HUNGARIAN AGRICULTURAL ENGINEERING
No 40/2021 91-95
Published online: http://hae-journals.org/
HU ISSN 0864-7410 (Print)
HU ISSN 2415-9751(Online)
DOI: 10.17676/HAE.2021.40.91
Received: 08.12.2021 - Accepted: 23.12.2021

PERIODICAL
OF THE COMMITTEE OF AGRICULTURAL AND BIOSYSTEM ENGINEERING OF THE HUNGARIAN ACADEMY OF SCIENCES
and
HUNGARIAN UNIVERSITY OF AGRICULTURE AND LIFE SCIENCES INSTITUTE OF TECHNOLOGY

HUNGARIAN UNIVERSITY OF AGRICULTURE AND LIFE SCIENCES
Institute of Technology

STRATEGY ANALYSIS OF INTERNATIONAL FORAGE LABORATORY NETWORKS

Author(s):
G. Kövesdi[1], Sz. Orosz [1], Cs. Fogarassy [2]

Affiliation:
[1] Livestock Performance Testing Ltd., 2100 Gödöllő, Dózsa György u. 58., Hungary;
[2] Institute of Agriculture and Food Economics - Hungarian University of Agriculture and Life Sciences, 2100 Gödöllő, Páter Károly u. 1., Hungary;

Email address:
gretakovesdi@gmail.com; orosz.szilvia@atkf.hu; fogarassy.csaba@uni-mate.hu

Abstract: Nowadays, there are some successful forage laboratory global networks owned privately. Their strategies have been extremely successful in the past decades, and have shown a similar pattern worth examining for its effectiveness. In recent study, the business and corporate strategy of international forage laboratory networks (Eurofins Agro, CVAS, Rock River, DairyLand, DairyOne) have been analysed. Porter's five-factor model and the SWOT analysis have been applied to find out the key factors of the forage laboratory network building strategy.

Keywords: NIR-analysis, laboratory service, forage analysis, development strategy

1. Introduction

In 1987, Henry Mintzberg defined five different interpretive concepts for strategy: plan, trick, vision, position and pattern [1] [2]. It is important to differentiate between content and process. In terms of content, it encompasses the different types of decisions that decision-makers will make in the future. This can be a type of prioritizing of environmental adaptation, growth or decline [4][7][8]. In business, the strategy and strategy-making management functions of firms are regularly examined. One of the most defining figures in defining strategy was Porter. In terms of business strategy, the goal is for the business unit to gain a competitive advantage, while corporate strategy decides in which industries and how the company's units participate [10].In the 1990s, however, Porter approaches the concept with a triple definition. The first is positioning, which means building a valuable position, the second is creating a trade-off, choosing between incompatible activities, and finally integrating activities to create a competitive advantage [11][12]. Views on competitiveness can be divided into four different groups: 1. denial of the concept of competitiveness, 2. macroeconomic, 3. microeconomic, and 4. unified positions [8] Porter's view can be classified as a microeconomic approach, as in his view competitiveness can only be interpreted for companies and industries, not for national economies [10].

One of Porter's best-known models is the five-factor model, which divides corporate performance into two different parts: industry-standard activities and activities that the company is able to perform above average. [11][11]. He believes a company is successful if it can achieve the best possible competitive position in its industry. It uses a five-factor model to measure competitive advantage.

In recent study, the business and corporate strategy of international forage laboratory networks (Eurofins Agro, CVAS, Rock River, Dairyland, DairyOne) have been analysed. Porter's five-factor model and the SWOT analysis have been applied to find out the key factors of the forage laboratory network building strategy.

2. Materials and Methods

In our research, we analyzed international laboratory networks using two models. Porter's five-factor model was used to measure competitive advantage.

The other method we used to analyse the current state of networks is SWOT analysis, a popular and widely used method of analysis that helps discovering the capabilities of a company, product, or service. Of the four options, strengths and weaknesses appear in the internal environment of the business, while opportunities and threats are external factors [12][14].
The analysis of the laboratory networks was performed on the following companies.

