

Modern industrial policy or postmodern industrial policies?

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In memory of Dr. Jörg Meyer-Stamer

The author of this study, Dr. Jörg Meyer-Stamer, unexpectedly passed away as a result of a brief but severe illness at the age of 50 on May 1, 2009. Jörg Meyer-Stamer had that rare combination of exceptionally creative, independent thought and a sharp, analytical mind. Always intellectually curious, he had a remarkable feel for the dynamics of society that can foster or hamper economic development. Along with his strict work discipline, his phenomenal productivity led to a tremendous volume of all kinds of work on issues pertaining to regional economic development and competitiveness. The recently founded Working Group on Modern Industrial Policy was therefore looking forward to many fruitful years of work with Dr. Meyer-Stamer. This study was to be only the beginning, but fate determined that it would be this incredibly productive author's last study.

We are left with the cherished memory of a friend we were just getting to know.

The Working Group on Modern Industrial Policy

Executive summary

Industrial policy is a multidimensional term combining a number of different policy fields at a number of levels. As a result, political control suffers. The changes in general conditions brought about by globalization only make things harder by hampering the design of industrial policy. To make coordination more efficient, the control mechanisms of the market, hierarchies, and networks have to be further developed. Workable markets have to be designed, the industrial-policy competence of state institutions improved, and network control reinforced.

This study draws the following conclusions:

- **Industrial policy is a holistic term.** It is characterized by the combination of various policy fields, target groups, and actors. New industrial policy no longer only concerns the processing sector, but can also cover the service sector. Various policy fields also have industrial-policy mandates.
- **Globalization changes the rules for industrial policy.** There are global value chains, greater mobility, and competitors from emerging countries. Competition between knowledge-based sectors is also increasing globally. In addition, there is now competition locally, below the level of nation-states, requiring industrial policy to be redesigned.
- **State control has to be improved with better coordination.** Political intermeshing and the relegation of competence at various levels make it harder for the political goals of industrial policy to be met. Policy networks could be a good solution as negotiation systems for a wide range of actors.
- **Better basic conditions are needed to promote innovation in Germany.** While the range of incentives is excessive, the instruments are too focused on purely technological innovations. Furthermore, state structures are very fragmented and not sufficiently professionalized. These structures must be made more efficient, and new innovation incentives must be provided.

Introduction: What the design influence of industrial policy should be

Industrial policy is repeatedly found at the top of the political agenda. Market fundamentalism has not made good on its promises. Above all, disguised as naïve/interest-based privatization, it has made the coordinating principle of the market look like an ideology. Yet, industrial policy cannot do without market-based instruments, especially proper market design. As means of coordination, hierarchies and networks have their limits.

The question is not *whether* we should pursue industrial policy, but *how*. What role can the market play as a coordinating mechanism and what roles can hierarchies and networks play? Other questions then arise. What should the design influence of industrial policy be? Does it assume the primacy of the global market and limit itself to increasing the competitiveness of firms and particular locations (modern industrial policy)? Or does it attempt to go beyond tracking the fundamental change in society as a reaction to globalization, the climate crisis, and resource scarcity in order to organize the process of looking for a better society (postmodern industrial policy)? Regardless of its ambition, industrial policy requires significant effort in setting up qualifications and using up to date instruments.

1. What is industrial policy?

Industrial policy may be such a reliably controversial, passionately discussed topic because everyone seems to understand it differently. For instance, this is the definition in the German encyclopedia *Meyers Lexikon online*:

Industrial policy, all of a (supranational, federal, state, or local) government's regional and structural political efforts to maintain, design, adjust, and promote industry. Recently, the term has become synonymous with all sectoral structural policy.¹

This is how the German Economics Ministry's website describes industrial policy:

Policy for competitive industry

Entrepreneurial responsibility, freedom of contract between economic partners, competition, and a properly working price system form the foundations of a market economy. State intervention must not override these factors. The main task of industrial policy is therefore to set rules that protect industry's competitiveness and increase its potential for growth, job creation, and innovation.

*Simultaneously, there are situations in which additional state activities are necessary and beneficial. For instance, industry in the former East Germany would have quickly collapsed after the economic and currency union without public assistance [...]*²

The German Industry Association (BDI) puts it this way:

*For the BDI, industrial policy means policy for industry. A business-friendly environment. Greater flexibility. Less bureaucratic red tape.*³

Renowned economist Dani Rodrik puts it this way:

I will use the term to denote policies that stimulate specific economic activities and promote structural change. As such, industrial policy is not about industry per se. Policies targeted at non-traditional agriculture or services qualify as much as incentives on manufactures. Public subsidies for high-yielding varieties of traditional agricultural products, for new crops such as pineapple or avocados, for call centers, or for tourism are some examples. (Rodrik 2007, p. 3 f.)

It is also not easy to get even experts to agree on what exactly is meant by industrial policy.

Types of industrial policy

Thanks to Google, it now only takes a few minutes to get a long list of different definitions.

Industrial policy is a broad field. To provide a better demarcation, we will deal with a number of dichotomies below that concern typical alternatives and controversies.

¹ Meyers Lexikon online: „Industriepolitik“. URL: <http://lexikon.meyers.de/meyers/Industriepolitik> (15.07.2008) – am 23.03.2009 ist Meyers Lexikon online eingestellt worden.

² Bundesministerium für Wirtschaft und Technologie: „Industriepolitik“. URL: <http://www.bmwi.de/BMWi/Navigation/Wirtschaft/Industrie/industriepolitik.html> (15.07.2008).

³ Bundesverband der Deutschen Industrie e. V.: „Industriepolitik“. URL: <http://www.bdi-online.de/de/fachabteilungen/Europapolitik/Industriepolitik.htm> (16.07.2008).

Processing sector or economy?	Traditionally, the focus of industrial policy has been on conventional industry, i.e. the processing sector. There is no such thing as "service-sector policy" because industrial policy has gradually expanded to include the service sector.
Generic or selective?	Traditional industrial policy was selective; in other words, it focused on setting up or strengthening individual industries (such as aerospace) and even companies (such as Airbus). Ordopolitically, ⁴ this approach to industrial policy has been fiercely criticized; for instance, it is argued that the market, not government officials, should decide which companies/sectors are successful. In reaction, the focus of industrial policy has shifted towards generic measures that improve the business climate for all firms.
Conserving or accelerating?	Industrial policy has occasionally attempted to slow down an old industry's demise (such as coal mining), especially when this downturn detrimentally affects an entire region's economic foundation. Since the 1990s, industrial policy has increasingly focused on strengthening new industry sectors and enabling them to keep up with the global race for innovation.
Improvised or strategic?	Industrial policy sometimes seems improvised, especially when large or (regionally, strategically) important firms face bankruptcy. In Europe, such attempts conflict with the EU's policy on state aid. The focus has therefore shifted to strategic industrial policy, which aims to strengthen economic sectors that can ensure prosperity for the long term.
Catching up or racing ahead?	Success in industrial policy has often stemmed from an attempt to make up for lost ground in a clearly defined scenario (such as Japan's industrial policy under MITI for electronics, Korea's industrial policy for automobiles and microelectronics, etc.). The attempts these countries made to focus industrial policy on establishing new industries worldwide were far less successful.
Explicit or implicit?	A number of success stories in industrial policy were actually launched under a completely different banner than explicit industrial policy; they only implicitly had an industrial-policy character. Some typical examples are the numerous initiatives by US military research agency DARPA.
State or private beneficiaries?	When industrial policy tries to "catch up," private firms are not always the beneficiaries. Often, countries with market economies had industrial policies that set up state-owned industrial firms or nationalized firms considered strategically important.
(Supra-)national or territorial?	Traditional industrial policy was primarily handed down by central governments. Over time, however, industrial policy has been increasingly decentralized, such as in the transition from top-down to bottom-up approaches in regional structural policy ("mobilizing endogenous potential"), to an extent as part of the EU's structural policy. At the same time, the European Commission has increasingly played the role that used to be reserved for national governments.

⁴ Note from the editor: The term Ordo-policy emphasises the need for the state to ensure that the free market produces results close to its theoretical potential. The theory was developed by so called Ordoliberal scholars as Walter Eucken from about 1930-1950. Ordoliberal ideals inspired the creation of the post-World War II German Social Market Economy and its attendant Wirtschaftswunder.

Economic policy or social policy? At first glance, industrial policy seems to be a core part of state economic policy. Nonetheless, social-policy interests often affect industrial policy, especially when large firms or regionally crucial industries could cause a structural crisis.

Strict (competitiveness) or broad (social policy)? Since the 1990s, industrial policy has focused on efforts to strengthen competitiveness. In contrast, in recent years there have been explicit steps towards "ecological industrial policy," which does not kowtow to the global market from the outset in terms of its design and control ambitions.

Behind a number of these alternatives lie fundamental political and/or scientific differences of opinion that can be discussed, but often not resolved. Few of the dichotomies are solved by logic alone. One of them is the alternative "processing or economy." The share of the processing sector in gross domestic product is shrinking. One reason for this trend is that a number of services that industrial firms used to provide in-house are now also offered by specialized firms. A lot of other services are a reaction to the increasing differentiation within industry. Against this backdrop, it hardly seems to make sense for industrial policy to focus only on the processing sector.

