and Italy in the 1990s (OECD 2001, 209). Considering that the 1990s were not particularly good for the Japanese economy Norwegian achievements are nothing to write home about.

This introduction leads to the question of why Norway has become such an ICT “loser”, as a representative of the young and outspoken generation would put it, and this not only compared to neighbouring Finland and Sweden and other small Northern European economies like Ireland, but also when compared to most OECD countries.

The 1980s marked the end of what was considered a bright future for the Norwegian ICT industry. The reasons for the failure of Norwegian ICT industry are of course complex, and constitute a puzzle many scholars have tried answering from different perspectives. However, we know for example that the Finnish industrial/innovation policy and industrial policy institutions have been considered instrumental in creating ICT industry growth in Finland (Castells and Himanen 2002; Moen 2002). The same applies to Ireland (Ó Riain 2004; Vårheim 2005). Regarding industrial policy and innovation policy, there are clear indications that institutions matter - so what about the development in Norwegian institutions and policies in the relevant period? This paper is explorative and will hopefully be one step towards elucidating institutional mechanisms in the formulation of ICT policy.

Firstly, an outline of the development in Norwegian ICT-relevant industrial policy after WWII focusing on the 1980s will be presented. Secondly, I will interpret

changes in Norwegian policy towards the ICT industry from a historical institutional perspective on how institutions and policies evolve.

2 The 1950s: cheap energy trumps technology investment

The making of post-WII Norwegian high technology policy and IT policy can be seen as a struggle between the two main paradigms for modernization of the Norwegian economy (Wicken 1992a; Arbo 1996, 178; Ørstavik 1999, 7, 11). One policy paradigm is the macroeconomic paradigm or economy paradigm. In its early formulation based on Keynesianism, economic growth according to this way of thinking is maintained by regulation of demand and credit. The second policy paradigm is the paradigm of science-led economic growth; we shall call it the technology paradigm. The Second World War meant that both policy paradigms were strengthened significantly. The so-called “social economists” of the Oslo school (originally a Keynesian variant) have dominated Norwegian economic policy-making since 1945, regardless of whether Labour or the Conservatives have been in power.

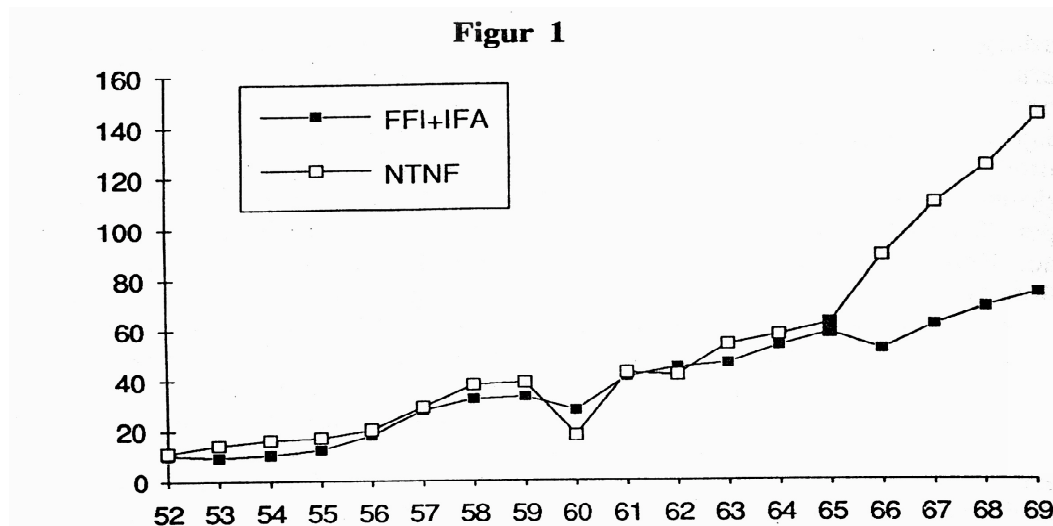


Figure 1. Relationship between military related research spending (FFI+IFA) and civilian technology research (NTNF). Current NOKs (Wicken 1992b, 8).