Eurofins is an international group of companies that provides unique analytics services (forage, water, manure, plant tissues et. cet.) to its clients across multiple industries. Eurofins Agro has set up a laboratory network around the world, which currently has more than 900 so-called 'satellite' laboratories. The company uses the NIR testing method. NIR is an innovative spectroscopy-based procedure that uses the absorption or reflection of near-infrared light (physical measurement, no chemicals required). This is an indirect matching method based on a NIR database and a reference database (classical chemical or *in vitro* value database). NIR spectroscopy is used partially to check parameters indicative of the phenological phase (e.g., water content, protein, and fiber content) during the harvest season. In part, it has an important role in quality control of the forage bank and is also the basis for TMR formulation [15].

CVAS (Cumberland Valley Analytical Services) is a US-based company that also deals in forage analysis and was founded in 1992 as a small-capacity chemical laboratory. They have tools suitable not only for testing forage samples, but also for testing water, manure, and plant tissue. This US based company also uses the NIR system to test incoming forage samples. CVAS, like Eurofins, has set up an international network of companies. Although headquartered in the United States, they operate forage analysis laboratories around the world [16].

The Rock River Laboratory is also located in the US. In addition to forage analysis, they also deal with animal health issues and water quality analyses. Their main customers are in the United States, but they have also set up satellite laboratories in South America, Spain and Germany [17].

Dairyland Laboratories, Inc. is an independent, full-service agricultural testing laboratory that provides analysis of forage, soil, plant tissue, manure, water, mould, and mycotoxins. It measures with laboratory wet chemistry and NIR methods. Dairyland Laboratories has customers in 42 states and 20 foreign countries [18].

Dairy One Cooperative is a non-profit cooperative focusing on plant, manure, water, milk and forage testing. In addition to wet chemical testing, this laboratory also uses NIR technology as its main testing method. They have built up a global around the world (more than 30 satellite laboratories) [19].

3. Results

In the following, we present the strategy of the examined international, privately owned forage laboratory networks through Porter's five-factor model (Fig. 1) and SWOT analysis (Fig. 2). We observe that analytical laboratories have gained a huge and unattainable market advantage over chemical analytical laboratories using NIR technology. The other trend is that several NIR laboratories have developed a worldwide network to take advantage of foreign opportunities. Therefore, the analysis of the strategic elements of successful networking can fill the gaps from an economic point of view.

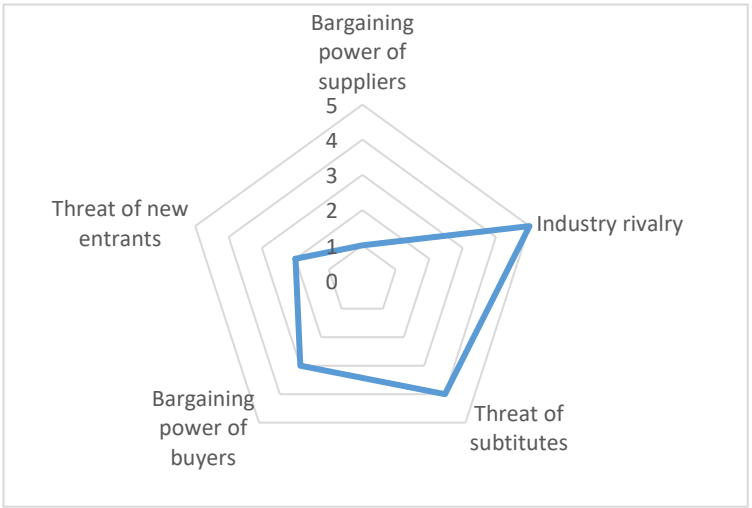

Figure 1. Application of Porter's five-factor model for five international laboratory networks, highlighting commonalities

