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RECENZJA MONOGRAFII JERZEGO KISIELNICKIEGO PT. „SYSTEMY INFORMATYCZNE ZARZĄDZANIA” WYDAWNICTWO PLACET 2008 ROK ........ 135
In this work the analysis of IT methods improving the communication process between all actors of business processes running in SMEs was made. One can observe that continuously developing Internet services and different digital tools enable the information transfer among smaller business units more and more cheaply and effectively. In particular, updated communicators like GADU-GADU, CHAT and others create more and more possibilities to satisfy better management functions like customer servicing, contract preparation and performance, common sell and buy transaction realizations, etc. However, permanent trainings of SME users from the area of IT application in business communication is necessary to avoid the mistakes resulting from non-appropriate usage of available tools.

Keywords: IT methods, SME, business communication process
Usually, organizations start to use new communication channels for business purposes, ad hoc, imitating, and experimenting. After such a first stage of learning and experimenting there often arises a need for a more systematic approach to identify business options for new communications channels [5].

In case of business contacts it is advisable to use the channels below:
- Discussion forums on WWW pages.
- Interactive forms on WWW pages.
- Online chat or/and tools such as instant messengers.
- SMS service.
- Hotline also called an automatic signaling service ringdown, or off-hook service.

A discussion forum may be one of the three tools the use of which can be worth considering in case of economic subject cooperation. The forum enables its customers to label matters important for them and determine both their mutual beneficial contacts and the inside of their formal branch organizations as well. A discussion forum offers an interesting functionality and in case of adopting an important topic (thread) by a guest of the forum and its commenting, (e.g. a milk supplier can describe the behavior of a cistern driver who collects milk from farmers), other forum users may add their suggestions to this topic or provide arguments against its importance and the author of the topic can exaggerate some rather unimportant problem or event. Thus, forum users themselves identify, order and eliminate the most important factors that decide about effective cooperation. It is usually the administrator that takes care of a forum and can modify the whole contents. The situation in which some forum administrators perceive their role in the forum service as searching and deleting all negative opinions about the company is rather unfavorable.

Very often, many consumers want to share their bad experiences with other consumers. Companies react by adopting anti-domain sites in an attempt to prevent the creation of such complaint forums. Companies such as Volvo and Chase Manhattan are attempting to defend themselves by setting up anti-domains. For example, Volvo owns an anti-domain site, volvosucks.com. Chase Manhattan was particularly protective, registering four site names: chasesucks.com, ihatethechase.com, chasestinks.com and chaseblows.com. Vail Resorts owns at least six such sites. The question for these companies is ‘how many name variations does it take to protect the company?’ Newer firms have a unique opportunity to block consumer complaint sites before their name is known. For example, a discount airline site Priceline registered Priceline-sucks.com three days before the company’s actual site launched. In all, at least two dozen companies – or their advertising or PR firms – have registered anti-domains so far[6].

The examples mentioned above show how companies ‘canalize’ customers’ dissatisfaction. However, it is vital to use valuable negative opinions for the purpose of offering improvement not only concerning the positive image.

Interactive forms on WWW pages constitute the abridged form of a discussion forum; they also enable the registration of new customers with the base (or only guests on WWW pages where the forum appears). The abridged version of a discussion forum means that such a form allows to express a short opinion on a particular topic, for instance a specific product (through a window enabling comment writing and a second one for a presumptive signature).

An online chat or tools such as instant messengers capacitate more interactive communication than a forum by bringing a relatively quick or almost instant answer to a problem or inquiry. A number of companies endow customers with the possibility of contact through the mediation of
such instant messengers as GADU-GADU or SKYPE where written or voice and video communication is possible.

In addition, contact among contracting parties in real time may take place with the use of Moderated Group Chat (MGC). MGC is defined as on-line, real-time interactions between groups of customer with an active coordinating role of a company representative and a commercial objective [7]. In that situation the company asking chat users a particular question may collect a number of valuable opinions about its functioning.

Web surveys are one of the fastest growing methods of data collection. Despite their advantages, their use is plagued by three main problems:
- not all people have access to the Internet and those who do are different from those who do not,
- the reliance on non-probability of self-selected samples or recruited panels, which are due to the lack of sample frames of web users. This results in an inability to generate random email addresses, a fact made worse by anti-spamming legislation, the observed low response rates of surveys in general and web surveys in particular [8].

Taking into consideration the above reasons it is worth starting to use the other two tools, that is an SMS service and hotline also called an automatic signaling service.

Based on their rationale and experience with using SMS, Balabanis, Mitchell and Heinonen-Mavrovouniotis propose that SMS can be used effectively for probability web surveys by using it either with Couper’s mixed-mode method [9]. (e.g. provide an option to receive a survey via phone call or web) or a pre-recruitment method of panels of respondents to achieve better coverage of the population and response rates [10].

An SMS service is relatively the least known service in case of contacts on Business-to-Business market (B2B). This service is very popular and known on the market for individual customers because of competitions, charity actions, TV voting in live programmes. However, it seems that few companies are aware that the service in such form can be used for contacts between supplier and recipient, for instance.

There is a service that enables sending the contents of an SMS to an e-mail address or into an Internet script (which can store messages in the database, for example and then display in the form of a transparent opinion list adopted to every worker in the company etc.). Taking into consideration one company’s SMS offers on the Polish market, the cheapest available connector (the number where the service is located) costs 0,50 PLN (net) for sending one SMS message from sender to recipient. There are usually no additional costs for companies associated with possessing an account in SMS service. The cost of the service very often includes an opportunity to send a reversible SMS from a recipient with acknowledgement.

