INNOVATIVE ICT SOLUTIONS OF KNOWLEDGE-BASED ENTERPRISES – A CASE STUDY

Ewa Badzińska

Poznan University of Technology, Pl. M. Skłodowskiej-Curie 5, Poznań, 60-965, Poland

Abstract

An intensive development in the field of communication and modern ICT technologies necessitates the acquisition and management of knowledge and the implementation of innovative solutions. The competitiveness of young businesses – start-ups – depends on the quality, timeliness and the completeness of expert knowledge, and above all on the ability of decision makers to apply it effectively in practice. The main goal of this paper is to provide innovative business solutions offered by a Polish company – Glip, the laureate of Poznan Leader of Entrepreneurship 2014 contest, in the category of start-ups.

Key words: *ICT technologies, entrepreneurship, start-up, expert knowledge*

1. INTRODUCTION

In an era of intense competition an important factor in a company's market success is certainly based on innovative solutions tailored to individual customer needs. Nowadays, an enterprise is forced to conduct its activities taking into account current interdisciplinary knowledge and experience of its employees and it must be able to generate value for customers. Human factor will be growing in importance and it will essentially determine business effectiveness. Expert knowledge – complex and difficult to acquire – is rapidly becoming obsolete, thus actions are necessary to acquire new knowledge, implement modern ICT[1] solutions and look ahead to the future in a multivariate way to enrich both the experience and insights of people who form organizations (Zacher 2007, p. 228).

The modernity of products and services provided by Polish enterprises depends largely on the development of innovativeness, which is the basis for creating entrepreneurship by people with funds, who are able to take risks (Hejduk 2013). The development of innovative solutions in the area of ICT is a source of increasing competitiveness of enterprises and allows them to achieve considerable economic benefits. Following the Oxford Handbook of Innovation (Fagerberg, Mowery & Nelson 2005), the concept of innovation refers to the putting into practice of inventions. An important distinction in the innovation literature is between innovations that are new to the world, innovations that are new to the domestic market or innovations that are new to the firm (Fagerberg 2005). A strictly technological approach focuses specifically on product and process innovations, or technological innovation, as a result of knowledge-intensive entrepreneurship. A broader approach refers to innovation as the development of new products, new processes, new sources of supply, but also to the exploitation of new markets and the development of new ways to organize business (Szirmai, Naudé & Goedhuys 2011, p. 5).

Knowledge management involves processes through which organizations generate value from their intellectual capital and knowledge-based assets. Paramount to knowledge management is the incorporation of the socio-technical perspective of people, processes, and technologies. This stems primarily from the fact that knowledge itself is a multifaceted construct that can be created by people, generated by means of a wide range of technologies and can also be embedded in processes. Wickramasinghe describes this concept as the knowledge management triad (Wickramasinghe & von Lubitz 2007, pp. 42-43).

The competitiveness of young Polish enterprises – start-ups and of the products they offer depends on quality, timeliness and completeness of knowledge. Knowledge is now perceived more often as a

[1] Information and Communication Technologies are technologies in the form of systems, equipment and services, the operation of which is based on the transmission of electronic signals.

strategic resource. Skills to acquire and manage knowledge resources are fundamental to competitive potential. We can say that there has come an era of intellectual resources of organizations. Intangible assets, such as information and knowledge are factors determining the success of organizations (Perechuda 2013, p. 106).

The main objective of the publication is to provide innovative business solutions in the area of ICT offered by young company with academic pedigree – the Polish enterprise Glip Ltd., the laureate of Poznan Leader of Entrepreneurship 2014 contest, in the category of start-ups. The competition is designed to promote outstanding enterprises belonging to the SMEs sector in building a strong market position. The award was handed in May 2014 at Poznan International Fair during the Days of Entrepreneurship (Laureat w kategori start-up 2014).

Considerations in the area of the object of study have been focused on the identification and analysis of innovative devices and services dedicated to the needs of individual customers, particularly in the B2B area. For the purpose of achieving the goal of this paper, both the owner and the co-founder of GLIP have been interviewed directly. The article is of an analytical-research character and can constitute a contribution to the discussion on the issues and as the starting point for deeper empirical research. The examples presented in this article regarding expert knowledge and the skills of its application in business practice can act as an inspiration for other businesses.

