Monika Pietrzyk, Piotr Winiarski

The application of CRM type systems in scientific marketing - prospects for effective cooperation of science and industry

Marketing Instytucji Naukowych i Badawczych nr 5(6), 71-88

2012

THE APPLICATION OF CRM TYPE SYSTEMS IN SCIENTIFIC MARKETING - PROSPECTS FOR EFFECTIVE COOPERATION OF SCIENCE AND INDUSTRY

Monika Pietrzyk, Ph.D.
Research Center for Einstein Physics
Free University, Berlin, Germany
Piotr Winiarski, M.Sc. Eng.
Poland Business Center Berlin, Germany

Introduction

Scientific marketing is an area which supports cooperation between science and industry. In some countries this kind of cooperation is already quite advanced, while in others, like Poland, it has only started developing. However, a lot can be done to improve the flow of information and technology from Polish science to Polish industry and the other way round, as well as to inspire new scientific research with demand on the national and foreign market (export of services). Insufficient cooperation results above all from the lack of mutual understanding of the manner of functioning. Scientific units hardly ever have independent marketing units within their structures. At the same time representatives of industry don't know who they should contact to start cooperation. The managements of industrial companies often don't regard their own marketing departments as significant, even though they generate further orders and can provide information about trends and innovations. In reality, the difference between the cooperation of science and industry and a standard B2B relation (business to business) between companies is not great. Thanks to this similarity it is possible to use the CRM system, which appropriately applied can contribute to raising profits by addressing the needs of the client (understanding market needs by scientific institutions, on the other hand the industry can skilfully present a problem). In this article we suggest paying attention to the application of CRM in the context of scientific marketing. Our current knowledge suggests that such solutions have not been yet implemented yet and if they exist, they concern only a small proportion of scientific institutions and the industry. Scientific institutions take advantage of CRM only in the context of databases or „address lists" used for contact with current, former and future students and scientific employees, but not in the context of cooperation with the industry. Such systems could be modelled and installed at the same time in scientific institutions, in the industry or in consulting companies dealing with establishing cooperation between various organizations with the industry.

This paper is devoted to scientific marketing and the prospects for its effective development thanks to applying a modern CRM system which manages relations with the client. At the beginning certain definitions and information about scientific marketing will be discussed. Then the CRM system will be discussed. At the end of the article the focus will shift to the possibility of applying CRM system in scientific marketing.

Scientific marketing

Scientific marketing is an area which is aimed at promoting cooperation between science and industry. It is associated with such issues as innovation, commercialization, technological offer and technology transfer. Below definitions of these terms are presented:

Innovation

Innovation means introducing an invention to the production process. In the contemporary world innovative activity is regarded as an essential condition for growth, as well as economic and social development. For this reason, it is currently in the centre of attention, especially in countries with the highest rates of economic growth.

Commercialization

The basic goal of commercialization is to transfer the results of research or a particular technology to the market. An effective process of commercialization in its most classic form, that is, the sale of research results by scientific units to companies requires cooperation between at least two partners - scientific and research units and companies. Nevertheless, in order to raise the efficiency, a third partner often takes part in the process. The third partner acts as an intermediary in the exchange of knowledge between science and industry. This is the role played by technology transfer institutions representing public institutions or private consulting companies, which have experienced engineers and scientists in their teams.

On the market there are also more and more „spin-off" and „spin-out" companies, which are companies established by scientists in order to commercialize research results. In the first kind of companies an employee or employees of a laboratory, a university or other scientific unit become independent and do not take advantage of the resources of their parent institution. „Spin-outs" are companies which, in contrast to „spin-off" ventures, are permanently attached to their parent institutions on the operative or capital level.

Technological Offer

Technological offer serves a very important role both as an element of the market of technology and the innovative and technology transfer process. Its quality, form and content determine whether the proposed innovation can attract the attention of the recipient and whether it will be accepted and implemented by the recipient. Technological offers are created in the process of innovation and appear at various stages of the project.

In theory, the most often applied models of the innovative process are:

- The traditional model stimulated by science, which illustrates the manner of creating innovations resulting from applying basic research carried out in research and scientific institutions in practice.
- The model stimulated by the market, in which the source of innovation is the needs of companies, which are to be satisfied by the results of applied research.
- The combined model (science + market) takes into consideration the interaction between social needs, the needs of companies, their technical and technological capacity and the creator of the technology. This model is illustrated by the activities of such institutions as centres of advanced technologies, technology platforms, or innovative clusters. In this model, thanks to constant cooperation between science and the economy, the technological offer can be created at every stage, from the first contact, through development work, to implementation, marketing and sales.

Preparing technological offers enables the offer to be catalogued for the industry and gives the opportunity to react faster and more easily to the emerging needs of companies. Many universities conduct projects aimed at identifying and publishing offers in a systematic way on their websites and in catalogues. This makes it much easier for potential clients to find the information they are interested in and it allows universities to more effectively manage their research and development work and its results

Technology transfer

Transfer of technology includes exchange of (on defined terms), technological and organizational knowledge, taking place between those who have the knowledge and those who need the knowledge. In every technology transfer process there are two sides - the provider of technology and its buyer-making a certain deal. In the most traditional understanding, the transfer of technology takes place between the scientific-research sphere (universities, universities of technology, research and development units) and the business sphere (industrial companies). However, more and more often there is yet another party - institutions dealing with technology transfer, acting as intermediaries in the exchange of knowledge (e.g. technology transfer centres, academic business incubators, science-techno- logy parks, national and international support networks and commercial consulting companies).

