Rene Wintjes

Chapter 6 in Internationalisation of European ICT activities 2008

Wintjes, R. (2008), “From Case studies; International Division of Labour within ICT Companies”. In H. Meijers, B. Dachs, and P. Welfens (eds.), Internationalisation of European ICT Activities. Springer-Verlag: Heidelberg, pp.186-200.

**From Case Studies: International Division within ICT companies**

1. **Business case-studies, objective and methodology**

The eighteen business case studies complement both the theoretical and the other empirical work by providing detailed and recent insights on the adopted internationalisation strategies and the implications for the international division of labour at the level of individual EU based ICT companies. The objective of the case studies is to illustrate and complement the theoretical and practical understanding developed in this study. The analyses mentioned above leads to insights mostly at the macro and meso-level of countries, sectors, or to insight focussing on R&D as one business function indicated by patent applications. With the case studies we have adopted a qualitative methodology to address geographical fragmentation (and organisational integration) of ICT activities at the micro-level, that is, the company level, but also below the level of a MNE, because some of the case-studies focus on a specific EU-based subsidiary of a multinational corporation. A two-stage work plan has been adopted to perform case studies. In the first stage eighteen business cases have been reviewed in an explorative way as to get a broad view on the emerging key issues. These eighteen companies have been selected to reveal different models of internationalisation, since these differences may have different policy implications. In order to get this desired diversity we have included:

* both small and large companies;
* companies in each of the three ICT sub-sectors of hardware, software and services;
* companies located in the West, East, South and North, in order to have an EU-wide coverage;
* some companies with R&D activities in NMS;
* some companies with FDI/subsidiaries outside the EU.

In the second stage we have focused on a smaller selection of cases in order to get a more detailed and in-depth view on internationalisation of five ICT companies located in Europe, namely: AS&T, LogicaCMG CEE, SAP, Océ and FreeSoft (see the below table and Annex E).

