

Competing with India and Russia: is Central Europe likely to become an IT outsourcing destination?

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Abstract

Much of the research on restructuring in Eastern Europe has tended to focus on the more traditional sectors of the economy. We have little research data on how well 'new economy' sectors like information technology are doing and whether that sector is likely to become internationally competitive.

The paper reports the results of a survey of IT exporters from Poland, Hungary, Romania, Bulgaria and the Czech Republic. The survey identifies the key competitive advantages and disadvantages of Central European IT companies as they compete for outsourcing work in the US and Western European markets. The results of the survey are then interpreted in the context of data on the development of IT environments, markets and sector investment in the region.

The paper argues that integration with the global information economy is just as important for the future prosperity of the region as formal integration with the European Union. Yet unlike some Asian governments the Central Europeans have failed to pursue policies of supporting their infant IT exporters which are small, underinvested and find it difficult to compete with established players like India. The paper proposes a set of measures that must be taken if needed Western Investment is to flow into the export oriented IT sector as opposed to just into telecoms and the marketing and sales of imported hardware and software.

1. Introductory remarks

In the information age the prosperity of countries and regions of the world will increasingly depend on their ability to be significant high value added contributors (rather than just passive consumers) to the international information economy. Today's competition among nations is very much becoming a race about who is best prepared and equipped to succeed in the global information economy of the future.

In the past decade the countries of Central Europe - especially the Vyshegrad four - have made great strides towards creating viable market economies. They have had to struggle with multiple challenges of privatization, restructuring as well as meeting the many standards needed for joining the European Union. Opening up to Western investment has enabled them to quickly improve their telecom infrastructure and also to create relatively modern IT infrastructure through imports of hardware and software.

In many respects the more advanced countries of Central Europe (Poland, Slovakia, Czech Republic and Hungary) are well positioned for the information age: they enjoy high adult literacy rates and high numbers of scientists and engineers in R&D. They have relatively strong technical universities and traditions of excellence in mathematics (Poland) and engineering (Czech Republic). They have also made great strides towards closing the gap with advanced nations as regards telecommunications. The Vyshegrad four after ten years of painful economic reform now have functioning market economies with large private sectors open to foreign trade and investment.

However, the creation of market economy institutions has not automatically assured a sufficient reallocation of resources to allow Central European countries to start catching up with OECD nations with respect to information technology. On a number of key dimensions of IT development, Central Eastern Europe lags behind the high income OECD Countries.

Table 1 below summarizes the positions of the countries of Central Eastern Europe on such key indicators used by the 2001 World Bank Knowledge Assessment system. For comparative purposes data for Finland has been included.¹ The data assembled in table 1 allows for some overall assessment of the position of Central European countries in the IT race. Notable is the success of policies allocating sizable investment to the telecom sector and the resulting good results achieved in bringing up the number of telephones/1000 people. The number of computers within society as well as that of internet hosts appears to be still considerably behind world leaders, but according to market estimates is growing sharply.² There are also positive trends in the development of E-commerce: Poland and the Czech Republic appear to be catching up quite rapidly with the OECD Leaders. The information society index ranks the countries as follows: The Czech Republic is ranked 27, followed directly by Hungary at 28. Poland is ranked 30, Romania 31 and Bulgaria 36.

From the point of view of longer term prospects, what appears quite disturbing is the insignificant private sector spending on R&D (which is only half of the corresponding percentage spent by Finland) and, with the notable exception of Hungary the dismal performance of Central European countries as exporters of high technology products.

Closing the technology gap will require a sustained investment effort by the countries of Central Europe. In terms of IT spending per capita they are well behind – spending on average 25% of what Western Europe spends.³

In our investigation we took the position that to succeed in the world information economy it is not enough to be a passive consumer or user of technology (although having the basic infrastructure is a prerequisite of integration). For this reason from the various dimensions of the information economy we chose to focus on the question: Are the Central European private sector companies actively present in international markets for outsourcing services?