The activity of a contracting party in case of such a service is vital, taking into account the fact that there is a possibility of receiving too many reversible text messages from the recipient. Consumers’ perceptions of SMS ads are rather negative. The highest willingness to give permission to receive SMS ads occurs when consumers have a high control over opt-in conditions, when an SMS ad is relevant and when a brand is familiar [11]. Therefore, the allowance that is expressed by sending a text message to that service with an opinion or comment is equal to adding a person to a customers’ database. Recipients often care about striving good contacts with formal suppliers’ decision makers, not considering the possibility of some decision makers caring about the opinion of people having a real contact with a recipient. If a spouse of a farmer managing a considerable cowshed finds out that it is better to change a recipient because a cistern driver does...
not fulfill the conditions determined by the spouse, the ideal contact between the director and the farmer himself does not have to support the maintenance of trade relations between the farmer and the creamery. The farmer prefers not to come into conflict with his wife and is willing to change the milk recipient for the more polite one.

The costs of SMS service functioning for a company that wants to run it are about several PLN a month. Instead of an SMS service a company interested in customers’ opinions sent in the form of a text message may simply provide a mobile phone number of the wholesale manager.

A hotline is a well-known tool of a customer – enterprise contact and it does not require an extensive description. However, it is worth mentioning that the name ‘hotline’ suggests that its employees should be open to current problems and suggestions and not only to questions associated with an offer which can be found on WWW pages. Unfortunately, it happens quite frequently that hotline workers put customers through to other departments where customers are registered. That type of behavior evokes much greater irritation and intensifies reluctance to a particular supplier or recipient.

The comment on a hotline may appear to be the reason for undertaking an attempt to balance the tools mentioned above (Fig. 1.) in the context of rational and emotional customer approach to tools usage on the B2B market. Rationality refers here to an attempt to excuse an inappropriate customer service.

An improperly treated customer (not necessarily in the complaint context) will react emotionally and will try to abreact this frustration on the unpleasant situation that he came across in the company he cooperates with. It is important that the company provides the possibility to vent one’s frustration and nervousness with the benefit for itself. It means enabling such a customer to present the reasons for his negative opinion. If the customer is very annoyed, it is probable that he will want to defuse emotions immediately. It seems that emotional approach has one disadvantage as it does not refer to a rational approach to a problem. Yet, for some people it can be a beneficial feature in the sense that only key reasons to a problem are taken into account and there is no justification of the inconvenience that could be the real reason for customer’s negative opinion.

In case of a hotline it is possible to admit that there is a substantial emotional approach to the problem and simultaneously a customer does not try to justify incorrect activities of the company himself. In addition, greater emotions appear shortly after the event and the nervousness fades away with time. A hotline enables a customer to express his opinions with no limit of time. However, in terms of an SMS service there is a need to send a short factual message. A discussion forum enables a contacting party to express a more precise and extensive opinion about the matter of his interest. Access to the tool can take place long after an event and a relaxed customer formulates more rational opinions.
3. Conclusion

The tools mentioned above can be used in business contacts in the following way:

- on the market, a producer released a new line of nutrients to growers, the description of which may be found on a producer’s website,
- a regional distributor can place an order on the WWW page with the use of an interactive form; it is possible to gain a discount having a password,
- the producer and distributor can familiarize themselves with comments of individual recipients inserted by them on the web page and with the description of the product (nutrient) on a discussion forum,
- on that web page the distributor and individual recipient can familiarize themselves with the clues regarding optimal swine nutrition through the nutrient mentioned. The individual recipient can do it for his own education and the distributor for professional training of his sales assistants for the purpose of more effective product sale,
- the individual recipient may pace an order in an interactive form on the WWW page. If he defined his profile before on the producer’s web page, the method of an order can be even more simplified and implemented with the use of a communicating tool such as Skype, a hotline or a text message - the customer may use his number in the contracting party’s database as a signature.
- the players from the same branch organizations like breeders of pigs or dairy cows can interact very easily for many business management problems like common transactions of means production purchase or sell the products or others.

Information technologies on the grocery product market can be used taking into consideration EPCglobal networks (open global network using an electronic code of a product). It is quite
relevant as the distribution of farming products requires a good organization diminishing the risk of rotting a product [12].

Undoubtedly the analyzed IT methods improving the communication process between SMEs give them chances to develop and reach solid competitive advantages because cheapness and arability of described tools create real chances to have the same superb communication channels like big corporations. Permanent trainings of SME users from the area of IT applications in business communication is necessary.

4. Literature


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E-LEARNING MODEL PLATFORM WHICH STRENGTHS MANUFACTURING AND DISTRIBUTING PROCESSES IN AGRI-FOOD SME IN THE REGION

Summary

In the paper e-learning tool assumptions which determines strengthening process of manufacturing and distributing processes in agri-food SME in the region were studied. One can observe that both technological aspects and learning objectives should be considered to create effective e-learning tool. Learner educational needs and their technical and organizational resources should be considered in a selection of e-learning type. In other side possibilities of teaching/training institutions should be also defined clearly to be successful in teaching process. Presented case study shows e-learning platform assumptions to strength TOWARDS project regional sustainability strategy. One can see a need of creation of differentiated content for different groups of learners. The outcomes over participation and bringing e-learning users their own input information will enrich the module and will be possible thanks their contributions.

