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**“European Integration and Complementarities Driven
Network Alignment: The Case of ABB in Central
and Eastern Europe”**

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**EUROPEAN INTEGRATION AND COMPLEMENTARITIES
DRIVEN NETWORK ALIGNMENT:**

THE CASE OF ABB IN CENTRAL AND EASTERN EUROPE

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Summary

The depth of industry integration between European ‘West’ and ‘East’ depends on the simultaneous existence of several factors, which, through mutual complementarities, align global and local networks. This paper takes the case of Asea Brown Bowery (ABB), one of the first large investors in central and eastern Europe (CEE), to show that the successful penetration of this company into CEE was the result of the simultaneous occurrence of several factors, which had mutually reinforcing complementarities. Changes in the strategy of ABB towards knowledge-based services may be weakening these complementarities and dis-aligning local and global networks in CEE. By integrating the insights of Milgrom and Roberts (1995) on complementarities the paper further develops the ‘network alignment’ perspective (Kim and von Tunzelmann, 1998) on growth.

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1. Introduction

The extent and nature of the linkages that are emerging between the 'East' and 'West' of Europe will strongly shape its competitive dynamics and industrial development. The accession of the Central and Eastern Europe countries (CEEC) into the EU raises the issue of whether 'East' - 'West' industrial networks will be a factor that improves the growth prospects of the enlarged EU or whether they will deepen the differences in levels of development and undermine the prospects for cohesion in Europe.

The issue of industry integration has generally been approached through econometric analysis of FDI. The underlying assumption in this type of research is that the more FDI there is in a country, the more that country is integrated into global industrial networks. The research issue here is to explain the degree of relative presence of FDI, and, hence, prospects for growth. Usually, the relative presence of FDI in CEEC is explained by such variables as the per capita GDP of the country, its proximity to the EU, or its progress in transition) (Lankes and Venables, 1996; Meyer, 1998; Brenton et al., 1998; Resmini, 2000; for overview see Holland et al, 2000). Recently, econometric evidence on spillovers has been used to explain the presence or absence of technology transfer, and thus integration, of the CEEC into European economy (Damijan et al., 2001, Knell, 1999). The underlying idea is that the effects of indirect linkages are more important for the growth of the host economy than direct effects.

This paper complements these studies by analyzing the mechanisms and processes behind aggregate evidence. In contrast to econometric results, which explain determinants of FDI at the aggregate level, we focus on the mechanisms of industry integration at the firm and inter-firm levels. While econometric evidence illustrates the quantitative side of industry integration there is also a need to understand the dynamics of industry integration from a qualitative perspective and at the micro level. Based on these two aspects, the factors of industry integration are much more complex than when analyzed at the aggregate level.

Our argument here is that the depth of industry integration between European 'West' and 'East' depends on the simultaneous occurrence of several factors, which through mutual complementarities align global with local networks. Successful alignment of global with local networks is the mechanism that produces the positive spillovers recorded by econometric evidence. This approach falls within the international business related perspective on growth, which has been recently reviewed and analyzed by Ozawa and Castello (2001).

The issue of alignment of different networks is analyzed on the case of Asea Brown Bowery (ABB), one of the first large investors in CEE. The success of ABB's penetration into CEE was the result of several factors, which occurred simultaneously, and had mutually reinforcing effects or complementarities. Changes in the strategy of ABB towards knowledge-based services may have the effect of weakening these complementarities and dis-aligning global and local networks.

The next (second) section introduces a conceptual framework within which to interpret the case of ABB in general terms. The third section outlines ABB's history and strategy. The fourth section analyzes ABB's strategy in relation to CEE. The fifth section

interprets ABB's case through a complementarity driven network alignment framework. The conclusions highlight the main points in the paper and draw policy implications.

2. Complementarities and the network alignment perspective on FDI and growth

In an increasingly interdependent world economy, growth is dependent on how countries integrate into the global economy. Patterns and modes of integration are driven by a variety of national factors as well as by the strategies of foreign enterprises. An understanding of the way in which interaction between global companies and locations takes place is essential for understanding catching-up processes in a globalised world economy.

At the industry level, growth is increasingly dependent on alignment of local and national networks with global networks and markets. Gereffi (1999) shows that participation in global commodity chains is a necessary step in industrial upgrading because it positions firms and economies on a 'potentially dynamic learning curve'. Humphrey and Schmitz (2001) and Kaplinsky (2000) expand this type of analysis by including local and national value chains. Ernst (1999) points to 'co-evolution of international and domestic knowledge linkages', which explain the catching-up process. Kim and von Tunzelmann (1998) point to the alignment of networks in explaining success in industry upgrading.

This paper builds on Kim and von Tunzelmann's (1998) -alignment of networks framework, to explain how CEE countries integrate into global production/technology networks. The key feature of this approach is the proposition that the issue is not only 'the question of developing networks but of integrating locally and nationally emerging networks with global network structures' (Kim and Tunzelmann, 1998, p. 1). In other words, the issue is about the formation of a network of networks, or meta-networks. Network alignment comes through effective coupling of the evolution of national specific systems and global (regional) production networks.

However, whether an alignment of networks will take place depends on linkages as well as on the nature of each individual network. Robust industrial networks have developed a political governance and corporate governance that match each other. In CEEC, weak national industrial networks hamper their alignment with global networks. The more developed are national and local networks, the more sustainable will be their alignment with foreign firms and networks.

Following Kim and von Tunzelmann (1998) the analytical framework for understanding these issues should have all three dimensions — global, national and local networks - as well as their interactions. Industry integration is the result of the strategies of foreign investors coupled with a variety of factors in the host economy and in the international environment. These factors operate at different levels and are driven by different governance mechanisms. Among these mechanisms, conjunction between the demand network and supply network sides is essential. By using the concept of alignment, Kim and von Tunzelmann (1998) show the co-evolutionary dynamics and mutually reinforcing supply- and demand-side driving forces behind Taiwan's IT development process.

However, we think that the notion of alignment is though potentially very powerful still rudimentary. The mechanism that underlies network alignment must be specified in each individual case and is thus of limited theoretical value. This paper tries to develop the notion of alignment. By integrating the insights of Milgrom and Roberts (1995) on complementarities we try operationalise and analytically develop the notion of alignment into heuristics, which we label the ‘complementarities driven alignment of networks’.

Milgrom and Roberts (1995) point to the problems in strategy research in achieving complementarities between the firm’s strategy, its structure, and its managerial processes. The difficulty in achieving a ‘fit’ between these three aspects has been recognized for some time in strategic management literature (see Chandler, 1962). In the context of the CEEC, Johnson et al. (1996) recognize the relevance of this problem in explaining failure and success in restructuring by two Polish shipyards. By drawing on Milgrom and Roberts (1995) they show how enterprise effectiveness depends on a coherent and comprehensive alignment between strategy, systems and structure. They show how ‘the dramatic improvements achieved by the Szczecin Shipyard have come only as a result of a positive outcome ‘on a series of highly interconnected issues, each of which was complex and fraught with potential for failure’ (Johnson et al., 1996, p.40)

Although the ‘alignment of networks’ perspective and the ‘complementarities’ perspective address different levels of analysis they share common concerns about how to ‘align’ or ‘fit’ diverse sets of factors or actors. Complementarities, Milgrom and Roberts (1995) understand as situations in which doing (more of) any activity increases the returns to doing (more of) any other (p.181). In the neoclassical framework, the idea of complementarity is defined as a situation in which marginal returns to one variable are increasing at the levels of other variables (ibid.). The novelty of Milgrom and Roberts’s (1995) approach is that formalization of the complementarities framework does not require divisibility of choice variables or smoothness of objective function. Instead, complementarity is perceived as a matter of order, and choices from sets of objects that are (partially) ordered (p. 181). The essential feature of complementarities is that ‘the choice variables tend to move up or down together in a systematic, coherent fashion in response to environmental changes’ (p. 185).