Industrial policy and associated policy fields

It is becoming harder to make clear distinctions between industrial policy and associated policy fields. Today, industrial policy and structural policy are practically synonymous. The two fields also largely overlap with research/technology policy, also known as "innovation policy." Within research/technology policy, there are fields which do not pursue any industrial-policy goals, such as the basic research performed in such centers as CERN. But most research/technology policy pursues the following goals:

- finding innovative solutions for urgent problems facing mankind, with most of the products or services eventually coming from commercial providers (radical innovations)
- supporting companies in their attempts to get competitive advantages through constant innovation (incremental innovations), in other words strengthening their competitiveness

In addition, a number of policy fields also have implications for industrial policy and sometimes even industrial-policy goals:

- **environmental policy**, which the German Environmental Ministry also calls "ecological industrial policy"
- **energy policy**, in which, for instance, promoting renewables is an explicit part of the industrial-policy agenda
- **defense policy**, in which issues pertaining to a European industrial foundation for key military technologies still play a role
- **healthcare policy**, which has complicated the structure of such sectors as the pharmaceuticals industry and medical devices
- **agrarian policy**, which has probably influenced structural change within EU agriculture over the past few decades more than the market process has

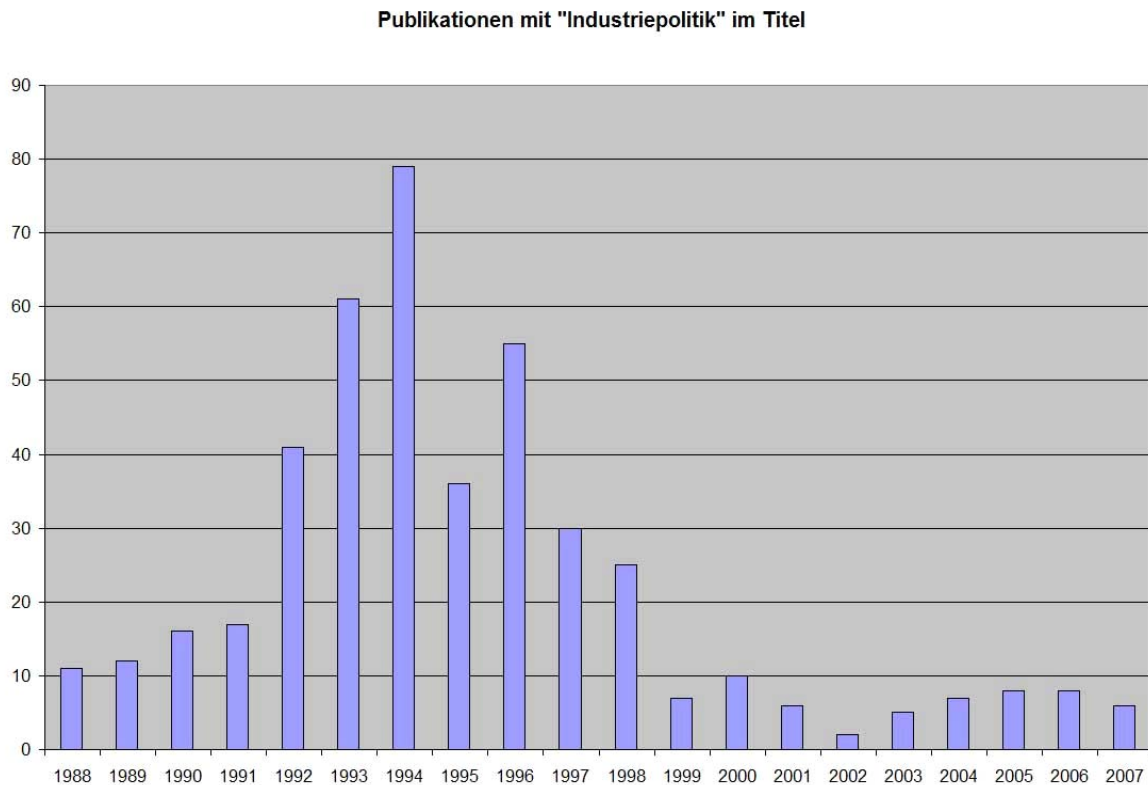
Here, it obviously makes little sense to talk about "industrial policy" in the singular. Realistically, we cannot assume that a large, highly differentiated, complex industrialized country can have a single, coherent, consistent industrial policy negotiated by dozens, if not hundreds, of state and non-state actors. There will always be a number of industrial policies – both at the national/supranational and at the territorial level.

But what should we make of the idea that all of these industrial policies pursued at various levels by different actors with different goals could be focused on joint overriding targets? Before we deal with this issue, we first have to clarify why industrial policies still exist despite all of the efforts to stamp them out.

2. "No industrial policy" is politically not an option

If you search the German Central Library of Economics for publications that have the word *Industriepolitik* (*Industrial policy in English*) in their title you find the following distribution for the past 20 years:

FIGURE 1: INDUSTRIAL-POLICY PUBLICATIONS



Source: own research

The publications from 1994 concern such issues as European industrial policy for new industries and industry sectors with fundamental structural problems (especially steel) alongside the economic structural change in the former East Germany. A number of publications ask whether industrial policy is principally useful. Over the course of the 1990s, economists tended to answer in the negative – which may help explain why the number of publications has declined. The main reason for this negative answer is the assumption that industrial policy skews the playing field, thereby reducing prosperity. When faced with a choice between market failures and state failures, the pendulum swung far to one direction, and state failures were judged to be far more damaging than market failures.

Nonetheless, industrial policy never completely disappeared from political discourse. At the European level, the Lisbon Strategy constitutes the foundation for common industry policy. It basically pursues two goals:

- improving the business climate for industry so it can increase its competitiveness constantly
- strengthening industry sectors that are considered especially important for the EU's future economic development

At the same time, industrial-policy practice has changed over the past 20 years. Take, for example, the OECD's *Globalization and regional economies* study from 2007 (OECD 2007a). Its policy recommendations are as follows:

TABLE 1: POLICY RECOMMENDATIONS

Supporting firms	
Existing specialised firms	Broadening the customer base of specialised firms; reducing their dependence on MNEs, helping them to reach global markets.
Innovative small firms	Supporting small firms with technical facilities, linking them to venture capital and other finance, helping to create networks among small firms.
MNEs (multinational enterprises)	Embed certain functions/activities of MNEs in the region through stronger supply chains and a richer regional environment, support interaction between large firms and innovative small firms.
Improving the regional environment	
Cross-over technology	Reducing dependence on single industry by identifying cross-over or enabling technologies; finding new applications for sector-specific technologies.
Regional innovation system	Promoting linkages between economic actors through co-location (science parks, etc.), strengthening the applied research dimension of public R&D facilities, supporting open innovation mechanisms.
Other measures of regional attractiveness	Infrastructure, ensuring that skills supply is appropriate, limit brain drain and try to attract skilled people.

Source: OECD (2007a)

Well-known terms also pop up in other OECD publications: SME support, promoting startups, supporting innovation, launching specific financial instruments, promoting clusters, etc.

And yet, a lot has changed:

- Some instruments have moved to the background, such as creating public firms in areas especially prone to market failures.
- The relative importance of individual instruments has shifted. Industrial policy used to mainly benefit large firms. Now, startups, firms in an early growth phase, and small and midsize enterprises (SMEs) have taken center stage.
- The toolbox now has a wider range of tools and currently contains a number of demanding instruments that require a great degree of competence among the

organizations implementing the policies, such as with a number of financing instruments or in the competent use of change management tools in regional development initiatives.

- In addition to tools focusing selectively on individual industries, generic instruments used to improve the business environment for all firms are becoming more important.
- Industrial policy must not simply react to globalization, but must also actively shape it. Traditional instruments that promote exports, attract investments, and generally market a given location only have a limited effect and require other instruments that focus on such phenomena as international value chains and international migration.

From the political perspective, "no industrial policy" is not an option because voters elect politicians who promise to improve their standards of living – and if the economy does not provide enough well-paying jobs, voters want politicians to get to work. Politicians will not get very far by subjectively answering that industrial policy risks distorting markets and leading to prosperity losses.

3. Providing momentum for economic development

In academic discourse, Dani Rodrik has been one of the main researchers over the past few years contributing to a Renaissance in the debate about industrial policy.⁵ Instead of discussing how industrial policy can be used to manage structural change in old industrial regions, his publications focus instead on what type of intervention is needed to set off dynamic economic development processes in countries or areas that do not benefit much from spontaneous, market-controlled processes. Let us take two practical examples that illustrate this issue.

Example A: A cluster comes about without being planned

Let's begin with a local cluster that is just being created. By historic happenstance, the company is set up in a given location, for instance to manufacture clothing, and because the founder is competent and the market situation favorable, the company quickly grows. Some employees set up their own firms within the same sector. Others with an entrepreneurial spirit find the clothing manufacturers to be interesting customers, so they begin selling fabric, buttons, labels, etc. Some of these sellers start making their own labels, buttons, etc.

The first manufacturer in this new sector has a hard time finding people with skills, but in time it gradually becomes easier to recruit local skilled engineers, technicians, and craftsmen in all areas within clothes production. A vocational school for training such people is opened. A laboratory is set up where unfinished products can be tested, and the technicians at the lab might begin experimenting with materials. All of this leads to something like research and development. The entrepreneurs might also found an association to represent their joint interests. And this association might also start offering services, such as further training events and market analyses. In other words, a cluster has come about over time without any planning – you might say, as a result of the market's invisible hand.

Example B: No cluster without industrial policy

How would this scenario pan out if the first entrepreneur opened up a firm specializing in IT products and services instead of clothes manufacturing? In all likelihood, the outcome would be different. In his presentations, Richard Florida (2002, p. 217) regularly mentions the case of Internet firm Lycos, which was spun off of Pittsburgh's Carnegie Mellon University in the 1990s but eventually moved to Boston because it was not able to attract enough highly qualified, specialized workers to the steel city of Pittsburgh.