Obstacles hampering cooperation

Cooperation between science and industry makes it possible for (usually underfinanced) scientific institutions to obtain additional funds, it creates the possibility of directing scientific research so that it can more realistically model reality, and it also gives the opportunity to confirm the theoretical presumptions of some technical issues in practice. On the other hand, the economy, in order to develop effectively, needs scientific research (this primarily concerns companies that do not have their own laboratories, which is typical in Poland). For this reason effective cooperation between science and industry would be the perfect solution.

Unfortunately, the experience in cooperation between scientific centres and industrial companies is limited, especially in a post-communist country like Poland (the communist system in Poland collapsed in 1989, but the destructive remnants of the system can still be felt in all spheres of life).

Studying statistical data concerning innovative activity, it is possible to notice a deep and alarming gap between the European Union and such powerful centres of research and development as USA and Japan (these countries have the best possible regulatory environment supporting the process of commercialization of scientific research and providing the opportunities for protection of intellectual property[1]). The indicator of efficiency in USA and Japan, compared to the European Union amounts to 49% and 40%, respectively (data from 2010[2]). I). In this respect the leader in the European Union is Sweden (innovation indicator for 2011 is 0.755[3]), followed by Denmark, Finland, Germany and the UK. Poland which is placed near the bottom of the ranking (innovation indicator of 0.296) is ahead of only Romania, Lithuania, Latvia and Bulgaria. One of the elements influencing innovation is „intellectual capital" (knowledge, experience, technologies, relations with customers and skills) which in the case of Poland is alarmingly low (indicator of 0.087) in comparison to the EU average (indicator of 0.506). The only element which can be regarded as positive in this context is „personnel" (indicator of 0.38 in Poland, compared to the EU average of 0.440).

In Poland only about 0.74% of GDP is spent on research activities. In comparison, the average for the whole European Union is 2.09% (the biggest proportion of GDP is spent on science in Finland - 3.87%, the lowest in Romania - 0.47%). In Japan, South Korea and the USA these proportions are even higher and they are 3.45%, 3.36% and 2.79% of GDP, respectively (data for 2010[4] – here the indicator „R&D expendi- ture as a percentage of GDP" is used). Also, the scale of national spending on research and development (GERD) in Poland, per inhabitant and per researcher are far from the level typical in highly developed countries[5]: The GERD indicator per inhabitant in Poland is eight times lower than the average indicator for the EU and seven times lower than the average in the European Union. In Poland the proportion of spending on one researcher is the lowest in the whole European Union and four times lower than on average in the European Union.

Moreover, in highly developed countries the biggest share of spending on science comes from non-budget sources, mainly from companies. At the same time, in Poland funds from the state budget are dominant and constitute almost 2/3 of total spending on science. Unfortunately, such proportions are typical of less developed nations[6]. Moreover, in highly developed countries 90% of funds allocated to science are spent on research and development and 10% on equipment. In Poland this proportion is just the opposite[7].

1 BBC, EU sees alarming innovation gap for European firms, 01.02.2011, http://www.bbc.co.uk/news/world-europe-12334091
2 Inno Metrics, Innovations Union Scoreboard 2010, EU 2011.
3 Pro Inno Europe, Innovations Union Scoreboard 2011, EU 2012.
4 Eurostat, Eurostat pocketbooks: Science, technology and innovation in Europe, 2012 edition, EU 2012.
5 J. Kozłowski, J. Rychlewski, R. Sławeta, M. Wanke-Jakubowska, M. Wanke-Jerie, Stan nauki i techniki w Polsce, KBN, Warszawa 1999.
6 Ibidem.
7 P. Musiałek, T. Romanowski, Rozmowa z dr. Tomaszem Geodeckim, wykładowcą Uniwersytetu Ekonomicznego w Krakowie, współautorem raportu pod red. J. Hausnera, Kurs na innowacje. Jak wyprowadzić Polskę z rozwojowego dryftu? 08.11.2012, pressje.salon24.pl/462152,wywiad-o-innowacyjnosci-w-polsce.

With regard to the cooperation between scientific centres and companies, statistical data show that only about 57% of scientific centres in Poland have started cooperation with companies - this is confirmed by the fact that Poland is placed 64th (among 136 countries) in the ranking of cooperation of universities with industry - The Global Competitiveness Report 2010-2011)[8]. In this respect the position of companies is even worse[9].

One of the obstacles hampering this cooperation are the different languages used by these two spheres. For example, the word „spray" used in science is commonly understood as „a spray container", even though the word denominates „small particles present in the atmosphere", the scientific term „theory" is commonly perceived as „speculation" rather than as a „method of scientific understanding" of a particular problem. The word „error" is understood as „incorrectly done", even though from the scientific point of view it is about the „difference between the actual numerical value and the estimated value" [10,11].

According to representatives of the scientific sphere in Poland, the obstacles hampering cooperation are: lack of interest from companies and lack of appropriate incentives from the state, limited tradition of cooperation between universities and private companies, shortage of appropriate equipment for commercial research, shortage of people and institutions helpful in commercialization, difficulties associated with unclear and constantly changing law and bureaucracy, and also the fears of scientific employees associated with starting cooperation with big corporations[12,13]. For companies one of the barriers is the lack of profitability of cooperation and the fact that scientists have little knowledge of commercial realities.

