Original Article

Innovative technologies absorption process: the case of the STS Timing company operating on the mass sports events market

WALDEMAR GLABISZEWSKI

Department of Enterprise Management, Faculty of Economic Sciences and Management, Nicolaus Copernicus University in Toruń, POLAND

Published online: April 30, 2020

(Accepted for publication: April 15, 2020)

DOI:10.7752/jpes.2020.s2163

Abstract:

Innovative technologies absorption from the surroundings is a highly structured process, very difficult to implement and requiring full commitment at all stages. Its effectiveness is conditioned by having specialized intra-organizational absorptive capacities.

This theoretical and empirical article attempts to determine, based on the subject literature, the entire structure of technology absorption process and verify its comprehensive implementation in business practice, specifically based on the availability of data obtained from the STS Timing company. The company is a key player on the Polish market of mass sports events and specialises in measuring time in sporting competitions. The main empirical goal of the article is to identify the course of the process of absorbing innovative technology and assess its effectiveness in the STS Timing company.

The author uses the case analysis method and proves that there are companies on the sporting events market that are able to perform a compiled process of absorbing technological innovation. Methodically and perfectly cope with emerging problems based on the experience and broad interdisciplinary knowledge possessed. As indicated by the results of the study, STS Timing can be considered as an exemplary company. When equipping itself with innovative technologies, the company professionally and consistently carried out in detail separate and logically related stages of the absorption process, forming a coherent and integrated whole. In the stage of technology acquisition, it identified and assessed its technological needs, assessed various technology sources and donors, selected the form of transfer, selected sources of financing, established relationships with selected technology donors, negotiated with them and finally determined the terms of the transfer. In the stage of assimilation of acquired technologies, STS Timing not only successfully acquired the knowledge necessary for their exploitation, but also adapted them to their specific needs arising from a wide range of measurement services provided and improved them, so that it stayed independent of their manufacturers and effectively built lasting technological advantage over competitors. And finally, in the stage of final targeted use of the technologies purchased and improved, STS Timing ensured their efficient and effective operation focused on generating the desired effects. Thus, it successfully completed the absorption processes of innovative technologies.

Key Words: absorption; innovative technologies; absorptive capacity; mass sports events services market

Introduction

Under the conditions of contemporary economic reality, highly competitive and extremely demanding, as well as in the era of the digital revolution and changes inscribing in the essence of Industry 4.0, technologies, or rather modern technologies are becoming one of the key determinants of the success of enterprises in almost every industry, including the services sector.

Creating innovative technological solutions that can become a source of competitive market advantage within one's own research and development activity is increasingly difficult, and often impossible even from the perspective of a small enterprise. Hence, even the largest enterprises are forced to acquire new technologies from their surroundings, using the commonly known and used transfer, though diverse in its form.

The transfer of innovative technologies is a very desirable way for enterprises to provide new solutions, and - contrary to appearances - extremely difficult, requiring appropriately developed multidimensional absorption capabilities, which include the ability to acquire, assimilate and exploit new technologies (Cohen & Levinthal, 1999).

The process of absorbing innovative technologies is well-established not only in practice, but also in management theory. As part of scientific considerations and research, it is defined, structured, classified, undertaken in different forms, powered by specific resources, supported by dedicated techniques and methods, conditioned by various factors, implemented to achieve different effects. Therefore, the author attempts to verify

the degree of use of certain aspects of the scientific achievements in the field of absorption of innovative technologies in the economic reality of a Polish company operating on the market of mass sports events.

As a consequence, the main purpose of this article was to identify the process of absorbing innovative technology and assess its effectiveness in the STS Timing company, specializing in measuring time in sporting competitions at mass sports events. Its implementation, based on the analysis carried out in accordance with the case study method in the STS Timing company, is to answer the following four major questions. How is the technology absorption process handled at STS Timing and to what extent is it compatible with theoretical models proposed in the literature? What problems does STS Timing encounter during this process and how does it deal with them? Is STS Timing able to effectively absorb innovative technology from its environment? Furthermore, what is the awareness of STS Timing employees about the scientific achievements in this field and how do they use it, and how much of their activity is undertaken intuitively, based on their broad interdisciplinary knowledge and experience possessed?