This experience is one indication of the challenges that entrepreneurs face in a new, knowledge-based industry. A clothing firm needs a few managers and a lot of workers, and most of the workers can be trained quickly, while an IT firm needs a lot of highly specialized, skilled workers, who are scarce not only locally, but possibly even globally. In addition, the clothing entrepreneur mainly needs routine services, while the IT entrepreneur relies on a number of specialized service providers. The IT firm may also fall under the label "born global," and if so, simply finding a local tax advisor familiar with international tax law may prove to be an insurmountable obstacle.

Rodrik (2004) describes the kind of market failure at work here. It becomes difficult, if not impossible, for new industries to be created and grow for lack of complementary firms. Market failure stems from the following problems:

⁵ Vgl. Dani Rodrick : „Research“. URL: <http://ksghome.harvard.edu/~drodrik/papers.html> (18.07.2008).

- asymmetric information, for instance when existing and potential startups have a hard time signaling their intentions and potential or real demand
- indivisibility, such as in the case of the tax advisor, for whom it is not worthwhile studying complex international taxation legislation for a single customer
- the availability of public goods/club goods, such as networks and expertise

For these and similar reasons, new industries are not established in a particular location, region, or country. Industrial-policy intervention is necessary to remedy such types of market failure. Past experience with industrial policy can, however, only serve to a limited extent as a roadmap for how current industrial policy should be formulated and implemented because crucial general conditions have fundamentally changed.

These changing basic conditions can be identified in two areas. First, economic globalization has created different conditions for industrial policy; and second, the requirements and basic conditions for political control have fundamentally changed.

4. Globalization: value chains, benefits of clusters, and regional marginalization

Economic globalization manifests itself partly in the following phenomena:

- **greater mobility for firms, capital, and labor:** In particular, the mobility of labor should be emphasized here because its scope and relevance are often underestimated. Push factors are not the only drivers of this trend, contrary to a common view within the EU (thanks to the dramatic images of migrants from Africa). More than ten percent of college graduates from Latin America, Africa, and the Middle East work in OECD countries (World Bank 2007, p. 122). A lot of industrial countries – in particular, Ireland, the UK, Australia, New Zealand, and Canada – have implemented policies to attract highly qualified people from abroad. The Anglo-Saxon discourse often speaks of the "global war on talent," meaning the international competition for scarce, highly skilled and creative workers.
- **the shift in the international flow of goods from an anonymous global market to global value chains:** More than two thirds of global trade and a majority of the international trading of processed products now take place as intergroup trading or as trade in relatively stable global value chains controlled by wholesalers or retailers (such as Otto⁶), international industrial firms (such as Volkswagen), and specialized international coordination firms (such as Li & Fung).⁷
- **changes in terms of trade:** At the beginning of the 1950s, Latin American economists Raúl Prebisch and Paul Singer published their theory of the "secular fall of terms of trade," which states that developing countries will have to export an increasing amount of raw materials to pay for a given basket of industry products. The validity of this theory was widely accepted up to the end of the 20th century. In the past few years, however, there have increasingly been indications that the terms of trade are reversing – in favor of countries that export raw materials and to the detriment of countries that export industrial products, especially industrial commodities (relatively standardized products) (Kaplinsky 2005).
- **increasing presence of new competitors from emerging countries:** For some time now, first-generation firms from emerging countries – especially from Korea and Taiwan – are not the only ones doing business on a lot of markets, but also firms from BRIC countries (Brazil, Russia, India, and China) along with other countries that Europeans often classify as developing countries (such as Malaysia, South Africa, and Mexico). Such firms threaten the position of traditional companies not only by offering well-known products at far lower prices, but also by coming up with innovative business models (Khanna and Palepu 2006).

Bridging the knowledge gap

Have political decision-makers in Germany understood these trends and their consequences for state control efforts? The following example makes it seem doubtful. In the run-up to the Future Congress 2005 of the German Social Democrats in the state of North Rhine/Westphalia (NRW), the local daily newspaper WAZ quoted the party's secretary-general as follows: *"We cannot compete with such low-wage countries as Korea, so we will have to do so with quality. To do so, we are going to need role models in all fields."* If we compare Korea to Germany, we find the following data describing the status of the two countries in terms of knowledge-based competition:

⁶ Editors note: The Otto group, or Otto (GmbH & Co KG) (formerly Otto Versand), is the world's largest mail order company, operating in more than 20 countries. The family of executive board chairman Michael Otto owns the majority of the company. The company is based in Hamburg, Germany. Founded by Werner Otto in 1950.

⁷ Vgl. The Global Value Chains Initiative. URL : <http://www.globalvaluechains.org/> (22.07.2008).

TABLE 2: DATA FOR 2005

	Korea	Germany
R&D expenditures / GDP	2.98	2.48
R&D staff / 1,000 jobs	7.88	7.15
Percentage of households with computers	78.9	69.9

Sources: OECD; for NRW: Innovationsbericht 2007

It is worth considering whether there is a gap between perception and reality in terms of the quality of the challenge that newly industrializing countries pose for Germany. The number of countries with companies that are relevant competitors for German firms in knowledge-based industries is increasing, thereby also adding to the pressure on German firms to further develop their competitive advantage – individually, with collective action, and with public and public-private initiatives to strengthen the domestic business environment.

Local advantages – the basis of clusters

The concept of local factors shows that the discussion about the effects of globalization on national and sub-national policies does not always do justice to the complexity, contradictions, and irony of the actual situation. One of the paradoxes in globalization is the greater role of local advantages as industries further specialize. The performance of companies that do business internationally depends on the availability of unfinished products and services that are increasingly becoming more differentiated.

For the production of highly specialized unfinished products and the provision of highly specialized services to be feasible, a certain economy of scale has to be reached, which requires a certain geographical concentration of providers and customers, at least for services that cannot easily be offered over long distances. At the same time, locations that have a number of highly competent, specialized suppliers and service providers for a specific industry attract firms from that industry, which can then reduce their transaction costs and increase their competitiveness. This fact explains the ongoing importance of economic clusters and the increasing polarization between prospering and marginalized locations. Both phenomena – cluster advantages and marginalized regions – are central motives behind structural policy. At the territorial level, the pressure to pursue industrial policy has not let up.

What is the situation at the national level? One important instrument in traditional industrial policy was the establishment of national "champions." But even in the early 1990s, this option was no longer realistic because the interdependence of companies in what was then called the "three triad regions" was constantly increasing. Protectionist industrial policies are not only incompatible with EU and WTO rules, but also not likely to be successful in light of the increasingly global distribution of important competencies. Industrial policy therefore has to be rethought within the context of globalization.

5. State control between hierarchies, markets, and networks

The changing starting points for political control are reflected in three terms: political intermeshing, complexity, and control mechanisms.

Political intermeshing: independent freedom of action is decreasing

Globalization is not limited to the sphere of economics. Politically, it also makes itself felt in an increasing intermeshing of politics, in which not only the EU, but also multilateral control processes (global governance) play an increasingly important role. For some time now, the ability of federal, state, and municipal governments to make independent decisions has been decreasing.

For industrial policy, political intermeshing is important for yet another reason. The horizontal policy intermeshing between ministries is increasing; ministries of labor, research, and construction are hardly less relevant than the economics ministry when it comes to industrial policy, and the ministries of the environment, defense, agriculture, and health are also involved in industrial policies. Vertical policy intermeshing is increasing not only internationally, but also within states, where professional competence is increasing and initiatives are being launched locally and regionally.

Three stages of complexity

The term "complexity" covers more than the everyday experience that the world is becoming more complex. The academic discipline of complexity research has come up with a number of categories that help us understand complex systems, such as the global economy. One of them is the observation that we often are dealing with systems that are not linear and therefore cannot be reduced to simple cause/effect relations. Attempts to control nonlinear systems generally have unplanned, unintended effects (see Dörner 1989). The challenges in dealing with complex systems can be divided into three categories:

- *Puzzles* are constellations in which both the problem and the solution are clearly defined.
- *Problems* are constellations in which the problem is clearly defined, but the solution is either unclear or disputed.
- *Messes* are constellations in which not even the problem is clearly defined. Attempts to politically design societal relations do not always take account of the basic problem of complexity.⁸

All control mechanisms have their limits

There are basically three mechanisms used to coordinate society: markets, hierarchies, and networks. In markets, coordination is decentralized as actors attempt to maximize their individual benefits. In hierarchies, coordination is centralized based on the principle of

⁸ "The relationship between messes, problems and puzzles is summed up beautifully by Michael Pidd in his book 'Tools for thinking' (1996): 'One of the greatest mistakes that can be made when dealing with a mess is to carve off part of the mess, treat it as a problem and then solve it as a puzzle -- ignoring its links with other aspects of the mess.' (p. 40)". Quelle: Tom Ritchey: Modeling Complex Socio-Technical Systems using Morphological Analysis. URL: <http://www.swemorph.com/it-art.html> (22.07.2008).

obeying commands; both state actions and internal processes within companies are examples of hierarchical control. In networks, coordination is based on negotiations and the principle of voluntary participation. Market failure is often the starting point for industrial policy. State failure is one of the main reasons for criticism of industrial policy. Network failure is the reason why pragmatic approaches to industrial policy reach their limits.

Why are the three categories of political intermeshing, complexity, and control mechanisms relevant for state control in general and industrial policy in particular? We assume that industrial policy is an event in which the state plays a leading role. When a state launches an industrial policy, it plays a central role in formulating and implementing it. If industrial policy takes place within the context of a process of delayed economic development (such as in Japan from the 1950s to the 1970s or South Korea from the 1960s to the 1980s), the problem is probably a puzzle – the problem is clearly defined (for instance, there is no shipbuilding industry), and there is a consensus about what the solution should be (set one up that can be better than German shipbuilding).

