INTEGRATING REGIONAL INNOVATION AND SUSTAINABLE DEVELOPMENT: EXAMPLES FROM THE ESZTERHÁZY KÁROLY COLLEGE

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Eger is located in Northern Hungary, where decision makers constantly struggle with social and economic problems caused by the challenges of non-sustainable development. This paper presents two examples of how higher education organizations, through market-oriented innovation, can facilitate the economy of the region in getting back on the sustainable orbit. The first part of the paper reports an innovation in tourism education that embraces the renewal of the curriculum and the establishment of an internship hotel, while the second part discusses the successes and difficulties of technology transfer from the Egerfood Regional Knowledge Centre to the food industry.

Keywords: tourism education, internship hotel, health food, new product development, technology transfer

Introduction: Northern Hungary

Northern Hungary (NH) is one of the seven NUTS II level statistical regions in Hungary. It is located at the Eastern border of the EU and is part of the so-called Eastern Wall. After the failure of forced industrialization this region became *one of the least developed territories in Hungary* and also in Europe. Although NH's development level is low, its economic growth remains slow as well, i.e. there is no catching up process (Figure 1).

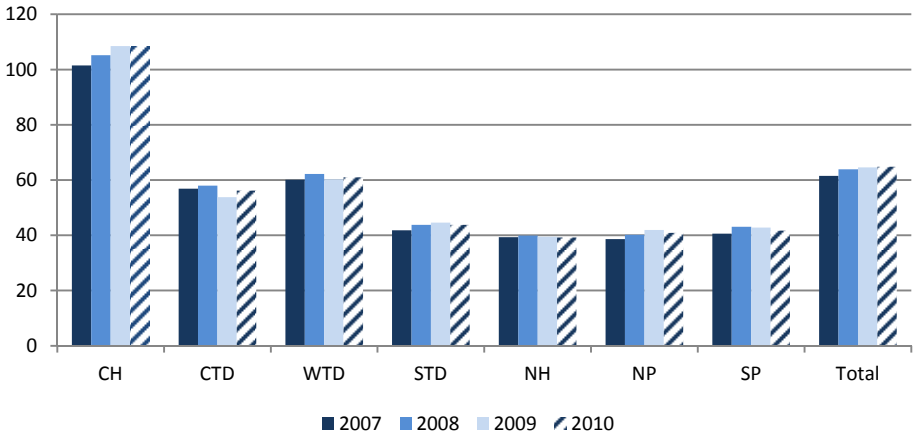

Figure 1. GDP/capita 2007-2010. EU27=100%. Data obtained from KSH, 2012. Figure No. 4.
Note. NUTS II level regions of Hungary: CH=Central Hungary, CTD = Central Transdanubia, WTD =Western Transdanubia, STD = Southern Transdanubia, NH = Northern Hungary, NP=Northern Great Plain, SP = Southern Great Plain.

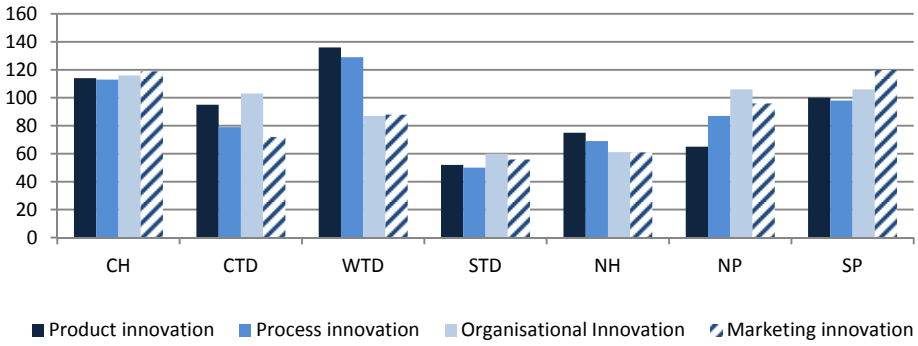

Figure 2. Proportion of innovative firms by region in 2010. National average = 100%. Data obtained from Grosz (2011), p. 219.
Note. CH=Central Hungary, CTD = Central Transdanubia, WTD =Western Transdanubia, STD = Southern Transdanubia, NH = Northern Hungary, NP=Northern Great Plain, SP = Southern Great Plain.