Theoretical background

Technology absorption is the process of its transfer undertaken and implemented by the recipient, thus treated as the absorption into the organization of technology acquired outside, in other words, the transfer of pull technology, the so-called internal - directed inwards (Lichtenthaler & Lichtenthaler, 2010). Technology transfer is an open innovative process connecting at least two entities, and thus, by its nature, goes beyond the boundaries of one (Glabiszewski et al., 2020), while these boundaries should be seen at the same time as an integration mechanism of the organization to introduce technological innovation into one of them (Cyfert, 2012). It is seen as a transfer of technological capacity - usually a bundle of artifacts, information, rights and services - from a supplier to a potential user (Dodgson, Gann & Salter, 2008).

The absorption of technology is not always clearly defined, although its essence is always a deliberate process to acquire a new technology for operational purposes. In the subject literature it is referred to as 'the process of identifying, accepting, adapting and disseminating technology in a company to implement strategic goals, taking into account organizational, technical and environmental factors' (Xinhua & Cuiling, 2008). At other times, it is treated as a process involving the acquisition, development, assimilation and use of technical knowledge and capabilities by an external source (Rastogi, 2009). However, the most mature concept can be found in the theory of knowledge management and learning organization, under which the process of technology absorption boils down to three basic, but internally differentiated and structured stages, such as (Cohen & Levinthal, 1999; Van den Bosch, Volberda & de Boer, 1999; Zahra & George, 2002):

- acquiring new technology,
- assimilation of acquired technology,
- the use of assimilated technology.

The process of technology absorption is described by a wide spectrum of activities. Therefore, it is not easy to clearly define the boundaries in which it takes place. Detailed identification of its structure should be carried out by looking for all substantially related activities forming a logical whole within the more aggregated stages referred to in the above definitions.

The first stage, *i.e.*, the acquisition of new technology, provides at the very beginning, the identification of the company's technological needs and the possibility of satisfying them with ready-made solutions existing in its environment, although the greatest emphasis should be placed on recognizing the real value of the new technology for the organization purchasing it.

In order to carry out this stage comprehensively, the following actions should be taken:

- identification and assessment of the company's technological needs (determining the existing gap or desired technological advantage) as well as competence and financial possibilities to satisfy them,
- identification, assessment and selection of available technology sources (Glabiszewski et al., 2018), technology providers and technologies themselves,
- identification, assessment and selection of forms of technology transfer and sources of its financing,
- establishing cooperation with a technology provider, negotiating with it and defining the terms of its transfer,
- acquisition of a new technology and transferring it to the final destination.

The next stage of absorption of the new technology is its assimilation. Although it seems less complex due to the number of actions taken, it is much more complicated when it comes to their precise definition and identification. S.A. Zahra and G. George (2002) reduce the process of assimilation of knowledge, including technology, to such activities as analysing, considering, interpreting and comprehending knowledge, in other words, generally speaking, its learning. Therefore, they exclude from assimilation activities related to the modification and improvement of acquired knowledge, assuming that they are of a different nature (Fichman & Kemerer, 1999). Instead, they anticipate them as part of the next stage, which they extract as part of the absorption of technology, which is the transformation of knowledge, which boils down to its development by combining selected elements of newly acquired knowledge with the desired elements of knowledge already possessed and already verified. Furthermore, according to G. Todorova and B. Durisin (2007), the processes of assimilation and transformation of knowledge perform similar functions, as they are responsible for making a certain level of changes in newly acquired knowledge, and then combining it with existing knowledge in the

organization (Todorova & Durisin, 2007). Given the different and more complex nature of knowledge and the multidimensional structure of technology, it is difficult to clearly determine the border between the stage of its assimilation and transformation, as proposed by S.A. Zahra and G. George (2002) - especially since the actions envisaged within them are often undertaken in a more or less integrated manner at the same time or alternately. In addition, the transformation stage - theoretically speaking - may not occur at all if a technology dedicated to its recipient is implemented uncritically and thus fully ready for use. It is also difficult to distinguish substantively the activities that constitute assimilation and the transformation of technology alternative to it, as G. Todorova and B. Durisin (2007) do.