Keywords: e-learning tool, platform, technology, goals, active users

1. Introduction

Decision about choosing an appropriate tools for e-learning program in cost effective manner is often not simple or easy because the decision is usually made by managers who have a little knowledge about information technology or by informatics who are not involve in educational processes directly and know little about educator’s requirements and needs. Today various e-learning solutions, especially those based on Internet platform are being used by persons without hard technical knowledge and they need a simple way for identifying various types of tools and evaluating different products which are offered on the market [6]. The problem becomes more and more complicated because of complexity of modern solutions has increased. Often the price and overall costs are important factors that justified our final decision except choosing one of free available solutions like Moodle or DoCoMo platforms (in opposite to commercially available Blackboard or Clix). Not less important in this area is a problem of knowledge base creating for effective e-learning tool needs. It seems that a useful solution is networking concept of e-learning users participated in the platform not only as learners but also being simultaneously “teachers” who insert their knowledge and experiences to the e-learning platform. Such a way of interactive building of e-learning knowledge base satisfies condition of relevancy, consistency and trustworthy. Such knowledge is also up-to-dated permanently.
2. Choosing type of e-learning

First of all we have to give answer a very basic question: what type of e-learning we intend to implement in our education program? This is important for choosing solution that meets our as educators and students needs and requirements [8].

- **E-coaching.** It uses collaboration tools such video conferencing, instant messaging or other systems. Relationship, mentoring in its form is usually long term one. Mentor focuses on career development of learners who learn things beyond those written in handbooks. Online form tends to be more short term and contacts between learner and educator are precisely defined and limited to particular problems. This type of e-learning is appropriate for large and medium sized companies. Example of technology requirements: video conferencing system, internet connection and meeting system, server, e-commerce software (if necessary).

- **Embedded e-learning.** This is a type of just-in-time learning. Education materials or instructions are components of various applications, help files or Web pages and others. Embedded solution is appropriate for learners who must resolved their problems immediately. It may be Web based only or installed on user’s computer as tutorial materials. Example of technology requirements: multimedia and authoring tools, server, internet connection, web browser, help viewer.

- **Facilitated e-learning.** This is combination of Web content (typical for learner-led e-learning) with a system enable collaboration between students and instructors/educators. System is appropriate for students who prefer learning through discussion with others (combining class discussion forum with additional self-work such homework that must be completed). Facilitator does not teach or conduct learning directly but answers questions, helps solve problems and evaluates assignments. Example of technology requirements: multimedia and course authoring tools, web site authoring, server and internet connection, learning management and content system, discussion forum suite (not necessary when discussion forum is accessed via web browser), web browser and email program.

- **Instructor-led e-learning.** Platform uses internet technology to conduct traditional classes with distant learners, using video and audio conferencing system, chat, white boards. Educational presentations are transmitted with instructor voice together to distant learners computers. Learner may ask question by typing it into a chat or send it by email or use audio conferencing software. Learners must complete some homework. This type of e-learning has similar structure as traditional learning in the classrooms. Example of technology requirements: presentation software and authoring tools, audio and video conferencing software, server, fast internet connection, web browser, collaboration system.

- **Learner-led e-learning (also called self-directed or self-paced learning).** Course content is usually accessed by typical web browser like Explorer or Netscape and it is housed on Web server that enables to monitor student activity and freely access to many information and data resources via Internet. All instructions for students must be provide with main course materials together because there is no real instructor or facilitator who might help students in their endeavors. Also there is often no any mechanisms to allow communication or share knowledge or ideas between students and no time restriction. Example of technology requirements: multimedia and course authoring tools, fast internet connection, server, learning management suite, content management tool.
3. E-Learning content quality

Although technology plays an important role in delivery of online courses, real offline issues seem to be even more important – quality of content, administering distance learning or support for remote student [4]. Today quality of content still disappoints instructors and learners. Apart from that relatively large number of educators who choosing or implementing information technology do not really understand it correctly. They often make more or less costly mistakes in purchasing given solutions and sometimes in choosing technology that do not work correctly in particular cases. E-Learning content must be updated periodically in order to match current industry standards what shifts education quality to higher level, unfortunately many institutions still do not do it [8]. Many universities making efforts toward integration technology into their classroom but only partially. Some problems are caused by academic teachers habits to using traditional methods or insistence on using old models of professional development for introducing them to the information technology. When we think about implementation of distance learning system in our university considering the use information technology in broader context of educators, learners and learning environment is better than considering the use of technology alone. Technology supports our efforts in the e-learning field. We have to realize that e-learning can not to deliver only little more than ‘electronic’ workbooks accessed online what we may observe today in many cases. It should be focused on scoring, tracking, outcomes monitoring and courses sequencing rather than delivering of education materials in form of content libraries that are some kind of bookshelves in traditional library or simple set of many coursewares (learners often failed to complete this type of online courses) [3].

4. The models of international e-learning cooperation in the field of higher education

Distance learning platform enable us to start cooperation with foreign higher education institutions and design interesting mutual teaching programs and courses. We may choose one or more of five different collaboration models that will be most appropriate for us and for our partners:

- **Complementary articulation.** It is appropriate when two universities offer similar degree education programs with some unique modules or specialities that expand an option available to students. Student may matriculate at one university and has opportunity to take some courses/modules at another one. For example, institutions offer logistics but one of them has medical logistics as specialty and another one offers general logistics. Student may study logistics in one of them and some of modules in another meeting their degree requirements. The result of this type of collaboration is that both universities could offer a broader range of specializations. Student can choose admission to the university from which he or she wants to earn the degree. Intellectual properties are not exchanged among institutions involved and student pays tuition per module.