The proportion of innovative firms located in the NH region is also moderate (see Figure 2). According to quantitative analyses (Papanek, Borsi & Tompa, 2007; Borsi & Papanek, 2006), *the main causes of the region's technology lag can be found in the sphere of the human resources*: the proportion of unskilled labor is high, entrepreneurship spirit is low, and the number of qualified

managers is small. During the last decades abandoned facilities of many traditional industrial enterprises have become brownfield sites. Skilled workforce continues to migrate away from the region, while non-skilled people move in the deserted houses of villages. Investors also tend to divest their capital.

As a result of the described socio-economic situation, *the present development path of NH is not sustainable*. Today, higher education institutions are said to have three missions: teaching, research, and the so-called third or entrepreneurial mission, which is sometimes interpreted as community engagement. This broad interpretation of the third mission embraces social, economic, environmental, and cultural dimensions of capacity development. In what follows we present two innovative initiatives of faculty members at the Eszterházy Károly College in Eger (*hereinafter*: EKF), to show how teachers and researchers can better contribute to the economy of a region.

Education for Sustainability: Training Tourism Professionals

Realizing the non-sustainable processes of the region's economy, the faculty of EKF seeks ways to tackle regional backwardness. The primary mission of higher education institutions is education, thus the most important contribution of universities to the economy should be *preparing undergraduates for the current and future needs of the labor market* by constantly monitoring the content and effectiveness of training programs. Considering NH's abundant touristic attractions (four world heritage sites, mountains, forests, historical monuments, etc.), EKF decided to increase focus on the tourism sector. By training tourism professionals, it aims at raising the share of the tourism and catering industry in the region's value-added.

To determine the specific steps to be taken, the faculty at the Institute of Economic Science (*hereinafter*: GTI) conducted 20 interviews to identify the potential discrepancy between the skills and competences of young tourism graduates and the expectations of employers.[1] The research concluded that employers were not satisfied with graduates' skills; they complained of their weak knowledge of basic housekeeping chores (e.g. cleaning materials and methods), tourism law, hotel management softwares, and foreign languages (Farkas & Katonáné, 2011; Kovács, 2011; Nagy & Papanek, 2011; Román, 2011; Vas, 2011).

[1] The idea of the research originated from a previous analysis, which showed that employers in several industries were not fully satisfied with young graduates' skills (see: Kádek & Zám, 2008).

To better satisfy market requirements, EKF has introduced *organizational innovations* in the field of tourism education.[2] (1) The first one of these innovations was the creation of a new organization, *EKF's own internship hotel* (Hotel E*Stella), in 2008. This hotel type is well-known internationally, but exceptional in Hungary. Internship hotels enable trainees to improve their hotel management skills following the principles of learning by doing: students can apply the knowledge gained during the academic semesters, develop real-life awareness of industry standards, discover their personal strengths and weaknesses, and deepen their knowledge of this dynamic field (Glion, 2012).[3]

In autumn 2011, GTI monitored how the hotel completes its tasks. The monitoring gave a good picture of the results. It became clear that students enthused over the practical tasks they encountered in the hotel on a daily basis. They especially found the work at the reception desk interesting, but also gladly learnt about how waitpersons serve wines, and realized that mastering room-cleaning technics is a must. During their internship, students made considerable developments in the following knowledge areas:

- *Cleaning* – students got to know the up-to-date cleaning materials.
- *Serving* – students learnt the hygienic rules of running a restaurant as well as the standards of preparing and serving food.
- *Reception* – students learnt about various hotel management softwares, and could practice their foreign language skills.
- *Labor market rules and laws* – students gained experience on current legislation about employment in the tourism sector at first hand.