In successful cases of catching-up we can see the phenomenon of ‘fit’ between the actions of different actors or networks. However, the alignment between their activities is not centrally coordinated but represents fortunate occurrences of constellations of pull and push factors. For example, the success story of Ireland can be interpreted from this perspective. O’Connor (2001) shows that Irish FDI driven growth is a case of a good fit between several interrelated factors, operating at different levels, but occurring at the same time. For example, the competent Industrial Development Authority, which has been in the business of attracting FDI for number of years, growth in the US economy in the 1990s, membership of the EU, expansion and enhancement of the education system, improved communications, social consensus including fiscal reform are all factors that were mutually reinforcing and produced a virtuous circle of growth and welfare expansion in the case of Ireland. As Tulder and Ruigrok (1998, p. 36) show in the case of the car industry in CEE, this development in a tiered structure of countries in the region was triggered by the interaction of firm strategies and government policies - mediated by trade and industrial policies. In some cases, for instance the case of

Hungarian Suzuki, this led to a situation in which network alignment became very weak and which would be better defined as network failure (see Swain, 1998 for evidence).

However, one should distinguish between a mere evolutionary coincidence of several factors, which jointly produce a fortuitous one-off outcome and situations where complementarities operate in a systematic fashion. In the latter case, doing more of activity A raises the value of increases in activity B, which then by increasing B also raises the value of increasing A. Whether variables move together in a systematic, coherent fashion, in a way that increases in any one variable lead to increases in all the variables, is the real test of complementarity. This is much more difficult to show at network and inter-network level than at firm level because the strength of the complementarities is much more difficult to measure at network and inter-network level. This is due to the multidimensionality of networks, especially the multi-level governance nature of alignment of networks. Thus explanation of the feedback mechanisms becomes rather complicated and probably impossible to formalize.

Fortunately, the case of ABB is both sufficiently simple and complex to illustrate the power of heuristics - the complementarities driven alignment of networks -, which we are attempting to develop and apply.

In general terms, our objective function is network integration or 'deep' industry integration. The problem is defined from host country perspective rather than that of the investor firm. Industry integration is a combination of production and technology integration. Production integration is a relatively straightforward category as it can be proxied by ownership, trade and FDI linkages between foreign and domestic firms. Technology integration is rather more complicated. We define it as integration of domestic enterprises into a dynamic learning process with foreign partners in which they become involved as active contributors to and recipients of the production of knowledge for generating technical change (see Radosevic, 1999, 1999b). Implicitly, we assume that deepening integration of foreign firms into CEE economies will bring knowledge inflows, employment and spillovers. On the other hand, 'shallow' industry integration will lead to limited knowledge inflows, employment and spillover effects. Whether this will happen is dependent on several groups of mutually dependent variables at different levels. These variables are management, firm, and region (country) specific variables. We assume that the depth of industry integration is dependent on favorable complementarities between management, firm and region (country) specific variables and several external variables.

In stylized form this relationship can be defined as:

$$IId(M, F, R, E) = (M) + (F) + (R) + (E)$$

where depth of industry integration (IId) is a function of management (M), firm's (F), and region (country) (R) specific factors coupled with external (E) variables.

The perceptions of management, both at parent and subsidiary level, are essential in terms of whether the company will undertake the strategic shift towards integration into the host economy. Such decisions are very dependent on the personalities of CEOs and their individual perceptions of the situation. The degree of commitment and time spent on a specific country affects the degree to which local subsidiaries will be integrated into company global network.

Organizational type of Multinational Company (MNC) is an important factor in understanding the depth of industry integration that may take place. Conditions for the appearance of a developmental affiliate are different depending whether the MNC is highly integrated or if is loosely structured (a heterarchy) or is in between (see Young et al., 1994, p667). In highly integrated MNCs the distinction between core and peripheral activities is pronounced. On the other hand, heterarchies have many categories of headquarters; 'home country' and 'corporate level' cease to carry the same meaning. Centres of excellence can emerge in existing subsidiaries on the basis of resources that have been built up and well developed networking capabilities (Solvell and Zander, 1995). Thus, given the same level of technological capabilities, the inclusion of host economies in the global economy may differ, depending on the organizational type of MNC that enters a country. Discussion in literature shows that the organizational type may be secondary to management of subsidiary in upgrading its technological position (Young et al, 1994, *ibid*).

Host country or regional differences also play an important role in attracting foreign investors. Low vs. high cost locations, differences in factor endowments and local markets are variables widely accepted in explaining patterns of FDI. However, in economic research, motivations for FDI are very often seen as clearly defined and dependent on available factor endowments. In contrast to this, business cases show that this is a much more learning and discovery driven process with multiple motivations that change as new opportunities and 'factor endowments' come to light. In CEE, companies that initially enter because of local market often discover that there is a potential for export or even knowledge seeking investments (Pearce and Manea, 2000).

Industry integration also depends on a variety of factors that are external to the foreign investors and host economies. Timing or coinciding changes in company strategy and the external policy environment, such as the prospects for EU accession, can have a significant influence on the pace and depth of industry integration¹. Whether these factors actually determine the pace and depth of integration or are of secondary importance can be established only by examining individual cases.

According to our model, industry integration occurs only when all variables are present. The absence of one of them not only weakens the integration but might be responsible for it not taking place. 'Deep' industry integration is achieved when listed factors operate as complementarities in a systematic fashion for period of time. Sustainability of complementarities is essential for strong network alignment.

3. ABB: a brief history

ABB is a global technology and engineering group providing services in power transmission and distribution; automation; oil and gas, and petrochemicals; building technologies and in financial services. The company is a world leader in electrical engineering. ABB was established in 1988 by the merger of ASEA AB (Sweden) and BBC Brown Boveri Ltd (Switzerland), two national champions. For both companies, merger was the only way to survive and grow in a market where economies of scale and

¹ For econometric evidence which shows important role in EU accession announcements on direction of FDI see Bevan and Estrin (2001).

global presence had become increasingly important. The overwhelmingly successful merger of these two companies became a standard for Europe-wide restructuring, which was faced with the deregulation wave of the 1980s/'90s. ABB has become a globally connected corporation – one that is both centralized and able to reap economies of scale and decentralized in order to be locally responsive (Barham and Heimer, 1998).

The ABB group has 175,000 employees in 1,000 companies across more than a hundred countries worldwide. It generated revenues of \$22,967mn (2000) of which more than 50% came from Europe, 25% from the Americas, 12% from Asia and 8% from the Middle East and Africa.

ABB began operations in an environment that had seen significant changes in the power engineering industry, in particular, the deregulation of electricity markets. This prompted the establishment of smaller plants, which could take advantage of high prices and be switched off when prices were low. This, in turn, increased demand for microturbines, which made it possible for small energy consumers to generate their own electricity. Ongoing deregulation led to higher demand for turnkey system solutions.

These changes were followed by an increasing trend towards combined- cycle gas turbine (CCGT) power plants and away from simple-gas cycle turbines. In much of Western Europe, these CCG turbines have emerged as the most popular technology. Of the 8.5GW of gas fired systems, more than 50% was ordered by the new breed of independent power producers, many of which did not operate in the current form in Europe in 1980s/early 1990s².

Continued privatization and deregulation and the corresponding growth of independent power producers increased demand for innovative financing. This led to the increased importance of finance, as companies had to be able to support sales, provide finance, and risk management tools for their group's industrial segments.

It is within this industry context that the new ABB began to operate. Apart from aspects of the merger, meeting these challenges required several bold strategic changes. How ABB managed to meet these challenges is now a matter of business history as ABB's successes have been analyzed in several books and many case studies. In brief, the outcome was that ABB, as Fortune (October 1999 issue) put it, became 'one of the world's most admired companies'. Barham, Kevin and Claudia Heimer, (1998) call it 'the world's favorite case study' (p. 202).

ABB's success is based on its high degree of decentralization, its multidomestic strategy and its unique global matrix structure.

The next section describes the main strategic and organizational features of ABB through a historical overview of company growth.

Becoming one of the world's most admired companies: Percy Barnevik (1988-1997)

Percy Barnevik, ABB's first CEO, is credited with the company's pioneering approach to the challenges it faced, and in particular for the way company combined a global strategic thrust with the autonomy of local operating units. ABB is thus seen as providing a model of future developments in the large MNC.

² Marsh, Peter, Survey: World Energy: UK leads continent's gas fired growth, *Financial Times*, 10 June, 1999.