In practice, innovative technology obtained from the outside almost always requires some adaptive changes, either in itself or in the host environment. Often, it is unequivocal to determine whether these activities are still assimilation or transformation, it seems almost impossible, and from a practical point of view - even pointless.

Therefore, when absorbing new technology, it seems justified to isolate only one, though an internally structured stage occurring between its acquisition and use, which is assimilation. Taking into account assimilation understood in this way, three potential actions should be envisaged:

- learning the acquired technology,
- adaptation of the technology to the new conditions of its recipient or adaptation of these conditions to the implemented technology,
- improving technology to increase its level of innovation.

This approach refers to the original understanding of the concept of assimilation derived from the exact sciences, and at the same time returns to the precursor concept of W.M. Cohen and D.A. Levinthal (1999).

The final stage of technology absorption is its actual use as part of the company's ongoing operations. Its essence is the proper exploitation of the acquired technology focused on generating target effects. Although this stage seems to be only a simple consequence of the earlier ones, it is next to the assimilation that directly determines it, crucial as it crowns and ultimately determines the success stage of technology absorption. It is at this stage that the mechanisms of efficient, effective and market-oriented use of the newly acquired technology are launched and its usefulness is finally verified and the objectives underlying the decision to start the absorption of the technology are achieved (Glabiszewski & Zastempowski, 2017). At this stage, first of all, measures should be taken to ensure (Glabiszewski, 2016):

- efficient (reliable) functioning of the implemented technology,
- effective exploitation of the implemented technology,
- generation of the effects desired by the market thanks to the implemented technology.

It should be remembered that the success of an enterprise in the absorption of innovative technology depends not only on its implementation of a properly structured process, but also on its ability to carry out this process, on its resources and not only financial. It also depends on how favourable are the conditions under which it has to carry out this process (Liefnera, Sib, & Schäfer, 2019).

Mass sport events trends

Considering the last few years we can observe an incredible increase of sports events popularity. The market is growing in both size as well as professionalism of various organizational aspects (Metelski, 2019). This state of affairs results, among others, from scientific studies that prove that limited physical activity contributes to the appearance of numerous diseases and significantly increases obesity in society. The trend promoting physical activity stimulates investment in the type of infrastructure that is necessary for practising sports. Thus, bicycle routes, gyms and swimming pools are created. According to the data published by the Central Statistical Office in Poland in 2018, the number of Poles practising a selected sport increased by 2.5% when compared to 2016 (GUS, stat.gov.pl, 2018).

When we look at the recent trends, we can definitely say that running is still a very popular way for both amateur sports events as well as professionally organized, well crowded ones that involve a lot of interest locally and internationally. As we can see in the recent report prepared by The Outside Online, the running trend is not going anywhere (Huber, 2019).

When we take into account our national market, we can definitely see that snowsports are still very popular during this time of the year. The reason behind is not only the geographical location but also presence of local sports celebrities and accessibility, especially when it comes to Skiing, Ski Jumping, *etc.*

While doing analysis of international trends, some very interesting facts were mentioned in Deloitte's report, which suggest that this year we will see are the rise of women's sports, continued evolution of e-sports, legalized sports betting in various disciplines around the globe. Also considering the technological improvements, we will see a lot of 5g and sports in the cloud (Deloitte, 2020). Looking at those reports and analysis, we can definitely say that the future looks very bright for the sports industry overall and we will see a lot of interesting things coming.

Currently, mass sports events in Poland take place in almost every city. In 2018, there were as many as 3,468 of such events organised. Out of that number – 2,645 took place in closed facilities and 823 in open areas (GUS, bdl.stat.gov.pl, 2018). It is almost half of all mass events taking place in the country. In 2018, 14.8

million people took part in mass sports events, which is almost 30% of the country's population. It is worth adding that about 97% of participants had to pay for participation in the event. The growing tendency in organizing mass sports events is currently indisputable, with the level of this growth being steady.