In addition, observing trainees' at work, GTI faculty could diagnose the lack of basic knowledge elements that hampered students' effective learning. An important additional benefit was that students realized the link between customer satisfaction and profit.

(2) Besides investing in infrastructure, *the content of the tourism training program was also reviewed and modified.* This is also exceptional in Hungarian higher education, and thus can be considered an innovation, as program contents are generally based on teachers' preference rather than on true labor market

[2] "Innovation activities are all scientific, technological, organizational, financial and commercial steps which actually, or are intended to, lead to the implementation of innovations. (…) A common feature of an innovation is that it must have been implemented. An *innovative firm* is one that has implemented an innovation during the period under review. (…) An *organizational innovation* is the implementation of a new organizational method in the (firm's) business practices, workplace organization or external relations." (OECD-EUROSTAT, 2005; p. 47)

[3] Students can also complement their explicit knowledge by acquiring tacit information (Polányi, 1958) about tourism management.

requirements[4]. The idea of the curriculum development came from the aforementioned monitoring, which necessitated for the inclusion of several practice-oriented elements in the program. The monitoring identified a lot of parallelisms, meaningless generalities, and obsolete principles within course contents. On the basis of these observations GTI rationalized the curricula by

- reducing the amount of theoretical knowledge with little potential for application,
- increasing the amount of practical knowledge (e.g. protocol, tourism law, and Central European tourist destinations[5]),
- introducing new courses on food standards and cleaning materials, and
- increasing focus on communication in foreign languages.

Sometimes these modifications were welcomed by both professors and students; in this case their realization was easy and rapid. In other cases the implementation needed more efforts and time. For example, teaching and learning voluminous tourism laws and food standards can be a nuisance.

EKF hopes that the presented actions can raise the competitiveness of NH's tourism sector – and accordingly, with the creation of stable workplaces, they can enhance the region's ability to retain its population, and thus support the sustainability of the region's economy.

But there is still a lot to do, and faculty try to go on with their work. For example, it was also found that managers of tourist offices are dissatisfied with graduates' knowledge on regional tourist attractions. Therefore GTI is planning to set up an internship tourism information office, to give students real-life motivation to extend their knowledge on regional tourist attractions, and to gain feedback from tourists about the sites visited and the accompanying services.

Finally, the authors believe it would be of high importance to regularly collect industry feedback on graduates' performance and modernize course contents accordingly, in order to raise the sustainability of higher education in the region and in the whole country as well.

Innovation for Sustainability: Developing Safe and Healthy Food Products

The second part of our paper focuses on the *interaction between sustainability and innovation in the food industry*, which results in new or improved products,

[4] As J. Swift in Gulliver or Voltaire in Candide ironically wrote, sometimes the ideas of professors about the most important pieces of knowledge are not identical with those of other people.

[5] Kovács, Papanek, and Papanek (2012) exemplify the new learnings on regional destinations.

production processes, consumption patterns, and eventually a healthier society. Food consumption is an important aspect of sustainability for at least two reasons. First, the environmental impact of consumed food and beverages exceed the impacts of other areas (e.g. transport) and amount to about one-third of the total environment impact of households (Tukker, Huppes, Geerken & Nielsen, 2006). Second, good health including healthy diet is vital for maintaining an active workforce and society, and thus fundamental for sustainable economic development.

Health awareness has increased in the Hungarian society for various reasons, such as decreasing trust in the national health care system or consumers' deteriorating perceptions about their own state of health. According to a 2011 survey, 35% of the population is willing to pay an extra for products with health benefits including food, while 28% believes it is wise to increase expenditure on health (GfK, 2011). Consumers show a growing tendency to regard healthy diet as an investment to their general wellbeing, while health became an important criterion in purchasing decisions (GfK, 2012a). In 2007, the top five food buying criteria were good quality, good value for the money, (Hungarian) origin, lack of artificial ingredients and preservatives, and low price (GfK, 2007). A subsequent survey found preparation time, health effects, and taste to be the deciding factors in food shopping (GfK, 2012b).