2. KNOWLEDGE-BASED ACADEMIC ENTERPRISES

Entrepreneurial activity is the enterprising human action in pursuit of the generation of value, through the creation or expansion of economic activity, by identifying and exploiting new products, processes or markets (Ahmad & Seymour 2015). Academic entrepreneurship[2] is an expression of new jobs and opportunities that open up for college community and research and development sector. It can be argued that competitive advantage of academic start-ups is derived from their employees' unique knowledge, skills and especially the ability to implement them in practice, as well as specific organizational competencies and research experience. These companies successfully bridge the gap in manufacturing and implementation of innovative business services with the support of ICT. The analysis of case studies of academic start-ups confirms that they have a particularly high rate of innovation in high technology industries, among others, in telecommunications, computer science and electronics. These companies are characterized by a relatively high share of expenditure on R & D, intensive use of knowledge and human capital in building competitive advantage, fast response to market signals – mobilization of resources, a large share of workers with experience in research, creation and implementation of innovative solutions to the market, and regular contacts with scientific research institutions, which provide them with important sources of information. Undoubtedly a significant impact on the development of academic start-ups has been made by business ecosystem. We are talking here about a wide range of cooperation ranging from consortia or research centers, through consultancy, organizational, funding and infrastructure services, up to relations with business environment institutions in the field of incubation (Badzińska 2014, p. 28). In addition, the important role of the external environment in the process of technological entrepreneurship associated with the fundamental pillars of knowledge economy is often emphasized (Lachiewicz & Matejun 2010, p. 189).

Companies with academic pedigree often appear as a result of projects implemented by researchers at the stage of applied research. The participants of research teams decide to start a business based on knowledge and technology developed during the implementation of these projects. Special role here is played by knowledge workers with high qualifications whose acquisition is very time-consuming (Hejduk 2005, s. 80). Diffusion of knowledge is inseparably connected with man, and the knowledge transfer process applies to transactions (Kubiak 2011, p. 36).

Academic entrepreneurship is, therefore, a source of innovation and the transfer of knowledge into economic practice, affecting the local, regional and global economies (Guliński & Zasiadły 2005, p.

[2] Academic entrepreneurship in Poland is legally regulated mainly by the Parliamentary Act – Law on Higher Education (Act of 27 July 2005, Journal of Laws, No. 164, item. 1365, as amended.).

23). The entrepreneurs are the actors that respond to opportunities, threats, uncertainties, constraints, and incentives emanating from the economic environment in which they operate. Entrepreneurs, commercializing technology, often through creation or expansion of firms, apply and spread technology in a way which raises total factor productivity. The creativity, capabilities, dynamism, and innovativeness of the entrepreneurs in a country are important aspects of the absorptive capacity, which is such a distinctive characteristic of successful development experiences (Szirmai, Naudé & Goedhuys 2011, p. 10). The ability to implement practical, technical, technological and organizational solutions by employees of innovative academic enterprises and the ability to cooperate with other high-tech companies undoubtedly proves their competitive advantage.

The terms found in literature referring to the academic enterprises differ regarding the nature of technology transfer and financial support. Despite the lack of consistency of interpretation of the terms "spin-off", "spin-out", "start-up", it is assumed that they are entities based on knowledge created by university staff, its graduates – people with an academic pedigree (Chyba & Grudzewski 2011, p. 116). Nicolaou and Birley (2003, pp. 333-359) suggest that a necessary condition for the creation of a spin-off is the transfer of technology (from a university), but not necessarily the transition of workers from a university to a new entity. Birley (2002, pp. 133-153) furthermore emphasizes the essence of the flow of intellectual assets. Other representatives of science focus their attention on the characteristics of start-ups, such as the transfer of know-how, innovative solutions in the area of ICT, ideas for new products and services.