The growing market of sports mass events is also becoming a significant space for the development of various accompanying business areas, including those related to the organization of events, time measurement of players, sports sponsorship and others. Many companies, primarily from the private sector, are involved in financing sports sector entities. Mass sports events and their organizers are an important element of the image strategies of many enterprises. Especially when it comes to running, athletics or cycling events. However, the biggest leader among sports disciplines remains football, which brings the greatest profits in the sports industry (Kończak, Polski sport 2018).

In the case of mass events, running is dominant, which usually takes the form of street running, and the calendar of such events is completely filled in as far as weekends available in the following year are concerned. Triathlon is becoming increasingly popular in our country as an olympic sport. Triathlon, *i.e.*, swimming, cycling and running is a sport for everyone, regardless of their training status. Currently, 71 triathlon events are held in Poland each year, taking place in various forms and categories. For example, the triathlon competition in Gdynia currently gathers 4,000 participants, and in 2009 there were only 200 people.

The results of the Sponsorship Monitor ARC Market and Opinion survey show that also the number of active cyclists is constantly growing. In 2015, every fourth respondent admitted that he practises cycling, while in 2018 every third person declared so (ARC rynek i opinia, arc.com.pl). In Poland, many sporting events related to this discipline are organized, including road cycling Tour de Pologne or XC - Jelenia Góra Trophy Maja Race and MTB marathon in the UCI Marathon Series class (Bike Marathon). All these events are organized for both professionals and amateurs.

An increasing number of Poles spend their winter holidays actively in the mountains, and ski resorts offer more and more attractions for visitors. Interest in winter sports is also growing - as has already been mentioned. An example is the wide participation in supporting ski jumping, as it is not a sport for amateurs, and the organization of events in this discipline is handled by the ski association. It should be added that in Poland there are five ski complexes offering such opportunities. Cross-country skiing is equally promising, especially since it is a sport that can be practised not only in the mountains. Nevertheless, proper weather conditions must be ensured. The largest complex in the area of cross-country skiing is located at Szklarska Poręba, in the Jakuszycka Glade. One Poland's largest race - the Piast Race takes place in there. This sport is undoubtedly also for amateurs.

The organization of mass sports events influences the development of tourism, which has positive economic, cultural, environmental and political effects, and as a consequence contributes to the economic development of cities and villages. It is also a large market with great potential for enterprises dealing with sport-related activities, including time measurement during competitions. However, the disciplines taking place in the summer season bring the highest profits from the above-mentioned sports. They are the most numerous and attract the largest number of players.

Research approach and methods

The empirical part of the article was developed based on the results of a study conducted in 2020 using the case study method. The research object were the processes of the absorption of innovative technologies implemented in the STS Timing company, operating on the market of mass sports events. The case study analysis was based on the results of a semi-structured interview conducted separately with two business owners in three iterations, specifying the results and conclusions obtained in subsequent iterations and obtaining their acceptance by both respondents. In addition, internal company documentation was used, in particular the documentation related to the acquisition, modification and implementation of new technologies. Also, the observation method was applied.

Case studies allow the identification and analysis of research problems at the exploratory, descriptive and explanatory level (Yin, 2009). It can be used for both building the theory and testing it (Yin, 2009; Eisenhardt, 1989). These two premises form the basis for applying this method in the empirical part of the article. First, the author wants to recognize a specific phenomenon in real conditions (the theory of cognitive function), and secondly, check whether the theoretical assumptions adopted in the issue are actually present in the surrounding reality (the verification function) (Czaron, 2015). Moreover, the use of case study is of great importance from a practical perspective, as it allows potential decision-makers to see and understand decision paths and its circumstances (the application function). It is also worth adding that the basic advantage of the case study method is the fact that it gives the possibility of direct reference of the analysed phenomenon to the real context in which it operates.

The study and analysis based on its results constituted the basic source of data necessary to achieve the main empirical goal of the article, the one referred to in the introduction section. It identifies the course of the process of absorbing innovative technology and assesses its effectiveness in the STS Timing company, specializing in measuring the time of competitors during mass sporting events. In order to achieve the main goal

formulated in this way, the author attempted to find the answer to four research questions that were formulated in the introduction:

1. How is the technology absorption process handled at STS Timing and to what extent is it compatible with theoretical models proposed in the literature?
2. What problems does STS Timing encounter during this process and how does it deal with them?
3. Can the STS Timing company effectively absorb innovative technology from its environment?
4. What is the awareness of STS Timing employees about the achievements of science in the field of technology absorption and how do they use it? How much of their activity is undertaken intuitively, based on their broad interdisciplinary knowledge and experience possessed?