Table 1. Key economic and technological indicators for Eastern Europe and Finland

	Finland	Bulgaria	Czech Rep.	Hungary	Poland	Romania	Slovakia
Intellectual property is well protected	6.2	3.1	4	4.5	3.7	n/a	4.3
Technology Assessment Index	0.74	0.41	0.47	0.46	0.41	0.37	0.45
Scientists and Engineers in R&D per million	7.94	7.47	7.11	7	7.21	7.24	7.53
Availability of venture capital	5.6	2.7	2.9	3.7	3.6	n/a	3.3
Private sector spending on R&D	5.5	2.5	2.3	3	2.8	n/a	3.4
FDI as a % of GDP	1.97	2.01	3.5	4.54	2.39	1.59	1.18
High Technology exports as % of manufactured exports	24	4	9	23	3	4	5
Indicator of Telephones/1000 people*	7.15	5.86	6.69	6.5	6.12	5.66	6.32
Indicator of Computers/1000 people*	5.89			3.28	4.67	3.29	4.7
Rating of Computer processing power as % of total world wide MIPS	0.54	n/a	0.19	0.21	0.49	n/a	n/a
E-Commerce	66.7	12.8	45	24.7	55.3	n/a	62.3
Internet hosts/10,000people	7.22	2.99	4.91	4.87	4.22	2.66	4.26
Information society Index (2000)	3	36	27	28	30	31	n/a

Source: World Bank Knowledge Assessment Methodology, found at: <http://www1.worldbank.org/gdln/kam.htm>

*Natural log [ln]

2. The survey and its findings

Between the months of July and November 2001, we conducted structured interviews with representatives of export-oriented Central European IT companies. As there is no exhaustive list of such companies, we had to locate potential respondents through incremental research. For this purpose, we contacted embassies, Chambers of Commerce, and other professionals. Our main source of information were websites of IT-related business associations, export institutes, and annual rankings in technology magazines such as the Polish Computerworld. We then mined these lists for contact information. From these lists, we narrowed the firms down to those IT companies that appeared to export to either Western Europe or the US.

Contractors and team members fluent in one of the Central European languages then conducted telephone interviews with managers of these companies. Most managers preferred to answer the questions in writing. In these cases, the team members sent the questionnaire via e-mail.

The advantage of the search strategy we employed is that we came across those companies interested in international visibility. Therefore, we believe that with a few exceptions, our respondents are at the forefront of the export-oriented IT industry in Central Europe. The drawback of this strategy was a small sample size, as companies were difficult to locate, and then quite reluctant to respond either by pleading little time or by expressing concerns about confidentiality. The Bulgarian sample is the largest, since unlike in the other cases, the research contractor was in Bulgaria.

The dataset we gathered contains 22 observations: nine from Bulgaria, four from the Czech Republic, two from Hungary, five from Poland, and two from Romania. Among these, two companies - one Polish, one Hungarian - turned out to provide services to neither the US nor Western Europe.

Collapsing the country data into a regional data set allowed us to discern trends that are not visible when looking at the smaller country data sets. The reason for this is that the different Eastern European economies exhibit structural similarities, such as proximity to Western Europe, communist legacy of state involvement in the economy, and weak reputation. Because of these characteristics, companies across the region face similar constraints. Also, even though the number of observations is small, our research approach led us to interview the most prominent and thus most internationally oriented firms in the sector. Obstacles experienced by these companies are likely to constrain the progress of less competitive firms as well.

2.1 Export orientation still in its early stages

Companies that are export oriented are competing in a more demanding international marketplace. They need to perform at higher levels of quality than domestic firms.

But the sample data reveal that these efforts are still in their early stages. In spite of seeking only firms that have at least some export experience in software products or services, the median number of years of selling outside the country was 3.5 years, and the median years selling to the US was even less at two years.

Only four of the sample firms had US sales offices (19%) and these have been in place for but a short time - a few years (Table 2).