Even though it can be assumed that the Polish economy has been fully transformed into a free market system following the fall of communism in 1989, Polish universities have efficiently managed to avoid the necessary and imminent changes:

„Polish science is divided into very small pieces, closed to the environment, resistant to reforms; it is not interested in the surrounding environment. Polish institutions do cooperate with industry, but when you look closer, it turns out that they cooperate not with innovative companies developing new technologies, but with partially state-owned concerns, where certain socialist habits are still common. It is obvious that this kind of cooperation is different in character than developing innovations and new technologies, what is most important here are aspects originating from the time of communism," Mirosław Miller, Professor of the Wrocław University of Technology, the President of the Wrocław Research Centre EIT+ [14].

8 J. Wolszczak-Derlacz, A. Parteka, Produktywność naukowa wyższych szkół publicznych w Polsce - bibliometryczna analiza porównawcza, Sprawne Państwo, Program Ernst & Young, Warszawa 2010.
9 Najlepsze praktyki w zakresie współpracy ośrodków naukowych i biznesu przy wykorzystaniu środków z UE, Warszawa 2008.
10 T. Dorigo, Getting Science Through: Misunderstood Terms In Science Communication, 24.10.2011.
11 D. E. Simanek, A Glossary of Frequently Misused or Misunderstood Physics Terms and Concepts, 2004, http://www.lhup.edu/~dsimanek/glossary.htm
12 Jagiellońskie Centrum Innowacji Sp. z.o.o., Raport nt. barier komercjalizacji wyników badań naukowych w dziedzinie life science w Małopolsce, 2007.
13 D. Markiewicz (ed.), Komercjalizacja wyników badań naukowych krok po kroku, Kraków 2009.
14 II Kongres Innowacyjnej Gospodarki, Raport o Innowacyjności Polskiej Gospodarki 2011, Rozdział 6, „Osobiste rekomendacje członków zespołu badawczego" , Uczelnia Vistula, 2011.

„The current system of support for innovation in Poland is anachronistic and ineffective. It resembles the socialist economy. There are no clear criteria for measurement and a strategy/vision of the target. Various interest groups which don't necessarily create added value for the economy fight for money" - Tomasz Czechowicz, managing partner and main shareholder of MCI Management S.A., remarks[15].

In Poland the scientific sphere itself has to cope with many problems. Recently, the Supreme Audit Office (NIK) investigated the utilization of funds for science in the years 2009-2011[16]. The results of this investigation were shocking: in Poland financial assets are not concentrated on major research of essential value for the society, economy and technological development of the country; most of the scientific projects financed by the Ministry of Science and Higher Education are „small research programs not associated with each other, doctoral studies". They are usually targeted at the development and maintenance of scientific staff.

As the results of NIK's investigation[17] sshow, the results are also not impressive with regard to publications in prestigious scientific periodicals from the ISI Master Journal List[18]. In terms of the number of publications in these magazines Poland occupies a comparably high 18th position and its share in the global pool amounts to 1.02% (in comparison, in USA it is 37.41%, in UK 9.7%, 8.70% in Japan and 8.07% in Germany), in terms of annual number of publications per 1 million inhabitants (average for the years 1993-1997) Poland is in the same group of nations as Croatia, Bulgaria, Russia and Portugal and occupies 39th place[19]. Moreover, even the best universities in Poland, in terms of the number of publications, that is, the Jagiellonian University and the Wrocław University of Technology (where the publication ratio for 2008 amounted to 0.54) are no match for the best universities in the European Union, e.g. the University of Helsinki can boast a ratio of 1.4. In the scientific units surveyed by NIK the average number of publications in scientific magazines distinguished by Journal Citation Reports (JCR) per one scientific employee over a year was very low and ranged from 0.5 to 1 in institutes of the Polish Academy of Sciences (PAN), from 0 to 0.2 in research institutions and scientific and research centres and from 0.1 to 0.5 at universities[20]. Aggregated bibliometric indicators from SCImago 2007 JCR confirm these observations: the number of publications per number of employees (average value for the years 1996-2008) and the number of citations in Poland is low and amounts to 0.37 and 6.6, respectively. At the same time in the UK these figures are 0.59 and 14.8, respectively and in Switzerland – 1.16 and 18.6, respectively.

Moreover, only a few Polish scientific journals have managed to gain international renown: only 59 magazines edited in Poland (out of a total of 6598) have made it to the database of JCR-Science in 2008 and only 13 among them have an impact factor higher than 1. In the rankings of most often quoted scientists for the years 1981-1999 (according to Thomson Reuters - ISI Highly Cited) only two scientists

15 Ibidem.
16 Polityka/PAP, TR, „Polska nauka ma się źle, miażdżący raport NIK," 14.11.2012, http://m.onet.pl/wiadomosci/kraj,zw0q8.
17 J. Kozłowski, J. Rychlewski, R. Sławeta, M. Wanke-Jakubowska, M. Wanke-Jerie, Stan nauki..., op. cit.
18 ISI Master Journal List, http://ip-science.thomsonreuters.com/mjl/
19 J. Kozłowski, J. Rychlewski, R. Sławeta, M. Wanke-Jakubowska, M. Wanke-Jerie, Stan nauki..., op. cit.
20 M. Kosmulski, „Poprzeczka listy filadelfijskiej," onet.pl / Tygodnik Powszechny, 10.01.2012, http://tygodnik.onet.pl/1,72518,druk.html

were from Poland[21].