The above research questions refer to the basic issues raised in the theory of technology absorption, which emerged primarily on the basis of the fundamental assumptions of the concept of knowledge management and learning organization. The desire to verify the reflection in the economic reality of the factors determined in the theory of effective implementation of the transfer of innovative technologies has led the author to formulate these questions and seek answers.

Results and discussion

STS Timing is one of the largest Polish companies operating on the mass sports events market. It has been operating in the industry for 20 years. From the very beginning of its activity, the company has specialized in measuring the time of players. Observing market changes over the years and adapting to them, systematically expanded the scope of its services. The STS Timing offer included successively IT service elements, such as electronic record forms, website templates for organizers, comprehensive sports accessories for players, and finally organization of entire sporting events. STS Timing clients are private organizers, budget units, event agencies, companies for which entire sporting events are carried out, *e.g.*, for their employees or local communities. Its most important clients include the Warsaw Marathon Foundation, Poznań Sports and Recreation Centres, Polish Ski Association, PKO BP, Orlen, Nestle Toruń. The company also supports sports events abroad, *i.e.*, in Ukraine, Slovakia, Sweden, the Czech Republic and Germany. Currently, STS Timing is expansively entering the European triathlon event market.

STS Timing is a large, well-known in the industry and still dynamically developing company. It has extensive experience, modern equipment, many loyal customers and dedicated business partners. Currently, it is the only company in Poland that has several types of measuring systems, which makes it stand out from the competition. Furthermore, the company has the infrastructure to independently organize a large mass sports event.

In the subsequent years of its operation, STS Timing has repeatedly purchased various types of professional measuring equipment, including Mylaps and Chronotrac passive chips, Mylaps active chips, Linx camera systems as well as photocells and a microgate chronometer. This equipment is primarily used to measure the time obtained by players during mass sporting events, but also to design from scratch the supported competitions, organize a system of recording players, transfer data to various media, *e.g.*, to television.

The recalled technologies were purchased from the two largest measuring equipment manufacturers in the world, namely from the Dutch company Mylaps and the American company Chronotrac, which has its sales office in the Netherlands. The purchase was made directly from producers. It should be added that the sector of professional measuring equipment manufacturers is narrow - basically seven companies count in the world, so choosing the target technology was not so difficult, because it referred to only a few variants. The decision to buy equipment was dictated primarily by market requirements, especially the qualitative and quantitative expectations of customers, the pressure of competitors, but also the aspirations of owners who wanted to build a competitive advantage in the company based on modern technologies. Thanks to these technologies and related equipment in measuring equipment, STS Timing is able to handle the largest sporting events in Poland, as well as many, even a dozen or so mass events at the same time.

When selecting the technology, STS Timing carried out an analysis of several offers from competing manufacturers. This analysis took into account selected technological and market parameters, primarily quality, precision of measurement at high speeds, availability of new functional solutions, scope of warranty, ease of contact with the manufacturer and his reaction time to reported problems, but also the price, or rather the price relation to quality. Moreover, during the verification of individual technologies, STS Timing tested them in practice. Not only technologies, but also their providers were assessed. STS Timing was guided by the size, brand and reliability of companies in their selection. An interesting solution was definitely to use the technologies of two different manufacturers. The first reason for doing so was not to become dependent on one supplier only. Also, each of them had in its offer advantages in different aspects. The company acquired all technologies by purchasing them, initially financing them only from its own resources, as banks were not willing to finance or lease equipment that they believe is not transferable and therefore does not constitute a real collateral. However, in recent years there has been a leasing offer that STS Timing effectively uses.