The overall aim of ABB at that period was to become a 'globally connected corporation' i.e. to have manufacturing plants in domestic markets that remained close to ABB companies not having production capacity there. ABB used its global network of rationalized, focused plants to become the world's lowest cost producer and a complete supplier of all-relevant products and technologies in its core areas (Barham and Heimer, 1998). This form of reorganization has been termed by Bartlett and Ghoshal N- form in terms of three core processes:

- the *entrepreneurial* process in which front line operators become key strategist and decision makers constantly creating new business opportunities;
- the *integration* process in which middle managers convey information across the organization and to and from external partners;
- the *renewal* process in which top managers provide inspiration and a sense of purpose, frequently challenging the status quo³

Bartlett and Ghoshal see an organization such as ABB as a 'portfolio of processes' rather than a 'hierarchy of tasks' ⁴. The problem with the N-form of organization or matrix form is that it easily becomes overly bureaucratic. ABB overcame this problem successfully, which made it a model that is difficult to emulate. The keys to its success are not only product technologies but, more importantly, process advantages. Percy Barnevik, explains the importance of process technologies in the following way:

'Process advantages (...) offer by far the best route to lasting competitiveness. You can be a leader in technology but it never gives you a long-term competitive edge. Process advantages are longer lasting because you do not get down from 50 days to 15 easily. If you really make a leap here, you can get a three-to-five year advantage'⁵

ABB established 1300 companies as discrete business entities, each with around 200 employees and \$25m in annual revenue. Barnevik's idea was to create a federation of companies where employees would lose 'the false sense of security of belonging to a big organization' ⁶. Business units were to be decentralized and entrepreneurial, based on open information sharing networks. Performance figures for each business unit would be simultaneously published across networks, league tables were encouraged, and internal benchmarking was and is an ongoing process⁷. This has led to an organisation bearing the slogan that it is 'being local world-wide'.

Somewhat in contrast to this stylized picture Blanger et al. (1999) uncover a more complex picture of ABB, one in which the business areas' global programmes provoke a highly variable set of responses in individual plants, depending on such factors as the plant's history, institutional arrangements, local and international market conditions, and relations with customers (Blanger et al., 1998).

³ Hope, T and J. Hope, Chain reaction, *People Management*: London, 25 September, 1997.

⁴ Sumantra Ghoshal and Christopher Bartlett, *Managing across borders: The transnational solution*, London: Hutchinson Business Books.

⁵ Kennedy, Carol, ABB's sun rises in the east, *Director*, London, Sept. 1996

⁶ Hope, T and J. Hope, Chain reaction, *People Management*: London, 25 September, 1997

⁷ *ibid.*

While much admired and attracting praise for creating the first multi-domestic and global company Barnevik was unable to bring a focus to the sprawling global empire. By 1997, sales in traditional ABB businesses, like power plants and heavy engineering, had ground to a halt. This was coupled with the Asian financial crisis where ABB had long-term commitments. Analysts think that ‘they were just in too many businesses, which was a reflection of the activities of the old Swedish and Swiss companies’⁸.

During Percy Barnevik’s period as CEO, ABB entered CEE by acquiring local companies in almost all the CEECs. He was very committed to expansion in the ‘East’ and ABB managed to successfully integrate CEE subsidiaries into their global operations.

Intermediate stage (1997-2000): Goran Lindhal: bringing focus and moving to technology and services

Goran Lindhal took over a company very much in crisis. He made dramatic moves into technology and services and shifted the company away from its traditional heavy engineering activities. As Lindhal said, ABB had entered an era of stagnation, an era in which traditional industries did not grow anymore. Then came the Asian collapse and \$6bn worth of business immediately shrank to \$3bn⁹. A performance review of 109 of the group’s businesses led to 12 factory closures and 13,500 job cuts, mainly in the high wage countries of Western Europe. Also, Lindhal simplified ABB’s capital structure by creating a single class of publicly held shares¹⁰. In 1998, the business segments were realigned and the regional management levels dissolved. Lindhal tore apart ABB’s layer of regional management, which, for five years, had been integral to the success of ABB’s much imitated ‘think globally - act locally’ strategy. His reasoning was that ‘in most countries, where we have large customers we (now) have local expertise. We have local brainpower that can look after the added value. So we do not need to have any extra management layer’¹¹. He redirected ABB’s engineering towards systems architecture and divested its heavy engineering activities. He narrowed the group’s focus to six-core businesses, including automation, power transmission, power distribution and financing. Lindhal’s most dramatic change was the transfer in 1999 of ABB’s power generation business to ABB Alstom Power NV, a 50-50 joint venture with Alstom SA of France, and the \$2.1 bn acquisition in 1998 of Elsag Bailey Process Automation NV, an automation-systems firm¹².

Netherlands’s Elsag Bailey Process Automation was a leader in the high growth areas of industrial robotics and automated control systems for mines, factories, oil processing plants and office complexes. Combining Elsag Bailey’s automation activities with those of ABB put the combined group into a position of global leadership – ahead of GE, Siemens and Invensys – with \$8.5bn a year in sales and a position in 11% of the global market¹³.

⁸ Evans, Richard, Back from the brink, Barron’s: Chicopee, 25 October, 1999. Vol, 79. Issue 43.

⁹ Ibid.

¹⁰ Under Barnevik, ABB was burdened with four distinct share categories. Despite the merger, the Swedish and Swiss companies continued to trade separately. From 1997, ABB is listed as a single unified share class.

¹¹ McClehanen, S. John, *Industry Week*, CEO of the Year, 15 Nov., 1999.

¹² McClehanen, S. John, *Industry Week*, CEO of the Year, 15 Nov., 1999.

¹³ Ibid.

ABB and Alstom have merged their power production into ABB Alstom Power, a 50-50 joint company known as ABB ALSTOM POWER. This came about as the result of two major factors: both ABB and Alstom were losing out to their major competitors, GE and Siemens Westinghouse on the number of power plant orders in the US¹⁴, and increasing customer pressures were forcing companies to become larger in order to compete¹⁵. The sales of the new company totaled \$9.4bn in 1999. After only a year, the new company merged with ALSTOM. Alstom bought ABB's share for \$1.2bn and brought the entire power business under its corporate wing^{16,17}.

This change was a significant shift in the profile of ABB as power generation had been ABB's business for 100 years.

For ABB, this was the transfer of a low-margin, capital-intensive power generation business, which, in the past, had been very important to the company's growth¹⁸. The majority of ABB's acquisitions in CEE were in this area and the change in profile of ABB had important implications for the company's presence in CEE, an issue that is addressed in the next section.

In addition, the Swiss telecommunications company, Ascom, bought the Power Supplies unit of ABB¹⁹. Under this agreement, Ascom purchased all the shares of ABB Power Supplies located, among other countries, in Hungary²⁰. ABB said it had sold the unit because it was not a core activity.

ABB's withdrawal from the large-scale power generation business indicates a consequent pursuit of its strategy towards IT-led solutions, for which power transmission and distribution apparently provide a wider scope²¹. Worldwide demand for new steam and gas-powered generators is around 70 GW, which is equal to almost the entire demand for electricity in Germany, but production capacity is twice this²². Lindhal stated that this move would free the company to 'focus more on industrial IT' and other industrial sectors²³. This shift towards high technology and service business is set to continue under the new CEO (see below). ABB has also become an avid supporter of alternative energy and has launched a new wind-powered generator designed for offshore use, which is 20% more productive and needs 50% less maintenance than conventional generators. It is expected that this will become a \$1bn a year business in small-scale power by 2005²⁴.

Lindhal also sold ABB's 50% interest in the ABB Daimler Benz Transportation Group, a rail transportation joint venture, to Daimler Chrysler AG for \$472m in cash.

¹⁴ The US market makes up 40% of total global demand.

¹⁵ Project Finance, ABB-led consortium selected as EPC on Brazilian Ethylene project, Feb 2000, Anonymous.

¹⁶ ENR, Alstom Buys Out its Partner ABB for \$1.2bn, New York, 17 April, 2000.

¹⁷ Project Finance, ABB-led consortium selected as EPC on Brazilian Ethylene project, Feb 2000, Anonymous.

¹⁸ This disposal followed 1999 sales of ABB nuclear business to UK-based British Nuclear Fuels, Risley.