Changes in buying criteria and the emergence of a new, health conscious consumer segment present new opportunities to innovation in the food sector. Accordingly, a plethora of new type of food products occurred in the western world, such as fair-trade, organic food, products with little processing, or functional food often with national or regional specialties. While innovation mostly takes place in the business sector, the required knowledge is often created in the higher education sector and the related transfers originate from here as well.

The Egerfood Regional Knowledge Centre at EKF (*henceforth*: Egerfood), which has been developing rapidly since its launch in 2004, is an important source of new knowledge, technologies, and even products in the food industry of Northern Hungary. Egerfood promotes the development of the agro-food sector in the region by planning and implementing product, process, and marketing innovations in order to provide safe and healthy food to consumers (Egerfood, 2012a, 2012b).[6] Its operation is mainly financed by competitive EU grants channeled through national bureaus in line with the goals of the revised Lisbon Strategy. With an annual budget of about EUR 1 million, they work on R&D projects related to food traceability, origin protection, and analytics in

[6] To learn about the economic rationale behind the so-called Regional Knowledge Centers in Hungary see Novotny (2008).

collaboration with more than 20 food producers and agribusinesses.[7] Based on the theory of regional specialization of industries (see Krugman, 1991) Egerfood's original strategy was to colligate frittered research initiatives in the food industry of the region. Nevertheless, the cluster has expanded to more distant regions of the country, while today Egerfood provides research services to foreign clients as well.

Besides satisfying *ad hoc* development needs of business partners (e.g. reducing production costs, increasing storage life, improving product quality and safety) they are also engaged in comprehensive R&D projects, such as a food traceability system designed for mobile phones. Their research output is impressive, it includes 15 patents, six biosensors, 37 production process innovations, 22 know-hows, 33 analytical methods to determine food origin, six food traceability models, and a complex food safety database (Egerfood, 2012a, 2012b). By disseminating research results through informal ways of technology transfer (food safety training programs, conferences, research papers, books, and textbooks), they promote the culture of health and environment conscious consumption and production to a wide public.

Difficulties of New Product Development: The Case of Functional Biscuits

Attila Kiss, the managing director and a Ph.D. in chemistry believes that R&D in the area of functional food holds for the highest market potential (A. Kiss, personal communication, December 18, 2012). Accordingly, in the first years of its establishment, Egerfood came up with a three-member family of functional biscuits, namely *Inukeksz*, *Liziner*, and *Metikeksz*. In the case of functional food the value added is created at the R&D phase: the biscuits are enriched with health-promoting ingredients, with antioxidants and amino acids, such as inulin, lysine, and methionine as reflected by their brand names. Later, a tea product made from purple corn was added to the functional product range.[8] Egerfood's latest product development is a wine-like beverage made from grapes and fortified with bee propolis, of which only prototypes have been made.

The production and related marketing activities of the functional biscuits were assumed by a cluster member, a local biscuit manufacturer, but as sales have not reached the anticipated level production was discontinued. In case the expected sales volume (HUF 40 million) had been reached, profits would have

[7] Cluster members cover many areas of the food industry including producers of confectionery, dairy products, tea, wine, canned food, meat, bakery, and mushroom, as well as distributors and retailers of health food.

[8] The *Peru gyöngye* ('Pearl of Peru') tea has been commercialized by a functional product retailer and can be bought online through web-shops specialized in health products.

been shared evenly among the manufacturer, Egerfood, and EKF. Why Egerfood's high quality, high value added biscuits have not been able to set foot in the market yet can be attributed, in part, to the most frequent bottleneck of university-industry technology transfer, insufficient marketing planning.