Table 2. Export activity of sampled firms. Years of activity abroad - frequency count. N=20

Years	Firms selling outside country	Firms selling in the US	Firms with US sales office
0	0	5	16
Les than 1	1	1	0
1	2	1	2
2	2	5	1
3	5	3	1
4	2	0	0
5	3	2	0
6	1	1	0
7	0	1	0
8	1	0	0
9	1	0	0
10	1	0	0
11	1	1	0
Mediaan	3-4	2	0

The magnitude of the region’s firms’ activities abroad is small. Only one firm is exporting more than one million dollars per year in software products or services to the US, another firm is exporting this much to Western Europe. This is an industry that is young - across all these nations.

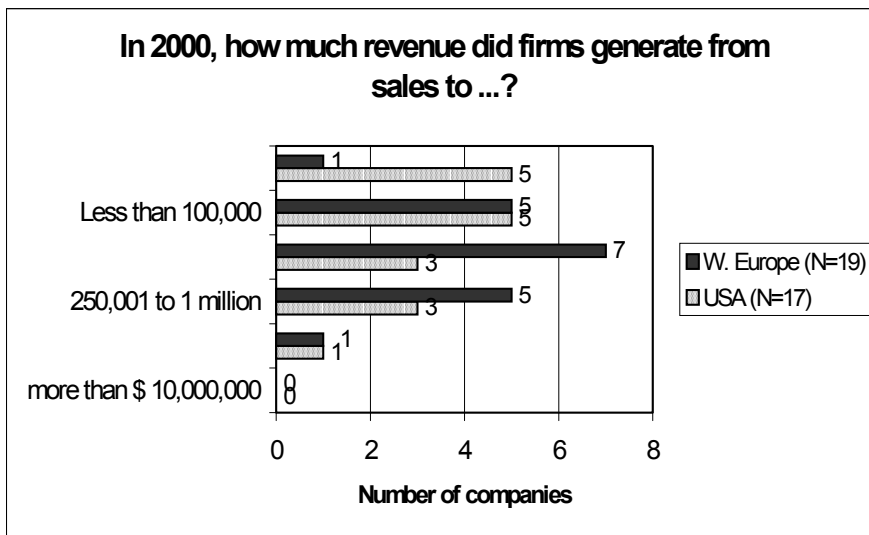


Figure 1. Tevenue generated from sales to Western Europe and the US

One of the implications is that many of the firms are small: They are small not just in terms of revenues, but in terms of employees as well: 55% of the sample firms had fifty employees or less (figure 2).

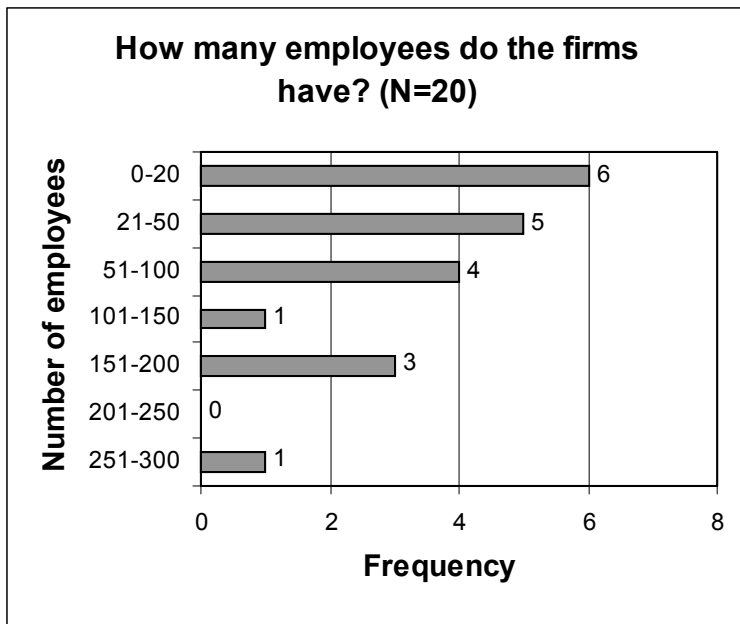


Figure 2. Firm size measured by number of employees

Nevertheless, these firms are making inroads into the global technology landscape. Many have well regarded customers abroad. These include North American government agencies as well as global blue chip firms from the US and Europe. Numerous other smaller firms were also noted.