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Case-study companies\*** | | | | |  |  |  |  |
|  | **Name** | **Location** | **Nationality of**  **ownership** | **Large / small firm** | **ICT Activity** | **R&D activity in NMS** | **FDI outside EU** | **Note** |
| 1 | ITProvision | Belgium/Romania | Belgium/Romanian Joint Venture | Medium (about 70 people in Romania) | Organises ‘near-shoring’ in Romania and sales of software | Yes | no |  |
| 2 | Infineon Austria | Austria | German, mixed | Large | headquarter for hardware automotive electronics | New large site in Dresden | yes | has its own internationalisation strategy |
| 3 | AT&S | Austria | Austrian | Large | manufacturer and developer of printed circuits for mobile phones | No | locations in Austria, India and China |  |
| 4 | T-Systems (Deutsche Telekom AG) | Germany | German | Large | Telecom services |  |  |  |
| 5 | FreeSoft | Hungary | Hungarian | SME, 100+ | Electronic customs management services | yes | Yes, in germany and US | After growth by take-overs thinks about how to enter brasilian and Chinese markets |
| 6 | SAP | Germany | German | Large | Software/services | Yes | yes |  |
| 7 | Kring Technologies | Denmark | Danish | MNE-SME  15 people in denmark, 130 global in total | Customized IT services | Plans to have a development unit in NMS in 2005 | India, and exploring options for Ukraine, China, Belarus, etc. | Works with Nikia, Intel, Sony Ericsson |
| 8 | ELMOS Semiconductor AG | Germany | German | Large, 960 empl. Globally | Development, production and marketing of tailor-made application-specific integrated system solutions based on semiconductors |  | Yes, in the US | suncontracting of packaging and assembly in the far-east |
| 9 | SAP Labs Bulgaria | Bulgaria | Germany | Large MNE; SME-subsidiary of 190 people in Sofia | Software development  180 people in Sofia R&D office;  Innovative software for J2EE SAP Web Application Server | Yes, Bulgaria | Yes, many | Fastest growing subsidiary of SAP |
| 10 | Delta Singular | Greece | Greek | 1500 in total | Software Products  IT Outsourcing Services  Systems Integration  (100 in R&D) | no | yes | Basically a collection of many small service companies |
| 11 | Océ | Netherlands | Dutch | Large | R&D, Manaufacturing and services of digital copymashines and document handling | Hardly, only small software sub-sidiary for software in Romania | Yes, salesoffices in many countries | Shifted assembly to Czech Rep.  Company is transforming to services: |
| 12 | OMRON Manufacturing of the Netherlands | Netherlands | Japanese | SME-subsidiary | R&D, manaufactiring and services industrial measurement and controll systems | No, as far as known by now | Yes, e.g. new plants in China | Strategy of EU sourcing, Centre of Excellence. within corporation in wireles technology |
| 13 | Xilinx | Ireland | USA | 2,600 worlswide  400 in Dublin | EHQ, Semi-conductor supplier, increased R&D activities ,engeneering and production. By teaming with technology leaders in silicon fabrication, design automation, system level tools, IP, and design services | no | Global, e.g. European HQ in Dublin, Asian headquarter in Singapore | 500 more jobs (mostly in research) in Dublin over the next 4 years |
| 14 | CertiCon | Czech Rep. | Czech (at least part) | SME | Software development | Yes | No | Originally a R&D spin-off from Academia of Science |
| 15 | Logica CMG Prague Development Centre | Czech Rep. | UK/International | Large MNE, SME subsidiary | Software development in Prague.  The company employs around 21,000 staff in offices across 35 countries and has more than 40 years of experience in IT services. | Yes |  | Headquartered in Europe, LogicaCMG is listed on both the London and Amsterdam stock exchanges |
| 16 | Videoton | Hungary | Private Hungarian (former state-owned  TV-Set-producer | Large  (8000 people in Hungary, 1000 in Bulgaria) | a privately owned Hungarian Contract Electronics Manufacturer (CEM), the largest independent Electronics Manufacturing Services (EMS) provider in the CEE region, in TOP 30 worldwide | yes | Not yet, but new plant will be located in Ukraine | Small marketing office located in Germany |
| 17 | Tumbleweed Communications | Bulgaria | USA | Large MNE, local SME subsidiairy of 100 empl. | Software, services;  Since 2002 provider of business solutions: anti-spam, anti-virus, e-mail filtering, and e-mail encryption | Yes, Bulgaria | yes | sold Indian (Bangalore) operation to expand the existing business and R&Doperations in Sofia |
| 18 | F-Secure Corporation | Finland | Finnish |  | Products include antivirus, network encryption, desktop firewall with intrusion prevention, anti-spam and parental control.  Founded in 1988, F-Secure has been listed on the Helsinki Exchanges since 1999. The headquarters is in Helsinki, Finland | no | offices in the USA, France, Germany, Sweden, the United Kingdom and Japan. |  |

\* these case-studies are performed by: Bernhard Dachs, ARC Systems Research, Vienna; Michael Vogelsang, EIIW, Wuppertal; Paul Welfens, EIIW, Wuppertal; and René Wintjes, UNU-Merit, Maastricht

**Analysis on ICT sub-sectors of: software, hardware and services**

Looking more closely to several companies of the three ICT sub-sectors could perhaps tell us if for instance software companies use a specific internationalisation model. We will especially focus on the software sector, because in theory they are the most footloose, especially when the products of the companies have a ‘digital good’ characteristic. Concerning the ICT hardware producers the more traditional concept of internationalisation could still apply. Here the question is mainly which functions remain in the EU, because from the literature review we could already expect that the EU as a location for cost-efficient manufacturing is loosing ground.

**Software Companies**

SAP as the largest European Software Company, F-Secure is a specialized producer of software and FreeSoft as a service provider for a broad range of software development and IT services. All three companies are listed at stock exchanges, respectively in Germany, Finland, and Hungary.

Comparing the strategies of these three companies shows that the internationalisation strategy depends on the type of products offers, especially the scalability and the service-intensity of the products, what can be translated into the two dimensions scale-intensity and knowledge-intensity. SAP is the most advanced in its internationalisation, FreeSoft is just beginning the process, but because it also offers services to a large extent their internationalisation won’t take off as fast as it did for the other two.