In addition to this, according to *The Times Higher Education World University Rankings 2012-2013* powered by *Thomson Reuters* no Polish scientific institution is among the top 100 best European universities; the University of Warsaw (UW) and the Jagiellonian University (UJ) are located in the 351-400 range in the ranking[22]. According to another ranking, namely: *Higher Education Evaluation and Accreditation Council of Taiwan Performance Ranking of Scientific Papers for World Universities*, the two above-mentioned Polish universities occupy positions 364 (UW) and 353 (UJ) among 500 best universities[23].

Poland is not doing well with regard to patents either: according to the patent database of OECD for 2007 in Poland there were only 5 patents for every million inhabitants, which is well below the OECD average which amounted to 100 patent applications per million inhabitants. When we compare this result with patenting activities of highly innovative European countries, such as Germany (257 applications per one million inhabitants this year), Finland (242) or Switzerland (369) the difference is staggering[24].

Unfortunately, in Poland the level of unemployment among people with higher education is very high (7.1%). This is good evidence for the fact that the potential of an educated workforce in Poland is to a large extent wasted[25].

With regard to the conditions for doing business, Poland's position is also very poor: in the *Doing Business ranking*, Poland is number 70, Czech Republic is number 63, Hungary 46, Estonia 17 and Lithuania occupies 24th place. Italy and Greece placed lower, but this is mainly due to the economic crisis. The number of procedures and the time needed to launch a company - in Poland it takes 32 days, in the Czech Republic it takes 20 days, in Italy 6 days and in Spain 47 days. These are the barriers that make it impossible for entrepreneurs to run their normal activities and especially introduce innovations. Unfortunately, when we look at other indicators, the situation is even worse. Getting a construction permit - 164th place in the world among 180 countries. In this ranking Poland is behind Burkina Faso and far behind more developed nations. Bulgaria placed 119th, Italy 92nd, Estonia 24th. Another important indicator is the indicator of execution of contracts. It tells us how much time a court needs to satisfy legal claims. In this respect Poland placed 72nd with an average of 830 days of court proceedings[26].

One of the few positive phenomena in Poland is a comparably young society: the average age in Poland is 37.7 (in the EU the youngest country is Cyprus and the oldest is Germany with average ages

21 J. Wolszczak-Derlacz, A. Parteka, Produktywność naukowa..., op. cit.
22 The World University Rankings,
http://www.timeshighereducation.co.uk/world-university-rankings/2012-13/world-ranking
23 J. Kozłowski, J. Rychlewski, R. Sławeta, M. Wanke-Jakubowska, M. Wanke-Jerie, Stan nauki..., op. cit.
24 J. Wolszczak-Derlacz, A. Parteka, Produktywność naukowa..., op. cit.
25 G. Węgrzyn, Zatrudnieni w nauce i technice a innowacyjność gospodarki," publikacja IV Konferencji Naukowej z serii „wiedza i innowacje pt. „Fundusze unijne i przedsiębiorstwa w rozwoju nauki i gospodarkim," Uniwersytet Jagielloński, Kraków 2008.
26 P. Musiałek, T. Romanowski, Rozmowa z dr. Tomaszem Geodeckim, wykładowcą Uniwersytetu Ekonomicznego w Krakowie, współautorem raportu pod red. J. Hausnera, Kurs na innowacje. Jak wyprowadzić Polskę z rozwojowego dryftu? 08.11.2012, pressje.salon24.pl/462152,wywiad-o-innowacyjnosci-w-polsce.

of 36,2 and 44,2, respectively[27]). Poles also constitute one of the most educated societies in Europe. The share of workforce employed in the science-technology sphere aged 25-34 in the population currently amounts to 43.8 in Poland and only to 30.6 in the European Union. The share of population aged 30-34 with higher education amounts to 37 in Poland and in the EU it amounts to 35, the share of population aged 20-24 with secondary education amounts to 91 and 79, respectively[28]. The number of scientific employees, in comparison to the total number of employees in Poland is also at a high level, similar to Italy, Spain and Austria, but higher than in Hungary, Czech Republic, Portugal, Greece, Turkey[29]. In Poland there are 457 higher education institutions (data for the year 2009/2010[30]): 131 public schools, 17 universities and 22 higher technical schools (universities of technology, technical academies) as well as 318 non-public universities. They offer over 100,000 jobs for academic teachers.

To sum up, scientific units in Poland do not generally achieve significant scientific effects in the form of publications in prestigious scientific magazines, quotations of their publications, patents for inventions and other intellectual property rights, as well as implementations of scientific research results and revenues derived from this fact[31]. There is comparably little scientific work of fundamental significance, as well as complete technical-technological projects suitable for immediate application in practice[32]. There are few patent applications. Moreover, very little money is spent on research and development work and of this 2/3 of the funds come from the state budget and the rest comes from industry. At the same time, this proportion in the most developed nations is just the opposite. Also characteristic for Poland is the weak level of cooperation between universities and companies in the area of technology transfer and commercialization of knowledge.

The human resource potential is actually Poland's only strong point. The level of secondary and higher education in Poland is relatively good. This means that in Poland there is still a very strong untapped potential in the area of facilitating cooperation between science and industry. The results of this facilitated flow of information may be very good for both sides – science and business – and thus for the whole economy (here the words of Stanisław Staszic, a pioneer of the development of science and technical education in Poland fit in very well: *„Skills are a vain invention, merely a construct of the mind or a pointless play, until they are applied to bring benefits to nations"* [33]).