Even before Norway became one of the founding members of NATO in 1949, “Forsvarets Forskningsinstitutt” – the FFI (the Norwegian Military Research Establishment) had been set up in 1946. This meant the introduction of the ideas of science-led economic growth in Norway. The technology paradigm was significantly strengthened by the advent of NATO, especially in monetary terms by American dollars. Defence funding including American financial support was by far the biggest contributor to the overall Norwegian research effort. Figure 1

shows the development of military research funds and civilian funds in the 1950s and 1960s. From 1966 onwards, civilian research seemingly overtakes military research. One reason for this is that the distinctions between what was military research and what was civilian research became increasingly blurred. A second reason is that formerly military research, e.g. within IT, from the 1960s was conducted in civilian institutions.

Year	Funding from NATO/allies	Total Funding	NATO funding as percentage of total funding
1946/47	0	1 467 000	0
1947/48	0	1 779 000	0
1948/49	0	1 579 000	0
1949/50	0	2 960 000	0
1950/51	0	3 201 000	0
1951/52	0	3 913 000	0
1952/53	0	4 476 000	0
1953/54	1 550 000	4 867 000	31,8 %
1954/55	499 000	5 123 000	9,7 %
1955/56	1 264 000	5 770 000	21,9 %
1956/57	417 000	7 190 000	5,8 %
1957/58	1 257 000	8 468 000	14,8 %
1958/59	7 274 000	12 601 000	57,7 %
1960	8 226 682	17 188 400	47,9 %
1961	5 753 511	17 378 800	33,1 %
1962	3 738 382	23 416 300	16,0 %
1963	12 263 221	19 012 800	64,5 %
1964	6 865 908	22 633 500	30,3 %
1965	2 339 307	25 305 700	9,2 %
1966	6 861 327	23 010 900	29,8 %
1967	8 536 758	32 798 000	26,0 %
1968	13 750 187	40 422 800	34,0 %
1969	23 019 776	53 099 200	43,4 %
1970	15 396 526	42 856 300	35,9 %
1971	2 724 347	37 296 000	7,3 %
1972	1 420 482	37 520 000	3,8 %
1973	2 692 517	41 530 295	6,5 %
1974	1 236 500	44 431 000	2,8 %
1975	1 478 000	50 977 000	2,9 %
1946-75	128 564 431	592 270 995	21,7 %

Table 1. Funding from NATO allies to FFI 1946-1975 in current NOKs and relative to total FFI income (adapted from Njølstad and Wicken 1997, 503).

In table 1, we can see one example of American support in the case of FFI. From the table we literally can read off the varying temperatures of the Cold War.

As in the US and the UK, the structure of research funding in Norway meant that most public sector research money was allocated to defence research and nuclear energy research. In the 1950s, nuclear energy and missile development were popular, in the 1960s space technology and information technology were given priority (Wicken 1992b, 4-5).

In spite of the perceived imminent threat from the Soviet Union and the strong military build-up in response, the technology paradigm did not dominate in the 1950s as one would expect. Many economists were sceptical about the benefits of science for economic growth, and the industrial policy focus was on exploiting natural resources, mainly energy in the form of hydroelectric power and energy related industry like aluminium and other metallurgical industry (Ørstavik 1999, 7, 11). Despite its boost by defence spending, the failure of the research effort in generating economic results in the 1950s, especially in the nuclear energy sector, gave the economy paradigm the upper hand. In addition, parts of the 1950s, e.g. 1957/58, were years of stagnating economic growth and increasing unemployment.

3 The 1960s: technology policy activism

However, the advent of Sputnik in 1957 and the alleged technology gap meant that the 1960s became a decade dominated by the technology paradigm (Ørstavik 1999, 7). Also, advances in economic theory indicating that technology was an important factor in economic growth contributed in turning the tables (Ørstavik 1999, 7, 11; Arbo 1996, 182). The profits from the huge investments in general manufacture in the 1950s were considered too low.

