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Outward direct investment versus technology licensing: an SME perspective

Based on the example of the evolution and internationalization of a Hungarian wastewater treatment company, this paper investigates various theoretical and strategic management issues. As for the theoretical part, Hungary's outward direct investment performance is analyzed departing from the thesis that Hungary's present seemingly favorable OFDI performance is just a statistical artifact. It is only organic development, based on local entrepreneurs' capital export that can substantiate Hungary's present OFDI position. The strategic management issues analyzed in the paper include the sequencing of internationalization; the pitfalls related to growth; modes of foreign market entry; and the choice between FDI-based internal exploitation of technological knowledge and external technology exploitation in the form of technology licensing.

JEL codes: F23, L24, L26, O16, O33, Q57

Keywords: internationalization, outward foreign direct investment technology exploitation, licensing entrepreneurship, ecological engineering,

Introduction

Hungary has only recently appeared on the global map of outward direct investor countries. Although Hungarian outward foreign direct investment (OFDI) performance is marginal in comparison to the ones of advanced OECD economies, Hungary is one of the leading foreign investor countries among former transition economies – both on per capita- and OFDI/GDP bases (tables 1 and 2 – for the sake of comparison we included two EU economies with similar population size; see also: Antalóczy–Sass 2009). Hungary's leading position is however due to a couple of relatively large-scale deals: the two biggest investor companies MOL (a Hungarian oil and gas company) and OTP (a bank) account for 60 % of total OFDI from Hungary (Antalóczy–Sass 2009).

Table 1

Basic OFDI indicators (mn USD)

| | OFDI flows | | | OFDI stock | | Memorandum: Inward FDI stock |
|----------|------------|-------|-------|------------|--------|---------------------------------|
| | 2006 | 2007 | 2008 | 2007 | 2008 | 2008 |
| Hungary | 3874 | 3737 | 1661 | 17596 | 14179 | 63671 |
| Czech R. | 1467 | 1619 | 1900 | 8557 | 9913 | 114369 |
| Poland | 8875 | 4748 | 3582 | 19369 | 21814 | 161406 |
| Portugal | 7139 | 5490 | 2106 | 67708 | 63642 | 99820 |
| Austria | 13670 | 33380 | 28214 | 156043 | 152562 | 139340 |

Source: UNCTAD, Country factsheets

Table 2

Comparative indicators of OFDI performance (% and USD)

| | OFDI/FDI flows (%) | OFDI/FDI stock (%) | OFDI stock/per capita | OFDI /GDP (%) |
|----------|-----------------------|-----------------------|-----------------------|---------------|
| | 2008 | 2008 | 2007 | 2007 |
| Hungary | 25.5 | 22.3 | 1750.8 | 9.3 |
| Czech R. | 17.7 | 8.7 | 828.9 | 3.5 |
| Poland | 21.7 | 13.5 | 508.2 | 3.2 |
| Portugal | 59.6 | 63.8 | 6382.7 | 28.0 |
| Austria | 208.2 | 109.5 | 18766.4 | 50.5 |

Source: UNCTAD, Country factsheets and OECD Factbook, 2009 (Paris: OECD) for GDP and population data

Given the high concentration of OFDI deals¹, Hungary's regionally favourable OFDI position is just a statistical artifact, which only seemingly supports Dunning's classic thesis, the investment development path.² In the medium run, *organic development of OFDI*, i.e. local entrepreneurs' capital export will be indispensable to substantiate today's OFDI position.

Since one of the main deficiencies of Hungarian SMEs is their low growth potential,³ there is only a thin layer of (mostly) knowledge-based companies willing to venture abroad and export capital.⁴ Similarly to their counterparts in advanced economies, many of the

¹ According to UNCTAD's data (UNCTAD World Investment Report, 2009, p. 212), the total number of Hungarian greenfield FDI projects in the world amounted to 115 between 2004 and 2008. The respective data are: 163 for the Czech Republic, 171 for Poland, 209 for Portugal, and 1193 for Austria.

² Dunning (1981; 1986) argues that there is a U-shaped relationship between economic development and a country's net outward investment position.

³ According to rich and growing empirical literature, Hungarian SMEs are not growth oriented, unable and unwilling to move beyond stage one in their life cycle (see e.g. Major 2003; Szerb-Ulbert 2002)

⁴ 50 companies with OFDI figure in the author's OFDI database, compiled by monitoring the business press and ITD Hungary's releases. 25 to 30 of them can be considered SMEs, though many of them will fast growing IT firms that will sooner or later outgrow this category. Examples include Aitia International Inc. and Onlinet Ltd. Ind Group Ltd. Some of them are manufacturing companies that venture abroad, like Fornetti Ltd. Sanatmetal Ltd. and Jászplasztik Ltd.

Hungarian knowledge-based companies adopt born global strategies (Oviatt-McDougall 1994). They are the ones that constitute the main drivers of organic development of OFDI.