**SAP** offers Enterprise Resource Planning (ERP) systems, which include a variety of additional software components such as Customer Relationship Management (CRM), Supply Chain Management (SCM), among others. The service intensity of the SAP platform is high: 120.000 software companies and consultants implement SAP systems in over 120 countries, this means they adapt the SAP system to the special needs of the client or the sector. Nethertheless the scalability of the SAP system itself is high. Comparing the 2005 financial results SAP shows the highest rates of revenue per employee and EBT (earnings before tax) per employee of the three companies covered.

**F-Secure** offers antivirus, network encryption, desktop firewall, anti-spam and parental control software. In the beginning F-Secure sold its products only via Internet (download) and by CD (box-Solution). Since 2004 the strategy has changed, now Anti-Virus solutions are bundled with additional services which require a local presence in international markets. The new strategy is called "security as a service". Additional services are, for example, consultation on network, security and organisational concepts and gateway solutions. The products and services of F-Secure are offered by resellers and distributors in over 50 countries.

**FreeSoft** offers a range of software and internet products and services; these are, for example, document management solutions (for governments), custom applications, mobile, e-commerce, multimedia, data entry, ERP implementation. Subsidiaries are located in Germany and US, where they have been offered outsourcing solutions for developing customs applications. Meanwhile the strategy has changed from a price competition strategy to a strategy that sells specialized knowledge at high margins. However 93 per Cent of revenues have still been generated in Hungary in 2005. This is the strongest home-bias of the three companies compared; F-Secure generates 36 per cent of revenues in Finland and Scandinavia and SAP realizes 21 per cent of its revenues in Germany.

In the **theoretical** review, two approaches with respect to digital goods are presented: The administration rights approach in combination with the general equilibrium approach of Antras (2003) and a general equilibrium model which is opened for aspatial digital companies located in ‘rest of the world’. The two models showed that different internationalisation strategies might prevail in the sector of digital goods. The key driver for internationalisation in the first model is to accompany multinational companies going into foreign markets or to support outsourcing solutions. On the other hand the second model predicts that the search for new markets for the digital good producer itself is the key driver of internationalisation. Both constellations have different consequences for company's strategy, e.g. regarding the goals retaining the market leadership or the R&D-intensity. The analysis of the three case studies provides anecdotical evidence on the prediction that there exist different internationalisation strategies for digital goods producers, depending on the knowledge-intensity and scale-intensity of the products.

**Comparing the strategies** we first point out that the products of SAP and F-Secure are knowledge intensive and scale effects are important. Consequentially the internationalisation strategies of both companies show common strategic goals:

Linking scalable products with high-margin services

Becoming / Remaining No. 1 in market segment worldwide.

Technological leadership matters. High investment shares in R&D.

Internationalisation pattern: First to find a local partner (reseller) for service and distribution; if the local partner is successful, then an own presence (a subsidiary) is established in this country.

A difference between SAP and F-Secure is the original starting point of internationalisation: SAP accompanied multinational enterprises first, F-Secure has used the internet to offer products worldwide. FreeSoft products show high knowledge-intensity, but have only low economies of scale. Therefore its internationalisation strategy is different from that of SAP and F-Secure: FreeSoft offers own labour-intensive competencies as services; and Only selected markets are targeted.

The future international targets of the companies reflect the differences in strategies and the global position achieved today: SAP’s next goal is to strengthen its position in China and India, F-Secures international targets are in Europe and Asia in general. FreeSoft wants to enter the market of governmental document management systems in China and India in particular, because they presume a lack of domestic competence in this field. Offering knowledge-intense products to gain higher margins is a common feature of all three companies, but they vary in their internationalisation strategy due to differences in the economies of scale.

**ICT hardware companies**

Several of the case-study companies can be labelled as ICT hardware companies. However immediately the diversity in the extent to which the activities really relate to manufacturing is striking and sheds a light on the position of the EU with regards to manufacturing.

