

Dynamic Germany

The Role of Policy in Enabling Markets

REBECCA HARDING

Modell Deutschland has drawn much criticism in recent years. It has been roundly condemned as, at best top-heavy and inflexible and, at worst, defunct in an economic era characterized by dynamic, market-based operations and radical innovation. It is inflexibility, especially in labor markets, that has damned Germany in the eyes of »Anglo-Saxon« policy makers during the 1990s and into the 21st Century. Low-cost, flexible labor markets are seen as key to competitive success and Germany fares badly in this area. As evidence, politicians, journalists and academics alike cite worryingly high levels of unemployment throughout the 1990s until now. Not only does Germany have an apparently insurmountable problem in its intractable level of unemployment, but it also has had successive administrations which appeared incapable of introducing the »enabling« policies necessary to allow the market to function more effectively. In short, inflexibility appears to be rigor mortis in comparison to the dynamism of the Anglo-Saxon model.

However, the case of Germany, its future competitiveness *and* the nature of its »Neue Mitte« warrants further investigation. In particular, there is evidence to suggest that prophecies of doom are somewhat premature. Germany's venture capital industry grew by 62 percent between 1999 and 2000 and has grown by nearly 500 percent since 1996. By the year 2000 there were almost as many biotechnology firms in Germany as in Britain and the »Neuer Markt« had established itself as the leading European hi-tech stock exchange. Policies to stimulate innovation and regeneration in the »Neue Bundeslaender« through the Innoregio program are proving effective, if not in substantially reducing the levels of unemployment amongst older people trained under a different system, then in laying the foundations for strong performance in the future. Perhaps most convincingly of all, German export performance has been consistently strong and the technological component of exports is increasing again. As one leading European Venture Capital company manager said

recently, »there's something really interesting going on in Germany that isn't happening in Britain. We want to be part of that.«

The problem, then, is to explain the »something« that the Venture Capitalist identified. In general terms, events in the labor market are only part of the story and the case of Germany clearly illustrates this. German labor market performance is still unimpressive with unemployment rising again above four million in 2001. Growth similarly remains sluggish and growth forecasts are currently being revised downwards. Yet »Wirtschaftswoche«, not normally noted for its optimism, pronounced Germany the IT powerhouse of Europe, and commentators on the micro economy are consistently impressed with the rate at which, at a market level, the innovative capacity of the economy has adapted to incorporate biotechnology. It follows that if we are to understand the nature of national systems in a new »global« paradigm, we need to look beyond the unemployment figures. In particular, commentators and analysts should look at the inter-relationship between policy and institutional adaptiveness that creates sustainable changes in the innovation system.

It is time to move the debate away from tired notions of macroeconomic performance and towards understanding the real source of competitiveness within the German economy.

Any discussion, therefore, has to focus on the sources of innovation in its broadest sense within an economy and the degree to which policy can affect the rate at which a process of institutional adaptation can take place. Exogenous change is endemic through history. Thus interest lies, not in the change itself but in the process of adaptation to change. Competitiveness in the »global« era is no exception to this.

This paper argues that Germany's »Third Way« is historically based in the political structures that have, over centuries, adapted to changes in the competitive environment successfully and with remarkable institutional resilience. In particular, the paper suggests that the complex set of connections between institutions within the German »system« are enabled through policy and that this »Third Way« structure is actually more similar to the US system than is commonly assumed. Indeed, there is historical evidence to suggest that the US system of innovation was actually derived from German structures! Far from being undynamic and uninnovative, therefore, Germany is actually shown to be highly adaptive and capable of competitiveness in the global era.

So, the paper's central contention is that competitiveness stems from the capacity of enabling policy to stimulate effective institutional adaptation. This is the essence of the Third Way – it is not an Anglo-Saxon paradigm. Rather, it is a mechanism by which policies to facilitate and widen participation in key markets (for example for labor, or innovation) are co-ordinated in the wider interests of macroeconomic performance.

So what is an enabling industrial policy?

It is worth dwelling for a moment upon the exact nature of industrial policy in a globalizing economy. Since the early 1990s there has been a marked decline in interest in industrial policy both as a valid area for academic research and as an area for government attention. This, of course, reflects the hegemony of market-based neo-classical economics during the 1980s and 1990s. Put simply, industry is the domain of markets and microeconomics. Markets function best without government intervention. The logic of this position is to leave industry to fend for itself, free from the induced market imperfections of government intervention.