As a result of learning knowledge has become a core value of scientific institutions and organizations and it determines their ability to introduce changes. High efficiency in the use of knowledge is associated with intellectual efficiency, which on the other hand, is obtained as a result of education and along with experience it enriches the existing knowledge resources (Koźmiński & Jemielniak 2008, p. 257). Knowledge is a combination of experience, values and information about the context of situations and expert insight into a given issue that together provide a framework for the assessment and incorporation of new experiences and information. It is also worth pointing out to the interactive nature of this process, in which various feedback loops take place between the senders and receivers of knowledge and new technological and organizational solutions (Matusiak 2011, p. 301).

Current expert knowledge is a prerequisite to decision-making, setting objectives, and is a component mitigating the risk of business activity. Moreover, knowledge is a fundamental resource that controls the processes of reconfiguration and multiplication of other resources, constitutes a platform of shared values and is fundamental for building trust in a company. The competitive advantage of knowledge-based academic enterprises comes from their unique knowledge, specific skills and research experience. These companies successfully bridge the gap in the creation of innovative business solutions and, above all, seek to obtain market acceptance for their offer. However, it is necessary to skillfully combine innovative ideas with effective governance and relevant funding sources.

Supporting the development of innovative academic companies and accelerating the process of commercialization of intellectual property may significantly contribute to the further integration of academics and practitioners, and indirectly increase the competitiveness of the Polish economy. The advanced technology of information processing and communication in addition contributes to a greater awareness of international business opportunities (Gómez-Gras et al. 2014).

3. KEY COMPETENCIES OF ACADEMIC START-UPS

Competencies can be considered crucial, if they increase the perceived value in the eyes of customers by providing them with substantial material and emotional benefits. In addition, the core competencies should apply not only to the present but also to the future activities of a company. The key competences of start-ups are undoubtedly located in the resources of knowledge, research experience and skilful use of these resources to create added value and value for customers. Knowledge is an essential resource needed for efficient planning, organizing and implementing all management processes in a modern enterprise. Current expertise and interdisciplinary knowledge in conjunction with the skill to develop them constitute a basis to build core competencies of a company, allow one to

design an appropriate organizational structure and the division of responsibilities, and make the right decisions, thereby reducing business risk. An important determinant for the undertaken actions is the knowledge of the behavior of competitors and changes in the environment, both direct and continuing. The management of knowledge is a complementary organizational process that directly affects and influences the growth of a company (Grudzewski & Hejduk 2004, p. 509).

Among the key competencies of start-ups, it is worth mentioning intangible assets, such as an ability to create a brand and a corporate image, customer relationship management through the reliability and credibility of information and intellectual capital to build a team. A company's ability to achieve competitive advantage is closely determined by customer trust towards its employees, its brand and its values. Knowledge and intangible assets are important in the process of building core competencies of a company. Thus, it is possible to state that knowledge becomes a major strategic resource on which to build competitive advantage in contemporary markets. The knowledge resources of an enterprise constitute its intellectual assets, being the sum of knowledge of individual employees and the teams of employees. These resources undergo constant changes, which are the result of the learning process of an organization (Skrzypek 2009, p. 145).

A very important factor that has an impact on the acquisition and enhancement of knowledge is experience along with a capacity for the analysis and synthesis of information gained by a team. Knowledge constitutes a certain amount of content (information and data) collected and recorded in the human mind, which is derived from both experience and the process of learning. By processing information stored in the mind and enriching it with new data through learning, people give it a new shape, gain experience, and create knowledge (Mikołajczyk 2003, pp. 204-205). Modern companies should create and acquire new knowledge, disseminate it and mobilize their current activities if they do not want to get defeated by competitors (Penc 2008, pp. 392-393).

In new economy knowledge is becoming increasingly important as it is fundamental to the value of manufactured products and the source in the creation of key competences of a company. ICT technology is today one of the most important factors shaping both the creation and the flow of knowledge. It has significantly influenced the access to information resources in a virtual environment and revolutionized the management of information and data within an organization. The measurable benefits of an open access to knowledge are certainly the quality of the test results submitted to the public, the evaluation of the conducted work, the impact on innovativeness and competitiveness of an organization and the execution of missions related to the promotion of knowledge in the society. Knowledge becomes extremely valuable when it settles in products, services, core competencies, business processes and a company's relationships with the environment.

The analyzed start-up with academic pedigree uses a wide range of ICT to provide other entities with new technological, information and communication solutions. The continuous increase in demand for advanced, specialized services and modern e-business solutions creates an opportunity for new innovative companies.