Overcoming the liability of foreignness (Hymer 1976) is especially difficult in a 'post-transforming economy' context where local entrepreneurs have little chance of becoming global players. Powerful corporate networks⁵ that would enhance internationalizing companies' resources are lacking and developmental institutions are inefficient. Therefore, an OFDI-based growth strategy that would ensure efficient technology utilization and due profit from innovation requires substantial dynamic capabilities.⁶

This paper surveys the evolution and the internationalization of a Hungarian new-technology-based company. We explore the strategic and organizational discontinuities that accompanied its growth, and identify the explanatory factors of success. Another focus of the paper is the changing modes of foreign market entry.

Two interviews with the CEO (in September and October, 2009) as well as data made available by the director of business administration constitute the sources, together with corporate brochures and other information available on the Internet.

The company and the industry

Organica Ecotechnologies Inc. (hereafter Organica), a firm that develops and implements ecological wastewater treatment technology was founded in 1998 by two Hungarian private persons. In its broadest sense Organica's activity belongs to the highly diversified (Ernst & Young 2006) eco-industry, and more specifically to wastewater treatment. Organica's technology is an alternative to conventional wastewater treatment (activated sludge technology): it belongs to the ecological engineering segment.

Ecological engineering combines and recombines the findings of various related emerging sciences and technologies including biotechnology, nanotechnology, chemical science, information technology and control technology. Purposes of ecological restoration and rehabilitation, i.e. the solving of environmental problems⁷ are achieved with the help of devices made up of living organisms (a constructed ecosystem with self-design capabilities) housed within a casing.

Ecological engineering – an industry with a high growth potential (Todd 1997) – is applied for the solution of environmental problems in practically every manufacturing industry: it is virtually as ubiquitous as today's paradigm determining general purpose

⁵ Corporate networks are viewed here in a broader sense than Southeast-Asian type 'business groups'. The term 'corporate network' simply refers to the fact that economic actors do not act in isolation but are embedded in groups of collaborating organizations (including among others well-functioning financial institutions). If key elements in these networks are lacking or at least not functioning efficiently – as it is the case in transforming economies – the resulting network misalignment jeopardizes firms' competitive performance (Szalavetz 2010)

⁶ For a literature survey on the evolution of the concept of dynamic capabilities, see Helfat et al. 2007. This paper employs the term in line with the cited authors' definition: "the capacity of an organization to purposefully create, extend or modify its resource base." (Helfat et al. 2007:1)

⁷ Ecological engineering is also used for other purposes such as producing high-quality fuels, food, purifying air or regulating climate (Todd 1997).

technologies.⁸ Growth is fueled on the one hand by increasing public and private demand⁹ for environmental services, on the other hand by increasingly strict environmental regulations and not least by new actors' innovative solutions.

At present 95 % of the rapidly growing wastewater treatment market¹⁰ is covered by actors specialized in conventional technology. Three types of major new technologies are currently competing for the remaining 5 % of the market: membrane bioreactors (MBR); moving bed bioreactors (MBBR) and Organica's technology.¹¹ This distribution of the world market is however bound to undergo major changes in the medium run: the share of conventional technology is expected to decline to 25 or 30 % within the next 15 years. This expected huge structural change prompts the contenders (among them global players including GE or Zenon Environmental) to increase research efforts and ensure worldwide market presence – partly through large scale cross-country mergers and acquisitions.

As for the Hungarian situation, academic research based strategic planning related to water management and wastewater treatment, characteristic in the command economy era, abruptly ended with the change of the regime. The excessive fragmentation of the Hungarian public administration system coupled with rapid market liberalization; vanishing state planning, control and intervention; frequent changes in the financing structure have led to wasted resources and low transparency in public expenditures allocated to wastewater treatment. The first initiative to elaborate a coherent strategy was in the frame of the National Water Technology Platform program in 2009.

The distribution of the Hungarian market reflects this fragmentation: 20 % of the total water and wastewater treatment services are carried out by five regional waterworks companies in state ownership, and the remaining 80 % is distributed among ~350 actors: most of them are in the ownership of local authorities, while some are privately owned and some are foreign-owned (Source: Papp 2009). Key suppliers are mainly foreign companies: the French Veolia and Suez Environment, the German RWE and Berlinwasser; the Austrian Purator and the U.S. GE Zenon. Beside the subject of our case study, other important consulting and implementation companies include: Vituki Consult Rt., Öko Zrt., Aquaprofit Zrt., Viziterv Consult Kft and Vegyépszert Zrt.

It is in this context Organica's evolution will be investigated. We start by presenting some basic company data. The company has 37 employees, all with tertiary education level. The disciplines Organica's employees have graduated in are highly diversified, including bioengineering, chemical engineering, civil engineering, microbiology, molecular biology, environmental engineering, and of course there are economists, sales & marketing experts,

⁸ Bresnahan–Trajtenberg 1995; Lipsey–Bekar–Carlaw 1998; Jovanovic–Rousseau 2005.