So why debate what is acknowledged to be an unfashionable topic? As seen above, British politicians have for a while now talked about the virtues of flexible labor markets and the »new« economy – further evidence of the hegemony of markets. The praises of a dynamic »Anglo-Saxon« model have been sung and, in relation to her European counterparts it appears that Britain is doing rather well. Indeed, with unemployment and inflation at their lowest levels for 25 years, surely there is strong evidence to suggest that a less interventionist model works?

Why is there this mismatch between macro and micro economic performance – where Britain performs well at a macro level but less well in individual markets while Germany performance is still relatively weak in terms of macro indicators but strong at a micro level? The contention here is that the Anglo-Saxon model as it is commonly articulated is still dominated by the traditional economic arguments about government intervention. Put simply, either the government intervenes along traditional Keynesian lines to provide block finance to specific schemes, industries or regions or, to coin Thatcher's phrase, the frontiers of the state are »rolled back«. In other words, there is a stark choice – blunt intervention versus no intervention. And, in the interests of low prices and controlling public expenditure the UK has tended to favor the latter.

Indeed, during the 1980s critics even argued that America's economy was an »old« economy. Its structures and its systems were structured around a cold war need for strong defense research and development (R&D) with only limited transfer to non-defense sectors. Employment structures were Fordist and inefficient compared to the flexible specialization structures of Japan and the Newly Industrializing Countries. Germany was criticized during the 1990s for exactly the same reasons. Its employment system was inflexible and geared towards heavy manufacturing and the scope for creating a new and flexible labor market based on innovative start-ups was, at best, limited.

Yet neither economy could be seen as out-dated at the beginning of the 21st Century. How have structures adapted to ensure competitiveness in a world dominated by rapidly advancing technologies and global markets?

The answer, then, lies in the word »adapt«. The rate at which countries' systems and infrastructures change to ensure both sustainable development and competitiveness is their intrinsic adaptiveness. Germany and America are particularly good examples of adaptive economies. Both have built infrastructures on the basis of technologies initially developed elsewhere. Both have mechanisms for defining international competitive trends and implementing catch-up measures. And both have policy formulation and implementation structures where public sector organizations can be the funder and, if necessary, the initiator of a particular policy to instigate institutional adaptiveness.

In both countries, markets are seen as the most effective means of allocating resources. However, and this is central, there is also an acute awareness in both countries that sometimes measures have to be taken to enable these markets to work effectively. The means of quiet facilitation of markets are quite different from the heavy and blunt interventions of macroeconomics. Such interventions have their place in both countries. However, alongside this expenditure, both countries have »bridging policies« where the State will come in as a partner to facilitate wider investments in specific priority areas. That is, the government performs a bridging role between individuals and participation in the market as gaps arise.

This necessitates a clear and incontrovertible distinction between public and private goods. The government pays where the benefit is general and transferable while private sector organizations »pay« where the benefit accrues solely to them. Where the distinction cannot be made clearly, and venture capital is a good example of this, the government steps in to

mitigate the risk of the private sector by providing guarantees on investments should private sector profits not materialize. This is the essence of public-private partnerships and innovation and industrial policies are clear beneficiaries of this type of approach.

In short, then, the approach is one of Social Markets. It is not necessarily cheaper. For example, total state aids to regions in Germany are roughly twenty times higher than equivalent state aids in the UK, while German aid to small business is, roughly, eight times higher.

A neo-classical economic faith in the self-correcting power of markets is flawed since markets in themselves will not create flexible and dynamic institutional infrastructures.

In the 21st century, then, there is a »Third (or middle) Way« between the extremes of economic orthodoxies that is the domain of industrial policy, and that politicians in particular need to articulate. The international economy is market-based and this must form the cornerstone of any policy formulation. The challenge for policy makers is to turn this market into a »Social Market«: to take policy measures that enable individuals to participate in markets rather than to be excluded by virtue of their skills, their geographical location, their access to finance or their educational background.

The term »Social Market« is not new and, in fact, has been more commonly applied to the Rhenanian Capitalist model of Western Germany in the post-war era. This model was much vaunted by outside commentators during the 1980s as an example of how to create integrated and co-ordinated policy directed at particular micro level initiatives. Industrial, regional and national level »social partners« were instrumental in creating a strong domestic base with low inflation and low unemployment. This system had strong welfare provision, high level skills, strong innovation and embedded long-term perspectives in corporate and political decision making. In short, it was a quasi-coordinated market-based economy that, in an era of Thatcherite laissez-faire economics seemed the bastion of stability and sound economic management.