Control takes place within a hierarchy; well-informed state planners who can give instructions to the still relatively weak private firms oversee the process. The most important control medium is money, and the firms can hardly choose not to play the game, since the state controls the national banking system. Political intermeshing hardly plays a role; the mayor of the port town where the first shipbuilding firm is set up is quite unlikely to have any objections or an agenda that conflicts with the central government's.

The requirements for state control change in line with the rate at which a country proceeds along an industrialization process:

- A state loses its competitive information edge when high-performance companies go up a steep learning curve and eventually understand the trends and rules of the game within their industry far better than even the best informed state decision-makers. This is the situation described at the beginning of the 1990s in the discussion about policy networks. The control pattern shifts from the hierarchy to the market and the network.
- At the same time, the quality of the challenge changes from a puzzle to a problem or a mess. When it comes to catching up, industrial policy usually addresses a puzzle or a problem. If a country competes eye to eye with leading industrial nations, the industrial policy addresses a mess.

The combination of both elements explains why, for instance, Japan's industrial policy lost relevance in the transition from the 1980s to the 1990s. Into the 1980s, the logic behind industrial policy was one of catching up (hierarchy/puzzle). Once Japanese firms had caught up and held a strong position in both mainframes and microelectronic components, the challenge became a mess, especially because the firms were increasingly unwilling to follow MITI's orders, practically making it impossible to agree on what the problem was. Industrial policy can deal with problems, but not with messes. Promising political intervention can only be defined if the parties involved agree on a definition of the problem, thereby turning a mess into a problem.

Policy networks in the shadow of hierarchy and political intermeshing

The circle of actors relevant for industrial policy is large and includes various state agencies, a wide range of private actors (who are sometimes competitors), and a slew of other non-governmental organizations ranging from industry associations to NGOs and researchers. Industrial policy is rarely formulated with hierarchical control in an advanced industrial country. Normally, networks are used as a negotiation platform – "policy network" – to bring together all of the actors who have an interest in the industrial policy in question.

There are two basic types of policy networks:

- **Policy networks in the shadow of hierarchy** are negotiation systems in policy fields where the state principally has the option of unilaterally setting the rules, such as in consumer protection. There is a great incentive for non-governmental actors to take part in policy networks because they otherwise run the risk of having the regulation produced fundamentally conflict with their own interests; likewise, implementation costs could be great.
- **Policy networks not in the shadow of hierarchy** exist in policy fields where the state models the design without being able to hand down law; the issue in question is not part of its mandate. In such policy fields, the state generally provides positive incentives, especially subsidies (investment bonuses, R&D funding, tax breaks, etc.). The principle is that you can lead a horse to water, but you cannot make it drink.“

Industrial policy comes about in both constellations. A typical example of industrial policy in the shadow of hierarchy is implicit industrial policy as environmental and energy policy, which is currently becoming explicit industrial policy (ecological industrial policy). Nonetheless, industrial policy that is not in the shadow of hierarchy is predominant. Here, the state needs good reasons to get non-governmental actors to take part in policy networks in this policy field.

The worse the problem of policy intermeshing is, the harder it is to get them to do so. In industries that are maturing or in decline, problem definitions often differ between the local, state, and federal level; local actors are generally the last ones to accept the decline of a locally dominant industry. Industry therefore perceives the signals from the state (which non-governmental actors see as an actor and not as a mixture of different actors at different levels) as cacophony. In fledgling and growing industries, the situation becomes worse when a number of locations and regions compete to set up local clusters for such industries. In this competitive situation, it is unlikely that the state will send out a consistent message.

Using market forces for industrial-policy goals

Industrial policy is not necessarily based on network control. In principle, industrial policy can resort to all three coordination mechanisms: markets, hierarchies, and networks. Above, we discussed some of the dilemmas that network control entails. Since the 1990s, the pendulum between markets and hierarchies has swung far out in the direction of markets. It is hard to imagine the German government resolving to establish a new industry sector by founding state firms, but at the level of the German states the situation is a bit different, as the City of Hamburg demonstrated in 2003 when it took over a blocking minority of Beiersdorf. The dominant trend, however, is one supported by the European Commission: the establishment of competitive markets, even in areas previously viewed as "natural monopolies."

The creation of state-owned monopolies used to be common on the European continent, though it was not always a reaction to market failure (in this case, natural monopolies). The alternative – setting up state-regulated private monopolies – has been practiced in the US since the 19th century, reminding us that the state can react to market failures in very different ways. This insight has crucial implications for industrial policy. From the viewpoint of academic, liberal critics of industrial policy, the market and industrial policy are opposites. But in fact, industrial policy can view the market as a control option instead of replacing market coordination with state or network control.

What is the advantage of market control? The most important advantage is that a market works because market participants defend their own interests. In contrast, hierarchies and networks do not work when their participants consistently defend their own interests. Hierarchies and networks therefore require a lot of coordination and moderation. But a

market that is robust can largely be left alone, with supervision only coming from antitrust authorities.

Conventional industrial policy has not often used the market as an instrument. As a result, a lot of developing countries and some industrialized countries have seen industrial policy fail; while industries were created, they produced products of low quality at high prices, and the firms were not under any price pressure to approach international quality and productivity levels. On the other hand, the competition principle was one of the main reasons for the success of industrial policy in Eastern Asian industrialized countries.

The use of markets as an instrument becomes more important the more industrial policy pursues the goal of strengthening innovation. For some time now, economists studying innovation have pointed out that competition is the main reason why companies innovate. Contrary to one common opinion, it is not necessarily the nature of companies to innovate. Rather, it can make complete sense for a company not to innovate. Every minor innovation starts off as a disturbance that leads to a drop in productivity and quality. And every major innovation is a highly risky undertaking; it will certainly cost money to develop the new product, but you don't know what your revenue will be.

Properly working markets as innovation drivers

Three main factors force companies to innovate:

- Competition is the main driver of innovation: companies hope to gain competitive advantages over their competitors from innovation. Likewise, competitors may have successfully launched an innovation, forcing a company to follow suit. A company may also know that its competitors are working on innovative projects to improve their market position, forcing it to work on innovations itself.
- Customers demand an innovation, for instance because they are working on a new product for which they require new components (product innovation) or because they are forcing a supplier to accept a lower price for a given unfinished product, so the supplier has to look through its production process for ways to lower costs (process innovation).
- The state forces companies to innovate, for instance by imposing stricter limits to protect the environment, people's health, and their safety at the workplace or to combat money laundering.

Actions taken by the state influence the innovation of companies in three completely different ways:

1. **Macroeconomic policy:** competition policy ensures that markets have a competitive structure, forcing companies to innovate in order to compete. Trade policy ensures that domestic products have to face international competition.
2. **Sector policies:** healthcare policy, transport policy, environmental policy, etc. change basic conditions, forcing companies to change their products and/or processes.
3. **Innovation policy:** supports companies in innovating.

Innovation policy is thus paradoxical, for it has a fundamentally different stance on innovation than healthcare policy does towards the healthcare system or defense policy does for defense. If there were no defense policy, a country could not defend itself. If there were no healthcare policy, the healthcare system would be radically different. But if there were no innovation policy, there would certainly be innovation, at least in the private sector; and the more innovation there is, the more intense rivalry is in markets.

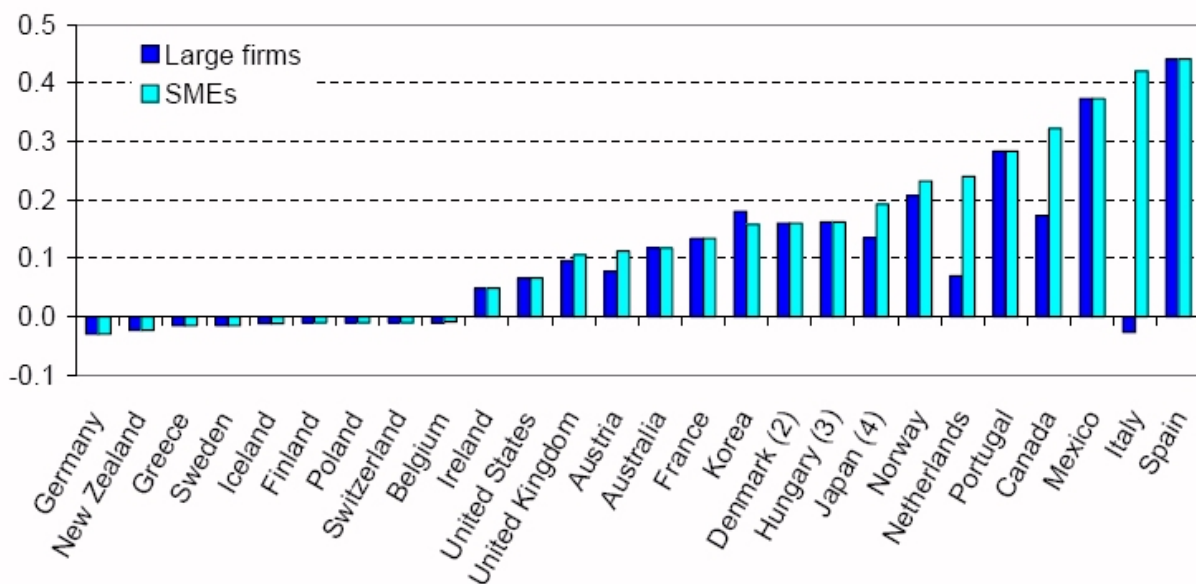
How can industrial policy use market mechanisms to promote innovation? One interesting example is the difference between ISDN and the Internet. In the 1980s, ISDN was launched in Germany in grand fashion as a system that was both technologically complex and static, with a data transmission rate of 64 kb/second, which was quite fast at the time but now seems completely anachronistic. In contrast, the Internet was developed based on the principle of "as easy as possible" as a platform technology that all other services could be put on. ISDN was intended to protect the monopoly of Deutsche Post in telecommunications. The Internet had the (completely unplanned) effect of creating a lively market on which a wide range of companies have gone into business over the past 15 years, many of whom have become giant corporations overnight (such as eBay, Amazon, Yahoo, and Google). It is no accident that most of these companies were founded in the US – the "home" of the Internet – because the US set the foundations for a properly functioning market, whereas German (and European) industrial policy was strengthening monopolist structures. What lesson do we draw from this example? Industrial policy must strive to set the foundations for properly working markets where entrepreneurial innovation can flourish.