The 1960s are characterized by many government industrial policy initiatives (Arbo 1996, 183; Sogner 2002, 27). Several industrial development funds were set up, and ensured strong government participation in the formulation of industrial strategies. The IT industry was given high priority within the fund system. This was the result of close cooperation between the head of defence research, Mr Finn Lied, who became Minister of Industry in the early 1970s, and the head of the Central Bank, Mr Erik Brofoss, former Finance Minister and the leading character in the industrial development fund system (Sogner 2002, 28). The importance of closer cooperation between research institutions was emphasised in policy documents, and the need for more knowledge-based industry in the future was

acknowledged (Arbo 1996, 184-185). The technology paradigm came victorious out of the 1960s, while the economists revised their theory.

4 1970s: technology activism combined with counter-cyclical economic crisis management

In the 1970s, the government continued and enhanced its industrial policy effort, in particular towards the IT industry (Sogner 2002, 44). The system of funding was strengthened, and the establishment of a holding company for state-owned companies was proposed. This was partly implemented within the IT industry, where it caused a small wave of mergers and acquisitions within the industry, focusing on the big indigenous companies. One electronics firm, Tandberg, became state-owned due to financial difficulties. Overall, the technology paradigm seems to have increased its influence during this decade.

As already hinted at previously, the 1970s were also a period of economic problems. The Norwegian government, newly rich in oil, implemented a counter-cyclical economic policy, granting huge industrial subsidies which resulted in structural problems, high inflation, high interest rates, high wages, and decreased competitiveness compared to other economies. Because of this, the 1970s meant that active state involvement in industry was discredited, and in particular involvement in the IT industry because of the Tandberg affair: Tandberg went bankrupt in spite of state ownership and subsidies.

5 1980s: IT industry breakdown, government inaction and economy paradigm consolidation

The 1980s did not put an end to all the traits of an active IT industry policy, but during this time the development of a few national champions was no longer concentrated upon (Ørstavik 1999, 17; Sogner 2002, 70). The policy was instead redirected towards a few strategic technology areas rather than specific firms, and one area was ICT (Remøe 2004, 21). However, the hallmark of the 1980s is the use of market mechanisms in industrial support rather than direct state intervention (Hauknes and Wicken 2003, 28; Remøe 2004, 23). Government industrial support from now on was expected to be neutral in regard to what kind of industries were supported. The policy ambitions of both paradigms were reduced in the 1980s. However, the economy paradigm came out as the clear winner, although it was a very changed economy paradigm. It had moved from Keynesianism to neo-liberalism. Of course, these change processes involved differences of opinion within the economy paradigm.

Until the year 1986, the 1980s proved a fantastic boom period for the Norwegian IT-industry. This meant that industrial policy actually did not seem very important. A crucial factor relating to the IT industry success needs to be mentioned, however: the significance of the petroleum industry and the petroleum revenues for IT industrial development. Oil was and is important in at least four ways. On the positive side, it represents a market that the Norwegian IT industry uses to specialize in oil-relevant technology, and this has been successful. On the more negative side is that this market niche does not constitute a mass market, and limits the growth potential of the IT industry. Another factor is that the oil revenues and resulting public sector expansion made companies like Norsk Data complacent about their market position and technological solutions. When economic crisis and public sector contraction set in in the late 1980s, and the PC became ubiquitous, Norsk Data lost its biggest market. Fourthly, the Norwegian petroleum economy with its huge surpluses has made the government opt for an economic policy that, out of fear of overheating of the economy, means that investments are made abroad, rather than at home. The Norwegian government invests in foreign enterprises and in the multinational IT industry, but not at home. Most people find this policy reasonable in the short term, but in the long term, when the revenues from petroleum are history, this policy might prove unwise.

6 Theory and discussion

The economy paradigm won the battle with the technology paradigm in the 1980s, and it is still winning. Why is this so? The situation is different in, for example, Finland and Ireland. The obvious answer is the oil revenues, but the oil income is no actor in itself. What are the properties of Norwegian institutions that give them such a short-term financial perspective? Compared to Finland and Ireland, it seems that the Norwegian problem is a lack of coordinating capacity in a fragmented system. The prime minister's office is weak. In Finland and in Ireland important policy areas are given a lot more attention from the top (Moen, 2002, Vårheim, 2005).