**Videoton** is a Contract Electronics Manufacturer (CEM) and the largest independent Electronics Manufacturing Services (EMS) provider in the CEE region, ranked in the TOP 30 worldwide and TOP 10 in EU. Videoton gains outsourcing contracts, mainly from Western European countries and produces, for example, fax-machines, TV sets, TV set-top boxes and different kinds of household appliances. Production is located in Hungary (8000 employees) and Bulgaria (1000 employees). A small office for marketing is located in Germany. An additional production plant in the Ukraine is planned. Relative low labour costs is one of the reasons why the investment pattern of Videoton directs to the east. Products (e.g. cable loops) which were produced in Hungary ten years ago are now being produced in Bulgaria. Standard electronic components are imported from Asian companies. Overall Videoton's management expect a threefold division of labour: West-Europe will specialize in design, development, marketing, distribution. Middle-Europe (EU10) will specialize in engineering and development and Eastern-European countries in labour-intensive production.

At the other end, **Océ** can hardly be labled as a manufacturing company anymore. In the statistics Océ is probably still listed under manufacturing industries, as a producer of office machines, but since employment in manufacturing & logistics represents in 2005 only 10% of total employees (against 22% in 1997) Océ is rapidly entering the service economy. Océ now supplies a wide range of products, software and services for copying, printing and digital document management. Software has become the major discipline in Océ’s research and development, which is mainly concentrated in Venlo (the Netherlands). Out of the 24,000 employees worldwide, approximately 4,000 work in the Netherlands, and in absolute terms this number of jobs in the Netherlands.

In the below figure the activities of Océ are plotted according to the scale-intensity and the knowledge intensity. The knowledge intensive activities are dominant in the Netherlands and the EU. The less knowledge intensive business functions concern the production of parts and components and this has been outsourced to a very high level, and increasingly the parts and components originate from Asia. Relatively low knowledge-intensive and low scale-intensive activities that are still performed at Océ to a large extent refer to the sales and service activities at the many offices around the world. The service and maintenance contract are however very profitable, moreover, the information coming from direct interaction with clients is of strategic importance to the R&D core at Venlo.

**Activities of Océ plotted along the dimensions of scale and knowledge**



The Austrian company **AT&S** is somewhere between Videoton and Océ and

*The expansion to Asia, however, will also lead to a new division of labour within the company. In the future, AT&S will concentrate small-lot, niche production, prototyping and tailored design activities in Europe while mass production will move to Asia. An example of such niche products is the engine control system PCB ordered by Airbus mentioned above. Despite its international organisation of production, the company’s R&D activities are deeply rooted in the Austrian Innovation System, as can be seen from AT&S’ co-operation network*

*(See in-depth case-study AT&S in Annex E)*

**ICT Services companies**

Overall the ICT service companies are basically more market-oriented and the activities are decentralised because for most activities interaction with customers is essential. However, all the service companies we interviewed distinguish between activities according to the extent that they can be outsourced, and or internal or externally off-shored. Small firms like ITprovision and KRING technologies include off-shore possibilities in their offering of services to local clients in Belgium and Denmark respectively.

Larger service providers such as LogicaCMG are truly global networks, which offer economies of scope. While the Product Development Centre of LogicaCMG CEE in Prague is specialised and has its product responsibilities in wireless technology, the rest of LogicaCMG CEE has a market responsibility and offers the whole range of LogicaCMG’s sector-specific as well as cross-sector offerings. For any offering they can involve other LogicaCMG offices and vice versa, CEE offices are involved in offerings of their globally located ‘sisters’ according to the Blended Delivery Model, which is a concept that combines on site, on-shore, near-shore and off-shore activity within a global corporate network of offices and locations. Again we can not plot all the activities of LogicaCMG CEE in one box (see figure), but the trend is towards the more knowledge intensive activities.

**Activities of LogicaCMG CEE plotted along the dimensions of scale and knowledge**



**Motives and models of internationalisation**

A horizontal analysis across the case-studies has resulted in the conclusion that for ICT companies a certain internationalisation decision is almost always a ‘multiple-motivated’ decision, combining mainly low-cost arguments, market development arguments and strategic arguments. Take for instance the case of AT&S:

It became clear to AT&S at the end of the 1990s that the company had to expand its operations abroad for several reasons; first, market growth seemed to be higher in Asia than in any other part of the world. Second, production in Asia could make AT&S less vulnerable to exchange rate fluctuations. Third, production capacities in Austria had reached their limits and had to be expanded. Fourth, production costs in Asia are lower than in Austria.