The concept of scientific marketing focusing on the client can help build a bridge between science and industry. Here, a well prepared CRM system, which supports managing customer relations, can help. CRM makes it possible to define potential clients from the point of view of a service or product that can be the subject of a transaction. Preparing this forces both scientific units and companies to define their

27 Eurostat, European Commission, Population structure and ageing, 2011, http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Population_structure_and_ageing
28 Pro Inno Europe, Innovations Union Scoreboard 2011, EU 2012.
29 J. Kozłowski, J. Rychlewski, R. Sławeta, M. Wanke-Jakubowska, M. Wanke-Jerie, Stan nauki..., op. cit.
30 Wikipedia, Uczelnie w Polsce, 2012, http://pl.wikipedia.org/wiki/Uczelnie_w_Polsce.
31 M. Kosmulski, Poprzeczka listy filadelfijskiej, onet.pl / Tygodnik Powszechny, 10.01.2012, http://tygodnik.onet.pl/1,72518,druk.html
32 J. Kozłowski, J. Rychlewski, R. Sławeta, M. Wanke-Jakubowska, M. Wanke-Jerie, Stan nauki..., op. cit.
33 P. Wolański, Jak zreformować Polską Naukę?, PAUZA, Kraków 2008.

mission, strategy, operative goals, and subject of activity, and structuring the most important elements of an institute towards arranging and distinguishing between the most important departments in an institute/products of a company which provide the greatest share of income.

CRM (Customer Relation Management)

CRM is a system supporting management of relations with customers. The basis for the system is the concept of administering a company or an institution based on excellent knowledge about potential customers and adapting the activities of an organization to their needs. CRM is a durable, constantly evolving process, which requires departing from the traditional business model focusing on company organization and focusing on building lasting relations with the client in order to gain his loyalty[34]. Statistical data show that attracting new clients is five times more expensive than keeping current ones[35,36], and for this reason the main rule should be an individual approach to contacts with clients, nurturing them, learning about their needs, preferences, level of satisfaction and plans for the future - everything in order to create a strong connection with the client and gain their loyalty. The company should focus on 20% of its most important clients (that is, those who generate the biggest profits), taking care of them so that they feel comfortable and trust the company - this way it is possible to achieve savings of 80%-90% on the costs of sales and marketing[37].

Thus, in the CRM system client information is very important: it is necessary to know their individual needs and know what they like and what they dislike. To this end, it is necessary to collect data about them and register the history of contacts. However, doing this for a large number of clients is not an easy option; it is necessary to have intelligent software allowing entry and analysis of data that cannot be presented in the form of numbers. CRM is something more than just standard „back office" software: it makes it possible to collect and analyze knowledge of clients and the market, group clients, and define their preferences. CRM also makes it possible to react quickly to changing client needs and manage these needs efficiently. An important element of the CRM system is the possibility to raise work efficiency within a company. Using the database of a CRM system, a marketing specialist is able to take into consideration more factors than is possible in the traditional way and design profits over the time span of many years and not only one campaign. Currently, in the age of globalization, only companies working in real time and which can meet the desires of clients fastest and most efficiently will survive on the market. The CRM system guarantees such fast and efficient functioning.

CRM systems appeared on the market in highly industrialized countries in the early 1980's, while in Poland, due to the technological backwardness associated with the communist system, they started functioning only in the second half of the 1990's.

Unfortunately, statistics show that implementations of CRM systems are successful in only 30-50% of cases. This is associated not with the application of CRM itself, but with the flawed process of implemen-

34 MCX Telecom Spółka z ograniczoną odpowiedzialnością S.K.A. White Paper, Co warto wiedzieć o CRM?.
35 A. Binsztok, Obsługi klienta z perspektywy nowoczesnych rozwiązań w zakresie informacyjnych technologii, NTiZ 2006.
36 SPSS White Paper, Badania satysfakcji klientów jako metoda osiągania przewagi konkurencyjnej.
37 A. Stachowicz-Stanusch, M. Stanusch, Zanim zaczniesz wdrożenie CRM, Modern Marketing nr 11-12, 2002.

tation of the CRM system. In order to avoid such mistakes, it is necessary to understand that CRM is not a technology, but a culture of organization which is mainly supposed to serve the customers more effectively and raise profits. Implementing CRM is not just about installing software, but also about changing an entire organization's way of thinking. The process of CRM implementation affects many internal issues and has a huge impact on the company's interaction with its external environment. Thus, it is associated with high risk and the implementation requires diligent preparation and planning for all activities.

Factors which determine the failure or success of the implementation of a CRM-class solution:

- understanding that CRM is not merely technology and classic software, but also a system that introduces changes to the whole company. The decision to choose the system and use it is not a task for the IT department, but for the management of a company.
- defining the company's needs and the direction of future development deliberately,
- defining the goals of implementation, which must be coherent with the plans of the company and its business goals, both short- and long-term goals of implementation, both internal (growth of efficiency in sales, marketing and service - it is necessary to identify weak points, e.g. whether employees waste time on unnecessary administrative tasks which could be avoided thanks to proper organization) and external targets (e.g. improving work on customer complaints, preparing offers more efficiently - everything in order to improve the connection with the client, satisfying their needs and eventually increasing sales) should be taken into consideration,
- deciding what kinds of clients are most important for the company,
- convincing the employees that the introduction of a CRM system makes sense - they will also actively participate in the implementation of the system,
- thinking about the possibilities and manner of integration of a CRM system („front-office" type) with the „back-office" (applications for background activities: production, accounting, staff, etc.) applications already existing in a company.