There is a noticeable emphasis on business ties with Western Europe over the US. Out of 20 respondents, 15 are selling their services to the US, but 19 are selling to Western Europe, a 27% difference. A larger share of the firms' revenues comes from Western Europe over the US. The modal category is \$100,000 to \$250,000 of exports per year to Western Europe, with 7 of 19 companies located in that category. For the US, the mode spreads over the 'no revenue' and 'less than 100,000' categories, with each having 5 observations.

In Figure 3 we summarize the percent of revenues derived from foreign activity in Western Europe and the US. Again, Western Europe is a more important source of revenues, impacting, in the median, 55% of revenues. On the other hand, regarding business with the US, the median result is that only 15%-20% of revenues is derived from US sales. An exception is one Bulgarian firm that derives 100% of its revenues from US sales.

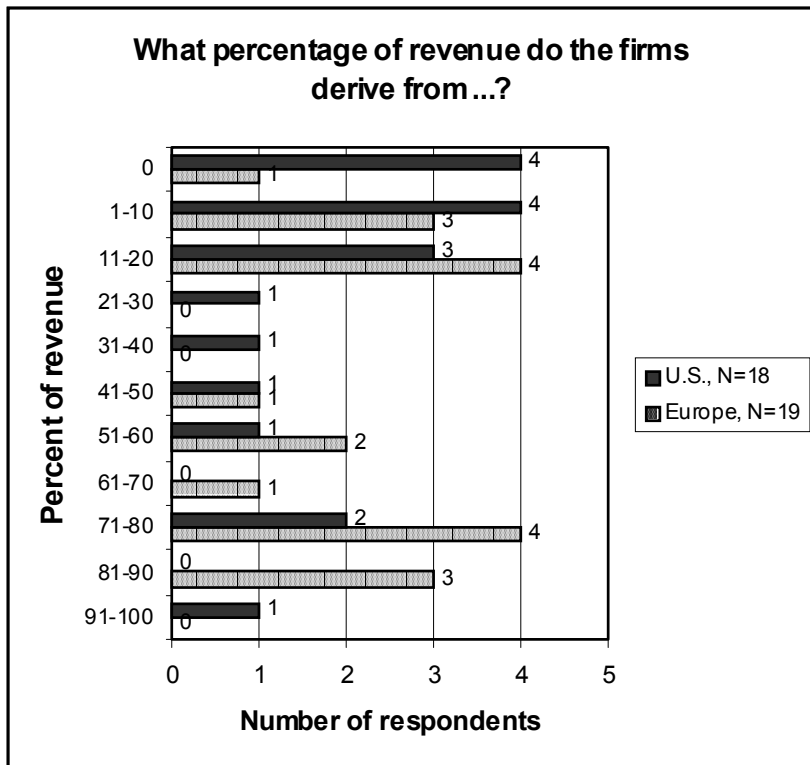


Figure 3. Revenue generated from sales to Western Europe and the US

Of the 20 respondents, 9 had three or more contracts with the U.S, two companies had two contracts so far. This gradual market entry is consistent with the median number of years the respondents have been selling abroad, 3.5 years. Of the 20 exporting companies we interviewed, four had sales offices in the US - one company for three years, one for two years, and two for one year. Establishing a sales office is an expensive, but necessary, mode of market entry.

The overwhelming majority focuses on high-end tasks: new development of a fully integrated system, and new development of system components (Table 3). These are the highest end tasks in software development using the definitions in our survey. Indeed, many of these firms develop their own products or design and build complete systems. Testing, maintenance and support, as well as design, are also services provided by around 50% of respondents. Also note that roughly the same services are provided to both the US and Western Europe.

Table 3 is a response to the question: ‘What are the primary services your company provides for US and Western European customers?’ and ‘Which services were most important financially?’