STS Timing maintains a constant relationship with both manufacturers of the equipment it uses from the very beginning, *i.e.*, from the acquisition of the first technologies. They have the status of their preferred partner on the market, giving various privileges, including special discounts. They systematically use their invitations,

going to technological conferences, exhibitions or presentations organized by them throughout Europe. On this occasion, they have the opportunity to meet the largest measuring companies in the world, such as, for instance, MIKA or DATACAPO, draw on their experience and the greatest achievements in the industry. These types of meetings provide abundant knowledge about the latest available technological solutions. What is more, long-term relationships with manufacturers provide a rational basis for negotiating the favourable conditions for the acquisition of further measuring systems.

To sum up, at the stage of acquiring innovative technologies, STS Timing identified and assessed its technological needs, especially in terms of market requirements, its own development aspirations and financial capabilities. It also evaluated various technology donors, selecting the largest and most reliable manufacturers of measuring equipment. Thus, it took into account only one form of transfer, which is the purchase of new technology from the manufacturer. This form seems to be the best from the perspective of ensuring the assumed competitive advantage. The only source used to finance the purchased equipment in the first years of the company's operation were own funds. Only recently has the leasing offer appeared on the market, which the company systematically uses. It is a pity, however, that they failed to support themselves with public or EU funds, especially since they made such attempts. From the very beginning, STS Timing has been actively cooperating with suppliers of its technologies, has been developing relations with them during various technology conferences organized by them, as well as it has been acquiring knowledge about available technological novelties and about the functioning of the largest measuring companies in the world. By the way, it builds its bargaining power in negotiations undertaken as part of subsequent purchases of equipment, which is ultimately delivered to the STS Timing headquarters.

After purchasing the technology, one must assimilate it, *i.e.*, learn how to use it, adapt it to your own applications and possibly improve its functioning. All these activities are undertaken at STS Timing. However, the company has chosen its own technological development path. They buy equipment, but equip it with its own IT solutions, sometimes even created from scratch by IT specialists working with them. The company creates proprietary programmes for recording measurement, tracking, time visualization on television carriers, conversion systems, applications for photos and diplomas, applications for competition offices, professional profiles, *etc.* Due to operating in such a way, STS Timing does not depend on the technological changes implemented by the manufacturer, and on the manufacturer, either.

STS Timing employees take part in various external specialized training and thus acquire skills that allow free use of purchased technologies. They are most often invited to these training sessions by suppliers of these technologies. In addition, they share their knowledge and ongoing experience within the organization. The knowledge accumulated over the years by STS Timing employees means that it is becoming easier for them to acquire further knowledge resources and to use more and more advanced equipment with more and more ease. Increasingly, the company learns new technological solutions and how to use them alone. And in the event of difficulties, it can effectively obtain professional help, *e.g.*, on forums and industry portals from professionals specializing in narrow areas of knowledge. In addition, the company, being the author of many IT solutions, learns and educates its employees by providing the competences necessary to use them. It is worth emphasizing that these own solutions of STS Timing are not so much the result of adaptation processes, but rather improvement processes, thanks to which the technologies used acquire an innovative form that gives the company a real competitive advantage. The company's ability to modify acquired technologies allow, after certain modifications, to use them for measurements in various sports. Recently, STS Timing has independently prepared the measurement system for the Norwegian combination from scratch, and it has also prepared IT solutions for measurements during horse races, speedway and even golf. It is also able to carry out unusual orders by preparing an individual application dedicated only to a given sporting event, *e.g.* for events organized for an exceptionally demanding customer in this matter such as Red Bull.

The next stage of technology absorption is its targeted use. The STS Timing company, due to its highly developed competences, does it without any problems. It uses the acquired equipment, improved with proprietary IT solutions, in accordance with its intended purpose, obtaining the intended and therefore desired effects. Furthermore, it can exploit absorbed technologies in an efficient and reliable manner. It does not cause any technical interference. Possible problems arising during the current operation - as a rule - result only from difficult and adverse weather conditions. They are eliminated due to the spare equipment provided at each event, thanks to which the metering process is always maintained. It should also be emphasized that the acquired technologies are used effectively, *i.e.*, they generate higher - expressed in monetary units - effects in relation to the expenditure incurred. The full return on investment in technologies occurs after a maximum of three years with such a large number of events supported.