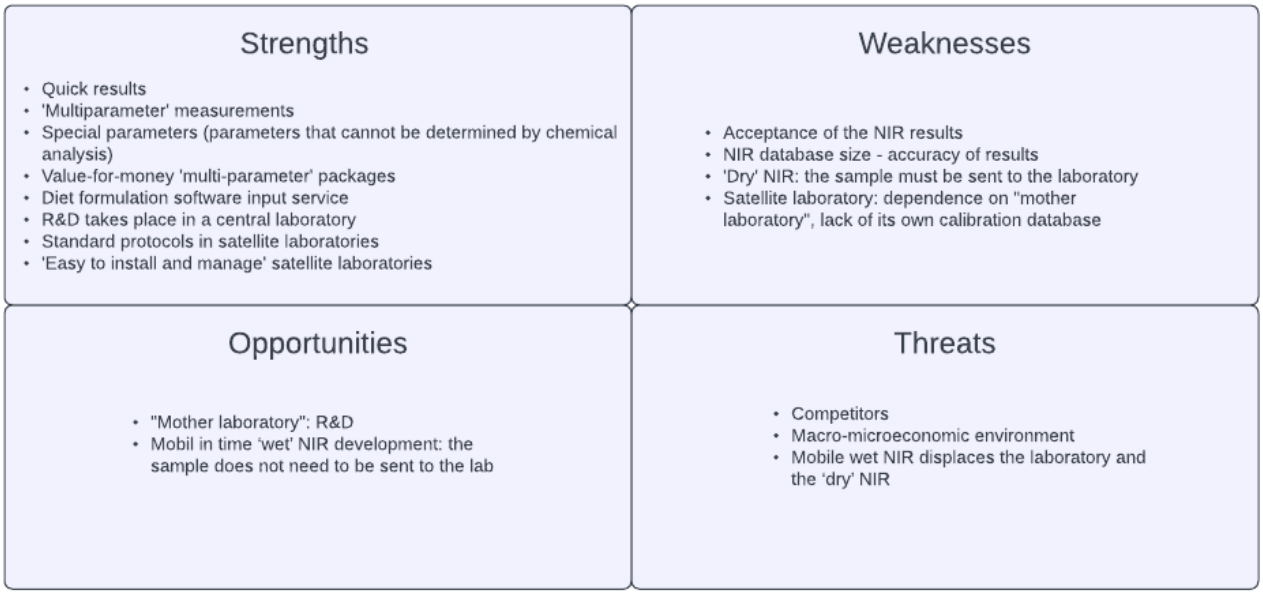

Figure 2. Application of SWOT analysis to five international laboratory networks, highlighting commonalities

4. Discussion

As a result of our research, the main, key elements of the strategic development of international forage laboratories are presented below. Furthermore, we found that the following parameters were very similar for the five networks examined:

- Independent laboratories (there is no feed company in the background, thus they can build a wide range of partners),
- Ability to test a wide range of different sample types (feed, water, manure, soil, etc.),
- The service is usually based on NIR measurement, because it is fast and accurate enough for practice (it took 20-30 years and a significant investment to create a database that allows internationally acceptable results, number of parameters and a wide range of sample types),
- Ability to measure many (20-30) parameters from a single forage sample (serving the demands of the crop manager, herd managers and nutritionist, respectively),
- They are also able to measure parameters with the NIR method, that cannot be routinely tested by classic chemical analytical methods (eg. *in vitro* digestibility)
- The parameters are offered in a package to their partners (convenient approach for the partner, makes ordering easier and secure)
- The operation also includes sampling services and advisory,
- In a so-called franchise system, a network of satellite laboratories has been set up. Satellite laboratories are required to measure and participate in internal audits according to uniform standard methods defined by the main company. The database is located in the centre, thus the satellite laboratories are in a dependent position as they get the results based on spectrum and pay for the results. So there is no need to send the sample physically, it just has to be transmitted online (this is one of the basics of the fast reports).
- As a result of nearly 30 years of developmental work, private research laboratories have a knowledge reproduced over decades, at a significant investment cost. Thus, creating an own calibration database (in a quality that is already existing at the level of global laboratory networks) is not a realistic strategic goal at either the private or at the state level. Because of this, the make-or-buy decision situation can not arise, if results to the partner is wanted to be quick). Therefore, for integration lab partners participating in a global network, a dependent relationship means immediate service opportunity and income, while stand-alone development would require years of investment without any revenue. Creating and maintaining this situation is one of the strategic cornerstones of building a laboratory network.
- The satellite laboratory in the country is supported by the “mother laboratory”, as it works with it, shares knowledge and, in some cases, receives the necessary tools from them (NIR equipment, grinder). The

"mother laboratory" conducts research and development to maintain their competitiveness, which requires significant investment and huge infrastructural laboratory capacity.