¹⁹ ABB Power Supplies had posted revenues of \$180m in 1998.

²⁰ Europe Energy: Ascom to buy ABB Power Supplies, 7 May, 1999.

²¹ Anonymous, ABB to sell stake in ABB Alstom Power. *Transmission & Distribution World*, Overland Park, May 2000.

²² ABB reenergized, *Forbes*, 23 August, 1999

²³ Project Finance, ABB-led consortium selected as EPC on Brazilian Ethylene project, Feb 2000, Anonymous.

²⁴ Peter Reina, ABB's new strategy features debut of innovative generator, *ENR*, New York, 19 June, 2000.

All these changes were part of Lindhal's plan for ABB 'to become a true service company and a true technology company, but one that still cares for the systems, the complete process'. In 2000, ABB had \$8bn or 25% of total revenues in services²⁵. Lindhal wanted to definitively shift the company towards offering not only hardware but also solutions.

Goran Lindhal, the chief executive since January 1997, has been noticeably less enthusiastic about eastern Europe than his predecessor, Percy Barnevik, ABB's non-executive chairman until 2001.

New stage (since 2000): Centermann: building links to the new economy

A new CEO continued the direction of the changes initiated by Lindhal by moving into the fields of industrial IT and industrial knowledge and services. ABB launched a family of software products as part of its industrial IT strategy, aimed at integrating all a company's processes into a single real-time information system, and linking companies with their suppliers and customers within networks of collaborative commerce²⁶. The idea was to create one single industrial IT architecture for the entire range of ABB technologies and products –using the WWW to enable them to speed up collaboration with customers and form online communities along the whole value chain.

Centermann scrapped the old group structure, replacing 4 industrial divisions with 4 new customer segments and adding 2 product-based divisions and new arm to manage corporate transformation. The overall aim is to become a 'knowledge based company' that uses the Internet to respond more quickly to customers' needs based on 'collaborative commerce' between suppliers, manufacturers and customers. This marks a shift from close integration of functions to close integration with customers. The goal is to achieve 'highly flexible mass customization' for 4 groups of customers in: process industries manufacturing and consumer industries, utilities, oil, gas and petrochemicals. It is expected that the group structure at the top will remain intact²⁷.

In 2000, ABB exited completely from the large-scale power generation field, much of which was located in CEE operations. Its key acquisitions included software technologies for the pharmaceuticals industry from Base Ten Systems of the US; polypropylene technology from BASF of Germany; a US based provider of utility eBusiness software called Energy Interactive; a Norwegian oil and gas service company; and a 35% stake in the Swedish Export Credit Corporation²⁸. ABB established a Web-based eBusiness portal as part of a customer focused eBusiness platform for key business, third party Web portal and online marketplaces. It features the opportunity to purchase ABB products online, specialized customer packages, design and project management tools, solutions banks, and online customer communities. The company aimed to have 30% of its standard offerings online by the end of 2001, and the remaining standard products would be available online during 2002.²⁹

²⁵ Ibid.

²⁶ ABB Annual Report 2000

²⁷ The Economist: 18 Jan. 2001, A Great leap, preferably forward

²⁸ ABB Annual Report 2000

²⁹ ABB reports record Q1 orders, double digit operation margin, www.abb.com/global

This strategic shift was the result of the realization that out of the top 200 customers who account for 30% of total ABB sales, 180 buys from just one ABB business area. The new organization should increase revenue, which currently are falling behind its potential, by offering multiple services and products to its most important customers. In terms of internal restructuring, it involves reorganization around customers rather than products or regions.

‘Traditionally, corporations in our business have been organized around either technology or geography – and sometimes both. For large and global companies, this leads to many units serving customers in parallel with different products and services. Quite simply, we’ve decided to break that mould. As an industry first, we are fully organizing our company around customers and channels to market, building our whole organization from the customer’s perspective and working our way in. From the salesperson to the central office, every unit at every level will be structured along customer lines’³⁰.

For clients with multiple needs, this should ensure that ABB acts as one partner rather than multiple uncoordinated sales teams³¹.

To meet this demand, and anticipating customer needs, ABB will be structured along the lines of seven customer divisions. Four customer divisions – Utilities, Process Industries, Manufacturing and Consumer Industries, and Oil, gas and petrochemicals – provide end users with faster and easier access to the full range of ABB’s products and services and solutions. Two customer divisions – Power Technology products and Automation Technology Products – are responsible for all generic products. The Financial Services division serves both internal and external customers with a full range of financing solutions.

In the new stage, ABB’s five strategic thrusts are customer centric organization, industrial IT common architecture and software platform, R&D focus, value management and new venture.

4. ABB in central and eastern Europe

The entry of ABB in CEE stems from Barnevik’s often expressed conviction that the only possible strategy for the division of labour in Europe is to manufacture high-tech products in the west and standard products in emerging countries³². As part of this shift towards carrying out engineering and production in the low cost developing world, ABB had an estimated 70,000 or 40% of its employees based in less developed world regions (Barham and Heimer, 1998).

³⁰ ABB Annual Report 2000, p 9.

³¹ Presentation by Centermean, ABB CEO. www.abb.com

³² Survey: Mastering global business 10: After the iron curtain, golden opportunities, *Financial Times*, 2 April, 1998.

With the lifting of the Iron Curtain ABB was one of the few companies that fully realized the implications of this change on its business. Its competitors, General Electric of the US and GEC Alstom, the Anglo-French group, also had a presence in CEE, though neither made investments in local production of power generation equipment on the scale of ABB and Siemens.

Stages of CEE penetration

First stage (1990-93): formation of network of companies

ABB's entry into CEE coincided with the end of its period of 'acquisition frenzy' in Western Europe and the USA and a period of consolidation in these two regions. Hence, the timing of the opening up of CEE coincided nicely with ABB's search for new acquisitions in a deregulated world power industry. Consequently, by the end of 1991, ABB was employing some 10,000 people in CEE. In 1992, the number of employees rose to 20,000 in 30 companies (Barham and Heimer, 1998). From its first venturing into CEE, ABB followed its general approach to take only majority stakes in companies. If ABB wanted to integrate companies into the group, a minority stake would make it difficult to allow its proprietary technology to flow in (Barham and Heimer, 1998)³³.

Second stage (1994-96): restructuring, enhancing customer relations and efficiency improvements

By 1994, ABB already had 25,000 employees in 45 companies in CEE. As Barnevik pointed out 'all of them were not brilliant successes. But I can tell you that we make, today, good profits, above average returns. This is not charity business. They gain. We gain'³⁴. The inclusion of plants from CEE enabled ABB 'to cut prices on some major products by as much as 50%. And the company is well positioned in a part of the world where most of what it makes – heavy, infrastructure – based power engineering components and devices – will be in great demand for years'³⁵.

Third stage (1997 -2001): consolidation

ABB consolidated its network and growth of CEE affiliates was becoming increasingly differentiated following growth opportunities in each of the countries. This generated a differing presence across regions, with Poland, Czech Republic and Hungary being the high growth markets.

Fourth stage (2001>): divesting power engineer companies

ABB has been increasingly moving towards expansion of service, repair and modernization activities to serve the mature industries. As part of this strategic shift, it has divested its power engineering activities to Alstom.

³³ Exceptionally, this policy had to be abandoned in Russia. See below.

³⁴ McClenahan, John, Percy Barnevik ... and the ABBs of competition, *Industry Week*: Cleveland, 6 June, 1994.

³⁵ Hoheinz, Paul, Yes, you can win in Eastern Europe, *Fortune*: Chicago, 16 May, 1994.

Restructuring through ‘brownfield’ investment

It is estimated that up to 1996, ABB paid around \$300m for its acquisitions and joint ventures in CEE³⁶. International analysts consider this a bargain³⁷ or ‘peanuts’ considering all the assets it acquired³⁸. ABB would spend more than \$20m on a single acquisition and spread the risk over many different ventures (Barham and Heimer, 1998). By 1996, largely thanks to new subsidiaries, ABB orders in CEE have reached \$2bn³⁹. However, ABB investments in know-how transfer have been more important than investment in plant and equipment. ABB had to invest tremendous amounts into management education. By 1996, it is estimated that ABB had spent \$400m on training⁴⁰. According to other sources, during 1991-97, ABB invested over \$100m in providing its East European employees with some 400,000 person-days of training in seminars, workshops and management courses⁴¹. In six years (1990-1996), ABB has trained some 7,000 managers in CEE. To support its long-term management development it has built its own training centers. Much of this training takes place in three in-house business schools in Warsaw, Brno and Moscow.