Finally, the assessment of the absorption process of innovative technologies is worth referring to the activities undertaken by STS Timing in order to protect the already acquired technologies against competition. Measuring equipment is widely available on the market for all potential buyers. However, a significant barrier to its acquisition is high capital intensity. In addition, STS Timing has a significant technological advantage due to its own software developed on the basis of long market experience, which is not readily available to competitors. Even if they make an effort to imitate STS Timing solutions, it takes them about two years.

Conclusions

The obtained results of the conducted research allow to answer research questions formulated in this article. First, they give a conviction that in the analysed STS Timing company, the process of absorbing new technologies is a model one, *i.e.*, it is model from the point of view of theoretical assumptions determining the detailed structure of this process. This state of affairs results primarily from the company's 20 years of experience in the acquisition and use of modern technologies, but also from the specialized skills of its individual employees, especially technical and IT.

Secondly, the results obtained indicate that STS Timing does not encounter problems during the absorption of new technologies that prevent the implementation of this process. And if there are any, they are effective in dealing with them. The main source of problems, which is a factor that stimulates the acquisition of a new technology by the company is the high cost of its acquisition and the need to employ more employees to operate it possessing the appropriate competences, including those showing the appropriate skills and predispositions to work with measurement technology during mass sporting events. The proper use of these technologies requires knowledge of exact sciences and technical skills, while working in the conditions of mass sports events - resistance to stress and the ability to act under time pressure. The long-term and cost-intensive process of training a new employee is also a barrier.

Thirdly, the analyses confirm that STS Timing can effectively absorb innovative technologies from its environment. As it turns out, in the process of transfer they are actually obtained, properly assimilated and used in accordance with the intended purpose, *i.e.*, they ultimately generate the desired resource, market and financial effects. According to the information obtained, the absorbed technologies each time enabled the objectives underlying the decision to obtain them to be achieved at a fully satisfactory level.

And finally, fourthly, according to the STS Timing owners and employee's declaration, in the framework of absorption of new technologies they make decisions and actions primarily based on their extensive previous experience and broad interdisciplinary knowledge, as well as guided by the increasingly high expectations of their clients (cf. Glabiszewski, 2014). Thus, they do not reach for subject literature when looking for inspiration or decision-making premises in the achievements of management sciences. As can be seen, many years of experience, commitment and openness to the growing market requirements are a sufficient factor for the company's success. The achievement of this success is not so much owed to using scientifically verified paths of conduct, but rather to an entrepreneurial attitude and new solutions focused on real market needs.

The analysis carried out in this article using the case study method allows to recognize the phenomenon of transfer of innovative technologies in the real conditions in which STS Timing operates, providing the basis for theory-forming and application conclusions, and also does not bring any reasons to negate the scientific achievements in the theory describing the assumptions and determinants of knowledge and technology absorption. However, it should be remembered that generalizations derived from inductive research methods, which include case study, require confirmation by carrying out quantitative research. Therefore, to increase the epistemological and application value of the conclusions formulated above, it is necessary to continue empirical research, especially quantitative, aimed at identifying in detail specific internal and external determinants of the effectiveness of the process of absorbing innovative technologies.

References

- ARC rynek i opinia [ARC market and opinion]. <https://arc.com.pl/Wyniki-badan-bloglist-pol-4.html>, (25.02.2020).
- Cohen, W. M., & Levinthal, D. A. (1990). Absorptive capacity: A new perspective on learning and innovation. *Administrative Science Quarterly*, 35(1), 128-152.
- Cyfert S. (2012). *Granice organizacji* [Organization boundaries], Wydawnictwo Uniwersytetu Ekonomicznego w Poznaniu, Poznań.
- Czakon, W. (2015). *Zastosowanie studiów przypadku w badaniach nauk o zarządzaniu* [Application of case studies in management sciences research], [in:] Czakon. W. (ed.), *Podstawy metodologii badań w naukach o zarządzaniu* [Fundamentals of research methodology in management sciences], Oficyna a Wolters Kluwer business, Warszawa, 189-208.
- Deloitte, 2020. <https://www2.deloitte.com/us/en/pages/technology-media-and-telecommunications/articles/sports-business-trends-disruption.html>, (25.02.2020).
- Dodgson, M., Gann, D., & Salter, A. (2008). *The management of technological innovation. Strategy and practice*, Oxford University Press, Oxford.
- Eisenhardt, K. (1989). Building theory from case study research. *Academy of Management Review*, 14(4), 532-550.
- Fichman, R. G., & Kemerer, C. F. (1999). The illusory diffusion of innovation. An examination of assimilation gaps. *Information System Research*, 10(3), 255-275.