- Formulation software servicing is also part of the strategy, as laboratories providing in-put data for multiple diet formulation software can gain market advantage. Also all this in the form of an xml input file (no need to manually enter the data for today's software user). Therefore laboratory networks generally consult with developers of major software owners on parameters and IT issues.

After performing a five-factor analysis of Porter, we found that the bargaining position of suppliers is less dominant in the strategy of international forage laboratory networks. The threat of new entrants is not a significant factor due to its capital and time-consuming nature. However, the threat of substitutes is significant, as there may be more than one satellite laboratory in a country or region. These competitors can easily replace other laboratories due to the better price / value ratio. The bargaining power of the buyers is high, as the use of an optional service is of paramount importance to the laboratory, so meeting the needs set up by the customers is priority. The industry rivalry has the greatest impact on strategy. Due to continuous research and development, the needs of the market and the market itself are changing rapidly.

Based on the SWOT analysis, the following was established.

- Strengths: The strength of international forage laboratory networks is their ability to provide results fast (24-48 hours) and 'multi-parameter' data with special information (e.g. digestibility). All this is provided in affordable and convenient packages. In addition, they have a broad knowledge base across countries. Through developments, satellite laboratories are also be able to provide input data for major local and global software, providing a huge market advantage in collaboration with a feed company. The unified methodology operated within the network provides security that the applied methods are up-to-date and validated, which supports the authenticity through accuracy. Through the central research and development laboratory, it is possible that satellite laboratories do not require large infrastructural investment and a highly skilled workforce.
- Weaknesses: a weak point of the system is the acceptance of NIR over chemical analysis. Accuracy is determined by the size of the database, which can vary between networks. Samples for 'dry' NIR must be sent to the laboratory (drying, grinding, homogenisation), which is a disadvantage compared to the mobile NIR equipment. This will have a major impact in the distant future, when mobile NIR technology will be accurate enough for large-scale measurements. The dependent position of satellite laboratories may weaken the market position in a given area because they do not have their own calibration database. However, the developments also cover locally occurring special feeds, so this disadvantage can be mitigated by the central developmental laboratory. However, running a central research laboratory is expensive if it wants to stay competitive. Appropriate and innovative technological tools, their maintenance and use mean high and regular costs for the company.
- Opportunities: there is an increasing emphasis on central research and development in this area. If such a program is successfully completed in a centralized, high-capacity and well-equipped central laboratory, it will be a great opportunity for all satellite laboratories to stabilize their market position and improve their position. The latest development was particularly investment-intensive and significantly strengthened the position of satellite laboratories (calibration database of CNCPS model input data). The situation of central development and database significantly increases the economic efficiency of research and development (specifically cheaper than operating several local development laboratories) and data security (thus data theft is not possible). Mobile NIR can be both an opportunity and a threat to laboratories. On the one hand, the laboratory becomes unnecessary if the measurements can be performed on site. On the other hand, the laboratory can participate in the calibration of the mobile NIR and later provide it to its partners as a service.
- Threats: increasing competition in the sector poses a significant threat to the agricultural business [20]. Satellite laboratories (competitors) appearing on the market in more and more places are also a primary threat to networks. In some countries, there are already laboratories with a similar strategy and technology, thus taking revenue from each other. The market position of each satellite laboratory affects the performance of the entire network, as these are factors that interact with each other. Through developing their services, laboratories can prepare to reduce the risks.