ABB’s strategy was generally not to buy whole companies, preferring potentially profitable divisions of the large, usually bankrupt old enterprises. As ‘Fortune’ describes it ‘once the jewels are identified, ABB negotiators begin devising a business plan while still talking terms. Then they look for local managers. Often this means bypassing older command bureaucrats in favor of younger people, whom ABB finds more adaptable’⁴². Once in control it would divide the company into profit centers, install its own accounting system (ABACUS), introduce English lessons for middle managers so that they were able to communicate with the headquarters in Zurich, and put in new testing devices to help raise quality to Western levels⁴³.

Barbara Kux⁴⁴, whilst in charge of ABB operations in CEE, negotiated the first, the biggest and the most successful joint ventures in Poland. The principles that applied in the early programme of takeovers in CEE were:

- Immediately reorganize operations into profit centres with well-defined budgets, strict performance targets, and clear lines of authority and accountability.
- Identify a core group of change agents from local management (or ‘hungry wolves’ as Kux termed them), create small teams responsible for championing high-priority programmes, and closely track the results.
- Transfer expertise from around the world to support the change process, without interfering with it or running it directly.
- Keep standards high and demand quick results’⁴⁵

³⁶ Kennedy, Carol, ABB’s sun rises in the east, Director, London, Sep. 1996

³⁷ GE, ABB competitor had to spent \$400m to make just one of its CEE companies profitable – Hungarian light bulb manufacturer Tungsram.

³⁸ Hofheinz, 1994 in Barham and Heimer, (1998).

³⁹ *ibid.*

⁴⁰ *ibid.*

⁴¹ *ibid.*

⁴² Hoheinz, Paul, Yes, you can win in Eastern Europe, *Fortune*: Chicago, 16 May, 1994.

⁴³ *Ibid.*

⁴⁴ Currently Nestle vice president responsible for CEE and the Former Soviet Union.

⁴⁵ Source: William Taylor, Changing Europe One Manager at a Time, FC issue – Prototype, 1993, p. 95

Restructuring activities in CEE: applying already developed restructuring model

ABB's strategy towards CEE followed the blueprint that ABB had practiced in other countries and regions.

'Every time ABB acquired a new company, its business area managers would send in teams - usually two to three specialists – to cut overheads, streamline inventories, cut out some operations and outsource parts to subcontractors. They would swap products and components between factories to get economies of scale. ABB's strategy and systems, including the ABACUS information and communication system, were plugged into the company. An experienced ABB manager would often take over day to day operating units, while the former management would be sent to ABB operating units to learn the ABB way of doing things. The business units that emerged from this process would then start to specialize in one aspect of their specific product group and, at the same time, customize ABB products to suit their local markets' (Barham and Heimer, 1998, p. 101).

ABB is known for being able to support cooperation and worldwide learning among its affiliates. CEE subsidiaries have benefited from this sharing of expertise to the same extent as other ABB subsidiaries.

Barham and Heimer, (1998) describe it taking the example of the Polish ABB Elta., the power transformer factory in Lodz.

'To support the reshaping of the company, ABB appointed as Restructuring Manager a Swiss former manager of one of ABB's most successful transformer factories in Switzerland. His job was to work with, advise the Polish President of the company, and coach its senior managers. One of the tasks in which he tried to help the company was to rethink its strategy and operations by inviting former colleagues from Switzerland to visit Elta for two to three days to suggest new or alternative ways of doing things to the Poles. When this kind of exchange is multiplied throughout ABB's worldwide network, the potential for global learning is enormous'
(p. 151)

Restructuring meant that CEE subsidiaries had to adopt several ABB-specific organizational innovations:

Activity based costing (ABC). Method for better assignment of indirect costs based on an integrated activity based costing system.

Value based selling. A tool for identifying the usefulness of product/services to the customer in order to draw up, evaluate and price different offers in a cost effective manner.

Balanced Score Card. A business performance evaluation system incorporating financial as well as non-financial (operational) parameters. The indicators are innovation, improvement and customer satisfaction oriented and derived from the strategy.

Shared services. The Shared Services unit has administration as its core competence, and operates as a business serving several different business units. The initial scope is Finance & Accounting and Human Resources.

Results of restructuring

Given the lack of experience of local firms with a market economy in the early 1990s, the experience of ABB was fairly positive. As Barnevik explained: ‘My experience is that within two years you can restore a typical Eastern European company to profitability. It is not a ten-year proposition. It is a two-year proposition. But you have to believe in the people’⁴⁶.

Some of the first joint ventures later became very successful operations. The best known is ABB Zamech in Poland, which makes turbines to generate electricity.⁴⁷ By the end of 1992, the change programme at ABB Zamech had produced doubled revenues compared with 1990, with only a 25% reduction in the workforce. Zamech sales went up from \$42.2m in 1990 to \$220.6 in 1995⁴⁸.

Some of the ABB subsidiaries have become examples of best practice. For example, ABB Zwus Signal in Katowice, Poland, has made radical improvements in its productivity. By mid-1994, one year after the restructuring team was established, the reject rates for its relay-production operations had dramatically improved. The reject rate for relays, which are incorporated into railway signaling equipment, fell from 40% to virtually zero. Production capacity, thanks in part to team-initiated worker cross-training, rose by about 25% and order to delivery time dropped to two weeks from three months⁴⁹.

All manufacturing companies belonging to ABB in Poland possess quality certificates compliant with the ISO 9000 norm whereas seven companies obtained environmental management systems certificates ISO14001 in the 1996-1999 period. In 1996, the District Heating division of ABB Zamech was awarded the first Environmental Management Systems (EMS) certificate in Poland.

Country presence

In 5-6 years, ABB built a network of some 60 companies in CEE, which at the time were probably the largest manufacturing operations of any foreign company in the region (see table 1).

Table 1: ABB presence in CEE

Companies	Employees	
	2001	1998
Poland	12	7000
Czech R	8	7000
Russia	14	3000
Romania	4	2000
Ukraine	4	1500
Hungary	9	600
Croatia	1	500
Slovakia	1	500
Latvia	1	400
Bulgaria	2	100

⁴⁶ Hoheinz, Paul, Yes, you can win in Eastern Europe, *Fortune*: Chicago, 16 May, 1994.

⁴⁷ Power business of Zamech has been later sold to ALSTOM as apart of a wider ABB restructuring.

⁴⁸ *Warsaw Voice*, 22 September, 1996, No. 38(413)

⁴⁹ John S. McClenahan, Europe’s best practices, *Industry Week*, Cleveland, 17 May, 1997

Estonia	1	100
Kazakhstan	1	50
Lithuania	1	25
Slovenia	1	12
	60	22787

Source: ABB

The growth of ABB operations followed the dynamics of individual CEE economies. Because of the expansion of their power equipment markets, ABB focused on Poland, Hungary and the Czech Republic. These countries were the most attractive places for investment, with the opportunity for new projects in each roughly three times higher than the next country in the league table, Latvia⁵⁰.

Due to its size and substantial power engineering industry, ABB chose Poland for the start for its expansion into the region. In Poland, order intake grew from \$48m in 1990 to \$700m in 1997. In the same period, ABB Polska's export grew from \$10m to \$200m (Barham and Heimer, 19998, p.229) with affiliates exporting more than 20% of their production⁵¹. On 23 March 1999, the power generation segment was excluded from the structure of ABB. It was merged with its counterpart ALSTOM and a new company ABB ALSTOM POWER was established. For ABB in Poland, this meant the departure of three big companies – ABB Zamech, ABB Dolmet, and ABB ZUC.

ABB has 12,000 researchers working in 9 corporate research centres and other laboratories. In Poland, a corporate R&D center was established in 1996 employing 22 people. In 1998, ABB Corporate Research in Poland applied for 27 inventions, 21 to the Polish Patent Office and 6 to European Patent Office. It also put forward 41 rationalization motions.