If the above-mentioned requirements are satisfied, it is possible to count on success in implementation of a CRM system:

- boosting sales and adequate growth of revenues,
- saving on costs of marketing thanks to the opportunity to look into the marketing campaign in real time. Better cost management using the array of analysis possibilities.
- saving time thanks to improved tools for the reporting and consolidation of data, as well as automation of reporting,
- serving, keeping the current client, satisfying their needs, boosting their loyalty and attracting new clients.

CRM can be used in three different ways. Most often it is used to collect data concerning the client (oCRM - operative segment: sales, marketing, service), which facilitates more efficient operation

and insight into the history of contacts with clients. The second and most important thing is that CRM systems are tools for data management (aCRM - analytical segment: bulk databases, processing and analysis of data) which make it easier to identify the preferences of clients and plan future marketing activities on this basis. CRM systems are also a useful system for automation of contacts with clients (kCRM - communication segment: sending series of e-mails or other information to the clients).

The CRM system to a large extent also depends on the type of activity a company pursues. For the B2C model (business to customer, e.g. mail-order companies, finances, tourism, energy sector, telecommunications) databases are usually highly developed and client service is based mainly on call centres. At the same time B2B (business to business, e.g. machine building) requires smaller databases and client service is carried out directly by companies without the participation of call centres.

The company represented by one of the authors (P.W.) is currently at the stage of testing several CRM systems that could help organizations or companies lift management of customer relations and potentially interested from the level of an Excel (MS) table or Outlook (MS) to a more intelligent and effective level as that of CRM, which can be an excellent tool for achieving strategic and operational development in a company, as well as a research unit, which in turn would find it easier to define the potential client/contractor from the industry and the other way round.

There are a number of important elements important for the choice of CRM software[38]:

- it is necessary to investigate the identity of the provider of software - his experience, history, position, achievements, awards and certificates on the market,
- does the functionality of applications satisfy the company's priority needs:
  - what size of company is the system designed for,
  - what kind of register does the system have (e.g. are there fields important for the company and is it possible to add further fields),
  - how flexible is the modelling of sales processes,
  - is it possible to define various scenarios for trade contacts for particular products or sales markets,
  - what possibilities of analysis and sales planning does the system provide,
  - is it possible to measure the effects of a marketing campaign,
  - have special scenarios, such as the emergence of a crisis in the company, or on a local or global market, been taken into consideration,
- what are the possibilities of taking burdens off employees,
- are advanced technologies used (e.g. the possibility of using the internet, working out of office),
- can the system cooperate with the „back-office" applications already existing in a company,
- is it a general system or a system focused on a particular branch of industry,
- what technology (operating system, database system, software language) is used,
- does the system guarantee security of company data,

38 P. Zakrzewski, Jak się przygotować do wdrożenia CRM?, Modern Marketing nr 7, 2001.

- does the provider include maintenance and additional offers,
- price of the product.

On the German-speaking market there are over 200 service providers such as: SAP, Microsoft, Sage Oracle/Siebel. In Poland the number of offered systems and the number of providers is incomparably lower. An interesting alternative are programs competing with Microsoft, namely Open Source. Here, some of the examples are sugerCRM, vTiger or openERP. OpenERP is well known and popular around the world and has many language versions, as well as several hundred modules supporting complicated business processes in both manufacturing and service companies. Through CRM, excellent marketing modules can effectively support the people responsible for establishing new contacts as well as arranging and evaluating them in an intelligent way from the point of view of the strategic and operating assumptions for company or research unit development.

Examples of CRM functions in openERP program:

- ***CRM – customer management***
  - **Managing Customer – Provider relations**
    - Functional requirements
      - leads (inquiry about potentially interested parties),
      - chances for sales,
      - managing tasks through communication, identification, assigning levels of priority, allocating, executing,
      - reporting errors,
      - complaints,
      - campaigns,
      - automatic dispatch of reminders following deadlines,
      - identification by users, clients and suppliers,
      - process rule and automatic causal actions,
      - automatic processing through incoming and outgoing e-mails,
      - system can be fully configured,
      - configuration assistant for the process of creation carried out by the user.
    - Requirements associated with integration
      - integration with a company's calendars,
      - integration with distribution, purchasing, after-sales services,
      - steering company processes through Workflow.
  - **Marketing**
    - Functional requirements
      - marketing module manages and brings automation to creating, handling and control of campaign over most channels,

- tools for managing offers, campaigns, assets, processes and reports,
- mass mailing,
- multi-channel: e-mail, text messages, letters, phone,
- supporting barcodes for letters,
- workflow which can be configured,
- dashboards and statistics,
- creating offers and orders.

- Requirements associated with integration
  - integration with analytical accounting for cost control,
  - integration with help desk and after-sales service,
  - automatic purchasing (purchasing, production) for campaign,
  - integration with areas of distribution and CRM.