6. German industrial policy: not state of the art

Direct and indirect control

German industrial policy has been characterized by the demand for direct control. While the German government has stuck to its demand for detailed control up to now,⁹ other countries rely on indirect control and create attractive business environments, such as by implementing tax instruments. To stick with the example of promoting innovation, the following chart shows that no other OECD country provides so few tax incentives for R&D expenses as Germany does. Generic tax incentives require little state control competence.

FIGURE 2: USING TAX INCENTIVES TO STEP UP INNOVATION



Source: OECD (2007b). The vertical axis shows the relation between tax incentives and R&D expenses.

Too many incentives offered

Another popular approach in other countries is streamlining incentives and organizations. When the range of incentive programs and organizations becomes too great, the transaction costs exceed the benefits for an individual company. Incentives are utilized less than expected and less than they should be. Some countries have streamlined their incentives to solve the problem.

Promoting and demanding innovation

Overall, the evolution of innovation policy reflects the constant progress in the learning curve in terms of the factors that determine innovation. Naturally, innovation policy has to promote basic research, but it should not expect this research to produce market-ready innovations in

⁹ For instance, laws and ordinances take into account all sorts of possible outcomes and special cases. One random example is the rule in Section 68 of Volume 3 of the German Social Code: "During professional training, special expenses for a trainee's participation in distance learning can be honored at up to 17 euros per month if..." Source: Bundesministerium der Justiz. URL: http://www.gesetze-im-internet.de/sgb_3/_68.html (30.04.2009)

the short or midterm. Innovation policy has to promote a broad spectrum of basic and applied research because it is hard to tell at an early stage of technological development which solution in a series of plausible alternatives will prove to be the best. Innovation policy also has to strengthen innovation systems.

To do so, the basic rules have to promote innovation, such as by reducing red tape and requiring innovation because of, say, decisive environmental policy. In the 1990s, competitiveness guru Michael Porter came up with the theory that environmental policy sets off innovation in the business world, which eventually improves those companies' competitiveness (Porter and van der Linde 1995), but his message met with outrage – although his thesis is in line with the findings of innovation research. Nowadays, Porter's thesis is widely accepted (cf. Kriechel and Ziesemer 2007).

The Renaissance of entrepreneurship

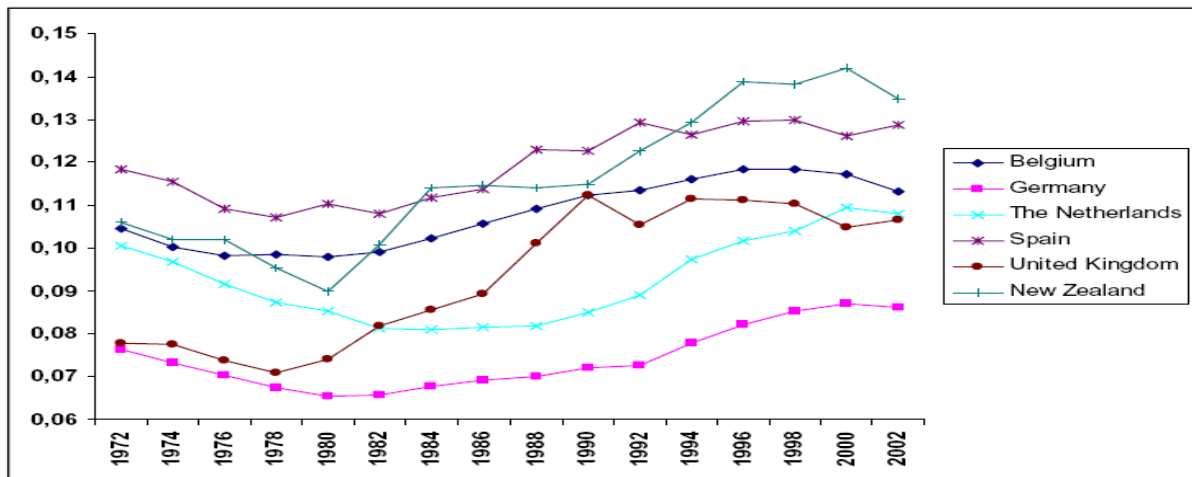
A closer look at innovation helps us understand the challenges that Germany faces in the political field of industrial policy. In academic discourse, innovation is now understood in the shadow of Joseph Schumpeter's ideas, though the mainstream only picks up a specific aspect of his thinking – specifically, his understanding of innovation in opposition to invention. The pioneering innovation research from the 1980s based on Schumpeter's ideas investigated a reality in which industry consisted of established conglomerates with large research labs and systematic, though often isolated R&D. The dominant indicators illustrate this aspect:

- R&D expenses are a relevant indicator in large corporations, in which hordes of researchers and engineers do nothing other than research and development all day – in contrast to innovative small firms, in which all employees constantly innovate, though their work is not statistically counted as R&D.
- Patent applications are a relevant indicator in large corporations, in which entire battalions of lawyers document and protect intellectual property – in contrast to innovative small firms, where intellectual property is outdated before you can get a patent awarded.

Entrepreneurship, another central category in Schumpeter's thinking, has only been marginally dealt with. Perception of economic reality has been characterized by such authors as Alfred Chandler, the economist who described large corporations as the fulfillment of capitalism.

In the 1980s, another factor was added – the Renaissance of entrepreneurship, as the following chart illustrates.

FIGURE 3: THE RATIO OF ENTREPRENEURS TO THEIR EMPLOYEES IN SIX INDUSTRIALIZED COUNTRIES



Source: Audretsch and Thurik (2004)

This data shows not only a shift in economic structure, but also a change in innovative activity. Intuitively, one would read this data to mean that, since the 1980s, a significant number of startups were founded in new industry sectors and that this large number is closely related to economically valuable technological innovations in such fields as IT and biotechnology – but that only partly describes this changed reality. In addition to this factor, which is doubtlessly very important, two other factors also play a major role.

Changing division of labor between firms

In this phase, large corporations increasingly began focusing on their core functions and farming out others, not only simple services such as cleaning and surveillance, but also knowledge-intensive services. In mature industries, such as the automotive sector, firms offering R&D services boomed.

The question of business models

Increasingly, the question of business models arose as economic structures shifted from industry to the service sector. In industry, the traditional business model was relatively easy to understand. You produced something and then sold it to other industrial firms, wholesalers, or directly to retailers. But in the service sector, products are by definition not tangible and/or storable, so entrepreneurs have long been looking for ways to optimize their business model. Well-known German innovators in this field include Gustav Schickedanz (mail order) and the Albrecht brothers (discount stores). As services became more important, the question of what innovative business models look like became increasingly relevant. This trend is especially clear in Internet-based services, where it is relatively easy to offer an attractive service and get a lot of customers, but far more difficult to get these customers to pay or find other ways of getting income. The experience at German Internet platform StudiVZ, a kind of Facebook for college students, is an excellent example.¹⁰

Innovation research has not taken the full notice of these trends. Traditional innovation research and policy continue to be characterized by an engineering view that there is a

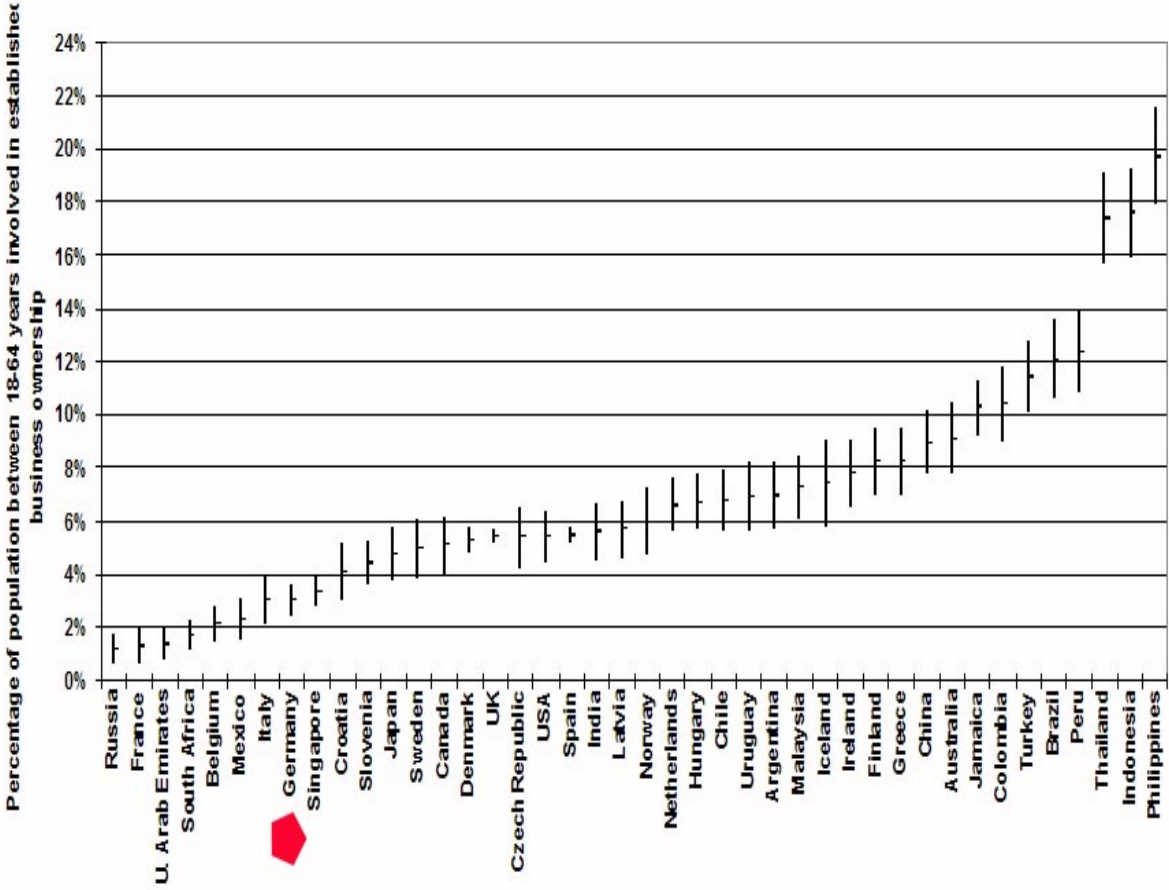
¹⁰ Cf. Wikipedia: studiVZ. URL: <http://de.wikipedia.org/wiki/Studivz> (24.07.2008).