A recent Harvard Business Review article by Schneider and Hall (2011) emphasizes that organizations are often so enthusiastic about designing and manufacturing new products that they tend to procrastinate the hard work of marketing planning until it is too late. The authors list 40 possible flaws of new product launch, but we only recite some of them to structure our observations regarding the market entry of Egerfood's functional biscuits (we base our comments on the personal communication with A. Kiss, December 18, 2012).

1. *Most of the budget was used to create the product; little is left for launching, marketing, and selling it.*
   It is only a myth that the most challenging stage of technology transfer is the scientific discovery, and the rest is only a routine job. Still, R&D grants and teams tend to allocate a disproportionately low amount of funds to marketing activities, which often leads to the loose alignment of research capabilities to consumer needs. Researchers in general are not marketers and should not be expected to professionally manage their products outside the laboratory. They are more motivated by academic success (measured by publications and impact factors) than market success. Therefore drawing on the knowledge and experience of marketing professionals (e.g. from the business faculty of the university, the industry partner, or an independent technology transfer organization) is a must.
   In the instance of functional biscuits, research and product ideas were selected on the basis of researchers' and industry partners' knowledge and perceptions about food market trends. Consumers were not directly involved at the idea development phase; more emphasis was placed on the technological feasibility of the project.

2. *The product is interesting but lacks a precise market. Because the target audience is unclear, the marketing campaign is unfocused.*
   To have a seemingly great idea is far from having a successful new product. Companies create hundreds of ideas and dozens of new products a year, but only few will stay on the market for years: A US study found that 90% of new food and beverage products fail within the first three months (Goffin, 2011). To increase the chances of success, marketeres should make sure consumers understand the offering and react to it as expected. Concept testing can help to answer questions like (Kotler & Keller, 2012): Are the benefits clear and believable to consumers? Do they see the product solving a problem for them? Do other products currently meet this need and satisfy them? Is the price reasonable as compared to value? Would consumers buy the product? If answers are all positive, one can define the target market, position the product accordingly, and prepare profit projections. Only following *concept testing*, *marketing strategy* and *business analyis* it is advisable to move to the *product development* stage. Revisions are always possible and necessary as we learn new information about consumers and competitiors.

As for the functional biscuits, idea generation was almost immediately followed by product development. Somewhat later, in 2010, Egerfood conducted a survey with the help of a market research firm on a sample of 1,000 Hungarian consumers. They found that (1) consumers were unfamiliar with the term of functional food, (2) women and people with permanent health problems were more prone to buy health food, (3) most respondents were willing to pay an extra 5-10% for functional products, and (4) price had a stronger influence on buying decision than health benefits (Soós, Biacs & Kiss, 2013). Although the results suggest that women with health problems would be the ideal target group for the biscuits, we recommend the study of some other possible determinants of buying behavior (e.g. geographic region, city size, family life cycle, psychographics, personal and social norms, behavioral occasions, benefits sought, user rate, loyalty status, readiness stage, etc.) to identify new target groups.

3. *The product's key differentiators and advantages are not easily articulated. It defines a new category, so consumers or customers will need considerable education before it can be sold.*
Differentiation in the food market is based on several factors including quality and other attributes (e.g. price, taste, nutritional value, etc.), geographic origin, or method of production or processing. Positioning confectionary products with health benefits is not that obvious anymore, as many easily understandable advantages are widely used by competitors (e.g. organic/natural, reduced calorie, added vitamins, whole-grain, etc. – see Figure 3). The global CPG market is highly competitive due to high market saturation and low consumer switching cots. On the orther hand, the fact that an important share of consumers actively look for new products to try, it provides great opportunities for new product development.