- Glabiszewski, W. (2014). Potencjał absorpcyjny w świadomości naczelnego kierownictwa banków [Absorptive potential in the consciousness of banks' top management]. *AUNC Zarządzanie*, tom XLI, nr 2, zeszyt 418, 143-152.
- Glabiszewski, W. (2016). *Potencjał absorpcyjny przedsiębiorstw finansowych w Polsce w procesie transferu innowacyjnych technologii* [The absorptive capacity of financial companies in Poland in the process of innovative technologies transfer], Wydawnictwo Naukowe UMK, Toruń.
- Glabiszewski, W., Grego-Planer, D., Liczmańska-Kopcewicz, K., & Zastempowski, M. (2018). Selection of sources of technological innovations and their consequences in financial services companies. Proceedings of the 31st International Business Information Management Association Conference (IBIMA), 25-26 April 2018, Milan, Italy, 3693-3701.
- Glabiszewski, W., Sudolska, A., Górka, J., & Pańka A. (2020). Financial services companies' abilities to collaborative technology absorption versus their innovativeness. Springer Proceedings in Business and Economics, Springer, Cham, 225-241.
- Glabiszewski, W., & Zastempowski, M. (2017). The absorptive capacity of a finance company as an efficiency factor of its pro-technology innovation activities, [in:] Dudycz, T., Osbert-Pociecha, G., & Brycz B. (eds.), *Efficiency in Business and Economics*, Springer, Wrocław, 57-69.
- GUS, bdl.stat.gov.pl, (2018). <https://bdl.stat.gov.pl/BDL/dane/podgrup/tablica>, (25.02.2020).
- GUS, stat.gov.pl (2018). <https://stat.gov.pl/obszary-tematyczne/kultura-turystyka-sport/sport/kultura-fizyczna-w-polsce-w-2016-r-,12,1.html>, (25.02.2020).
- Huber, M. F. (2019). <https://www.outsideonline.com/2393643/american-running-trends-survey-2019>, (25.02.2020).
- Kończak, J., Raport: Polski sport 2018. Sponsoring Sportowy, Fundacja Promocji i Rozwoju Sportu „Sport Life” [Report: Polish sport 2018. Sports Sponsorship, Sport Promotion Foundation and Sport Development, „Sport Life”], pdf on-line.
- Lichtenthaler, U., & Lichtenthaler, E. (2010). Technology transfer across organizational boundaries: Absorptive capacity and desorptive capacity. *California Management Review*, 53(1), 154-170.
- Liefner, I., Sib, Y., & Schäfer, K. (2019). A latecomer firm's R&D collaboration with advanced country universities and research institutes: The case of Huawei in Germany, *Technovation*, 86-87, 3-14.
- Metelski, A. (2019). Physical activity in Poland and the European Union. *Quality in Sport*, 3(5), 7-21.
- Rastogi, P. N. (2009). *Management of technology and innovation. Competing through technological excellence*, SAGE Publications, London.
- Todorova, G., & Durisin, B. (2007). Absorptive capacity: Valuing a reconceptualization. *Academy of Management Review*, 32(3), 774-786.
- Van den Bosch, F. A. J., Volberda, H. W., & de Boer, M. (1999). Coevolution of firm absorptive capacity and knowledge environment: Organizational forms and combinative capabilities. *Organization Science*, 10(5), 551-568.
- Xinhua, B., & Cuiling, Y. (2008). Absorptive capacity of information technology and its conceptual model. *Tsinghua Science & Technology*, 13(3), 337-343.
- Yin, R. K. (2009). *Case study research: Design and methods*, Sage, Thousand Oaks.
- Zahra, S. A., & George, G. (2002). Absorptive capacity: A review, reconceptualization, end extension. *Academy of Management Review*, 27(2), 185-203.