Table 3. Central European sample: Services exported

USA: services provided	USA: most important service	Western Europe: services provided	Western Europe: most important service	Nature of Work
11	6	15	10	A - New development of a fully integrated system
11	6	15	7	B - New development of a system component
2	0	5	0	C - Systems integration
1	0	4	0	D - Data communications networks
1	0	1	0	E - Data center operations
9	2	9	1	F - Maintenance and support
6	0	7	0	G - Testing
7	0	11	1	H - Design
1	1	2	0	I - Facilities management
1	0	1	0	J - Disaster recovery
1	0	2	0	K - Help desk
5	0	6	0	L - Localization
2	0	3	0	M - Training
0	0	0	0	N - Data Entry
N=15	N=15	N=19	N=19	

2.2 Firm and country advantage: wages and human capital

Asked to elaborate on their country advantageous characteristics, almost all respondents (95%) emphasize talented professionals as an attribute of the country to potential clients (Table 4). Analytically, this is not very revealing since all these firms are marketing their human capital - it is clearly their major asset.

Table 4. Central European sample: Country characteristics emphasized by respondents to the customer

	Number of responses (N=19)
Talented professionals	18
Low cost/ low wages	14
Rapid project start-up	9
Large pool of talented labor	7
Specific skills such as Microsoft, C++, etc.	4

More than one answer allowed.

Somewhat more objectively, 74% emphasize low wages as a country characteristic. This is instructive because it confirms a pattern of transition economies entering the global marketplace by competing on price rather than on innovation. To potential clients, it must be obvious that Central European companies are much less expensive than, say, their Ger-

man neighbors. However, it will take some time to ensure customers that these companies can actually do the job at adequate or high levels of quality. Showing that their country's educational system puts out talented professionals helps them sell their own employees as high-caliber.

Related to this item is the companies' emphasis that there is a large pool of talented professionals. This is attractive to customers because it implies continued low wages, low company turnover, and growth opportunities (e.g., when the foreign customer needs more personnel for the job than these can be readily found). About half the firms emphasized rapid project start-up. Rapid start-up is critical to project-level decision-makers. Once a project is approved, the client company wants an immediate pool of labor to begin work, rather than waiting weeks or months for employees to finish other projects. Indian firms in particular have emphasized their 'excess' labor at ready to begin a project immediately.

Finally, a number of firms emphasize specific skills. Generally these are skills available in nations around the world. In a sense they are commodity skills, so then these firms have no choice but to compete on price - based on low wages.

2.3 Country disadvantage: weak regulatory regime is perceived as a disadvantage

In Table 5, we summarize the results on comparative disadvantages when it comes to establishing an IT service sector capable of exporting to the US. With 68%, the most frequent response was that their country's weak regulatory and legal regime put the respondents at a disadvantage. In other words, respondents pointed their finger at the government. The second most common response was 'poor reputation.' The firms in Central Europe are well aware that the reputation hurdle is a big one.

Table 5. Competitive disadvantages of Central European countries

What are your country's greatest comparative <u>dis</u> advantages when it comes to establishing an IT service sector capable of exporting to the US? (N=19)	
13	Weakness of government regulation and legal regime
8	Poor reputation
5	Weak application knowledge
5	Inadequate project managers
3	Poor English competency
2	Poor telecom infrastructure
2	Cultural distance

The next two most common answers refer to core business issues: weak application knowledge and inadequate project managers. Weak application knowledge refers to the knowledge the programmer has about the actual application domain for which he/she is writing software, whether it be a gasoline distribution system, a utility for a database, or embedded software for a scientific measuring device. The second item deals with project managers. While it is important to have smart, capable programmers, they must work to-

gether on project teams. Well-trained, experienced project managers are the layer of middle management that get the systems development projects done. This layer of technical managers typically takes years to develop.

Poor English competency was selected by only 16% of respondents. This result is slightly baffling: Do the respondents not think that language differences play a role, or do they believe their employees speak English well enough to communicate with foreign customers and develop English user interfaces?

2.4 Businessmen, not political activists

We asked the respondents an open-ended question on policy: ‘What steps would you recommend your country undertake to improve its environment for outsourcing IT work from the US?’ Then we coded the answers and summarized them in Table 6.⁴ Among those interviewees who answered the question, a third would like to see tax benefits for the IT sector. Slightly less than a third believe that IT education and, separately, reputation should be improved.