- **Fully articulated degree.** Two universities start collaboration for development a single mutual degree education program. One institution can not offer the degree in its entirety. Student is matriculated at any chosen institution but must take modules from both participating universities to complete education program. Single institution has not ability to offer entire education program. Universities must agree on admission requirements or standards. Student may admit into the chosen higher education institution. This model requires a very high level of
cooperation – success depends on both of them. Each university is responsible for intellectual property for modules offered. However cross licensing agreement is possible. For example: two universities develop one program in public health and each of them offers an agreed part of modules.

- **Collaborative course development.** In this case two or more universities agree to cooperation in the development of courses that could be used by one of them to offer a program at a distance learning form. Collaborating institutions may implement the course materials in their own education program but only one of them offers degree. Student must admit to university that offers degree. Collaboration may not be visible to a student. Participating institutions get access to all education materials and use them in their own program. University responsible for the final form of education materials has responsibility for intellectual property. Incomes are generated by institution that offers the degree and participating universities benefit by having access to education materials.

- **Shared marketing.** The case in which two universities offer complementary degree programs in related fields that constitute reputable collection attracting attention on the international higher education market not achieve individually. Student may seek admission to the institution that offers most attractive program. Education institution agree to start co-marketing their own programs and must be able to delivery of their programs to students at a distance learning.

- **Client partnership.** In this case two or more universities may serve their common client, such as big corporations, government administration or public service institutions and ensure mutual professional education for employees working in various distant places. Institutions cooperate to design and development education materials that include content specific to the client needs and requirements. For example, two universities, one from US and another one from Europe serve multinational corporation with Master of Risk Management. Each of them adapted course to its own curriculum in order to provide a comparable credential for American and European employees. Students admission is determined regionally – students are approved through their employers. Universities collaborate with a client to create a program that is tailor to the needs of client’s organization. Cooperation between higher education institution needs a certain degree of curricular flexibility in order to coordinate content of modules. Intellectual property developed but one institution is copyrighted by him and shared with partner through a licensing agreement. Formal agreement with the client corporation should be agreed and signed. Incomes are generated by both universities.

Presented above different forms of distance learning platform creation shows crucial role of well defined agreements between co-operators which carried out commonly teaching process including intellectual property rights protection, certification and accreditation aspects. Presented solutions can also be useful to create e-learning platform created by different kind of users like research, administration and business organizations.

3. **Case study on regional sustainability strategy strengthening in the frame of PR 6 TOWARDS project**

Structure of e-learning module for strengthening effects of agri-food SME platform obtained in the frame of TOWARDS project (made under the Sixth Framework Programme of the European Community (2002-2006) for the Project called TOWARDS FOOD-CT-2006-518702 Specific
Support Action Migrating networks from a producer TOWARDS a market orientation within the agri-food sector is determined through the project assumptions, goals and expected outcomes [1]. TOWARDS is a 24-month SSA project, whose main objective is to support, promote and rigorously research the migration of agri-food SMEs networks/associations from a producer&regional focus (traditional networks/associations) towards a market&European orientation (innovative networks/associations): from fork to farm approach. TOWARDS aims to help implement the ERA by strengthening main Food Quality and Safety Priority’s “from fork to farm” approach, directly relevant to agri-food SMEs networks/associations, in regions of Europe stimulating interregional co-operation with particular attention given to innovation aspects. Market & client oriented agri-food networks/associations pull SMEs to more rapidly assimilate innovation, what encourages growth and strengthens the competitiveness of the food sector in European and global markets. The goal of the project justifies its European nature, since best practices and experience is best gathered from similar networks in other countries.

The project enrols 36 agri-food SMEs networks/associations (18 traditional+18 innovative), top-level experts including representatives of agri-food demand, regional&national public agencies, policy makers and professionals servicing agri-food sector. Firstly, TOWARDS creates a Migration toolkit to evaluate 18 traditional agri-food networks/associations enrolled and strengthens them supporting their migration into becoming more market&client oriented (development of Migration plans&strategies). Further networks strengthening are facilitated through the exchange of best practices previously identified in 18 innovative networks/associations enrolled. Secondly, TOWARDS creates an Agri-food Web Platform, sustainable beyond the project (Business plan), that involves and bring together around shared goals a range of agri-food players, carrying knowledge content and business information for agri-food networks and supporting their re-focusing towards clients. The project has an ambitious set of awareness creation & dissemination activities at regional, national and European level. Strengthening the project effects after its ending requires e-learning platform built up and keeping.

The structure of e-learning model can be expressed in a form of questions and the answers like mentioned below.

**For who are destined education offer stakeholders:**
- food consumers wanting have guaranty for obtaining healthy food and its manufacturing processes being friendly for environment
- representatives of food raw producers and processors representing farms and food processing plants,
- representatives of central, regional and local government and self-government agendas being interested in solving social and economical problems in rural areas,
- representatives of social sciences investigating social phenomena and processes in macro and micro scale for needs of definition of rules acting in those areas and also to shape methods and tools useful for more effective management with agri-food SME.

**Objectives**

**Why agri-food SME can be a guaranty of healthy, tasty food not disturbing environment during its manufacturing:**
- technological aspect – not big farms can carry out non-industrial, ecological manufacturing methods of less level of intensity and concentration of chemical means,
- economical – small and medium farms burdens businesses with lower fixed costs,
- social aspect – smaller farms ensure more work places in rural areas because of smaller work productivity.

Why SME ought to co-operate?
- Agri-food SME in Poland and in other TOWARDS project partner countries are dispersed business units of small market power which can not face big food receiver requirements like financing promotional activities, leading knowledge transfer, ensuring themselves effective economical, technological and legal advisory, carrying out products certification, doing lobbying to obtain friendly for the branch legal regulations, giving services exchange, elaborating effective tools for management with horizontal and vertical integration processes, and also introducing networking management ideas resulted in a global trends and changes in a structures of economies of particular countries, regions and multinational groups. Agri-food SMEs can not compete in mentioned above areas with big corporation capital.