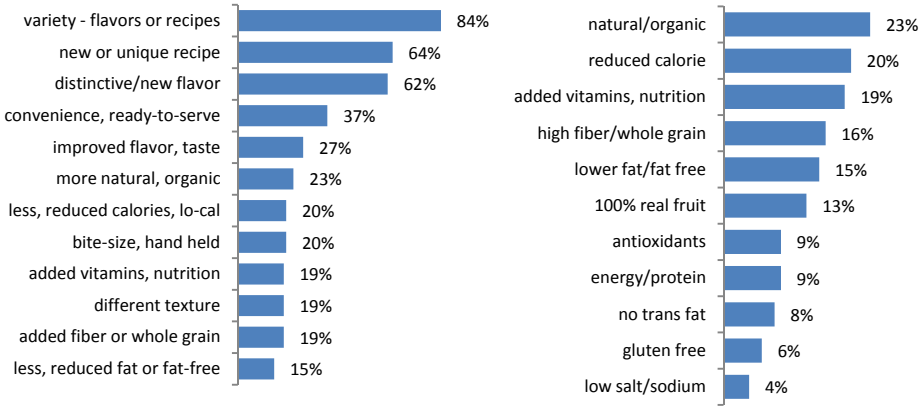

Figure 3. Food & Beverage New Product Pacesetters in the U.S. (2011): (Left) Top Benefits offered by the most progressive companies – % offering benefit; (Right) Top Health & Wellness Benefits – % offering benefit. Obtained from *SymphonyIRI Group (2012).*

Note. The most popular health-related benefit in 2011 is natural and/or organic ingredients, while the gluten-free attribute is the newest one, offered by an increasing number of producers.

Egerfood tried to make consumers aware and responsive to the term "functional", but the concept proved to be too broad, ambigous, and technical. The prebiotic characteritic of inulin and *Inukeksz* would be an easier benefit to communicate, as many dairy product manufacturers already introduced its twin concept of probiotics to public awareness. Lyzine and methionine have plenty of health benefits, but emphasizing only one or two is ideal for positioning.[9] When product developers choose the most promising benefit or value added, they are recommended to take buyers' expectations and reactions, as well as costs and competing products into consideration (Vágási, 2001). If there are several possible benefits, according to Crawford (1994), it is advisable to pick the one that (1) targets the largest market segment, (2) is the most competitive in comparison to rivals' offers, and (3) the most convincing to consumers (as cited in Vágási, 2001).

4. *The sales force doesn't believe in the product and isn't committed to selling it.*
If the product does not sell well in the beginning, the business partner may lose commitment without intensifying marketing efforts. For long term cooperation, it is essential to develop mutual trust with project partners, understand each other's goals and motivations, share ideas and problems, ask for feedback, and to take corrective measures. Gibson (1997) also pinpoints that transferring technologies from one sphere to another is a complex communication task, since the parties involved usually differ in several organizational characteristics including goals, motivations, strategy, and culture. Good communication between partners is essential as the technology transfer process is rarely linear: ideas often return to the laboratory or to an earlier development stage (e.g. to concept testing, marketing strategy, product development, or test marketing) to make improvements before moving forward.

Seeing the industry partner's fading enthusiasm, Egerfood is planning to take over the marketing and manufacturing of *Inukeksz* and thus becoming responsible for the whole process of technology transfer. Another difficulty Egerfood had to face was making royalty agreements, since partners tried to avoid paying regular license fees and rather contributed a lump sum for the new technologies. This attitude can undermine trust and long term cooperation.

[9] *Liziner* could be sold as a treat that "supports bones and muscles" or "protects you against cold sores". *Metitkesz* as "a strong antioxidant treat", a biscuit that "helps you in getting a lean body" or which "keeps your nails, hair and skin healthy while you enjoy a special taste". To avoid self-competition, the biscuits could be positioned to different target groups: *Inukeksz* to active adults and students as a healthy snack on-the-go that nurtures the immune system; *Liziner* mainly to third age consumers by emphasizing its bone, muscle, and mental skills strengthening properties; while *Metikeksz* primarily to women, because it helps to maintain a healthy tone, skin, hair, and nails.