Table 6. How to improve countries’ environment for outsourcing IT work?

What steps would you recommend your country undertake to improve its environment for outsourcing IT work from the US? (N=15)	
5	Create tax benefits for IT sector
4	Improvement of IT education
4	Improve reputation
3	Business associations should be more active
2	Speed up bureaucratic procedures/improve legal system
2	Convince US (to open its markets or provide visas)
1	Provide information on business opportunities

Only 20% stated that business associations should be more active on their behalf. Possibly, this indicates that IT companies view themselves as businesses not as political activists. Managers accept their country factors as constraints, as givens, rather than structures that can be changed through political involvement.

Interestingly, none of the respondents said that software piracy needed to be curbed, even though Central and Eastern Europe is notorious for its high piracy rates, and this surely prevents Western European and US corporations to move some system development tasks to the region. Silence on software piracy may simply mean that companies are not aware of the issue.

2.5 Limited competition among Central European firms

In their search for contracts in the US and Western Europe, Central European companies compete with firms from the US, the European Union, India, as well as Central and Eastern Europe (Table 7). However, competition among Central European companies does not appear to be very strong. Three companies listed Bulgarian competitors for US bids, and

three listed the Czech Republic for West European bids. This picture is a promising one for Central European industries: it means that the firms have not been 'typed' as addressing a certain market segment. If these firms were 'typed' they would be competing against other regional firms much more often.

There are differences, however, in competition for US and West European markets. For US bids, India is most relevant as a competitor, with over fifty percent of respondents listing Indian competitors. 38% of respondents listed US companies as competitors for US bids. In bids for Western European contracts, the playing field appears to be more level. 41% of competitors came from an EU member state, and 29% come from India and Russia, respectively.

Table 7. Competition for bids in US and Western Europe

During the last 5 bids in the US and Western Europe, what were the country origins of competitors?		
Country origin	US (N=13)	Western Europe (N=17)
India	7	5
US	5	4
EU member state	3	7
Poland	2	1
Bulgaria	3	1
Hungary	1	2
Romania	0	1
Czech Republic	2	3
Russia	2	5
Ukraine	0	1
Algeria	1	0

2.6 How do Central European firms compare to the successful Indian industry?

Our respondents attribute a substantial part of Indian success in bids for Western European and US contracts to their good reputation. Asked if India's reputation for being good at outsourcing was partly responsible for respondents losing contracts to India, 5 out of 20 said yes, 2 answered negatively. While the response rate for this question was low - with only 35% offering an opinion - the finding is corroborated by answers to the follow up question 'What advantages do your Indian competitors have?' (Table 8). 38% of respondents selected 'Firms are better known' and 19% chose 'Better overall reputation for IT work' as a response. One respondent added in his own words: 'Stronger than the [Indian] reputation, we feel is the Indian networking (Indian [immigrants] in top-management of the US and EU organizations)'

Table 8. Advantages of Indian competition

What advantages do your Indian competitors have? (N=16)	
7	Less expensive
6	Firms are better known
3	Better overall reputation for IT work
3	More professional sales marketing
2	More human resources
2	More sophisticated development process
2	Government support/protection

The most important factor from the respondents' viewpoint was price. 44% selected 'less expensive' Although Central European wages are low compared to those in the US and the European Union, Indian firms have been price competitive. But this data conflicts with the next item, in Table 9, in which some of the region's firms see themselves as being competitive on price. Also note the significant wage differentials between Poland on one hand and Romania on the other.

Table 9. Competitive advantages of respondents

When you compete with Indian firms in the US or Western Europe, what are the competitive advantages of your company ? (N=16)	
5	Cultural closeness
5	Quality/know-how
3	Closer time zone
3	Lower cost
2	Flexibility
2	Experience with foreign co.'s/similar projects

In an open-ended question, we asked the respondents for the competitive advantages of their firms vis-à-vis the Indian competition. Then we applied open coding to these responses. Some felt that *cultural closeness* was their edge. This is a refrain heard from other marketing people: From managers we heard, in reference to the advantage of accessing markets in Western Europe relative to the Indians, 'we are Europeans, after all.' The question is whether the perception of the companies matches reality.