- **Call Center**
  - Functional requirements
    - conducting telephone campaigns,
    - differentiating workflow for particular campaigns,
    - segmentation of customers,
    - automation of rules,
    - managing escalation,
    - transforming phone conversations into potential chances for sales,
    - integration with surveys,
    - setting the status of phone conversations: not carried out, carried out, unavailable, conducting a survey,
    - distributing work to most co-workers,
    - segmentation tools for the choice and view of filters,
    - statistics concerning results, efficiency and productivity of campaigns.
  - Requirements associated with integration
    - integration with e-mail marketing campaigns,
    - integration with segmenting tools,
    - integration with the marketing module.
- **Portals**
  - Functional requirements
    - access for clients or suppliers to the system as an information or service portal,
    - managing access rights, namely which data should be available for clients or suppliers,
    - recording tasks for general purposes or for service purposes,
    - secure access to the system e.g. for external partners.

- Requirements associated with integration
  - taking into consideration any ERP functions in the portal,
  - integration with analytical book-keeping.

- ***CRM – project management***
  - **Financial project management**
    - Functional requirements
      - managing revenues and costs concerning a project,
      - project budget,
      - automatic cancelling of issuing invoices for already completed tasks,
      - controlling personal costs,
      - project control.
    - Requirements associated with integration
      - planning will be automatically taken into consideration in budgeting finances,
      - fully integrated tasks and registration of time/hour list,
      - fully integrated orders from customers.
  - **Operating project management**
    - Functional requirements
      - multi-level system of project management,
      - task management,
      - short- and long-term planning,
      - delegations,
      - full integration with sales and purchasing,
      - dynamic view of the Gantt chart for the organization of projects and tasks,
      - retroactive planning and evaluation,
      - integration of methods of GTD project, Scrum.
    - Requirements associated with integration
      - integration with analytical accounting,
      - integration of distribution and invoicing with tasks that become automatic,
      - integration with co-worker management for the organization of resources.
  - **Time registration**
    - Functional requirements
      - time registration for employees' work on projects,
      - transfer to analytical accounting for the purpose of budget management, planning, costs, further estimation,
      - registering the time for projects or reference to projects,
      - analysis and control by the head of department,
      - estimations in time registration,

- fully adaptable Workflow,
- multi-type measuring units: hours, days, weeks.

- Requirements associated with integration
  - integration with analytical accounting for the purpose of control over time and costs of projects carried out by co-workers,
  - automatic clearing,
  - integration with tasks from project management,
  - integration with meetings schedule,
  - statistics and identification.

CRM system – statistical data

According to a report of the Central Statistical Office titled *„Społeczeństwo informacyjne w Polsce. Wyniki badań statystycznych z lat 2006-2010" (Information society in Poland, The results of statistical research for the years 2006-2010"*[39] in 2009 less than 18% of all companies took advantage of CRM systems. In the year 2010 the proportion dropped to 16.4%, moreover, only 13.1% used the full, analytical version. The CRM system is utilized mainly by big companies (45%), but also by medium-sized (26.2%) and small com- panies (12.7%). With regard to various branches of the economy, the system is most popular in the finance, insurance, information and communication sectors. CRM systems are utilized to a much higher extent in highly developed countries: in Germany in 2008 60% of big companies (employing more than 250 people) had the CRM system, among small companies about 30% used the system. Statistics shows that 51% of companies in the USA had CRM in 2011 (31% in the public sector), compared to 34% in 2010. Global data and forecasts concerning the development of the market of business applications suggest that this segment of the market is characterized by the highest dynamics of growth and these trends will continue over the coming years. This is not the case in Poland - the stage of implementation of CRM systems is currently at the level of education[40].

CRM – scientific institutions

Our current knowledge suggests that CRM systems have not yet been effectively applied for the purpose of transferring technologies from science to industry. Scientific institutions only use CRM systems in the context of a database or, in other words, „address lists" used for contacts with former, current and future students and scientific employees, but not in the context of cooperation with the industry. Higher education institutions resort to CRM technology in order to distinguish themselves from the competition and win the struggle for the best students. For institutions of higher education this is a very big and serious personal decision and thus the decision-making process is long and complicated - building the trust of students and scientific employees is the most important thing. For example, the University of

39 Główny Urząd Statystyczny, www.stat.gov.pl/gus.
40 P. Zakrzewski, Jak się przygotować do wdrożenia CRM?, Modern Marketing nr 7, 2001.

Leicester in the United Kingdom implemented CRM in 2007 and since then has observed a very positive impact on the recruitment of students[41], University of Miami from the USA has been testing such a system since 2011[42].

CRM can also be used for technology transfer from the science sector to industry. An important element for the proper choice of program/provider is adequate modelling of „marketing" processes in a scientific unit. This means that catalogues of information involved in the process of creation of new products as results of research have to be established. They should also contain data concerning the sequence of creation of information. Obviously, institutes of aviation and medical instititions, for example, operate on completely different types of information. Only on this basis can companies offering CRM systems create a well-matched program - tailor-made. Unfortunately, companies specializing in CRM systems do not usually inform their clients that a necessary condition for success in implementing CRM is a well-edited description of the processes taking place in a company (receiving mail by a company/institute employee is an example of such a process in administration, defining the sequence of actions in case of work on a new engine is an example of a process in production), because it obviously has to take a certain amount of time and postpones the date for granting the order to implement a CRM system. Using NACE[43] (system of codes of European services and goods) can help find a common language with the industry.

Conclusion

The subject discussed in this paper is very broad. The authors only wanted to draw attention to the possibilities of applying CRM systems for the purpose of facilitating technology transfer from science to industry. This is especially important in Poland, where statistics concerning the transfer of technology, innovation and patent applications are alarmingly poor. The development of a modern country is only possible thanks to cooperation between science and industry. Industry should be the driving force behind the development of science and the state should support education and scientific research. Simply investing in Western technologies (the main focus in Poland is on exactly this kind of development) leads to a situation in which all profits go to international corporations and Poland is a country providing cheap, even though often highly educated, workforce. Without effective cooperation between Polish science and Polish industry the development of the economy in Poland with the long-term goal of catching up with the most developed nations is impossible.