In 1999, ABB Corporate Research Poland received 'the most creative ABB Research Lab' title. After the reorganization connected with the departure of the Power Generation Segment, projects executed in the Center focused on three fields: engineering systems and manufacturing, technologies, modern service technologies, and automation and electrical systems.

In Russia, ABB has established a chain of production facilities capable of putting together complete power plants. Much of its investment in Russia was based on the belief that Russia would quickly recover. Overall, ABB's investments in Russia are only some 15-20% of its investments in Poland. Despite the size of its economy, Russia accounts for no more than 1% of the total for new power projects in CEE⁵². ABB went into Russia based on its experience in Poland but results are still awaited. In specific Russian circumstances, foreign equipment suppliers like ABB have limited scope for expansion although the potential remains 'as big as it was 10 years ago'⁵³. The resurgence of growth in Russia may bear fruits for this long-term approach.

⁵⁰ Marsh, Peter, Survey: World Energy: UK leads continent's gas fired growth, *Financial Times*, 10 June, 1999.

⁵¹ Survey: Mastering global business 10: After the iron curtain, golden opportunities, *Financial Times*, 2 April, 1998.

⁵² Marsh, Peter, Survey: World Energy: UK leads continent's gas fired growth, *Financial Times*, 10 June, 1999.

⁵³ Stefan, Wagstyl, Survey- *Financial Times: World Energy Review 2: Eastern Europe: Determined to squeeze until the pips scream*, *Financial Times*, 8 June, 1998.

However, despite still limited orders ABB has benefited from the technological potential of Russia. In cooperation with Uniturbo, a Russian joint venture, ABB is producing more efficient large gas turbines based on jointly developed gas and liquid dynamic technology⁵⁴. In 1998, ABB signed a long-term cooperation agreement with Gazprom. The agreement covers the manufacture of systems and equipment and the joint development of projects, both in Russia and in other countries, in the areas of natural gas exploration, recovery, oil and gas processing, transport and storage, environmental control and the construction and operation of gas power plants. The agreement builds on ABB's local companies in Russia, which are active in the areas of oil and gas, power generation and industrial automation, as well as ABB's strength in providing innovative financing. ABB also agreed to transfer technology in manufacturing and gas turbines, and to provide training for Gazprom employees in manufacturing and general management⁵⁵.

In Romania, ABB has no big projects but undertakes modernization upgrades and improvements in the environmental field.

In small CEE economies like Slovenia ABB plays an important role. For example, about 75% of all the robots used in Slovenia's industry are made by ABB⁵⁶.

The most active ABB business has been the refurbishment of existing power plants to prolong working lives, increase thermal efficiency and cut pollution⁵⁷. However, the continuing recovery in industrial output in central Europe, notably in Hungary and Poland, is steadily creating demand for new power plants.

Embedding itself into a region: being multi-domestic, being local

ABB has managed to successfully embody itself into the local environment. David Hunter, former head of ABB CEE, explained: 'We are better at being local faster than the competition. We are more comfortable with it' (Barham and Heimer, 1998, p. 227). The reasons behind this strategy are essentially commercial. In capital goods industries in which ABB operates entering markets is a long term endeavor where close connections with large customers are essential.⁵⁸ In order to achieve a local presence, ABB has played an active role as a 'good citizen' in the community by providing medical equipment to local hospitals or donating computer equipment to schools or police departments. Its policy regarding employment is that it relies on domestic local personnel and actively supports training of local managers. For example, Poles now manage all ABB branches in Poland⁵⁹. Poles are also employed in other subsidiaries and centers of ABB. In 1999, there were four Poles in ABB systems outside of Poland. In 1996, the vice

⁵⁴ Hoheinz, Paul, Yes, you can win in Eastern Europe, *Fortune*: Chicago, 16 May, 1994.

⁵⁵ *ABB Corporate Communications*, 8 September, 1998, ABB signs long-term cooperation agreement with Gazprom.

⁵⁶ Slovenian Business Report, Spring 1999, p. 52-53, Companies to watch.

⁵⁷ Stefan, Wagstyl, Survey- *Financial Times*: World Energy Review 2: Eastern Europe: Determined to squeeze until the pips scream, *Financial Times*, June 8, 1998.

⁵⁸ In words of ABB executive the company's advantage is that is perceived as local company: 'This is where we leave other companies behind, because we have these local talents that do business in the local way (...) It's damned difficult to ride this multicultural animal from Zurich or Brussels, but we just got an order for \$500m in Uzbekistan to build a petro-chemical plant and we would never have got it if we had relied on western talent only. It's only by being local, being close to local decision-makers, giving them trust, speaking their language'. Kennedy, Carol, ABB's sun rises in the east, Director, London, Sep. 1996

⁵⁹ Interview with Miroslaw Gryszka, CEO of ABB Poland, *Polish Market*, No. 12., 2000.

president of the Power generation segment for CEE became Polish executive⁶⁰. In 1999, ABB was awarded ‘The best foreign investment’ award in Poland. The Polish president decorated Percy Barnevik, chairman of the Board of Directors, with the Commander Cross with a Star of the Order of Merit of Republic of Poland.

Reliance on local managers is accompanied by close coaching in initial stages. For example, ABB speeded up a change at its ABB Zamech joint venture in Poland by assembling a team of high-level experts in finance, quality control, technology, and restructuring from around the world. The members of the team were not based in Poland, but they visited often and received frequent updates on the J-V’s progress and problems⁶¹.

In the Czech Republic, ABB was one of the first industrial companies to introduce a Succession Planning programme. The idea behind the programme is for each manager to designate and train one immediate deputy and one to three potential successors who could take his or her place if necessary. A Personal Development Plan is developed for each employee so designated, describing the practical tasks he or she must complete before being considered able to take over from his or her superior.

In Poland, ABB cooperates with the Electrical Faculty of the Polytechnic Academy of Gdansk which has the strongest team of scientists in Europe specializing in the range of fuses and this team is a strong support for ABB ZWAR.

5. Complementarities driven network alignment and ABB presence in CEE

ABB expansion into CEE is the result of several complementary factors that operated in a mutually favorable manner. In this section we interpret the case study evidence in terms of our heuristics – complementarity driven alignment of networks. Our interpretation of ABB’s success rests on complementarities between management, firm, and region specific factors. Visionary management and firm organization are well geared to exploit a variety of advantages that CEE offers as a market and production location. This is well complemented by regional resources and constraints in technology, finance and market access. These elements had a positive influence on one another, thereby generating a variety of advantages for ABB and the regional economies. For ABB, it opened up new markets, low cost locations, and specialized knowledge assets. For CEE, it brought access to technology, finance and the market, together with employment.

Top management: vision and commitment

The role of Percy Barnevik as first CEO of ABB, in the expansion into CEE was very important, if not determining. His commitment was a real commitment to work and during the 1990s. involved substantial amounts of time of top management. Barnevik spent about one-fifth of his management time on eastern Europe while the head of ABB Europe devoted around a quarter⁶².

⁶⁰ *Warsaw Voice*, September 22, 1996, No. 38(413)

⁶¹ Source: Hiseh Tsun – Yan, Johanne Lavoie, Robert A. P. Samekt ‘Think global, hire local’. *McKinsey Quarterly*, December 1999.

⁶² Director, September 1996.

During the reign of Goran Lindhal the enthusiasm for the region was significantly reduced. This was due in part to the stabilization of operations in CEE but was also related to the perceptions and priorities of the then CEO. Undoubtedly the perceptions of top management and their commitment to them were very important in terms of exploiting opportunities for embedding the firm in a specific region. The commitment of the ABB management in the 1990s resulted in rapid integration of CEE operations into the ABB structure so that, in its global approach to business, there was no longer any differentiation made between Eastern and Western Europe (Barham and Heimer, 19998, p. 149).

At the same time, expansion into CEE was not a high risk move, especially as it was spread across a large number of companies. A fair assessment of ABB's early move into CEE was made by Eric Elzvik from ABB, who said: 'It was very foresightful but it was not brave from an economic point of view – it was brave from a publicity point of view. Falling in the investment would not have imperiled ABB' (Barham and Heimer, 1998, p113).