The role of market enabling policy, then, is to lead the debate about a nation's competitive position and to put in place the coordinated strategies for improving it. It is the interface between the macro and the micro economy – accepting where an economy is not world class in all sectors

and providing the enabling policies to bridge such performance gaps as they arise. This is the essence of »Third Way« industrial policy.

Historically, the German system has proved itself capable of producing hi-tech and high value added innovations and adapting itself to exogenous paradigm shifts. The inherent dynamism of the system is such that it can successfully adapt to new markets and new technologies. Inflexible labor markets and sluggish growth that have been endemic since the early 1980s have masked this dynamism and flexibility at the micro level of the German economy.

It is time to move the debate away from tired notions of macroeconomic performance and towards understanding the real source of competitiveness within the German economy. This lies in its innovation system and it is to this that the discussion now turns.

Evidence of enabling structures and policies

The evidence for the intrinsic dynamism within the German system that has allowed it to be remarkably resilient to dramatic changes in the external environment is grouped into three categories:

- ▶ *The internationalization of R&D*: Since we are trying to understand the inter-relationship between the German system and the global economy it is helpful to have a picture of the historically based international activities within the German system.
- ▶ *Policies and structures within the German innovation system*: An analysis of this allows a picture of the funding delineation between public and private goods to be developed.
- ▶ *Competition and market structures within the R&D system*: If any picture of competitiveness with the Anglo-Saxon model is to be convincing, the sources of innovation at a market level have to be identified.

Internationalization and specialization of R&D

It is particularly in the area of global technological specialization that a true picture emerges of how cumulative is *national* expertise. Earlier studies have shown that countries have tended to narrow their technological specialization and become more focused on areas of historical competitive advantage. This makes a country an attractive location for foreign-owned R&D in those sectors. Simultaneously however, partly as a result

of a shift towards »global« strategies in which diverse activities are integrated across national boundaries, the major firms have tended to broaden the extent of their technical specialization (drawing on a wider system of related technologies to support their core strengths). Firms starting from technological advantage in areas of national specialism in their home country build on this strength to develop into new and related areas. Thus the role of policy in supporting domestic specialisms in R&D is critical both in providing the support for indigenous companies in their development of core technologies *and* in creating a conducive environment for the inflow of R&D from abroad.

Both Germany and the US have very strong historically based »Third Way« policies.

German R&D has been increasingly international since the early 1980s, that Germany is an increasingly attractive location for foreign-owned R&D (particularly in electronics, chemicals and motor vehicles). Further, German companies sustain their revealed technological advantage (i.e. the level at which they patent relative to their foreign counterparts) in areas of traditional technological strength and specialization. Statistical surveys show:

► *German national technological strength is focused in five industries:* chemicals, pharmaceuticals, electronics, motor vehicles and metals. Any diversification undertaken by the major German companies in these industries has tended to strengthen rather than weaken their strengths in the »core« technologies of their respective industries.

► *German companies have internationalized their technological activity strategically to take advantage of expertise which exists elsewhere:* this is especially clear in pharmaceuticals and semiconductors. It suggests that they conduct leading-edge research in focused areas *and* are well placed to take advantage of any innovations which are conducted outside of Germany. Indeed, German technological strength has always been built on the ability of its companies to exploit research conducted elsewhere and this should not be regarded as automatically disadvantageous or uncompetitive in any way.

► *German companies, although slow relative to their British or French counterparts, have internationalized their R&D activities:* this pattern has generally increased over the period, suggesting that German companies are in-

creasingly taking advantage of technological possibilities in foreign locations. In the »global« world of the 21st Century, this is a competitive advantage rather than a competitive disadvantage.

Unique structures and funding for R&D

Of central importance in the intricate relationships between actors in the German economy is the balance between the funding structure of schemes that develop general and transferable competencies through public funding, and specific competitive advantage at a corporate level through private funding. This »dual« relationship is particularly clearly demonstrated in the development of technological competencies in the German economy. The system of corporate governance produces a research climate that is both reflective and reflexive – in other words, it evaluates its own strengths and weaknesses and puts mechanisms in place to resolve problems. It is secure in its long-term access to finance, its decision-making structures are integrated (through co-determination) and the workforce is highly trained and skilled. Combined with this is a consensus-based technology infrastructure which allows the general, and transferable, skills of research scientists in dedicated research centers or universities to develop prototype products in partnership with the commercial beneficiaries of that prototype: a uniquely clear delineation of responsibilities between general science and specific applied technologies.

Technology policy has been particularly effective in developing clusters around core technologies at a regional level.