⁹ Growing demand in advanced economies is in line with the environmental Kuznets curve hypothesis (World Bank 1992) according to which the environmental impact indicator is an inverted U-shaped function of income per capita (for a literature review and a discussion of the concept see e.g. Stern 2004). As for developing countries, demand is bolstered among others by the UN Millennium Development goals, i.e. to provide safe drinking water and basic sanitation for the entire population. (There are currently more than one billion people worldwide, who face difficulties in accessing to safe drinking water and are exposed to water-borne diseases because of the poor quality of water they drink.) In Central and Eastern Europe the growth of the industry has been nurtured on the one hand by the necessity of complying with EU directives related to wastewater treatment, on the other hand by the rapid industrialization these countries have undergone during the transformation and EU integration process.

¹⁰ According to the interviewed company's CEO, the size of the wastewater treatment world market – of an estimated value of EUR 30-35 billion in 2008 – increases by 20 % annually.

¹¹ Biological wastewater treatment techniques are in a rapid progress, and nowadays there is an emerging fourth contender: microbial fuel cells (MFC) technology.

logistics experts; employees with several years of experience in consulting & investment analysis business; in business process outsourcing etc. The R&D department consists of 12 employees.

In the 2000s net sales varied between HUF 1.2 million (~EUR 5 million) and HUF 2.5 billion (~EUR 10 million). The share of export was minimal (1-2 %) in the first decade, however, following 2005 it was continuously growing to reach, according to Organica's plans, 70 % in 2009. Export increase stems from technology transfer and license fees as well as from engineering services.

So far Organica has built twenty municipal treatment plants in Hungary, six plants abroad (five additional plants abroad are under construction). As for industrial treatment plants, there are over 300 (exclusively in Hungary) in their list of references. Key industrial references include GE, Opel, Suzuki, MOL, Levi's, Dunafer, etc.

The average value of the indicator of R&D over net sales has been 10 % over the past decade, currently however it is expected to reach over 15 %, with the inclusion of grant money.

Organica has undergone several organizational changes (to be reviewed in the next sections) that have affected its ownership structure as well. Currently Organica has three owners: Organica Holding Ltd. (43 %), owned by Organica's two founders; and two international investment firms: RNK Capitals (38 %) and Gamma Capital Partners (19 %). Organica has two local subsidiaries:¹² Organica Investments Inc. that offers financing solutions for the implementation of Organica's wastewater projects, and KVG Konvergencia a software development company that also elaborates e-learning material related to Organica's solutions. Organica has currently one subsidiary abroad: Shenzhen-Organica in China, which was established to market Organica's technology in China, and coordinate the implementation of its local wastewater treatment projects.

Issued capital increased substantially in the 2000s: established with HUF 1 million in 1998, issued capital amounted to HUF 182 million in 2004. In 2005, (after the de-merger) the value of the indicator was HUF 356 million. Currently, after several organizational changes (see below) it amounts to HUF 47 million. As for equity capital, its value was HUF 815 million in 2005, and currently it amounts to HUF 888 million.

The founders

István Kenyeres, Organica's founder and CEO engaged into entrepreneurial activities already in the 1980s. As a university professor at the Faculty of Chemical Technology and Biotechnology of the Budapest University of Technology and Economics, he kept seeking the commercialization possibilities of his research findings.¹³ With the development of the Hungarian second economy¹⁴ the first legal possibility for entrepreneurship was the establishment of a called enterprise work partnership (GMK) as of 1982. Kenyeres founded a GMK already in 1982 at the university, and tried – with the help of selected intermediary

¹² The third one was sold in July, 2009 when Veolia Water Solutions acquired Organica's shares in Organica VWS, a Veolia–Organica joint venture, 25 % of the shares of which were in Organica's ownership.

¹³ His main research focus was bioreactors, i.e. devices/systems that support a biologically active environment: e.g. vessels in which a chemical process (involving organisms or biochemically active substances derived from such organisms) is carried out. Bioreactors are designed among others to treat sewage and wastewater.

¹⁴ About the socialist entrepreneurs and the development of the second economy see Gábor 1989

foreign trade (state owned) enterprises – to find Western European and American partners and transfer technology.

Following the 1988 Company Act¹⁵ Kenyeres, who was already owner of three patents, left his university professor's status, and founded a private consultancy company jointly with three partners: a state-owned foreign trade company; the Innovation Fund of the Hungarian National Bank¹⁶ and Vegyterv, a large state-owned chemical enterprise. Experiencing the disadvantages (rigidity, inflexibility) of having state-owned enterprises as co-owners, Kenyeres soon left this company and founded another private consultancy firm: "Kenyeres Mérnökiroda", in the frame of which he carried on his research, consultancy and market exploration activity.