Why agricultural producers ought to be more oriented on customer needs satisfaction and international markets?
It is challenge of global economy, social marketing and competitors’ activity.

Why SME agri-food sector organizations ought to use knowledge and best practices benchmarked from other similar organizations acting in at local, regional, country and European level?
Benchmarking of marketing, financial and economical solutions is the cheapest positively verified by scientists and practitioners method of updating and developing business activity.

What organizations can use elaborated methods for their management support?
There are, as follows:
- branch farmer organizations – animal breeders and producers, fruit and vegetables producers, farmer cooperatives, not formal food delivery chain units (raw material deliverers, processors, distributors), wholesale markets, etc.

What common the most important goals are integrating factors for mentioned above organizations?
- similar manufacturing objectives and methods – breeders, catering and gastronomical firms,
- similar legal status and scale of activity big farms leasers
- better usage of common resources – big farms leasers, strawberry breeders and producers, orchard producers.

What strong and weak features have organizations associating different business objects in food delivery chain system (position related to end receiver of food):
- raw material producers and breeders,
- distributors – wholesale markets,
- deliverers of food and food services for consumers.

What strong and weak features have organizations associating different business objects in legal status system? The answer gives knowledge base created on the base of TOWARDS project reports and publicity.

What strong and weak features have organizations associating different business objects in innovation system in a view of better customer needs satisfying and opening for international markets? The answer gives knowledge base created on the base of TOWARDS project reports and publicity.

What criteria of innovativeness activity evaluation can be mentioned?
- Control/ownership
What migration strategies one can mention for particular organizations and what models through benchmark can be applied?

More detailed answers on the questions mentioned above gives knowledge base accumulated in files of TOWARDS project reports and publicity.

Expectations of particular groups of TOWARDS project stakeholders mentioned below at fig 1, fig 2 and fig 3 and fig 4 express e-learning module goals which should consider both obtained the project outcomes and needs of e-learning end-users. Expectations of particular groups of learners differ to each other but there are some common interests connected to process of migration of SME agri-food associations towards consumer and international markets. Remarks of consumers and a number of their visits at e-learning website can help estimate key determinants of their acceptance for food products what can help farmers, breeders, food processors and distributors adjust their activity in the most appropriate way (see fig.1). Food raw material producer expectations in area of economy, technology, marketing, logistics and common sale and purchase transactions could be satisfied over knowledge available in elaborated press articles and research papers and also through getting in touch over e-learning model and TOWARDS websites where the producers will be able to exchange the best practices and other business information (see fig.2). Expectations of public administration agendas concerning sustainable development of rural areas and solving social and economical problems occurred there will be satisfy over creating common programs and projects with agri-food networks and this way representatives of administration will support local businessmen and their organizations contributing to growth in their competitiveness (see fig.3).

Expectations of research and educational organizations are closed to creating new research area over e-learning module platform giving possibilities of empirical data gathering which can investigate new methods and tools from the scope of associationism, benchmarking, agri-food best practices, changes in rural areas business and social structures, coopetition and other new management conceptual trends. Opposite, businessmen, leaders of agri-food SME networks cal also use achievements of R&D sector over e-learning module content to adjust better to new challenges (see fig.4).
Consumers expectations

What is for you as food consumer a guaranty of healthy food?

- Ecological shop
- Label
- Product mark
- Local deliverer

Food raw material producers expectations

What information is expected from you as food producer?

- Technological knowledge
- Economical knowledge
- Marketing knowledge
- Local deliverer
- Common purchase of means production
- Common sale of products

Fig. 1. E-learning model consumer expectations and their determinants
Source: Own investigation on the base of TOWARD project outcomes

Fig. 2. E-learning model food raw material producers' expectations and their determinants
Source: Own investigation on the base of TOWARD project outcomes
Expectations of public administration agendas

What area of information are you looking for?

- Social policy
- Economical policy
- Sustainable development of rural areas
- Limiting depopulation of rural areas
- Keeping work places in rural areas

Fig. 3. E-learning model public administration agendas expectations and their determinants
Source: Own investigation on the base of TOWARD project outcomes

Expectations of research and educational organizations

What area of information are you looking for?

- Processes of associationism
- Benchmarking
- Agri-food best practices
- Migration toolkit verification
- Trends in management concepts

Fig. 4. E-learning model research and educational organizations expectations and their determinants
Source: Own investigation on the base of TOWARD project outcomes
For an effective regional sustainability strategy building it is necessary to set up such IT and substantial platform guaranteeing further co-operation of the agri-food sector stakeholders after the TOWARDS project ending.

It seemed that for regional sustainability strategy effective introduction it is necessary to use mentioned above Learner-led e-learning variant (also called self-directed or self-paced learning). The facility of this type of e-learning module is a fact that course content is usually widely accessed by typical web browser like Explorer or Netscape and it is housed on Web server that enables user easy access via Internet to e-learning information and data resources and in other side let monitor learner activity. All instructions for learners must be provide with main course materials together because there is no real instructor or facilitator who might help students in their endeavors. Technology requirements are not so strong, so average level of IT infrastructure is enough to access e-learning content, e.g. multimedia and course authoring tools, fast internet connection, server, learning management suite, content management tool.