2.7 Market access through personal connections

The respondents were asked how they are able to win contracts for work abroad. The respondents were given open-ended and closed-ended questions for this topic.

First, we asked the respondents how many of their last contracts with US firms went through a competitive RFP ('Request for Proposals') process. 60% of respondents had never won a contract through this process, which indicates that it plays a very minor role for Central European IT companies. While not all projects are awarded based on an RFP,

it might also be that Central Europeans do not have sufficient business connections in the US to make it onto the RFP mailing lists.

We then asked the open-ended question how these firms won contracts and applied open coding. 82 % professed to have won their contracts through personal contacts or direct references.⁵ This is a powerful finding, given that the question was open-ended and the respondents came up with the response without being prompted (Table 10).

Table 10. How companies got their contracts (open-ended)

How did you get the other contracts? (N=12)	
9	Personal contact/reference
1	Trade fair/conference
1	Government tender
1	Chamber of Commerce etc.
1	Consultant/Business agent
1	Informal ties to immigrants
1	Website

Finally, we asked the respondents the closed-ended question of how they found their current customers in the USA and Western Europe. Here, word of mouth and reference play a smaller role than in the previous question. The most interesting result is that only one respondent selected the option 'the Chamber of Commerce/ Export Institute, or a similar 3rd party mediated the business relationship' (Table 11. This suggests that industry associations play a limited role in helping these small to medium-size firms close deals.

Table 11. How companies found current customers (closed-ended)

How did you find your current customers in the USA and Western Europe? (N=16)	
7	Trade fair or conference
6	Web site
6	Informal ties to immigrants to the US or Western Europe
4	Consultant
1	Chamber of Commerce/Export Institute
3	Other: Word of mouth and references
2	Other: Direct mailing
1	Other: Visits to potential clients in the US, Europe
1	Other: Specialized magazines

3. Discussion and some preliminary conclusions

Important for the future prosperity of the region is the task of integrating the economies of Central Europe with the emerging global information economy. This task by and large has received far less attention than the national goals of accession to NATO, EU, or the

OECD. Indeed what is striking is the lack of national or regional visions or strategies of how to achieve integration into the international information economy on the best terms possible. As the Human Development Report puts it, 'the technology revolution begins at home - yet no country will reap the benefits of the network age by waiting for them to fall out of the sky.'⁶

Under present conditions Central Europe - especially as compared with India (or even Russia) - is not considered by Western companies as an attractive destination for outsourcing.⁷ Before this may happen, the region as a whole as well as individual countries have to overcome negative perceptions of quality as well as build an international presence through a sustained promotional effort.

Our findings are also encouraging, however. We have evidence that in spite of a lack of an international awareness and recognition - even small Central European companies can successfully compete on cost and technical expertise to win significant (if not very large) international contracts. It is the opinion of the Central European IT exporters that they could do more with government policies designed to support them. They also acknowledge the need to improve their capabilities in project management, English competency and knowledge of Western business culture. This self-perception coincides well with the expectations of Western firms and consultants who stress that Central European IT firms need to change quickly to meet international standards for quality, speedy communications, dependability and adaptability.

The growth and improvement of the Central European export oriented IT sector (most of which consists of small and midsize players) brings up the question of size, critical mass and investment. Given the existing intense international rivalry, the Central European IT exporters will likely find it hard to grow without supporting government policies. In turn for the governments to pay attention, an effective lobbying effort has to be made by business associations. Below we make some recommendations that flow from our study and are addressed at governments, business associations and the companies themselves.