4. INNOVATIVE ICT SOLUTIONS OF THE POLISH COMPANY GLIP

Glip Ltd. is a young company from Poznan manufacturing multimedia touch platforms. The company was founded in 2012 by three men graduates of the Poznan Universities who, on the basis of interdisciplinary knowledge and experience related to the IT industry, marketing, finance and economics, have created a modern business model. Knowledge has become the basis for the creation of services that generate measurable values for customers. The purpose of their business is to create and promote innovative projects that will explore new opportunities and offer unique business solutions with the support of ICT. The company offers equipment based on the technology of touch, motion detection and holographic projection. The offer includes multimedia tables, touch totems and screens, as well as interactive floors and holographic pyramids (Glip Multitouch Solutions 2015). The equipment is available in a wide range of sizes and types tailored to individual projects. Glip also offers copyright software created per requests of different groups of consumers, freely customized and designed in accordance with customer's colors and company logo. The products are dedicated for

business customers, cultural and educational institutions and local government units. They are used in sales promotion, marketing activities, e.g. as parts of exhibition stands, surfaces for the promotion of sports clubs, hotels and showrooms. They are also widely used in entertainment, tourism and culture as interactive guides, sources of information and places of interactive fun.

Glip products are innovative, created on the basis of expertise and integrated devices supporting a variety of applications – ready-made or manufactured according to individual orders. The software functions on both Android and Windows systems and is tailored to touch environments. Glip's employees pay particular attention to visual and functional side of each of their applications. The team of entrepreneurial, ambitious and creative people who constitute Glip believe that understanding customer needs, partnership in business relationships and offering customized solutions tailored to the specifics of a particular industry is the basis for the value and effectiveness of each action.

GlipTable is a perfect tool for sales, product presentations and for the presentation of ideas, information sharing and also multimedia, science and entertainment playback. The multimedia table was first presented at the International IT Cluster Forum in September 2012 (Łopusiewicz 2012). Later it appeared at the Innovation Maze during the World Innovation Days. Glip media surfaces also appeared at the Game Arena fair during the Poznan Cartoon event, on the birthday of Geek Girls Carots and at Marketing and Technology Conference 2013. GlipTable has a 48-inch touch-sensitive surface with an ability to track more than 40 points of touch and a sound system, built-in Wi-Fi and Bluetooth. The device interface is based on Windows 7 operating system and allows several people to use it simultaneously. It allows comfortable surfing of the Internet, view images, specially prepared multimedia presentations and browse the detailed programs of events.

The significant impact on the development of academic start-ups and in the process of technological entrepreneurship has been made by business environment institutions. Glip received capital support from Poznan Science and Technology Park of the University Foundation under the name of Adam Mickiewicz within the framework of InQbator Seed project, co-financed by the European Union under the Innovative Economy Operational Program (Mam Startup 2013). It was a strong impetus for the development of large-format touch surfaces and the software offer.

The company has been working on developing new products and would like to implement innovative solutions based on the latest technologies. It creates new needs of customers and has already found applications for its devices regarding the arrangement of urban space. The latest idea is the concept of a modern outdoor media stop (shelter) which earns its own living (Fijałkowski 2014; Bełcik 2014). This innovation in the field of transport will be the first such solution in Poland. An interactive outdoor stop – a shelter equipped with screens – has been developed in cooperation with the manufacturer of car shelters – A2HM Company. In addition to basic information such as timetables, route change information, or the means of transport crossing sketch, the screens will be equipped with additional information and entertainment applications with an ability to carry out promotional activities. In order to improve the updating of timetables and the download of current information about the selected connections, cooperation with City-Nav has been undertaken. This company is the creator of application 'jakdojade.pl', which is very popular in Poznan. It is the innovative public transport journey planner that allows one to check public transport timetables, find stops and plan an optimal journey.

The shelter is equipped with cameras which will be useful for travelers in situations when they need to summon help. In addition, the screens are equipped with a text magnifying function. Additional features include a map and an interactive guide to the sights and the guide-book about cultural events, as well as an electronic bulletin board especially attractive for local advertisers. External screens mounted on the shelter can serve as advertising media, and thanks to a Kinect sensor advertisements can be interactive and change several times a day. The type and the complexity of applications will determine the cost of the shelter.