5. Conclusions

As a result of the research, we explored the strategic foundations of how international laboratory networks executed their global network development. The key strategic elements were as follows, which can be found

for all 5 laboratory networks: centralized system (central database and database development), central well-equipped R&D chemical and *in vitro* laboratory (reference analyses), easy to install 'satellite' laboratories, standard protocols globally, NIR-technology, all-in-one hand (multifunctional NIR-services: forage, manure, soil, water), quick service, multiparameter-packages (20-30 parameters/sample), collaboration with formulation software owners. The study confirmed that this development strategy was detailed and extremely effective. That is the reason why many similarities have been found in the different laboratory networks studied.

References

[1] **Porter, M.,** (1985) Competitive advantage, creating and sustaining superior performance. The Free Press, New York
[2] **Mintzberg, H.,** (1987) The Strategy Concept II: Another Look at Why Organizations Need Strategies. California Management Review, vol.30.1, 25-53 doi:10.2307/41165264
[3] **Porter, M.**, (1998) Clusters and the new economics of competitiveness. Boston: Harvard Business Review
[4] **Seth, A., Zinkhan G.,** (1991) Strategy and the research process: A comment. Strategic Management Journal, vol. 12.1 75-82 doi:10.1002/smj.4250120107
[5] **Ward, P.T., Leong, G.K., Synder, D.L.** (1990) Manufacturing Strategy: An Overview of Current Process and Content Models. Manufacturing Strategy 189-199 doi:10.1007/978-94-009-2189-4_19
[6] **Porter, M.,** (1979) How competitive forces shape strategy? Boston: Harvard Business Review
[7] **Porter, M.,** (1996) What is strategy? Boston: Harvard Business Review
[8] **De Wit, B.,** (1997) Porter on business strategy. Perspectives on Strategy 7-18 doi:10.1007/978-1-4615-6179-8_2
[9] **Lengyel, I.,** (1999) Régiók versenyképessége (A térségek gazaságfejlesztésének főbb gazdasági fogalmai, alapgondolatai, tényezői az EU-ban). Kézirat, JATE Gazdaságtudományi Kar, Szeged
[10] **Porter, M.**, (1990) The competitive advantage of nations. The Free Press, New York
[11] **Porter, M.,** (1987**)** From competitive advantages to corporate strategy. Boston: Harvard Business Review
[12] **Dobbs, E. M.,** (2014) Guidelines for applying Porter's five forces framework: a set of industry analysis templates. Competitiveness Review vol.24.1 32-45 doi:10.1108/CR-06-2013-0058
[13] **Gürel, E.**, (2017) SWOT Analysis: A theoretical review. The Journal of International Social Research, 10, 994-1006. doi:10.17719/jisr.2017.1832
[14] **Helms, M. M., Nixon, J.,** (2010) Exploring SWOT analysis – where are we now? A review of academic research from the last decade. Journal of Strategy and Management, vol3.3, 215-251 doi:10.1108/17554251011064837
[15] **Eurofins** (2022) Our Strategy and objectives. Available at: <https://www.eurofins.com/about-us/our-business/eurofins-strategy-and-objectives/ (Accessed 2 March 2022)
[16] **Cumberland Valley Analytical Services** (2022) Our mission. Available at: <https://www.foragelab.com/ (Accessed 2 March 2022)
[17] **Rock River Lab** (2022) About us <https://www.rockriverlab.com/pages/About.php / (Accessed 2 March 2022)
[18] **Dairyland Laboratories, Inc.** (2022) History. <https://www.dairylandlabs.com/about-us/history / (Accessed 2 March 2022)
[19] **Dairy One** (2022) Core Values <https://www.dairyone.com/about/core-values/ / (Accessed 2 March 2022)
[20] **Namugenyi, C., Nimmagadda, S. L., Reiners, T.,** (2019) Design of a SWOT Analysis Model and its Evaluation in Diverse Digital Business Ecosystem Contexts. Procedia Computer Science 159, 1145-1154. Doi: 10.1016/j.procs.2019.09.283