Public policies are important cases of political institutions (Pierson 2006; Vårheim 2001). Insights about institutional effects can consequently be used in studies of policy effects. Major policy changes and institutional changes occur that are not the results of external shocks to the political economy, and that are not the outcome of punctuated equilibria and critical junctures. Accumulated incremental change can add up to gradual transformational change (Streeck and Thelen 2005; Thelen 2004; Pierson 2004). Social order manifests itself in institutions that in the context of advanced political economies can be defined as systems of social interaction under formalized normative control (Streeck and Thelen 2005, 16).

Institutional development is characterized by ongoing conflict between political coalitions during institutional genesis, and later the point of contention shifts from the form of institutional arrangements to what effects they have, although the form often remains controversial, together with functions and salience (Thelen 2004, 32; Streeck and Thelen 2005, 19). Resilient, previously losing coalitions or paradigms can, over time, develop as important forces of institutional change and ultimately effect institutional transformation, either gradually or as a revolution in the form of breakdown or replacement.

Shifts in the balance of power are the basis of institutional change, regardless of the magnitude of the change. Reproduction and change both form parts of institutional development. Institutional survival is dependent on the ability of actors to construct an institutional development process synchronized with the political and economic environment. Within this parameter of institutional survival, actors pursue their own agendas for institutional development (Streeck and Thelen 2005, 19). The ability of actors to tip the balance of power is heavily dependent on earlier institutional development limiting the menu of choice, as well as their ability to build coalitions around their own interpretation of policies satisfying the necessities of survival (Pierson 2004, 141, 152-153; Thelen 2004, 289).

Gradual and at the same time transformative changes happen in different ways. One comprehensive overview is given by Streeck and Thelen outlining five different models (Streeck and Thelen 2005, 19-30): displacement; layering; drift; conversion; and exhaustion. Here, I will concentrate on displacement, as that seems the most relevant to our case. *Displacement* means that less important institutions gain more relative importance compared to the dominant institutions within an institutional system. The dominant institutions are abandoned by a growing number of actors. Alternative institutional arrangements have already coexisted within the institutional system, or they invade the system of institutions/society from outside, through occupying powers that are subsequently domesticated, or by the importation and integration of foreign practices.

Within Norwegian ICT industrial policy we have seen how the positions of the technology and the economy paradigms have varied over the years, and how losing policies have existed within the institutional system waiting for their comeback. Furthermore, we have seen how the paradigms have managed to adapt to environmental change, and how policy content has changed while losing policy paradigms have not been fully exterminated, but have instead survived and come back with a perceived environmental change.

One example is furnished by the industrial policy development in the 1980s, which can be interpreted as a process of transformative change through displacement. In the 1980s, the economy paradigm grew in importance at the cost of the

technology paradigm. The economic crisis of the 1970s was supposed to indicate the failure of an active policy towards technology development and the ICT industry, and the importation of monetarism/economic liberalism (coming from the wallet of Mr Reagan and Mrs Thatcher's handbag) gave the economy paradigm the upper hand. The old, seemingly industry-neutral basis of Keynesianism found a new companion in economic liberalism. Even old-timers like Finn Lied, Jens Christian Hauge and the rest of the Labour establishment abandoned their activist policies. The balance between the two paradigms or coalitions was tipped. Energy resources underpinned "neutrality" in both the 1950s and the 1980s. Huge public investment in electricity development and oil is understood as industry-neutral. It seems that the meaning of neutrality at times can be very elastic indeed!

7 Conclusion

In relation to historical institutional theory, this paper has not disproved the main tenet that institutions or policies can go through transformative change gradually, not only through "big bangs" in times of extreme crisis. Institutions and policies evolve and, as in this case, they also devolve. The active, technological-oriented industrial policy of the 1960s and 1970s disintegrated. This does not necessarily entail the end of an active industrial policy; according to the theory I have laid out here, the active industrial policy can be in hibernation, rather like the brown bear waiting for spring to come, so he can eat wild berries and, perhaps, the occasional economist passing by in the wilderness.

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