Regional network will continue using elaborated tool kit online networking tool and information. Regional body has embedded into its plans the idea of transforming traditional into innovative networks. The regional body will be University of Technology and Life Sciences, Management Faculty, Bydgoszcz, Poland. Web address of body is http://wz.utp.edu.pl/. There are strategic plans of six Polish SME agri-food networks saying they will continue the work of migrating traditional and innovative networks into more innovative ones is confirmed by one of its chief officers. The regional body will use TOWARDS toolkit in syllabuses of M. Sc. Management study program during realization of such subjects as:
- Agri-food SME development in a view of integration processes
- Quality Systems in Food Economy
- Food delivery chains
- Evaluation of SME projects
- Partnership in management

Absolvent will be well prepared for managing with agri-food business units, agri-food branch associations, local governments and self-government agendas in the scope of problems of food delivery chain management especially role of farmers and breeders in satisfying food consumer aspirations. He will transfer knowledge concerning coopetition of business partners in the frame of branch organizations and their co-operation with public institutions. The regional body will use TOWARDS toolkit in training courses for regional animator certificate – new profession officially registered by Ministry of Science and Higher Education. Regional website sustainability will be strengthen also over TOWARDS tools or cases or materials available on the UTP Website. E-learning module platform is built up using the UTP IT recourses agreed with the UTP authorities. The IT infrastructure will include such resources like:
- MySQL version 4.3.
- PHP version 4.0
- Server Apache 2.0
- Required disc memory size – 1 GB
4. Conclusion

In the paper e-learning model platform which strengths manufacturing and distributing processes in agri-food SME in the region was characterized. One can observe that both technological aspects and teaching goals should take attention to ensure effective e-learning module platform creation and introduction. Especially learner educational needs and their technical and organizational limits should be considered in a process of e-learning shaping. In other side possibilities of teaching/training institutions should be also defined clearly to be successful in teaching process. Presented case study shows assumptions for e-learning module creation being platform for TOWARDS project regional sustainability strategy strengthening. One can see complexity of the task in the area of differentiated content for different groups of learners. The outcomes over participation and bringing their own input information to the module are possible for all e-learning users.

5. Literature

5. Howell S.L., et al. 2004. Seven Strategies for Enabling Faculty Success in Distance Education. The Internet and Higher Education 7, 33-49.
Summary

The rollout methodology can be used in production and commercial companies having the same activity profile. Unification of business processes in companies within a corporation, having the same activity profile, is the major goal of the use of the methodology mentioned. Using this methodology we are able to speed up the implementation of most of project tasks and save costs. It has been confirmed by many studies.

Keywords: integrated systems, projecting and implementing of information systems, information model of company

1. Introduction

Project management is one of the most important elements which is decisive for the capacity of an effective cost management that is necessary for project implementation and devise ways for control and coordination. This ability regards organizations both from scientific-research sectors and innovative companies acquiring founds for investment implementations, as well as public benefic organizations acquiring founds from social founds. The availability of literature, cf. Wysocki Mcgary(2005), and an available education scope foster real skill progress. Project works abating during integrated system implementations is one of factors of effective implementations according to organizational needs. The use of methodical solutions was described for example in Antoszak and Drelichowski (2003) or Drelichowski and Górska (2003). In both Parafian (2007) and Drelichowski and Parafian (2008), the concept of the PRINCE2 and AIM (Application Implementation Method) metodologies and their use have been described according to the Oracle e-Business Suite integrated system implementation within a chemical industry corporation.

In those publications experience in the model system implementation creation, a functional scope specification, and the specifaction of modules abating organizational information – decision processes have been described. On the base of that experience, using the rollout methodology, an implementation project team has been directed to integrated system ERP implementation in a foreign country. In Szyjewski (2001) and Lech (2007) authors are pointing out complications and the rollout methodology effectiveness especially in foreign countries implementations. This paper contains an analysis of the rollout methodology concept and allows to point out the scope of implementation problems.
2. Essence of the rollout methodology

The rollout methodology can be used in production and commercial companies having the same activity profile. The major point of using this methodology is one full system implementation in one of companies within a corporation and then to rollout the business model built into other companies.

The use of that kind of implementation has plenty of advantages. Most important is the standardization of all processes that functions in a company according to the model implemented in the whole corporation. Companies that have the same business model, work in the same way, which directly affects reformation of management in the point of whole corporation view.

The analyzed method of system implementation influences the implementation cost and time reduction by virtue of implementation of existing solutions such as: reports, additional forms, interfaces.

On the other hand, the rollout methodology extorts a little bit different approach to the integrated systems implementation. In the classic way of implementation, in the beginning of each implementation, after a project definition phase an operations analysis phase follows, during which a detailed identification and verification of business processes should be done. Information gained by project teams is a base for future activities related to the preparation of a suitable system that equals the model of a company. Very often, during this phase we can notice reengineering of company business processes, cf. Hummer Chumpy (1996), because of the fact, that the implementation of an ERP system is a very good chance to the identification of an organization processes gap. The use of best practices gained in previous implementations makes possible the reformation of the mentioned processes functioning. A Rollout implementation eliminates the classic approach to the analysis phase. It eliminates classic elements but whole attention should be focused on the conformance of processes that function within object implementation in proportion to the model implementation. Instead of the classic analysis phase there is a GAP analysis. Main goal of aGAP analysis is to pick up all differences between a present model of processes and a base model of processes implemented in the first organization. Project teams should in a very detailed way, compare each process and pick up all discrepancies to model processes and after that based on in the collected information, prepare the system in the way to keep the processes accordance to base model.