However, restructuring of CEE affiliates was no easy operation and both sides had to lessons to learn. For example, Poland demonstrated that it was crucial that the hard (structure and procedures) and soft (human resources) aspects of the acquired firms should be developed and framed simultaneously⁶³. The difficulties of implementing such lessons were overcome because stakes and opportunities for both sides were significant.

ABB management realized from the outset that west-east division of labour between high-tech and low-tech products was the only way forward. However, they also realized that the infrastructure and the industry in CEE offered ABB a major long-term opportunity. Not only would power plants, electrical switching systems, locomotives and robotics be needed domestically, but their low cost manufacture in the east would give a competitive lead to many of ABB's global products.

Barbara Kux, restructuring manager for ABB in CEE in the early 1990s, explains management's understanding of the situation in the following way:

'Think of the impact of what we are doing on companies in France or Germany or Switzerland. Managers and workers now realize that there are factories two hours away that can produce with exactly the same quality and 30% lower costs. That is huge disadvantage. You have no choice but to change'⁶⁴.

ABB strategy in relation to CEE was framed within the continuing argument of ABB top management for enlargement. Very often such arguments were public: the opportunity to expand the EU eastward could not have come at a better time because the net long-term impact of enlargement is positive for both regions⁶⁵.

Expansion of ABB in CEE has led to restructuring in Western Europe. According to Kurz and Wittke (1998, p. 82) ABB created 46,000 jobs in Asia and CEE while reducing staff in Western Europe by 54,000. During Lindhal's chairmanship (1997-2000)

⁶³ Obloj, K. and Howard, T. , Transforming former state-owned companies into market competitors in Poland: The ABB experience, *European Management Journal*: London, August 1998.

⁶⁴ William Taylor, Changing Europe One Manager at a Time, FC issue – Prototype, 1993, p. 95

⁶⁵ Von Koerber, Eberhad (1997) Enlargement to the East: The Decisive Moment for Europe's Future, Churchill-Symposium 1997, Zurich, 18 September, ABB.

12 factories involving 13,500 jobs were closed in western Europe⁶⁶. However, these changes, as frequently pointed out by ABB top management, were inevitable, would have occurred anyhow, and were unrelated to the opening of CEE.

Company organization: heterarchy and matrix structure

The willingness of management to take risks (however big) is not by itself enough to explain the successful integration of ABB into CEE. The degree of industry integration or embeddedness of affiliates into the local environment depends on the organizational type of the firm that enters the region. In this respect, the organization of ABB as a heterarchy, in which there was greater scope for the emergence of centers of excellence than in hierarchically organized companies, was important. In this model of company organization it is more likely that a company will exploit the diversity of opportunities that a new region offers. Indeed, ABB pursued in parallel low cost, market seeking and asset (knowledge) seeking strategies. Opportunities to combine cost advantages with the advantages of the design skills of local engineers were clearly reflected in ABB's strategy. In strategic terms, this is described as complementary specialization. Kurz and Wittke (1998) define it as cost cutting by strategic rearrangement of all tasks and functions within the value chain. In the case of ABB this approach took shape in the increasing connectivity of different functions and activities across the globe. In practice, this meant the combination of resources across the entire company network.

'When ABB competes in large projects in Asia, for example, it goes in as a team of high-tech system suppliers from Western Europe and the USA, plus low cost equipment suppliers from Poland, Romania, Thailand or China. In that region, its major competition is Japanese firms in partnership with their own low-cost suppliers in China, Malaysia, Vietnam and other countries. (ABB) sees this combination of leading-edge technology and low cost production as the only way it can compete and be profitable in these competitive markets' (Barham and Heimer, 1998,p.139).

An example of this connectivity in practice is the design of a refinery in Thailand that was carried out collaboratively by designers working in Brno in the Czech Republic, the Hague in the Netherlands, and Houston in Texas, all linked via electronic 'workbenches'. In another project that is drawing on resources from around the world, a coal fired power plant in the Philippines is being put together by an ABB consortium involving factories in the US, Germany, Poland, India and Malaysia⁶⁷.

Integration of CEE firms into the ABB network has been based on complementary specialization that generates process advantage, which is difficult to imitate in the short- term. As Eberhard von Koerber, ex-President of ABB Europe, points out: 'ABB's Europe combines its resources in Portugal, Switzerland and Germany with those in Poland, Bulgaria and Russia to compete in the world economy (von Koerber, 1997).

It is very likely that initially ABB management perceived only the market potential of CEE and opted only for market seeking FDI. However, it was thanks to the organization of ABB as a heterarchy that the company ultimately pursued in parallel all three strategic options: efficiency seeking, market seeking and asset (knowledge) seeking strategies. Barham and Heimer (1998) claim that eastern Europe has not only helped

⁶⁶ ABB Reenergized, Forbes, New York, 21 August, 1999, Richard C Morais.

⁶⁷ *ibid*, p. 149

ABB to reduce production costs, but has contributed to new product development (for example, by helping ABB to manufacture more efficient large gas turbines through original jet engine technology from Uniturbo, a Russian joint venture). In a strictly hierarchical form of organization it is unlikely that all three options – least cost, market seeking⁶⁸ and knowledge seeking – could have been pursued simultaneously.

Another feature of ABB - its matrix organization - was very conducive to exploiting the advantages that CEE offered. A matrix organization allows for high pay/low- pay synergy; and gives access to cheaper inputs. So, a matrix organization is much more conducive to complementary specialization. The matrix makes it possible to connect the marketing, technical and financial strengths of high-pay countries with the lower labour and capital costs of less developed countries, both on a global level and within regions (Barham and Heimer, 1998, p228).

Regional deficiencies and advantages as complements

Firm specific features alone are not sufficient to explain the success of ABB in CEE. These advantages have to be complemented with region specific deficiencies and advantages. Regional resource deficiencies in technology, finance and market access were complemented by ABB's ability to compensate for all three deficiencies in local companies

ABB quickly came to dominate CEE markets because its technology was advanced and because it controlled its finances very strictly. ABB brought its cost base down more rapidly than any of its competitors⁶⁹. For CEE firms, licenses had been the main way to modernize production. In the 1990s, with finance having dried up, strategic investors became the only solution.

ABB had sufficient revenue for expansion into CEE. In fact, analysts argue that the common thread connecting all big investors in CEE in the early 1990s was that their ability in terms of revenue to fund such an expansion⁷⁰. The availability of finance was complemented with cheap assets.

In early 1991, *The Economist* described the situation in the following way:

‘To government desperate for foreign investment, ABB offers local jobs making products for local needs and, crucially, finance in local currency. In return, ABB has secured control of strategically placed firms at knock-down prices. No one will say exactly what those prices were (...) Zamech's zloty share capital, of which ABB owns 76% is worth a meagre \$5m’⁷¹.

In addition, in CEE there was and is large demand for components to renovate the region's outdated and worn-out power plants. Eberhard von Koerber, ex-President of ABB Europe, stated: ‘The need for basic infrastructure – literally everything from telephones and electrical sockets to decent roads, airports, industrial plants and safe efficient power supply – matched many of ABB's core businesses’⁷². In 1991, *The Economist* cited a study that estimated that the countries of CEE could be spending as

⁶⁸ In 1989, ABB obtained \$50m in components from CEE. By 1996, this figure was up six or seven times and ABB was expecting that figure soon to reach \$700m.

⁶⁹ Blishen, Charles, Profiting from direct action, *Central European*: London, April 1995.

⁷⁰ Blishen, Charles, Profiting from direct action, *Central European*: London, April 1995.

⁷¹ ABB in Eastern Europe: Showing promise, *The Economist*: London, 29 June, 1991, Anonymous

⁷² Von Korber, 1997 in Barham, Kevin and Claudia Heimer, 1998, ABB: The Dancing Giant: Creating the globally connected corporation, *Financial Times*, Pitman Publishing, London,

much as \$1.4bn a year building a new power stations and making existing ones more efficient and less polluting.

CEE became an important new market for ABB, and one with long-term potential. As management stated 'Poland has been a dream' with \$600m annual sales in late 1990s and with the huge potential of Russia in waiting. On the other hand, for domestic firms ABB was seen as an injection of finance, know-how and a channel for export.