technical solution for every problem. This perspective has a lot in common, but is not identical with the economist's viewpoint that a problem is often the starting point for a business idea and that innovative entrepreneurs realizing business ideas are one of the driving factors in economic and job growth. Innovation policy focuses on this topic only when innovative entrepreneurs step up technological innovation. But when they use robust technologies to implement a highly innovative business model, they are not the target group of innovation policy – especially not when it is the job of the economics ministry to promote startups and the economics ministry and the technology ministry are rivals. This fact can be interpreted as an obstacle to innovation.

Germany: few entrepreneurs – few startups

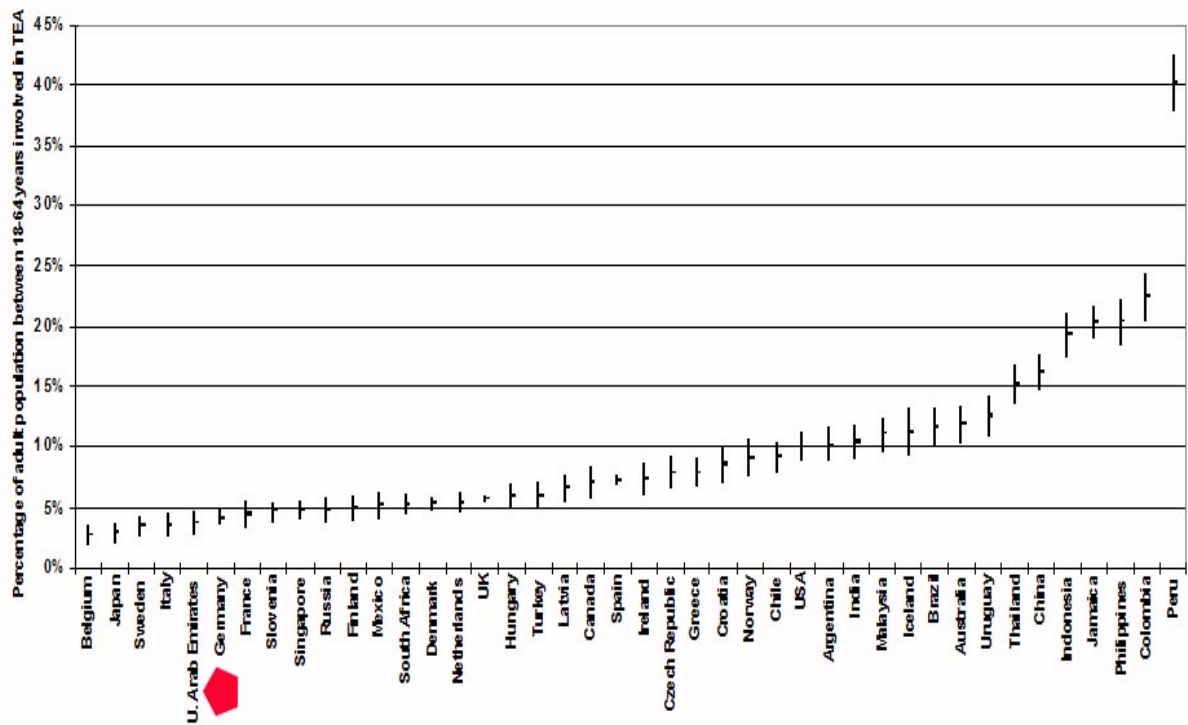
Compared to other countries, Germany has relatively few entrepreneurs and startups. The following two charts contain data from the Global Entrepreneurship Monitor, the renowned international comparative study on the topic.

FIGURE 4: AN INTERNATIONAL COMPARISON OF THE ENTREPRENEURIAL RATIO



Source: GEM (2006)

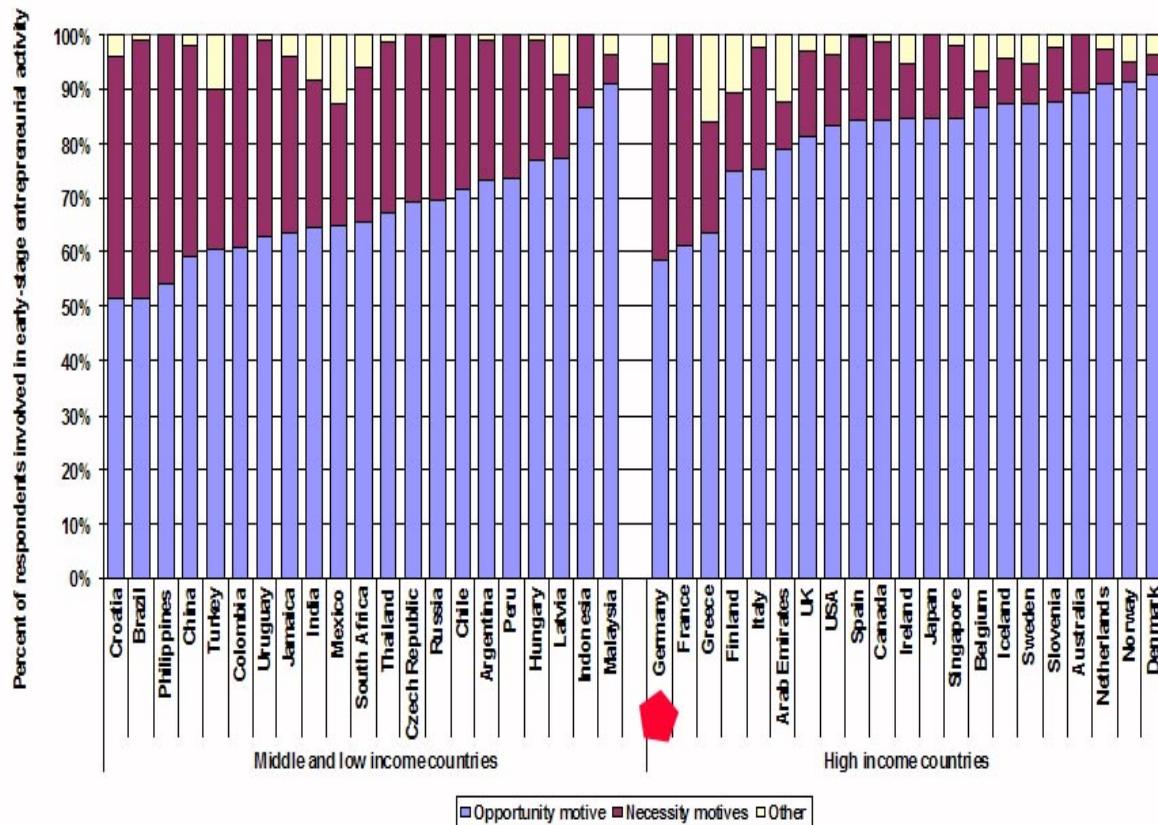
FIGURE 5: AN INTERNATIONAL COMPARISON OF THE STARTUP RATIO



Source: GEM (2006)

Furthermore, the number of startups that believe they have a promising business opportunity is lower in Germany than in other countries with high incomes.

FIGURE 6: OPPORTUNITY VS. LACK OF ALTERNATIVE AS REASON FOR STARTUP



Source: GEM (2006)

Various factors are behind these data: the promotion of *Ich AGs* (subsidies offered from 2003 to 2006 to the unemployed who wished to become freelancers), most of which would fall under the category of "necessity motives" here; the great bureaucratic red tape that founders have to work through; and other special aspects and drawbacks of startups in Germany.

The misleading model of "existence founders"

In Germany, incentives to promote the founding of companies are talked about as "founding an existence" (*Existenzgründung*). In English, one speaks of "serial entrepreneurs" – people who have the special talent of identifying a business opportunity and founding new companies. There is no such term in German. *Existenzgründer* are people who, if we take the term literally, do not initially exist until they found the company, with which they stay for the rest of their lives.

This concept conflates the founding of a company and the management of its growth, each of which requires different talents and skills. Some people are perfect founders, but not ideal managers for a growing company that increasingly becomes anonymous and bureaucratic. Others are excellent managers for a fast-growing firm but would feel queasy about launching their own startup with all of the uncertainties that entails. Other countries have various types of exit options for notorious founders. In Germany, such options are not well-known, and there is little industrial-policy activity focusing on strengthening the market for companies poised to grow quickly, for instance.