5. *The launch campaign depends solely on PR to sell the product.*
   Egerfood's functional biscuits get relatively intensive PR as Egerfood regularly publishes scientific papers as well as news about project launches and closures, newly established partnerships, and conference appearances in local media. They also have a monthly bulletin distributed online to EKF faculty members. However, to make a stronger influence in local markets, other cost-effective tools of promotion such as social media, word-of-mouth, or guerilla marketing could be better utilized. EKF students and teachers should be first targeted with the campaign, as they are easily accessible and could identify themselves with EKF-made products, thus playing a key role in word-of-mouth advertising too.

Egerfood is a fine exemplar of the multitude of channels how technology developed within higher education institutions can be transferred to the market. In many cases, patenting and licensing is not applicable, so spin-off companies, especially to provide R&D services to clients, can be flexible alternatives. Egerfood has started two spin-off ventures: *Eger Innovations* is not-for-profit and fully owned by EKF, whereas *Egerfood Kft.* is for-profit, its stakes are divided between Egerfood (25%) and EKF (75%). The management decided to set up two types of spinoffs to be able to meet grant application requirements flexibly.

As pointed out earlier, the most challenging stage of technology transfer is not necessarily the scientific discovery, but commercializing or selling new technologies. According to a common rule of thumb, 100 inventions will result in only one successful product (Blake, 1993). Other calculations are even more discouraging: Stevens and Burley (1997) assert that 3,000 new ideas will generate just one successful market offer. As goods with high value-added are the most difficult to sell, and researchers in general do not have sufficient marketing and sales skills, many universities established so-called technology transfer offices (TTO) to facilitate the commercialization of research results. Egerfood also estabished an internal unit with three staff members, the *Innovation and Technology Transfer Office*, which is reponsible for expanding industry relations and accelerating the market entry of new technolgies. But even in the US, where university resources for technology transfer are more abundant, TTOs' insufficient marketing expertise is blamed for the low commercialization rate of innovative ideas. To increase the success rate of new products launches, Egerfood intends to allocate more efforst and funds to marketing tasks, including the hiring of new staff members with marketing experience and expertise.

Introducing an unbrella brand such as "Egerfood" or even "EKF" to the food market and targeting local consumers in the first place might be a more effective strategy than creating several new, "unknown" brands in a market with fierce competition from multinational firms. Kraft Foods for example, who owns some of the leading biscuit brands in Hungary, operates a network of 3,300 food scientists in 15 major R&D centres around the world, with an R&D expenditure

of about USD 700 million a year (Kraft Foods, 2012). The company recently launched an Open Innovation website where consumers and other organizations can share their unsolicited ideas for new products, packaging, and business processes with the company. But market-creating innovations can also come from "newcomers". In the US, one of the most successful food products of 2010 was an unknown brand (*Chobani Greek Yogurts*) introduced by a small company with a purse-string advertising budget. Chobani was started in 2005 and made $150 million in sales in the first year the yoghurts hit the shelves. The company have grown from five employees to over 1,200 in its first five years. Kraft Foods' resources can hardly be compared to that of Egerfood, but if enthusiasm in research and high quality products couples with creative marketing work and a sharp focus on true consumer needs, Egerfood's new products will have a strong chance to become serious competitors to big players, just as Chobani did it in the field of dairy products.

Summary

In the form of follow-up studies, the authors presented two better practices of how higher education institutions, through their third arm, can contribute to the sustainable development of the region. The first example exhibited how faculty at the Institute of Economic Science has improved the quality and market-orientation of the tourism education program by means of organizational innovation: The launch of the internship hotel and the upgrading of the curriculum were welcomed by both students and teachers.

The second example focused on the Egerfood Regional Knowledge Centre, which promotes the culture of health and environment conscious consumption and production in the region by carrying out innovations in the food sector. The authors used the case of the functional biscuits developed by Egerfood to discuss some general bottlenecks of university-industry technology transfer. Hotel E*Stella and Egerfood set good examples for faculty at EKF and other Hungarian higher education institutions for two reasons. First, they show evidence on how innovation can foster sustainable development in the region; second, they themselves are sustainable: Both organizations have been operated with undiminished enthusiasm from faculty for five and nine years respectively.

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