The idea of the technology that gave rise to the 1998 foundation of the firm which is the subject of the present case study, originated in the famous American Biosphere 2 experiment. This experiment aimed at creating a working model of the Earth's biosphere (a closed ecological system), and test whether an artificial biosphere can be sustained, i.e. whether it can keep storing energy, preserve a high level of biodiversity, stabilize waters, soils and atmosphere (Allen–Nelson 1999). It was partially a space research related experiment that tested the possibility of creating biospheres for human life support beyond the limits of the Earth's biosphere, a precondition of permanent human presence in space. Another objective was to develop technologies for the solution of pollution problems, and for the recycling of water.¹⁷

A closed system with a crew of 8 persons was established in Oracle, Arizona for a planned period of two years. The system was designed to supply the entire food needed for the crew, with complete recycling of human and animal wastes, recycling of water and a minimum leakage of air. Although the experiment was not an outright success:¹⁸ oxygen levels declined, nitrous oxide increased etc., it proved thought-provoking in our case.

Kenyeres became acquainted with this experiment through one of his friends Attila Bodnár, who was living in the U.S. that time (in the 1990s) and had two friends closely connected to the 'Biospherians'. Since the idea of bioregenerative recycling of wastewater with the help of constructed wetland (Nelson et al. 2009) adopted in the Biosphere 2 experiment was closely related to Kenyeres' research field (bioreactors), he became interested and dedicated some time and effort to getting closely acquainted with the concept, the experiment and the problem areas. As a result, he decided to establish (together with his friend Attila Bodnár) a new firm: Organica that improves and markets this technology. The two founders managed to raise funds with the help of American business angels and bought the know how from Living Technologies Inc. for approximately USD 100,000.

¹⁵ Act on Business Societies, Associations, Companies and Ventures that came into force in January 1989

¹⁶ The Hungarian National Bank created the Innovation Fund (IF) in 1980. IF was the predecessor of Innofinance Innovation Financial joint stock company. The foundation happened still in the monobank system of socialism, when – as a first step of reforms, several new actors (financial funds) were created to diversify the centralized allocations channels, and allocate developmental resources to specific economic segments. (Várhegyi 1996)

¹⁷ Closed ecological systems imply a closed water cycle, i.e. wastewater should be recycled and purified in order to ensure sufficient potable water.

¹⁸ An overview of the experiment, the main related hypotheses, as well as the results is provided by Allen–Nelson 1999

The technology

The essence of Organica's technology is a combination of species established within an artificial setting i.e. a constructed complex natural system that benefit from nature's self-organization capability. Living organisms: plants with extensive root systems, animals and microbes contribute to the biological degradation of contaminants. Organica's treatment plants contain 3000 species,¹⁹ including not only microbial communities but also higher organisms such as fishes, crabs, snails and clams. The quality and the characteristics of the contaminants determine the selection of organisms and also their ratios. The system is enclosed in a greenhouse that ensures appropriate temperature for biological activity throughout the whole year. Biological filters are used to make the process odor free (as opposed to conventional treatment plants' environment).

Wastewater treatment is thus carried out without environmentally harmful chemicals, which solves the Catch-22 trap of pollution remediation: by resolving an environmental problem it does not create another as it is the case of conventional technologies. Even beyond this unique feature Organica's technology has several advantages over conventional wastewater treatment. The system is simple to operate and cost-effective: it is less capital and energy intensive (uses solar energy) than conventional treatment. The plant resembles a botanical garden (including ornamental flowers that not only fits into an urban environment but can also be used for education purposes).

Evolution and initial organizational changes

Right at the outset, the founders started 'attacks on several fronts': alongside to relentless technology improvement and experimentation, they were seeking commercialization possibilities and were at the same time looking for additional investors, i.e. business angels and venture capital (VC) investors who would provide funding for the initial projects. Negotiations with local governments about possible contracts to design municipal treatment plants have soon proved fruitful. The low(er than in the case of conventional sewage treatment) capital, energy and material requirements of Organica's system and the concept as such, namely that the appearance of the facility is a beautiful water garden rather than what is associated with a sewage treatment facility – proved attractive for the multinational real-estate developer of the Harbor Park logistic center and industrial park in Nagytétény, and Organica started to work on its first project.

That time, i.e. by the late 1990s, there were thousands of environmental service providers in Hungary. The majority of them were SMEs with one or two employees. Burgeoning entrepreneurship in this sector was the result of the dissolution and transformation of large former state-owned enterprises (SOEs) in the engineering, construction and chemical industries, e.g. of Vegyterv, Mélyépterv, Viziterv etc. These SOEs used to have several thousands of employees in the socialist era. Following the change of the regime

¹⁹ This diversity is indispensable for the stability of the system

these huge engineering and design enterprises were forced to downsize and most of them were dissolved because of serious liquidity and market problems during the transformation recession. They were partially privatized, and at the same time some of the skilled former employees started own businesses. These SMEs were engaged in environmental consultancy, design and construction services, but of course they lacked sufficient capital to assume larger scale projects.