But the misleading model of "existence founders" is not the only thing that is a setback for startup incentives in Germany. In addition, the incentive structure unfortunately focuses on the founding of industrial firms. Most incentives are based on a single assumption: a lack of

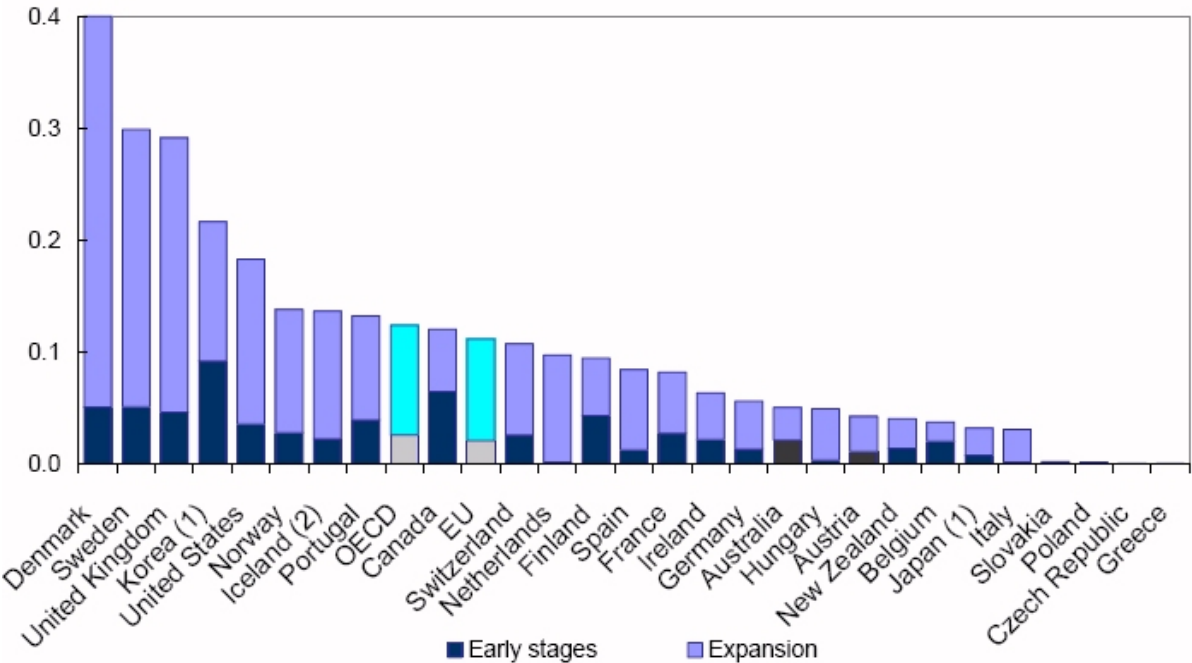
investment capital. This assumption often holds true for startups in the processing sector. In contrast, startups in the service sector face different challenges not properly addressed by incentives in Germany.

Furthermore, the question is also whether incentives should primarily encourage fresh college graduates to found companies. For some time now, German policy has placed great hopes on this target group. But why should people in their late 20s who have no capital, no business experience, and no business contacts be expected to successfully found companies? Shouldn't we be focusing on 40-year-olds with comprehensive work experience and good contacts – people who have discovered that their careers have practically come to an end? Are they not more promising company founders?

Silicon Valley – the misunderstood paradigm

This line of argument leads to the conclusion that German incentives for startups are based on questionable assumptions that may not have been adjusted to reflect the changing economic realities of the 21st century. Take, for example, spinoffs from German universities. They are modeled after Silicon Valley. For a long time, Silicon Valley has been an important, if not trendsetting role model for innovation policy in other countries. Yet, attempts to repeat the success of Silicon Valley were generally not very successful, partly because the factors leading to the success of Silicon Valley were not properly understood. For instance, it is extremely unlikely that an employee of a state economic incentive organization will behave the same as a venture capitalist in Silicon Valley, such as in terms of willingness to take risks. But most of all, the breadth and depth of the supporting services available in Silicon Valley have been systematically underestimated, and while this system continued to develop in Silicon Valley, German economic growth promoters continue to focus on finding potential business angels and creating venture capital providers who are averse to risk (to little avail, as the following chart shows).

FIGURE 7: RATIO OF VENTURE CAPITAL TO NEW INVESTMENT / GDP (2005)



Source: OECD (2007)

There has been little talk about an additional new trend related to Silicon Valley: the transfer of the Silicon Valley model from pure information technology to other sectors, especially biotechnology, new individual transport technologies, aviation and aerospace, and renewables. Here, actors from the private sector are providing a lot of momentum at speeds usual for them. It will be hard for political actors in other countries to create or reform public structures in order to keep up with this pace of innovation.

What conclusions are to be drawn from the investigation of this important part of industrial policy? They are sobering. Current industrial policy is not up to date, and its effects are unsatisfactory. In other words, to take up an important distinction from innovation economics, the further development of industrial policy does not require incremental innovation, but radical innovation.

7. Outlines of postmodern industrial policies

Doing away with "progress"

The target of industrial policy as a process of catching up was modernity. The goal was to force a premodern society into a process of industrialization that not only increases productivity and produces greater prosperity, but also modernizes society in such ways as individualization and differentiation. In leading industrial nations, industrial policy was an expression of the battle for position within the Triad hierarchy. In both constellations, industrial policy stood for a type of state action in which a forward-looking administration provided for progress in economic development.

Today, the basic conditions for industrial policy have changed. Such phenomena as climate change have undermined belief in progress. There is also widespread skepticism about the state's ability to coordinate. The structure of actors is becoming more fragmented; interests, more diverse. The global economy is becoming multipolar, and it will not be long before the share of old industrialized countries makes up less than 50 percent of global domestic product.

Against this backdrop, we not only have good reason to speak of "industrial policies" in the plural. Furthermore, we would be well advised to think not only about "modern" versions of industrial policies, but also about "postmodern" types that are no longer based on a generally accepted concept of progress; instead, the formulation of the concept of progress should itself be a central element of industrial policy.

Four types of industrial policy

This perspective allows us to come up with a matrix of four types of industrial policies. Along one axis, we find modern and postmodern industrial policy. Along the other, a distinction is made between a narrow and a broad perspective on industrial policy. The narrow perspective focuses on the goal of increasing competitiveness. The broad perspective takes into account overlapping, complementarity, and potential synergies between industrial policy and associated policy fields.

TABLE 3: FOUR TYPES OF INDUSTRIAL POLICY

		Paradigm	
		<i>modern</i>	<i>postmodern</i>
Perspective	<i>narrow</i>	(1)	(3)
	<i>broad</i>	(2)	(4)

Source: own research

These four variants are not necessarily alternatives. Industrial policies continue to be formulated and implemented at the local, regional, national, and supranational level. In principle, each type of industrial policy can be implemented at each of these levels. In all likelihood, the actors will, however, intuitively have a preference for certain variants at different levels. Let us take a brief look at what each of these variants could look like:

(1) **Focus on competitiveness:** Natural structural change and changing requirements due to the shift in the global economic hierarchy are accepted as cornerstones of industrial policy. They create new challenges for political intervention to strengthen

competitiveness. With its focus on strengthening ability to innovate, the Lisbon strategy probably belongs in this square.

- (2) **Focus on overlapping with social-policy goals:** Industrial policy overlaps and interacts not only with research and technology policy, but also with education policy, for example. German education policy's rationing of educational opportunities leads to social selection and societal stratification. Industrial policy can react with initiatives to strengthen sectors that offer income opportunities for people with low levels of education, as is done in the free production zones in Central America.
- (3) **Focus on growing markets:** "Ecological industrial policy" already gives us an idea of how targeted intervention can reinforce economic sectors that have especially good growth chances in the context of climate change and rising prices for natural resources. Industrial policy can use instruments that go beyond the ones currently used to support the setup and growth of such sectors. Such concepts as Factor 10, an economic proposal based on dramatically lower resource consumption, go much further. If this concept were widely accepted as the goal, far-reaching industrial policy intervention would be required to launch a radical structural change.
- (4) **Focus on overall societal control: Modell Deutschland,** which dominated a long phase of post-war development, was a pattern of social market economics controlled by corporations. This model has fallen apart, but no new model has replaced it. Some societal groups wish to have a libertarian economic and societal model based on the Anglo-Saxon example (such as metalworking employers in the New Social Market Economy Initiative). One can also imagine other models not based on existing foreign examples, but stemming instead from a creative design process against the backdrop of changing basic rules and new challenges. This sort of industrial policy would be a core element of social policy, especially in the search for a successor to *Modell Deutschland*.

Limits of network coordination

Conventional industrial policy works with strict control media, especially money and law. The law remains an important means of control in the context of state duties, in which the state influences economic structural change with regulations – whether well-planned or not. Like current initiatives, for instance in the field of research and technology policy, most conventional industrial policy nonetheless worked outside of the sphere of state duties – and hence outside of the shadow of the hierarchy. Here, the state offers/offered financial incentives in an attempt to control economic structural change. Over time, soft control media were added to this approach, for instance when sectoral or territorial policy networks were established.

In the political science discourse of the early 1990s, policy networks were considered a promising response to the "implementation crisis" – in other words, the failure of hierarchical coordination attempts in the 1970s. Since the 1990s, however, the limits of policy network coordination have also become obvious: such networks are time-consuming, tie up human resources, and overwhelm a lot of interested, relevant actors. The same conclusions could be drawn for ambitious regional development programs with a broad approach, such as Emscher Park, an international construction exhibition in Germany's Ruhr Area.