Modern technologies and information-advertising applications are to make city bus stops more attractive and also bring economic benefits for the Municipal Transport Company – MPK Poznan Ltd. Glip will act as a manufacturer and supplier of the software. Transforming the concept into a coherent

and valuable application, service or devices, created on the basis of professional consulting and support for the project in this phase of its implementation is a challenge faced by the young entrepreneurs of Glip.

5. CONCLUSIONS

Every enterprise developing itself as a knowledge-based organization needs to cultivate a unique skill set to match its goals, the competitive potential and the microenvironment. This requires an array of competencies that go beyond what any single organization can create. Organizations will need to link into a network of knowledge resources. The existing structure of linear thinking and action are being replaced by network structures, forcing decision makers and employees to adopt innovative and creative attitudes (Perechuda 2013, p. 9).

Innovations have become the key to competitiveness and business success. Competition in the global economy has increasingly become knowledge-based and this mainly concerns the ICT services. The existence of global competition, global products and constantly shortening their life cycle necessitates the continuous implementation of technological, marketing and organizational innovations as well as those in the methods of management. This is a necessary condition for the development of competitive advantage on both domestic and international markets. The best chance to acquire competitive remains in the hands of those companies whose decision makers and employees with expert knowledge are able to ensure the effective implementation of new technologies in products and services they manufacture.

Devices and applications created by Glip – individually adapted and modified – support interactive and engaging business communication and take into account the realities of a rapidly growing B2B market. The company implies innovative solutions based on knowledge and experience of IT professionals. Glip's first place in the Poznan Leader of Entrepreneurship 2014 competition confirms that interdisciplinary knowledge, creativity and commitment of the team and a shared vision of the present and the future of the company all provide an opportunity to achieve success.

REFERENCES

Ahmad, N & Seymour, RG, *Defining entrepreneurial activity: Definitions Supporting Frameworks for Data Collection*, OECD, viewed 20 February 2015,

<http://www.oecd.org/std/business-stats/39651330.pdf>.

Badzińska, E 2014, 'Indywidualizacja rozwiązań ICT w praktyce gospodarczej na przykładzie start-upów akademickich', *Business Informatics*, no. 2(32), pp. 24-32.

Bełcik, A 2014, 'Przystanki naszpikowane technologią', *Puls Biznesu*, 13 October, p. 16.

Birley, S 2002, 'Universities, Academics and Spinout Companies: Lessons from Imperial', *International Journal of Entrepreneurship Education*, no. 1, pp. 133-153.

Chyba, Z & Grudzewski, WM 2011, *Przedsiębiorczość akademicka w Polsce. Osiąganie przewagi konkurencyjnej w wyniku komercjalizacji technologii*, Wyższa Szkoła Zarządzania i Prawa w Warszawie, Warszawa.

Fagerberg, J 2005, 'Innovation: A Guide to the Literature', in J Fagerberg, DC Mowery & RR Nelson (eds.), *The Oxford Handbook of Innovation*, Oxford University Press, Oxford, pp. 1-27.

Fagerberg, J, Mowery DC & Nelson RR (eds.) 2005, *The Oxford Handbook of Innovation*, Oxford University Press, Oxford.

Fijałkowski, P 2014, 'Multimedialny przystanek stanie w Poznaniu', *Gazeta Wyborcza*, 18 October, p. 4.

Glip Multitouch Solutions, viewed 04 March 2015, <http://glip.pl/index.html>.

Grudzewski, WM & Hejduk, I 2004, 'Wpływ zarządzania wiedzą na wzrost wartości przedsiębiorstwa', in E Urbańczyk (ed.), *Strategie wzrostu wartości przedsiębiorstwa. Teoria i praktyka gospodarcza*, Uniwersytet Szczeciński, Szczecin 2004, p. 509.

Guliński, J & Zasiadły, K (eds.) 2005, *Innowacyjna przedsiębiorczość akademicka – światowe doświadczenia*, PARP, Warszawa.