To argue that the system is complex is something of an understatement. Above the »linear cascade« structure by which basic research is transferred to industrial application through a host of different technology and research institutes are the Länder and the Federal Government (Bund), the National Science Council and the Conference of Ministers for Cultural Affairs, Education, Arts and Science. These supervisory bodies set funding targets and priorities. However, several interesting points are worth summarizing here:

► *The multiplicity of funding sources for each of the independent technology transfer institutions* (Universities, Fraunhofer, Max Planck etc). These institutes receive monies from a total of four sources: industry, research

foundations, Länder, the Federal Ministry of Education and Research (and other federal ministries) and industry.

► *The inter-relatedness of funding.* In their turn, both the Ministries and Industry provide funds to the research foundations.

► *The rigid and hierarchical funding structure despite the multiplicity of beneficiaries.* Funding from governmental sources goes towards R&D and towards the administration of R&D: the intermediate administrations of the Fraunhofer Society (FhG), the Max Planck Institutes (MPG), the Blue List Institutes (AGBL), the National Research Centers (e.g. Helmholtz Centers) and Industrial Research Institutions (AiF) all accrue monies from the Länder, the Federal government and from industry separately, although some of this is passed on to specific research scientists and projects. This leads to a clear delineation between public and private research, benefit and, hence funding.

► *The relative independence of government laboratories conducting »big science« such as nuclear research.* In a structure which so greatly facilitates technology transfer, it is, perhaps, remarkable that the funding of government laboratories is simply from government sources.

► *Each of these separate intermediate organizations has responsibility for research in clearly delineated areas.* A tacit »research cartel« exists between the largest R&D structures within the technology transfer system (RH interviews, July 1998). For example, the FhG specializes in strategic and applied research for government and industry with a focus on the development of new technologies in microelectronics, civil and mechanical engineering, materials, environmental research and innovation studies. Until recently it has had little presence in biotechnology as it leaves this area of research to the Max Planck Institutes who have core competencies in basic research in related areas, largely in diagnostics. However, as a result of twentieth century German history, there is a public (and constitutional) resistance, particularly to genetic research within Germany. Thus biotechnological and genetic research tends to be conducted by small companies abroad (especially the USA). These companies operate independently but are owned by German private-sector large companies such as Hoechst, Bayer and Siemens.

Embedded consensus through »symbiotic tension«

The coordinated and systematic appearance of the system discussed above hides a competitive, market-based dynamic at a micro level that is

the essence of its adaptiveness and, hence, dynamism. The innovation market in Germany is highly contested: there is competitive tension between and within Technology Transfer Institutes for public and private money. Thus there exists within the system both market-based incentives and strong public support for innovation, which reflects the public nature of research in itself and its private exploitation. This combines with the »collaborative« (or symbiotic) approach for which the German system is renowned and with a new focus at a policy level on hi-tech areas to create an adaptive system which is both strong and, critically, well-resourced, despite a net decline in R&D expenditure.

The evidence of history suggests that it is not change in itself that is interesting in the context of the path-dependent nature of innovation. As has been argued throughout, change in itself is endemic. What *is* interesting, however, is the extent to which policy can influence the way and the rate at which a national system of innovation can itself change in response to the exogenous imperatives of global competitiveness. In the US, for example, this has taken the form of the interdependent development of the institutions of innovation (universities, government research laboratories and, critically, business) to create scientific structures that are, »less and less a matter of the independent unfolding of knowledge and more a response to technological progress in the development of a practical means to produce goods and services« (Mowery, D. and Rosenberg, N., 1999, Cambridge UP, p. 6). The key, then, is to establish the source of this adaptiveness within a particular system of innovation.

It is the Symbiotic Tension within the German system that generates its dynamism, its resilience and, critically, its adaptiveness. The key features of this Symbiotic Tension are as follows:

► *Clear delineation of research responsibilities for each institution within the system:* Technology transfer »cascades« through this system from basic science through to industrially applied R&D. Thus, for example, a Max Planck Institute with responsibility for basic science will not compete with a Fraunhofer Institute for an industrially based contract.

► *Interdependence between institutions within the system:* Where appropriate, institutions will collaborate on specific projects to combine basic and applied R&D. There is a mutual independence between institutions which is inherent to the system and which ensures that technology transfer is embedded within its organizational structures.

► *Tension and competition for funding and contracts:* Although interdependent and collaborative, institutions are increasingly competitive for fund-

ing and industrial contracts. This generates an inherent market-based dynamism which combines with substantial efforts at a policy level to create a system which is capable of adapting to radical technological change with resilience.