European Investment Partners (EIP), the Central and East European (CEE) Environmental Investment Fund was established by EBRD, the Swiss government, French and American environmental VC firms etc. in 1998 with the mandate of providing VC financing to CEE environmental firms. Seeking investment possibilities, EIP identified two promising firms in Hungary: Organica which had that time 4 employees, and Körte, a firm with 150 employees, specialized in industrial wastewater treatment. Körte was a holding firm with four companies: specialized in manufacturing chemicals, wastewater purification machinery, and various environmental services.

In 2000, EIP decided to invest into both firms (EUR 1.5 million respectively), and it proposed at the same time that the two companies (or else: together with Körte's group of firms altogether six companies) should merge. The proposed merger seemed beneficial for both parties: for Organica it provided the much needed critical mass, while for Körte the merger promised access to additional technical expertise, market connections and to a promising new technology.

Integration problems²⁰ associated with the merger of a small knowledge-based firm and a medium sized one with several production facilities seemed to be quickly solved: both firms had two owners²¹ respectively, who rapidly agreed on terms and conditions. Integration problems emerged only some years later, when it became increasingly difficult to sustain demand for (and thereby preserve employment at) the chemical and the machinery manufacturing facilities. Strategic interdependence of the two parties has become increasingly lopsided since the merged company (Körte Organica Inc.) has become progressively more successful in marketing living machines based sewage treatment.

In 2004 the two partners de-merged. Körte Environmental Technique Inc. continued the manufacturing activities and carried on with conventional technology based wastewater treatment projects. Organica Inc. specialized on marketing its own technology and know how abroad, alongside to domestic general contracting (turnkey design/build/operate) activities, i.e. design, construction and operation of municipal and industrial wastewater treatment facilities.

De-merger was not the only strategic turn marking the evolution of Organica in the mid 2000s. At the time of the merger and during the subsequent couple of years Körte Organica Inc.'s domestic market share (in municipal and industrial wastewater treatment) was fluctuating between 10 and 15 % resulting in yearly sales of HUF 1.5 to 2 billion. Since

²⁰ Integration of a company with substantial intangible assets with another that possesses extensive physical assets may involve hard negotiations on the optimal valuation of the two types of assets.

²¹ De jure, Organica was a foreign (U.S.) owned firm since its inception. During their initial fundraising efforts, when the two Hungarian founders negotiated with American business angels, these latter have made it clear that they prefer investing in an American firm, since they are familiar with the U.S. legal system but not with a Central European transforming economy's legal conditions. Kenyeres and Bodnár have thus established Organica USA that became the 'de jure' owner of the Hungarian firm. Ownership structure changed with EIP's investment, and also with each of the major organizational changes.

neither the size of the Hungarian market, nor Körte Organica's market share was expected to grow substantially in the medium run, Kenyeres recognized that only increased reliance on international markets can offer opportunities for further expansion. Foreign clients should be acquired: regionally first, and later on a global scale. This new strategic orientation was not acknowledged by Körte's former owners. Dissent among management members has also prompted de-merger.

Foreign direct investment and other modes of foreign market entry

The first internationalization step was facilitated by Organica's former Chief Technology Officer who graduated in Poland and had many professional relations there. Organica established a joint venture, and together with local Polish partners it started to acquire the Polish market.

The sequencing of foreign expansion was planned in line with the classical (Uppsala) model of internationalization (Johanson–Vahlne 1977). According to this model firms gradually increase their international involvement. In a process of learning by doing, firms' resource commitment as well as the geographical scope of international operations increases only gradually. Initially, firms venture only to neighboring countries, and this is followed by a broader regional expansion. Later the focus of international operations expands to the whole continent, while large, deep-rooted firms adopt a global strategy.

Organica established another foreign subsidiary in Slovakia, and prepared the opening of further subsidiaries in Austria and Romania. At the same time it kept looking for partners in several other CEE countries with the aim of establishing a dense network of representation offices, and/or local subsidiaries or joint ventures with local partners. However, the learning process that accompanied this type of international expansion made the management realize that this mode of entry was not optimal. Uncertainties related to market diversification were insufficiently alleviated by the complementary assets (market knowledge) local partners provided. Even Organica's outstanding technological competence and its own complementary assets (Teece 1986) including specialized support assets (logistics, branding, marketing, management and project development capabilities, industry experience, human capital etc.) as well as a fair amount of financial assets could not guarantee that the firm captures sufficient profits from these investments, i.e. could not ensure the realization of *internalization advantages* (Dunning 1980).

This has prompted the decision of changing the mode of entry into foreign markets. Instead of *FDI-based internal exploitation of their technological knowledge* (when general contracting projects abroad are coordinated by local subsidiaries or representation offices), they opted for *commercializing technology outside their own organizational boundaries* in the form of technology licensing.