Hejduk, I (ed.) 2005, *Wiedza jako źródło przewagi konkurencyjnej polskich przedsiębiorstw*, IFGN SGH, Warszawa.

Hejduk, I (ed.) 2013, *Przedsiębiorczość nowych mediów – analiza modeli biznesowych firm internetowych*, Oficyna Wydawnicza SGH, Warszawa.

Gómez-Gras, JM, Pastor-Ciurana, JT, Galiana-Lapera, D, Mira-Solves, I & Verdú-Jover, AJ, *Indicators of academic entrepreneurship: monitoring determinants, start-up activity and wealth creation*, Universidad Miguel Hernández de Elche, GlobalStart, viewed 14 June 2014,

<ftp://ftp.cordis.europa.eu/pub/paxis/docs/indicators_acad_entrepreneurship.pdf>.

Koźmiński, A & Jemielniak, D 2008, *Zarządzanie od podstaw*, Wydawnictwa Akademickie i Profesjonalne, Warszawa.

Kubiak, K 2011, 'Transfer wiedzy w koncernach high-tech', in MK Wyrwicka (ed.), *Foresight Sieci gospodarcze Wielkopolski – Scenariusze transformacji wiedzy wspierające innowacyjną gospodarkę. Raport końcowy*, Wydawnictwo Politechniki Poznańskiej, Poznań, p. 36.

Laureat w kategori start-up 2014, Web page of Poznan, viewed 20 February 2015, <http://www.poznan.pl/mim/main/laureat-w-kategorii-start-up-glip-sp-z-o-o,poi,4680/laureat-w-kategorii-start-up-glip-sp-z-o-o,55210.html>.

Lachiewicz, S & Matejun, M 2010, 'The role of External Environment in Creating Technology Entrepreneurship in Small and Medium-Sized Enterprises', *Management*, vol. 14, no. 1, p. 187-202.

Łopusiewicz, A 2012, *Stół multimedialny GLIPTable na Międzynarodowym Forum Klastrów IT*, viewed 04 March 2015, <http://mamstartup.pl/pressroom/2767/stol-multimedialny-gliptable-na-miedzynarodowym-forum-klastrow-it>.

Mam Startup 2013, *InQbator Seed inwestuje w interaktywne stoły z Poznania*, viewed 04 March 2015, <http://mamstartup.pl/pressroom/4583/inqbator-seed-inwestuje-w-interaktywne-stoly-z-poznania>.

Matusiak, KB (ed.) 2011, *Innowacje i transfer technologii. Słownik pojęć*, PARP, Warszawa.

Mikołajczyk, Z 2003, *Zarządzanie procesem zmian w organizacjach*, Górnośląska Wyższa Szkoła Handlowa im. W. Korfantego, Katowice.

Nicolaou, N & Birley, S 2003, 'Academic networks in a trichotomous categorisation of university spin-outs', *Journal of Business Venturing*, no 18, pp. 333-359.

Penc, J 2008, 'Tworzenie organizacji opartej na wiedzy', in S Lachiewicz & A Zakrzewska-Bielawska (eds.), *Teoria i praktyka zarządzania rozwojem organizacji*, Wydawnictwo Politechniki Łódzkiej, Łódź, pp. 392-393.

Perechuda, K 2013, *Dyfuzja wiedzy w przedsiębiorstwie sieciowym. Wizualizacja i kompozycja*, Wydawnictwo Uniwersytetu Ekonomicznego we Wrocławiu, Wrocław.

Skrzypek, E 2009, 'Wiedza jako czynnik sukcesu w nowej gospodarce', in E Skrzypek & A Sokół (eds.), *Zarządzanie kapitałem ludzkim w gospodarce opartej na wiedzy*, Instytut Wiedzy i Innowacji, Warszawa, p. 145.

Szirmai, A, Naudé, W & Goedhuys, M 2011, *Entrepreneurship, Innovation, and Economic Development: An Overview*, Oxford University Press, Oxford.

Wickramasinghe, N & von Lubitz, D 2007, *Knowledge-Based Enterprise: Theories and Fundamentals*, IGI Global Publishing, Hershey.

Zacher, LW 2007, *Transformacje społeczeństw od informacji do wiedzy*, C.H. Beck, Warszawa.