Germany arguably now has Europe's leading technology stock market and has nearly twice the number of young biotech companies of the UK. There was ten times the level of venture capital in Germany in 1999 compared to 1994 and some 45 percent of this went into early-stage funding for small companies. And of this 45 percent, some 99.8 percent was for technology-based projects.

This growth has been orchestrated by effective technology policy which augments existing strengths and which develops new capacities. This technology policy has been particularly effective in developing clusters around core technologies at a regional level and, critically, in collaborating with policy makers in the individual *Länder* to develop such regional-level strengths. Thus, even in areas where the catch-up task may seem insurmountable, such as Magdeburg, appropriate innovation tailored to regional comparative advantage in skills is the cornerstone to creating technology-led growth.

These policies are the oil that lubricates the multi-governance relationships between the European Union, national-level technology policy and regional level. At each level, policy makers collaborate and complement each others' activity in a manner which enhances the development of individual technological competencies. In short, then, symbiotic tension is as much a feature of the framework for policy formulation as it is of the technology transfer system. Any future research should look closely at this policy interface with the technology transfer system since it is here that the real adaptiveness of the system appears to lie. And, similarly, it is here that policy makers elsewhere, particularly in the UK, have the most to learn.

Market enabling policies: a comparison

The case of Germany suggests that innovation and science policies in particular are key »tests« of an enabling industrial strategy. Table 1 attempts to conceptualize the discussion by providing a comparison of Germany against the US and the UK. It focuses on five key areas that are derived from the discussion above. Ironically perhaps, it also illustrates that both

Table 1:
A comparison of enabling strategies

	<i>Germany</i>	<i>United States</i>	<i>United Kingdom</i>
<i>Technology is central to competitiveness debate</i>	Adaptive technology policy prioritizing sectors; demand/market-led.	Policy to prioritize sectors, university-industry research centers, research public-private partnerships.	Some progress in university/business partnerships & Faraday Centres ¹ but technology transfer largely private.
<i>Networks and alliances</i>	Networks initially coordinated through policy, stimulated by competition and collaboration amongst key actors.	Policy key in stimulating alliances and networks where none exist.	Domain of the market although cluster policy developing inconsistently across the country.
<i>Sectoral specialization</i>	Private and public R&D highly specialized to develop competitive advantage in core sectors. Inward investments build on core strengths while outward investments develop them.	Private R&D diverse; public R&D heavily focused on defense and health/ biomedicine.	Public R&D focused on defense; some measures to stimulate biotech; but increasing tendency to move R&D into the private sector.
<i>Regions</i>	Enabling markets at a regional and local level is inherent to a devolved structure but enhanced by positive relations between regions, the Berlin government and the EU.	Interventions to stimulate regional growth through »gap-plugging« measures (e.g. Small Business Investment Corporations); social entrepreneurship.	Power of central government over regions; excessive reliance on »block grant« funding formulae; no clear format for effective economic devolution.
<i>Flexibility and Dynamism</i>	Enabling inherent to the social market model through the »dual« funding system.	Policy interventions to »plug gaps« (e.g. locally based venture capital funds, University Industry Research Centers).	»Active« industrial policy of the most recent White Papers suggests awareness of dynamic role for policy is increasing.

1. See Lissenburgh, S. and Harding, R. (2000): *Knowledge Links – Innovation in Business Academia Relations*, London, IPPR.

Germany and the US have very strong historically based »Third Way« policies while the UK has, again historically, always relied on the self-correcting nature of the market!

The similarities between the US and Germany are particularly marked in the areas of technology, industrial and regional policy. Here both countries show quite clearly that flexibility and dynamism do not come simply from the free operations of markets. Government intervention is key in plugging the gaps as they arise through suitable and regionally devolved measures. While policy makers over, arguably, the last century in these two countries have built up a culture of both competition *and* collaboration amongst actors within the industrial system, the UK has tended to rely on markets to create this flexibility.

Germany, on some estimates at least, is now rated the third most entrepreneurial country in the world with the UK only ninth. It is a mistake both to see the Anglo-Saxon model as hegemonic and to regard Germany as uncompetitive on a number of grounds:

- ▶ First, the US government has a very proactive set of industrial strategies, many of which were learned from Germany at the beginning of the 20th Century.
- ▶ Second, a neo-classical economic faith in the self-correcting power of markets is flawed since markets in themselves will not create flexible and dynamic institutional infrastructures.
- ▶ Third, there is a very good example of enabling policy in Europe.

As recently as five years ago it would have seemed self-contradictory to put »Dynamic« and »Germany« in the same title. At the beginning of the 21st Century, however, what we are seeing is a major economy adapting successfully to change.