As has been pointed out, the sad paradox is that most Central European governments have proactive or passive policies that support and frequently subsidize traditional sectors of the economy such as agriculture, mining, steel - while they lack sufficient policies and programs that would be oriented towards the industries of the future, such as IT and high technology. The explanation of this paradox is simple: traditional sectors have powerful lobbies with strong political representation. Western companies, which also have considerable influence, push for market opening measures and not for the support of a nascent local IT industry. The experience and success of countries such as India and to a lesser degree Russia offer important lessons for Central Europe in the sense that an internationally competitive IT sector can be created.⁸

The creation of an effective national IT industry lobby is the task of private sector business associations, but given the weakness of the IT sector, the government may have to play the role of a catalyst. The important thing is to send a clear message to the private sector that the government considers IT exports a high priority and is willing to provide support. Within the government, clear responsibility for technology policy must be established - without creating a new bureaucracy. It should be a cabinet level position (education and science is one possibility) with a budget and a mandate to coordinate policy with other government agencies, such as the Ministry of Finance, the Ministry of the Economy,

etc. At present, responsibility for the IT sector is often split up among a large variety of agencies.

The lesson of the Indian success means that Central European governments should provide more outlays on IT education, training and research including resources for foreign study and internships. A system of national merit scholarships for students of computer science attending the best technical colleges should be introduced.

Although there are business associations in each of the countries of the region, none of them have reached the size and effectiveness of NASSCOM - the Indian Association that provides a clear model that others can emulate.

To become effective the IT sector associations need to build membership and develop resources and in some countries may need to undertake fundamental restructuring to eliminate built in conflicts of interest. [A good example of this is the Polish association which groups IT companies (interested in lower phone rates) together with telecoms (interested in high phone rates).] Given the general weakness of business associations in Central Europe, the task of strengthening IT sector associations (that have a relatively weak position from the beginning) is a difficult one. Some leadership may be needed from the National Chambers of Commerce in this regard and an attentive ear on the part of the government coordinator of technology policy who may need to play a limited leadership role in this process. Training and support can also be provided by international donors. To be effective, the leadership of the associations should be capable of operating not only as a domestic lobby for the industry but also as an international ambassador and promoter of the companies.

The IT companies themselves should also undertake vigorous actions if they are to improve their position in the fiercely competitive international market for outsourcing services. They should:

- work together to develop a strong business association that could effectively lobby with the government on behalf of the software sector. The companies alone cannot solve the promotion and image problems of the industry in the international market;
- establish partnerships with universities and R&D institutions by funding scholarships for talented students and sponsoring research programs and in return obtaining information, contracts, training opportunities and talent. The partnerships should not be limited to technical universities alone but include, for example, private business schools of which many have been formed in recent years. The government can provide tax incentives for the formation of the partnerships;
- invest in professional and management education. Many of the smaller firms were founded by IT entrepreneurs often with strong technical backgrounds but without professional management (and linguistic skills). This weakness must be systematically corrected through vigorous training and hiring policies within the companies themselves. Project management, English language, international business are among the most important subjects;
- seek out and form strategic partnerships and joint ventures with western firms. This may be the fastest way to obtain needed management expertise, technology and contracts and may be preferable to simply selling the company to a large western investor. Indeed for some Central European IT firms, the best option may be to become a specialized subcontractor to larger western outsourcing companies.

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- UNDP, Human Development Report, 2001.

Notes

- 1 Although Finland's population is only 5.2 million, the size of its economy is in the same league as that of Poland, and Finland is considered a leader in IT adoption (ranked number 3 in the information society index 2000). Thus Finland could be a role model of development for the countries of Central Europe.
- 2 See for example Polish Internet Arena, istart.com.pl.
- 3 EITO Report, 1999 – data for 1997 – see <http://www.eto.org.uk/eito>
- 4 5 of the 20 survey participants did not come up with an response for this open-ended question.
- 5 After excluding five companies that did not export to the US and four non-responses, we were left with an N of 11.
- 6 UNDP, Human Development Report, 2001.
- 7 A. Arora, V.S. Arunachalam, J.M. Asundi, and R.J. Fernandes, The Globalization of Software: The Case of the Indian Software Industry, Final Report, February 2000, from the Heinz School, Carnegie Mellon University, <http://www.heinz.cmu.edu/project/india>
- 8 American Chamber of Commerce in Russia, Information Technologies and Telecommunications Committee. White Paper on Offshore Software Development in Russia, March, 2001.