Beyond the usual motives of technology licensing listed in international business literature (e.g. Lichtenthaler 2007) including the ones of revenue generation; improvement of international market position; building reputation and strengthening networks, in Organica's case this decision contributed also to better positioning in the fierce battle for technological leadership (see the arguments above on competing alternative technologies

of wastewater treatment in the coming era of the demise of the conventional technology).²² Another strategic benefit of the decision on a new mode of entry was that instead of a gradual expansion – first in regional, CEE markets, later in advanced European economies and later again on a global scale – technology licensing made a “born global” strategy possible.

The new way of global market acquisition was launched with full steam ahead. Instead of final customers (e.g. municipalities, industrial companies etc.) “competitors” and partner organizations are contacted with technology licensing offers. There are currently 150 to 200 significant actors in the global wastewater treatment industry, and many of them – in the case of which Organica’s technological solutions complement their existing ones – may become licensing partners.²³

The other side of the coin is that this decision implied the turning back from the strategic path taken in the preceding years. Selected subsidiaries (e.g. the Slovakian) were closed, others were sold, others again, still in the preparation process were abandoned, e.g. the Austrian subsidiary was not opened. Currently, Organica’s has only one foreign subsidiary (in China: a joint venture with the local council of Shenzhen). It was established in the frame of the company’s new global strategy: this company will coordinate the design and construction of 200 treatment plants in Shenzhen in the coming years.

After all, the OFDI mode of foreign market entry has not been given up: further representation offices, subsidiaries or joint ventures with license partners are planned at various locations in order to support both Organica’s technology licensing efforts and license partners’ Organica-technology-related activities.

Recent organizational changes

These turns in the growth and internationalization strategies coincided with and were related to various organizational and ownership changes. After the de-merger from Körte, when Organica started a new growth phase through internationalization based on an expanding regional network of local subsidiaries and representation offices (in 2004–2005), joint management and strategic decision-making with the co-owners (EIP and the business angels) have been perceived by the owners-managers as increasingly burdensome. Organica initiated and has successfully accomplished a management buy-out. A holding company: Organica Holding was established by the two founders, as the formal owner of Organica Ecotechnologies and its domestic and foreign subsidiaries. Since the capital the American business angels have initially invested has also been paid back, Organica U.S.A. the formal owner company (see footnote 19) was also closed down and Organica Holding became the full owner of the group.

International expansion necessitated however sizable additional resources, which prompted Organica’s management to speed up previously started negotiations with VC organizations. Time consuming due diligence processes (business diligence, financial,

²²*In an era of technological turbulence (when emerging new technical solutions make the global market undergo major structural changes) early expansion (before the emergence of a new dominant design – see Abernathy-Utterback 1978; Utterback 1994, to strengthen new technology based firms’ product market position is especially important, since customers’ initial technology selection decisions may influence new customers’ consecutive technology choice.*

²³*Recall the theory of co-opetition advanced by Brandenberg–Nalebuff 1996 that argues that competition and cooperation among firms cannot be considered mutually exclusive.*

legal and technological analyses and various other items on a due diligence checklist), had been already started with the Hungarian Development Bank (MFB). In 2006 MFB invested HUF 380 million (~EUR 1.5 million) of venture capital and has acquired thereby 49 % of Organica's shares.

By that time – as it usually happens in cases of innovative, high-growth firms – several foreign companies have approached Organica's owners with buyout offers. Although Organica's owners strongly opposed to buyout proposals, they did consider the possibility of involving additional expertise and funding. Among the many unsolicited offers, the one of Veolia Water Solutions, a French multinational operator of water services (the former *Compagnie Générale des Eaux*) was seriously negotiated upon. The French company – a leading global actor in wastewater treatment industry – seemed a trustworthy partner, and the two companies decided to establish a joint venture that specializes in domestic turnkey projects that apply Organica's technology. Organica-VWS was established in 2006. The new joint venture (25 % of the shares of which were in Organica's ownership) has taken over the responsibility for the Hungarian projects and the development of the domestic market. Furthermore, it has taken over Organica's foreign subsidiaries as well as its representation offices abroad.

With the joint venture deal, Veolia has also acquired exclusive right for five years to commercialize Organica's technology in CEE (later also in France). This deal has however included two important special limiting clauses. Firstly, that Organica keeps its shares in the joint venture for a period of a maximum of three years. Meanwhile it provides technical assistance (both in the design and construction phases, in equipment supply, as well as operational support) to Organica-VWS's domestic and international projects. Following this temporary period, it sells its shares to Veolia. This latter clause was fulfilled in July 2009. The second important limiting clause was that in return for exclusivity Veolia guaranteed a yearly minimum of new contracts in the countries in question. According to the contract signed between the two parties, if this clause is not fulfilled Veolia loses exclusivity after three years, which is bound to occur in several Eastern European countries at the end of 2009.