(See case-study AT&S in Annex E)

This observation accords with the OLI paradigm (combining Ownership-, Location-, and Internalisation-advantages) which is basically an eclectic conceptual model to address this multiple motivated nature of internationalisation decisions.

Another clear message from the case-studies is that also for ICT industries the individual internationalisation decisions are clearly linked to former decisions, and this shows up in path-depency and trajectories in time and space. For instance, when asked for the reasons to start or increase R&D activities on a certain location, many interviewees have mentioned reasons referring to former experiences of any kind, e.g. an existing sales office.

The first reason is that both Logica and CMG already had established offices in Prague. Administrative structures were already in place and they had previous experience from off-shore projects for international clients.

(See case-study LogicaCMG CEE in Annex E)

In this respect the case-studies also confirm theories that emphasize the evolutionary nature with the process-models of internationalisation. However, the internationalisation process seems to be more dynamic for the ICT sector than for other sectors, especially for software companies (see the cases of F-secure and SAP). The ‘digital goods’ characteristics presented in the theoretical discussion fit with the observed internationalisation strategies of companies in the ICT software sector. Not only are these companies more foot-loose, but also in time there are less limitations to implement fast internationalisation trajectories. Since Dunning originally presented his OLI framework in a static way, the more recent applications adopting a more dynamic approach are therefore more relevant regarding the ICT sector.

Especially some cases of Foreign Direct Investments in New Member States have also pointed to the fact that asset-seeking and asset-exploiting are not mutually exclusive motives for internationalisation.

In May 2004 Tubleweed (USA) announced moving out of India, closing down the former ValiCerts office in Bangalore. At the same time it extended the existing business operations in Sofia (Bulgaria) by 50 percent. Besides an increasingly important location for R&D Bulgaria has also increased importance as a market for Tumbleweed. To name one example, Bulgaria’s leading GSM operator MobilTel has chosen Tumbleweed in 2005 to provide it with its MailGate E-mail Firewall to filter and secure email traffic.

(See case-study Tumbleweed Communications Bulgaria in Annex E).

The cases of Tumbleweed in Bulgaria and LogicaCMG in Czech Republic illustrate that for global networked companies the motives and opportunities for growth ‘abroad’ are dynamic and systemic. Such co-evolution of explanations blurs the boundaries between the originally expected Ownership-, Location- and Internalisation-advantages. When applied to ICT industries the OLI-framework has therefore to be put in a dynamic, networked perspective.

Concerning the **Ownership-advantages** we have witnessed a decreasing importance of the nationality of ownership, e.g. in the case of SAP and LogicaCMG, Delta Singular. The terms ‘home’ and ‘host’ seem to become less relevant for many of the case-study companies, and not only for the large globally networked companies but also for small companies like Kring and ITprovision, two companies that have developed a specific international business model in which they have integrated off-shoring and near-shoring possibilities. Concepts like ‘home-base-augmenting R&D’ and ‘home-base exploiting R&D’ seems rather out-dated for such international corporate networks of software and service providers. For instance, the R&D activities at LogicaCMG in Prague could perhaps be better labels as network-exploiting or network-augmenting, depending on the specific project. The cases involving ICT hardware show a more traditional patterns that accords with the observation that most R&D is still concentrated in the home-country near its headquarters.

**Location-advantages** remain very important in many case-studies although they change over time and we have seen many cases where there is a constant ‘competition between locations’ within corporate networks, e.g. between Bangalore and Sofia or between PaloAlto and Walldorf. Some illustrations:

… for some products manufacturing has been re-located to OMRON affiliates in China. Not only because it was cheaper, but also because OMN has increasingly focused on industrial markets, and industrial clients do not want standard applications.

(See case-study OMN:Omron Manufacturing of the Netherlands in Annex E).

Concerning the **Internalisation advantages** of the OLI framework the ICT case-studies highlight:

* the role of global networks of partnerships especially for software companies, e.g. in the case of SAP:

SAP has labs all over the world and tries to partner with other companies where SAP does not have a core competency or main focus. Co-innovation with partners and customers is part of the growth strategy. SAP has a unique partner ecosystem with more than 1,500 partners worldwide with overall more than 180,000 SAP partner certificates.