Depending on different destination organization localization, the rollout methodology needs an acknowledgement of some groups of activities. Especially in case of using this methodology in organizations located in foreign countries. It implies that we have to look very closely at following aspects:

- Chart of accounts adjustment is a very difficult task to do because of legal requirements existing in a destination organization, which can coerce some changes in the chart of accounts in an organization which is the model of implementation. Act of accounting gauges in each country the way of functioning and structure of chart of accounts, with which the implemented chart of accounts must be compatible. This situation causes that model chart of accounts must provide legal regulations that rule in different countries.

- Adaptation of all documents and reports generated from the system to a local language version and local legal conditions is also required. Use of the rollout methodology doesn’t eliminate all
programming costs but it governs a lot for costs increase because documents and reports have been already done and must be adopted only.

3. Object and project structure description

In the described case study, the rollout methodology was implemented in one of companies that functions within a corporation (group of companies). Useful conditions made by using production technologies similar to the model organization but located in a foreign country. The rollout project comprises of the following OeBS modules:

- General Ledger (with production costs accounting)
- Account Payables
- Account Receivables
- Fixed Assets
- Cash Management
- Purchasing
- Inventory management (ODM + OPM)
- Order Management

Project assumption

The project was implemented using the following conditions:

- On the starting moment of the project, the network infrastructure will be available.
- In the Oracle e-Business Suite system three language versions will be available (Polish, English and Local).
- At the moment of system’s start, key reports, which are present in model system, will be translated for local language and available. The rest of required reports will be designed and implemented within the support agreement.
- The implemented chart of accounts will be united with the chart of accounts used in the corporation. New lines can be added into the chart of accounts, after gaining approval of the corporation Chief Accountant. The final version of chart of accounts will be prepared in an analysis phase.
- End user training courses will be led by key users from the customer’s project team, with a provider’s project team support.
- The official project communication should be in Polish (English is an option). In case of necessary communications in a local language, the involvement of additional local translators is required.
- The whole project documentation will be done in Polish. The end user documentation will be translated into a local language by the customer’s team key users (with a support by translators).
- MS Windows and basic computer skills trainings are out of scope for the mentioned project.
### Project teams

Supplier’s project team:

**Table 1 – Supplier’s project team**

<table>
<thead>
<tr>
<th>Name and surname</th>
<th>Function in project</th>
</tr>
</thead>
<tbody>
<tr>
<td>Financial_consultant_1</td>
<td>- main solution architect</td>
</tr>
<tr>
<td></td>
<td>- responsible for General Ledger module</td>
</tr>
<tr>
<td>Financial_consultant_2</td>
<td>- responsible for Account Receivables module</td>
</tr>
<tr>
<td>Financial_consultant_3</td>
<td>- responsible for Account Payables module</td>
</tr>
<tr>
<td>Financial_consultant_4</td>
<td>- responsible for Fixed Assets module</td>
</tr>
<tr>
<td>Financial_consultant_5</td>
<td>- responsible for Cash Management module</td>
</tr>
<tr>
<td>Logistic_consultant_6</td>
<td>- responsible for Inventory OPM and ODM modules</td>
</tr>
<tr>
<td>Logistic_consultant_7</td>
<td>- responsible for Order Management module</td>
</tr>
<tr>
<td>Logistic_consultant_8</td>
<td>- responsible for Purchasing module</td>
</tr>
<tr>
<td>Consultant_9Translator</td>
<td>- translator,</td>
</tr>
<tr>
<td></td>
<td>- project support</td>
</tr>
</tbody>
</table>

Customer’s project team:

**Table 2 – Customer’s project team**

<table>
<thead>
<tr>
<th>Name and surname</th>
<th>Function in organization</th>
<th>Function in project</th>
</tr>
</thead>
<tbody>
<tr>
<td>Person1</td>
<td>CFO (Chief Financial Officer)</td>
<td>Project Manager by customer side</td>
</tr>
<tr>
<td>Person2</td>
<td>Chief Accountant</td>
<td>Key user</td>
</tr>
<tr>
<td>Person3</td>
<td>Chief of controlling</td>
<td>Project team member</td>
</tr>
<tr>
<td>Person4</td>
<td>Chief of financial office</td>
<td>Project team member</td>
</tr>
<tr>
<td>Person5</td>
<td>Accountant</td>
<td>Key user</td>
</tr>
<tr>
<td>Person6</td>
<td>Accountant</td>
<td>Project team member</td>
</tr>
<tr>
<td>Person7</td>
<td>Chief of export office</td>
<td>Key user</td>
</tr>
<tr>
<td>Person8</td>
<td>Chief Accountant</td>
<td>Project team member</td>
</tr>
<tr>
<td>Person9</td>
<td>Sales Director</td>
<td>Key user</td>
</tr>
<tr>
<td>Person10</td>
<td>Sales specialist</td>
<td>Project team member</td>
</tr>
</tbody>
</table>
The customer’s project team has been divided into two parts. The first part considered financial functions of the system and the second part considered logistic functions (inventories, sales, purchasing). To the first part of the project team belonged consultants implementing the following modules: General Ledger, Account Receivables, Account Payables, Fixed Assets, Cash Management. To the second part of the project team belonged consultants implementing the following modules: Inventory OPM and ODM, Order Management, Purchasing.