The joint venture deal with Veolia has provided sufficient revenue for Organica to buy MFB's shares back, one year after the bank's investment. At the same time, it has set the scene for a further strategic turn.

As a result of the agreed distribution of responsibilities, Veolia VWS has taken over the majority of Organica's activities: in particular, the cash cow part of Organica's activity portfolio. Organica-VWS incorporated into its organization the majority of Organica's workforce. What remained were the crucially important research and development activity as well as some core-activity-related service-type corporate functions: technical and financial assistance, marketing and sales, strategic management etc.

Preparing for the sale of Organica's shares in Organica-VWS to Veolia, scheduled for 2009, the owners had a newly structured company in mind that would concentrate on two core activities: research and development, i.e. the further improvement of Organica's technology, and global technology licensing. Following the divestiture, the downsized company started to grow again by focusing only on these two core activities.

In order to stay competitive amidst fierce global technological and market battles when competitors, like GE dedicate billions of euros annually to R&D, Organica necessitated new resources. Since the management has always exercised strategic planning, and has been

aware that especially at time of *discontinuities in the evolution of the company* access to sufficient resources is indispensable, negotiations on the involvement of additional venture capital have been quasi continuously going on. Negotiations on additional venture capital involvement (and the related due diligence processes) have brought fruit in October, 2008 – right at the bottom of the global financial crisis! Gamma Capital Partners, an Austrian VC investor and RNK Capital, an American environmental VC investor have decided to invest EUR 4 million altogether, and both investors have underwritten obligation for further capital increase of an identical amount. This capital injection has created the sound financial basis for an R&D- and global technology licensing based new growth path.

R&D and strategic linkages

The average value of the R&D to net sales ratio was approximately 10 % during the first decade of Organica's evolution, with a cumulative amount of ~ HUF 1 billion (EUR ~4 million). R&D efforts are bound to increase sizably at the recently refocused and capitalized company: the management plans to invest an additional EUR 4 million within the next two years on R&D.

Organica has been developing a dense network of scientific and technological relations. It has contracted out various research tasks to Hungarian universities (these industry–university links are beneficial also from the point of view of recruitment and job matching), and has initiated joint research efforts with Chinese, American and Portuguese universities. Organica's researchers regularly attend international conferences to identify promising research initiatives.

Technology licensing partners are also plausible partners in joint R&D initiatives: Organica has already involved Veolia's researchers into selected joint research projects.²⁴

As for other types of horizontal relations: NGO's, public administration organizations, policy actors of the national innovation system etc. Organica's network embeddedness is far below the level that is usually striven for and attained by innovative environmental firms in advanced economies. Although Organica has regularly submitted proposals for research tenders announced by innovation policy actors, there were only few occasions the company was granted public support. Out of a total R&D expenditure of HUF 1 billion (in the first decade of the company's existence) the cumulative amount of public grants was HUF 57 million. Moreover, regarding its core business activity: the design and construction of municipal wastewater treatment plants, Organica has never won a public procurement contract that contained public (national or EU) co-financing/support.

This "standing away" from public support mechanisms was a deliberate choice by the management, partly because of the huge administrative burden related to projects that receive public co-financing, and partly because of the company's intention to keep a distance from Hungarian politics.

²⁴*Organica's evolving network of scientific partners demonstrates that knowledge-based companies possess certain features that apply, irrespective of home country specifics. In contrast to the majority of CEE companies in the case of which value chain partners (buyers and suppliers i.e. vertical linkages) are the unique source of knowledge (Radosevic et al. 2008), knowledge based companies are also in CEE economies embedded into networks characterized by diversified horizontal linkages. Their network partners include actors of the national innovation system, foreign strategic research partners, as well as other strategic alliance partners.*

Nevertheless, in the past two years this “distance” has somewhat diminished: Organica received public support in the frame of several public grant programs. Assistance was given to its internationalization efforts: to the “China projects” (HUF 284.8 million = EUR ~1 million for 2009-2010); to its technology development efforts (HUF 90 million = EUR ~340,000); and to intellectual property protection efforts (HUF 1 million = EUR 30,000).²⁵ Furthermore, Organica is member of the Wastewater Technologies Cluster,²⁶ supported by the Hungarian Pole Program. The cluster participates in international RTD co-operations, supported by EU FP7 ENV-2010, CES and SEE Territorial Cooperation Programs.

Lessons

Organica’s case provides important lessons both from theoretical and from practical (strategic management) points of view.

As for the latter point of view, it is inspiring to monitor how the management achieved – mainly as a result of careful strategic planning and not least due to the capability to modify the plans flexibly, if necessary – to avoid the usual pitfalls related to growth and to internationalization.²⁷

Attacks on several fronts (technology development, active commercialization and the solution of financial needs) i.e. the striking of a balance between technology and business is a key aspect of knowledge-based companies’ sustainable growth.