* the increase of (external) off-shoring of the more standardised, codified, and less strategic tasks in software development and manufacturing;
* and to the increased importance of contract manufacturing.

Large ICT service companies such as Delta Singular and LogicaCMG prefer internalised networking.

LogicaCMG CEE plays an important role in the so-called ‘Blended Delivery Model’ that combines on site, on-shore, near-shore and off-shore activity within a corporate network of offices and locations. “In theory, everything is offshore-able, but the extent is limited to the degree with which the client is comfortable”. A system of Global Diliveray Services is used to decide what the best places and partners are to perform an assignment and for some activities that require more interaction and or intimacy the clients rather want to be served from a near-shore location, and not from a off-shore location.

(See case-study LogicaCMG CEE in Annex E)

Small and medium ICT service companies more often adopt external networking strategies. But overall many different new business models have been developed. Eg. By ITprovision and KRING:

Kring Technologies is a young Danish multinational employing 130 people world-wide and 15 people in Denmark. They provide customized IT services and consulting to clients worldwide. “We offer Western project management and quality processes combined with low cost qualified technical skills through our offshore facilities in India and more recently the near-shore facility in the Ukraine.

(See case-study Kring Technologiesin Annex E)

**International division of ICT business functions, the place of EU**

Fragmentation of production has been defined as splitting-up or decoupling of the value added chain allowing for a more in-depth specialisation and broader international networking. The reason for these developments is that different stages of production correspond to different production functions so that a country may have a comparative advantage in one stage of production and a comparative disadvantage in other stages or functions. In the past, when the Marshallion single-plant-family-firm dominated the economy, international trade has lead to specialisations of countries in certain products. In the business case-studies we have focussed on the geographical splitting-up of activities within ICT companies, in order to identify geographical specialisation in certain business functions.

Our **main conclusion** is that the case-studies support the evidence based on the analysis of international trade at the level of sectors and products. Within international ICT companies we have found evidence for this geographical splitting up of functions in ICT industries. Concerning the place of the EU in the international division of activities within ICT companies our main conclusion is that the activities in the EU15 tend to be the relatively knowledge intensive, focussing on customisation and high quality. The functions and activities located in Asia tend to be the more standardised and codifiable activities. New Member States take a middle position in this international division of ICT functions.

FreeSoft is the largest Hungarian software company. The Budapest based company offers a full range of software of internet products and services. It relies on international networks, especially with Oracle, but also with other companies. Its internationalisation strategy may be described - in short- as: 'Develop products, not price competition'. This refers to the strategy on the German and US market especially, to win customers for its database conversion services convincing them by a high quality level and less by differences in labour costs.

(See case-study FreeSoft in Annex E)

**Summarizing** the case-study evidence, we have plotted the geographically fragmented business functions along the dimensions of scale and knowledge (Figure 67). We can associate several of the plotted functions with the three ICT sub-sectors of hardware, software and services. ICT hardware and digital goods are more standardised and codified and therefore more scale-intensive and with more globalised markets than for ICT services. For ICT services companies the scale of production (that is the cost-efficient advantage of geographical concentration) is less important. Small service providers can therefore be very productive, but for ICT service industries economies of scope are very important, which can be obtained through international, but often decentralised networks. However the evidence from the case-studies extents the conclusion beyond the sector level, since we have observed the trend at company level across the three ICT sub-sectors. The typical slogan or mission of our case-study companies therefore does not refer to a specific product or service, but to solutions.

**Business functions along the scale and knowledge dimension**



Source: based on the case-studies; Note: functions in brackets are external, not performed under full ownership

In almost all case-studies we have seen that the companies have included more parts of the value chain, most notably by extending or expanding into service activities, but there is also hardly any company that is not engaged in software development somehow. Internationalisation facilitates both **geographical fragmentation and corporate integration** of business functions.

Within this international fragmentation and integration the EU has specialised as a location for the more knowledge intensive business functions, ranging from core R&D to design and marketing & management, and from innovative software development, to customisation and business consultancy. This specialisation can not be maintained without internationalisation.

Concerning the fear for losing ICT jobs in the EU we can not draw firm conclusions based on 18 case-studies, but at least they do not confirm the justification of such fears.