...

In summary, ABB's success was the outcome of several factors that complemented each other in sustainable manner during the 1990s. These factors are:

- Top management (vision; commitment)
- Company organization (heterarchy; matrix organization)
- Regional deficiencies and advantages (deficiencies in finance, technology and market access; advantages in low-cost and skilled labour, and local market).

During the 1990s, each of these factors individually fed back to one other in a manner that ensured benefits to ABB and to CEE economies. If only one of these factors had been absent it is unlikely that we would have seen the scale of mutual benefits in terms of competitive advantage and welfare that was achieved.

In addition to these primary factors there were several other factors that operated as facilitators or hindrances, but which seem to have been of secondary importance. In terms of our model these are external factors.

First, the opening of CEE generated expectations of enlargement of the EU, which favoured ABB's shift towards CEE. However, it is unlikely that this factor played a determining role as ABB presence in Russia would suggest. This is not to deny that in future a deficient regional integration does not necessarily counteract the potential benefits of complementary specialization.

Second, national differences in privatization policies, which are seen by economists to be significant determinants of differences in FDI, did not seem to influence ABB's strategy. Differences in the presence of ABB in Hungary and Poland cannot be explained by differences in privatization models. Differences in privatization do not explain the presence of ABB in Russia, in terms of scale but only in terms of mode of entry. In Russia, ABB had to enter via joint ventures rather than as the majority owner.

Domestic resource deficiencies in finance, technology and market access and advantages in market size, skilled labour and costs seem to be more important than institutional variables such as privatization.

Third, ABB found that within just a few years of restructuring most of the companies it took over were employing twice or even three times as many people as was necessary. Barham and Heimer (1998) state that ABB 'is now reluctant to lay off people, knowing that this hurts ABB's reputation and that when somebody is made unemployed in the region, they have not protection outside the company and are doomed, very often, to real poverty. Latterly, the company has said that it will not buy a company where it sees a large labor surplus that it cannot engage. It may be possible to use the surplus people by bringing in new products even expanding the existing product lines and selling more domestically and externally, although this may mean living with the surplus until quality

improves and export takes off' (Barham and Heimer, 19998, p234). So, it seems that inherited surplus labour was not a determining obstacle to the penetration of ABB given its potential for growth in the region.

'Win – win': for how long?

All analysts agree that ABB's entry into CEE was, as ABB management put it, a 'win – win' situation. The issue is for how long complementarities that have been generating this win – win situation will operate or if indeed whether they still do operate. The dynamics of the competition process have already forced ABB to divest much of its CEE operations by selling off its power activities to Alstom. This was part of a strategic move of ABB towards complex projects, and system architecture. ABB has made shift from 'dependence on businesses based on heavy assets and fixed capital towards new and flexible business based on intellectual capital'⁷³.

ABB is moving towards service contracts for industrial firms and wants to outsource the running and maintenance of its complex automated systems. According to some analysts, the market for such high-tech outsourced services may be growing at 15-20% a year, much faster than the 5-6% growth in the overall market for automation technology⁷⁴.

ABB's shift towards more knowledge and service based business could be very bad news for CEE, as the region, may be unable to offer complementarities, in terms of knowledge based activities, to the new ABB. Some of the disadvantages of CEEC are lack of a high quality service infrastructure, and deficiencies in IT use and software. Increasing labour costs in some CEEC, especially Poland, could further undermine opportunities for complementary specialization based on a combination of low and high cost production sites.

The definitive answer to these concerns cannot be given as ABB is only at the beginning of its restructuring towards being a 'knowledge-based company'. From a CEE perspective Alstom may offer similar opportunities for embedding the region into its global production and technology network as ABB did. However, this would require similar complementarities between management-, firm-, and region-specific factors to those we observed in ABB in the 1990s. In addition, transformation of Alstom into a knowledge based business may be hindered by an absence of complementarities similar to those suggested in the case of ABB.

The case of ABB demonstrates that complementarity based network alignment is not necessarily sustainable in the long term. It seems that in the case of CEE, complementarity factors operated for some time and created benefits for the region as well as process advantages for ABB. Process advantages, in terms of the increased cost competitiveness that CEE offered during the 1990s for ABB, persisted for some time but region would need to offer new types of advantages in order to further 'lock in' companies like ABB. It seems that Barnevik's rule-of-thumb on process advantages, which give a three-to-five year advantage in relation to competitors (see above), may not be far from the truth.

⁷³ ABB Corporate Communication in Poland, January 25, 2000

⁷⁴ *ibid.*

6. CONCLUSIONS

1. ABB has managed to restructure and integrate its CEE affiliates into global corporate network. These networks are mainly dyadic, though they involve some additional relationships like contracts with universities or close relationships with big CEE clients. However, local affiliates are fully integrated into the ABB corporate network where their scope for upgrading seems to be quite extensive as some of the Polish affiliates demonstrate.

The opening of CEE came at the time of a drastic restructuring of the world and European power engineering industries as a result of deregulation and privatization. During this period, ABB was probably the best example of increasing integration of the CEE industry into European industry networks and through this became part of a fundamental reorganization of the European model of production. In integrating CEE operations into its global network ABB did not follow, to use the terminology of Kurz and Wittke, 'the least cost approach' but followed a 'complementary specialization' approach. ABB did not use wage – cost differentials in order to substitute for production in the West of standardized, labour intensive parts and product groups, and to exclude other functions from relocations. By following an alternative, complementary specialization, it achieved cost cutting by strategic rearrangement of all tasks and functions within its value chains. Several of its CEE affiliates gained strategic positions in a reorganized production and technology network.

2. The ABB network in CEE developed based on the strong complementarities that operated during the 1990s. These complementarities were based on interaction between management-, firm- and region-specific factors. The vision and commitment of top management complemented heterarchical and matrix based organizational structure of ABB. The management and firm specific factors complemented regional needs in finance, technology and access to the export market.

The same vision and commitment would not have such effects in a tightly hierarchical organization where affiliates are given a fixed mandate. The decisive way in which ABB entered the region, made maximum use of idle capacities and under-utilized skilled labour and recognised the need to maintain employment and develop exports. Regional advantages in terms of low cost, skilled labour and local market complemented ABB's need to compete based on low cost complementary specialization strategies, by combining diverse cost and technology advantages of different locations.

The heterarchical nature of the ABB organization enabled simultaneous pursuit of market seeking, efficiency and asset (knowledge) seeking options. This absolutely complemented the situation in a region where technology assets could be found in parallel with cheap physical assets, skilled but low cost engineering, and opened local markets. It is unlikely that this variety of strategic options could have been pursued within a very hierarchical organization or in a region which had advantages either only in low cost or in technology assets.

3. The dynamic of the competitive process, especially the shift towards knowledge based services, pushed ABB towards knowledge and service based businesses. It seems that in this new period complementarities between ABB and CEE, which operated so well during the 1990s, will be much weaker in the future. It is unclear to what extent CEE will be able to complement the shifts of companies like ABB towards 'knowledge based companies'. The increasing importance of intangible activities in business, including complex projects, customized solutions, and software based services will be the test of how much CEEC can improve their national systems of innovation, which could complement the needs of such companies. There are increasing signs that CEEC, for example Hungary, are becoming, in European terms, very important production locations. However, as profit margins and power in value chains is moving towards non-production activities the real test for long-term growth of CEE is the extent to which the region will be able to integrate itself into global technology networks. This will have important implications for the long-term nature of European industrial integration.

4. The implication of our analysis is that policy should aim to identify relevant complementarities between firm and region specific advantages and disadvantages. Rather than trying to 'attract FDI' policy in CEE should aim to be selective by positively discriminating towards those investors whose strategies and organizations complement regional advantages. At the firm level management through centrally directed change can enhance complementarities between different functions of firm, whereas this is much less possible at country level. Alignment of different networks cannot be enhanced by centralized and coordinated change. Hence, the real policy challenge is to know what are the triggering or missing elements that might generate complementarities between national and global production and technology networks. Rather than trying to be generally attractive to foreign investors policy should aim to develop those parts of its infrastructure and national innovation system that complement the business strategies of companies that are moving towards knowledge based activities.

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