Another crucial explanatory factor of success is strategic planning²⁸ including the planning

- of growth phases and the related financing needs;
- of tangible and intangible; core and complementary asset accumulation;
- of human capital development²⁹

A third, highly unusual explanatory factor of success is the owners’ financial behavior.³⁰ In contrast to the truism that most SME owners prefer to retain control by not applying for external capital, i.e. SMEs rely on internal sources of funds (owner’s starting capital and retained earnings), Organica’s owners have always been open to involving external equity and venture capital to finance their business operations and growth: decisions on the firm’s

²⁵ Note, that even the cumulative amount of public support is insignificant, especially if ratios (support over net sales or over total R&D expenditures) are calculated. This is in sharp contrast to Radosevic et al.’s 2008 assertion, that knowledge-intensive entrepreneurs in CEE are dependent on the public sector in general and on the public research system in particular. (While this assertion may be the result of a biased sample – dependence on public research grants is indeed highly industry-specific – it is certainly not the case in Organica’s story.)

²⁶ The cluster was established in March, 2008 and has 35 members: 25 SMEs, 4 large companies (among them wastewater utility companies), universities, NGOs and public foundations.

²⁷ One specific aspect of internationalization traps is detailed in Monori 2009 who describes Organica’s China strategy (among other Hungarian firms’).

²⁸ This is especially relevant in a CEE context, where after the decades of command economy everything associated with “planning” is still regarded as somewhat suspicious.

²⁹ ‘Organica Academia’ was established to work out the plan and the content of employees’ training. On the other hand, KVG Konvergencia, Organica’s local subsidiary is responsible for the development of e-learning content, necessary for the operation of Organica’s worldwide wastewater treatment facilities.

³⁰ Organica’s financing story provides ample evidence for Vos et al.’s 2007 assertion that owner’s characteristics significantly influence both the financing performance of SMEs and the features of their financing activity.

capital structure have favored *the last item of the pecking order since the outset!*³¹ Success can be explained not only with the given choice of the capital structure but also with the careful timing of the involvement of external equity (as well as of buyback decisions) and the wary specification of the conditions.

Organica's management did not object to relying in some cases also on the managerial input VC investors contribute to the firms they invest in. The management has frequently made use of external business advice, i.e. of services by consultancy firms specialized among others in mergers and acquisition or venture capital investment issues, which is again highly unusual in Hungarian SME context.

Flexibility regarding both the organizational setup and the strategic plans is a fourth lesson Organica's case offers to strategic management analysts and practitioners. As regards organizational issues, rapidly growing firms' owners-managers have to abandon (beyond a certain threshold development level) the status of a managing director involved in day-to-day operational issues. Keeping a distance from operational decisions and becoming a CEO (general, strategic manager) is a difficult but necessary decision, the precondition of which is the delegation of tasks and responsibilities to persons who were not present at the very inception of the firm (this is usually very difficult for the founders-managers of growing firms). On the other hand, distance from everyday problems improves strategy formulation. The interviewed CEO utilized the analogy of painters: in order to make additional brush strokes, painters go close to the canvas. Thereafter it is necessary to step back and view the canvas from a distance. Appropriate distance allows to see the whole painting and to feel the effect it produces.

Even beyond the issue of leadership, much flexibility is required in growing organizations where the distribution of tasks frequently changes (as tasks themselves change). Both growth and strategic discontinuities – these latter happened at Organica periodically: in periods of 15 to 16 months³² – necessarily involve organizational changes. Thus, flexibility has to become deeply rooted in corporate culture.

Strategy has also been implemented with flexibility to allow for modifications. According to Organica's initial plans, the firm intended to become market leader in municipal wastewater treatment. Later, the management recognized that this status cannot be achieved without diversification into industrial wastewater treatment, general contracting, operation of plants in the frame of outsourcing contracts, etc.

Another example for the flexible modification of the strategy is the switch from an FDI-based internationalization to a technology licensing based one. This issue leads us to the theoretical lesson Organica's case offers.

The case supports *Lichtenthaler's* (2009) thesis that internal (OFDI-based) and external (licensing based) technology exploitation are complements rather than substitutes and the two modes of entry may produce synergy effects. On the other hand it also underlines

³¹ According to the pecking order hypothesis (Myers 1984 and Myers–Majluf 1984) firms' financing choices are characterized by a hierarchy: internally generated funds are preferred to all other options. The choice considered "second best" is debt (safe then risky) and the option firms adopt last is external equity.

³² Strategic discontinuities include Organica's merger with Körte, as well as its later de-merger; joint venture with Veolia as well as the subsequent sale of Organica's shares in the joint venture; the involvement of new VC investors as well as the consecutive buyback decisions; the abandoning of chief contracting projects and concentration on the core competence of research and technology development; the switch from an FDI-based internationalization to a technology licensing based one etc.

some of the traditional assumptions, i.e. that licensing may be a good choice for entry into markets for which the firm's complementary assets (e.g. financial assets and/or market knowledge) are limited.

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