In practice, more frequent use of policy networks leads to a differentiation and proliferation of networks, resulting in fragmentation. From the viewpoint of a given locality, there are relevant policy networks to promote business, labor market policy, research and technology policy, urban development policy, and other fields – and the same networks exist at the local, regional, state, federal, and EU levels. Some actors are simultaneously involved in several of these networks (and then hardly have the time to take care of their actual work). Other actors focus on individual networks (and then do not have any input in other networks working on

similar or complementary issues). In the end, the result is a coordination crisis of the second order (Meyer-Stamer and Giese 2004). Should we then simply do without networks? The answer is no, because there is often no useful alternative. But we have to have a realistic estimate of how many issues can be handled in networks and where the capacity limits are.

Let us now come back to the statement that markets, hierarchies, and networks are the three basic types of coordination. After the crisis in hierarchical control, we have been witnessing a crisis of network control for some time now. Attempts to control markets have also worked in some cases and failed in others. So what do we do?

One possible answer is network and market coordination, but more competently than in the past. Network control has developed as an organic process, becoming in some cases – but not everywhere – professional (as is reflected, for instance, in the growth of specialized moderation firms). A significant number of those involved viewed network control with unease and dreamed of the "good old days" of the "golden reins." But those days will never return. As a result, the requirements for state action, state structures, and the competency profile of state officials are changing. Governmental institutions, especially at the federal and state level, have reacted to these changing requirements, but only to a limited extent.

Designing markets instead of choosing technologies

In the recent past, attempts to control markets have sometimes been based on the naïve belief that markets work by themselves if governments just get out of the way. That is, of course, not so. There is now comprehensive literature on "designing markets" (McMillan 2002, 2003).¹¹ In Germany, it is easy to find examples of market failures brought about by the state – for instance, allegedly market-controlled competition between hospitals, which is doomed to failure because of the massive informational asymmetry between providers and customers. It is much harder to find examples of successful market design in Germany.

Why would anyone want to design properly functioning markets, and where is the nexus with industrial policy? For instance, take renewable energy, by far the most successful example of a German market brought about by the state. Here, there is a wide range of technological options and alternative business models. In the conventional industrial policy, the state probably would have picked and chosen based on advice from a committee of experts. This kind of procedure has already led to such technology and investment dead ends as breeder reactors, which are the starting point for standard arguments against industrial policy per se. But when an industrial policy focuses on setting up a properly working market in a specific field, this criticism is beside the point. The important thing is that a stable business environment be created for a relatively long term, which is exactly what was done in the Renewable Energy Act, for instance. Here, a market-controlled search process can begin, possibly leading to technologies and business models that no one can imagine today.

But what do you do when you simply have to pick and choose? Or when the creation of markets requires specific parameters to be determined, an aspect of the current Renewable Energy Act that is being hotly debated at the moment? In this case, forecast markets are useful; here, a sufficiently large number of people with the requisite professional expertise and interest in a given topic trade virtual shares, such as shares in different technologies, different price relations, or other alternatives. This approach has proven to produce a "wisdom of crowds" that is better than the expertise of even the most competent individual experts, and the results are far better than those of expert commissions, which are usually not very diverse (Surowiecki 2005).

¹¹ Cf. i.e. *American Economics Review*, AEA Papers and Proceedings, Vol. 95, May 2005, No. 2, S. 364 ff (24.07.2008).

8. The lack of state control in Germany

Fragmentation

The state is the central actor in industrial policies. But what about the coordination competence of state authorities at the local, state, and federal levels? What can we expect of them, and what not? Is there a relation between industrial-policy content and the state's coordination competence?

Especially in federal and state ministries, the structure of the German state has not fundamentally changed since the Stein-Hardenberg reforms of the early 19th century. An important incremental change was the increase in the number of ministries in the second half of the 20th century to keep up with new issues – and often with new problems (for instance, such interdisciplinary issues as innovation and the environment). New interdisciplinary issues were often interpreted as "sectors" and made the mandate of a newly created ministry, which then had to decide whether to look for niches of independent action or constantly cause friction with other ministries. As a result, state structures were increasingly duplicated and fragmented, and coordination capability dropped.

Underdeveloped organization development

In addition, the practice of organization development in state organizations is uncommon in Germany. Today, private firms have large change-management departments that professionally moderate the necessary change processes. Especially at the state and federal level, however, external organization consultants and change facilitators are only sometimes used in public organizations. Changes here are mainly made by shifting around boxes within the organization's structural diagram, an approach that does not do justice to current challenges.

Insufficient professionalization

Another indication of structural problems at ministries is the staff profile. Most high-ranking officials at ministries have legal training. It cannot be assumed that a degree in law adequately prepares people to moderate a policy network in a section of industrial policy competently. In municipalities and regions, no one has a degree in state aid because Germany – unlike other countries – does not offer any such degrees, but rather only brief further training courses. Such staff therefore have to become more professional and learn more skills so the state can cope with these new challenges.

No systematic approach

Furthermore, other countries – especially in the Anglo-Saxon world – place greater store in the systematic management of industrial policy. The tools used include:

- Evidence-based policies; in other words, political programs have to be systematically based on empirically determined facts and on specific intervention, with an explicit reference to the market failure addressed.
- Political intervention outside of narrowly defined structure policy is subject to a regulatory impact assessment, which looks into the expected effects on companies.
- Projects and programs are systematically monitored and evaluated, often from the outset.

- Knowledge management is used to connect these various tools.

Germany has no structural reporting (any longer) so that no single actor can truly understand the goal of structural policy. Furthermore, there is a lack of reporting on structural policy to explain which instruments are used where to what avail. One of the problems in industrial policy is thus that instruments are implemented but not subjected to any systematic monitoring. Incremental improvement processes can then turn out to be erratic, and an instrument often turns out to be unsuitable, although it pursues the right philosophy, merely because it is improperly implemented. One example is startup incubators (“Gründerzentren”), a number of which are performing quite well, while others have failed. The idea that startup incubators are fruitless is common, but unfounded.

Focusing learning processes

What we need is thus a greater focus on learning in the context of industrial policy. At the individual level, this means better training and more frequently offered further training. The organizational level requires professional knowledge management, the provision of resources for managing communities of practice, a new focus on network management, and professionalization of change management.

Five levels of action

Industrial policy takes place on at least five levels: local (especially as part of municipal economic aid), regional (such as in greater metropolitan areas), state, federal, and EU. These levels are linked in top-down fashion, for state, federal, and EU industrial-policy programs are central financing sources for local and regional initiatives. In return, the experience from structural-policy programs at the local, regional, and country level have gone into the EU's industrial policy, which has launched an evaluation process in a number of industrial-policy fields.

Local and regional level: *neglecting competition.* At the local and regional level, cluster initiatives have been added to the usual instruments of economic aid (opening commercial zones, marketing localities, and protecting investments) over the past few years. Generally, territorial industry initiatives are behind such actions. From the vantage point of coordination theory, the principle is usually based on networks and occasionally on hierarchies (especially when the economy does not get going as a result of state initiatives), but never on markets. As a result, important opportunities are not taken advantage of; after all, cluster research has repeatedly emphasized over the past 20 years that intense local rivalry is the main reason behind the great competitiveness in clusters based on intensive innovation processes.

State and federal level: *competition for state aid.* At the state and federal level, a new instrument – Contests (like BioRegio or InnoRegio) – has been used since the 1990s; here, regional networks of actors in particular are called on to come up with strategies for the funding provided. The most convincing strategies then receive funding. This approach corresponds to the principle of “strengthening the strong” and stands for the transition from hierarchies to networks.

European level: liberalization and intervention simultaneously. In terms of creating properly working markets, the EU is especially active in gradually liberalizing markets with monopoly structures in an approach known as salami tactics. In terms of industrial policy, the EU is in an interesting position. On the one hand, it consistently pursues its market agenda, including by controlling subsidies. On the other, it supports a number of explicit industry-policy initiatives – not only what it calls industrial policy itself, but also regional structural policy and research and technology policy. A number of onlookers have proposed linking the

various EU agendas, such as the Lisbon Agenda (competitiveness) and the Göteborg Agenda (sustainable development) in a "Lisborg Agenda."

Beyond market fundamentalism: industrial policy as social policy

The core question in industrial policy today is not whether we should have more solar energy or cellulose biodiesel, nor whether we should have nanotechnology or bionics. Rather, the big question is how society can regain its freedom of action at the local, regional, and national level. In particular, how can state organizations, which have lost their legitimacy by increasingly becoming caught up in the tradition of extremely detailed control efforts, regain their freedom of action?

There are a lot of reasons to believe that the phase of market fundamentalism is coming to a close; after all, it has not produced the promised outcome by and large. The question is whether the pendulum will now simply swing back into a position of more traditional state interventionism or whether the opportunity can be used to find innovative forms of intervention. In the process, it will be important to further develop each of the three coordination forms:

- Markets, by specifically designing them so that the most promising technical and organizational principles of sustainable development can be identified in competition
- Hierarchies, for example by implementing environmental taxation and legislation, but also by improving the competence of state institutions and ministries in particular
- Networks, especially by focusing network control on issues where neither the market nor hierarchies promise to be successful

It would be unfortunate if industrial policy mainly existed as a box within a federal or state economic ministry's organizational diagram. Industrial policy would then have too narrow a focus on "international competitiveness" as a knee-jerk reaction. It would be much more interesting and relevant for industrial policy to be debated in a broader context and in a postmodern spirit. Industrial policy is social policy. Conventional assumptions in industrial policy would then be called into question. The discussion about industrial policy would then lead to a discussion about the direction in which society wants to go. Does it want to continue to react to apparent imperatives created by globalization, or does it want to help shape the future?

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