Bibliography

1. II Kongres Innowacyjnej Gospodarki, Raport o Innowacyjności Polskiej Gospodarki 2011, Rozdział 6, Osobiste rekomendacje członków zespołu badawczego, Uczelnia Vistula, 2011,
2. Binsztok A., Obsługi klienta z perspektywy nowoczesnych rozwiązań w zakresie informacyjnych tech-

41 University of Leicester, http://www2.le.ac.uk/offices/marketing/marcomms/recruitment/crm.
42 L. Meyer, Miami University Implements CRM for Student Recruitment and Communications, Constituent Relationship Management, 20.10.2011.
43 List of NACE codes, http://ec.europa.eu/competition/mergers/cases/index/nace_all.html.

nologii, NTiZ 2006,
3. Dorigo T., Getting Science Through: Misunderstood Terms In Science Communication, 24.10.2011,
4. Eurostat, Eurostat pocketbooks: Science, technology and innovation in Europe, 2012 edition, EU 2012,
5. Inno Metrics, Innovations Union Scoreboard 2010, EU 2011,
6. Jagiellońskie Centrum Innowacji Sp. z.o.o., Raport nt. barier komercjalizacji wyników badań naukowych w dziedzinie life science w Małopolsce, 2007,
7. Markiewicz D. (ed.), Komercjalizacja wyników badań naukowych krok po kroku, Kraków 2009,
8. Kozłowski J., Rychlewski J., Sławeta R., Wanke-Jakubowska M., Wanke-Jerie M., Stan nauki i techniki w Polsce, KBN, Warszawa 1999,
9. MCX Telecom Spółka z ograniczoną odpowiedzialnością S.K.A. White Paper, Co warto wiedzieć o CRM?,
10. Meyer L., Miami University Implements CRM for Student Recruitment and Communications, Constituent Relationship Management, 20.10.2011,
11. Najlepsze praktyki w zakresie współpracy ośrodków naukowych i biznesu przy wykorzystaniu środków z UE, Warszawa 2008,
12. Pro Inno Europe, Innovations Union Scoreboard 2011, EU 2012,
13. SPSS White Paper, Badania satysfakcji klientów jako metoda osiągania przewagi konkurencyjnej,
14. Stachowicz-Stanusch A., Stanusch M., Zanim zaczniesz wdrożenie CRM, Modern Marketing nr 11-12, 2002,
15. Węgrzyn G., Zatrudnieni w nauce i technice a innowacyjność gospodarki, publikacja IV Konferencji Naukowej z serii, Wiedza i innowacje, pt. Fundusze unijne i przedsiębiorstwa w rozwoju nauki i gospodarkim, Uniwersytet Jagielloński, Kraków 2008,
16. Wolański P., Jak zreformować Polską Naukę?, PAUZA, Kraków 2008,
17. Wolszczak-Derlacz J., Parteka A., Produktywność naukowa wyższych szkół publicznych w Polsce - bibliometryczna analiza porównawcza, Sprawne Państwo, Program Ernst & Young, Warszawa 2010,
18. Zachara M., Strategia CRM - pomys na biznes czy system informatyczny, Modern Marketing nr 10, 2001,
19. Zakrzewski P., Jak się przygotować do wdrożenia CRM?, Modern Marketing nr 7, 2001.

Websites

- BBC, EU sees alarming innovation gap for European firms, 01.02.2011, http://www.bbc.co.uk/news/world-europe-12334091,
- Eurostat, European Commission, Population structure and ageing, 2011, http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Population_structure_and_ageing,
- Główny Urząd Statystyczny, www.stat.gov.pl/gus,
- ISI Master Journal List, http://ip-science.thomsonreuters.com/mjl/,

- Kosmulski M., Poprzeczka listy filadelfijskiej, onet.pl / Tygodnik Powszechny, 10.01.2012, http://tygodnik.onet.pl/1,72518,druk.html,
- List of NACE codes, http://ec.europa.eu/competition/mergers/cases/index/nace_all.html,
- Musiałek P., Romanowski T., Rozmowa z dr. Tomaszem Geodeckim, wykładowcą Uniwersytetu Ekonomicznego w Krakowie, współautorem raportu pod red. J. Hausnera, Kurs na innowacje. Jak wyprowadzić Polskę z rozwojowego dryftu?', 08.11.2012, pressje.salon24.pl/462152,wywiad-o-innowacyjnosci-w-polsce,
- Polityka/PAP, TR, Polska nauka ma się źle, miażdżący raport NIK, 14.11.2012, http://m.onet.pl/wiadomosci/kraj,zw0q8,
- Simanek D. E, A Glossary of Frequently Misused or Misunderstood Physics Terms and Concepts, 2004, http://www.lhup.edu/~dsimanek/glossary.htm,
- The World University Rankings, http://www.timeshighereducation.co.uk/world-university-rankings/2012-13/world-ranking,
- University of Leicester, http://www2.le.ac.uk/offices/marketing/marcomms/recruitment/crm,
- Wikipedia, Uczelnie w Polsce, 2012, http://pl.wikipedia.org/wiki/Uczelnie_w_Polsce.