**Project’s milestones – plans and reality**

Project schedule contained the following milestones:

<table>
<thead>
<tr>
<th>Milestone</th>
<th>Planned end date</th>
<th>Real end date</th>
<th>Deviation [in days]</th>
</tr>
</thead>
<tbody>
<tr>
<td>End of definition chase</td>
<td>2007-12-31</td>
<td>2007-12-31</td>
<td>0</td>
</tr>
<tr>
<td>End of analysis chase</td>
<td>2008-04-11</td>
<td>2008-05-16</td>
<td>35</td>
</tr>
<tr>
<td>Site implementation tests</td>
<td>2008-06-13</td>
<td>2008-06-13</td>
<td>0</td>
</tr>
<tr>
<td>Business acceptance testing</td>
<td>2008-09-01</td>
<td>2008-08-29</td>
<td>-2</td>
</tr>
<tr>
<td>Business acceptance testing (production costs)</td>
<td>2008-09-01</td>
<td>2008-10-07</td>
<td>36</td>
</tr>
</tbody>
</table>
After analyzing the above data we can notice that three of the project’s milestones have been reached with a delay. An analysis phase has ended with a 35 days delay. Business acceptance testing (production costs accounting) has been reached with 36 days delay and the last one of the project’s milestones – the first end month closing confirmation – has been ended with almost two months delay. As the explanation it should be said that in April the reorganization of the supplier’s project team occurred. That reorganization has occurred because of an additional work load of the project team. The below tables show the supplier’s project team work schedule in the first three months of the project.

<table>
<thead>
<tr>
<th>Milestone</th>
<th>Planned end date</th>
<th>Real end date</th>
<th>Deviation [in days]</th>
</tr>
</thead>
<tbody>
<tr>
<td>accounting)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>End users training</td>
<td>2008-09-30</td>
<td>2008-09-30</td>
<td>0</td>
</tr>
<tr>
<td>System start up</td>
<td>2008-10-01</td>
<td>2008-10-01</td>
<td>0</td>
</tr>
<tr>
<td>First end month closing confirmation</td>
<td>2008-11-20</td>
<td>2009-01-11</td>
<td>51</td>
</tr>
</tbody>
</table>

Month 1

<table>
<thead>
<tr>
<th>Name and surname</th>
<th>Main project [load in %]</th>
<th>Second, parallel PROJECT [load in %]</th>
<th>Other Activities [load in %]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Financial_consultant_1</td>
<td>42</td>
<td>7</td>
<td>52</td>
</tr>
<tr>
<td>Financial_consultant_2</td>
<td>52</td>
<td>13</td>
<td>35</td>
</tr>
<tr>
<td>Financial_consultant_3</td>
<td>39</td>
<td>13</td>
<td>48</td>
</tr>
<tr>
<td>Financial_consultant_4</td>
<td>5</td>
<td>7</td>
<td>88</td>
</tr>
<tr>
<td>Financial_consultant_5</td>
<td>10</td>
<td>1</td>
<td>89</td>
</tr>
<tr>
<td>Logistic_consultant_6</td>
<td>66</td>
<td>0</td>
<td>34</td>
</tr>
<tr>
<td>Logistic_consultant_7</td>
<td>100</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Logistic_onsultant_8</td>
<td>28</td>
<td>0</td>
<td>72</td>
</tr>
<tr>
<td>Consultant_9_translator</td>
<td>14</td>
<td>0</td>
<td>86</td>
</tr>
</tbody>
</table>

Month 2

<table>
<thead>
<tr>
<th>Name and surname</th>
<th>Main project [load in %]</th>
<th>Second, parallel PROJECT [load in %]</th>
<th>Other Activities [load in %]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Financial_consultant_1</td>
<td>26</td>
<td>19</td>
<td>55</td>
</tr>
<tr>
<td>Financial_consultant_2</td>
<td>4</td>
<td>43</td>
<td>52</td>
</tr>
<tr>
<td>Financial_consultant_3</td>
<td>1</td>
<td>56</td>
<td>43</td>
</tr>
<tr>
<td>Financial_consultant_4</td>
<td>12</td>
<td>23</td>
<td>65</td>
</tr>
<tr>
<td>Financial_consultant_5</td>
<td>4</td>
<td>5</td>
<td>92</td>
</tr>
<tr>
<td>Logistic_consultant_6</td>
<td>72</td>
<td>0</td>
<td>28</td>
</tr>
<tr>
<td>Logistic_consultant_7</td>
<td>65</td>
<td>0</td>
<td>35</td>
</tr>
<tr>
<td>Logistic_onsultant_8</td>
<td>33</td>
<td>0</td>
<td>67</td>
</tr>
</tbody>
</table>
After analyzing the above tables we can notice that the financial part of the supplier’s project team has been involved more in a parallel project and other activities than in major project works.

4. System implementation problems during the project implementation in foreign countries

During the implementation of mentioned system, the following problems, which in direct way had an impact on the accomplishment of the project’s milestones delay, have occurred.

Language barrier – it belongs to one of most important problems in the processes implementation in the use of the rollout methodology. Because of very weak English language knowledge of the customer’s project team key users, all of project works have been led with a support of translators. Very often translators were making mistakes because of a very difficult technical and system vocabulary, and this is a direct reason of a substantial misunderstanding of the project’s activities. During whole project’s implementation, project’s teams hammered out theirs own international language. The customer’s consultants used some national language words of the supplier’s consultants and vice versa.

An incorrect person pointed out as the customer’s project team key users is a danger in relation to effectiveness of the rollout methodology. After analyzing data from table 1 which contains the customer’s project team structure we can notice that top management of the mentioned company was asked to be the key users in different modules. The CEO, Sales director, Production director, Chief controlling, Chief of supply office, Chief Accountant became the key users. This situation influenced in a direct way project’s work because those persons did not have time to get involved in project activities to a sufficient degree. An incorrect choice of team members influences in a direct way a low activity in project tasks.

The Supplier’s project team lack of experience. This issue influences in a direct way the time of project activities implementation. Without any doubts, the participation of young consultants in
the implementation of project tasks is an opportunity of knowledge about system implementation capturing, but it influences in a direct way the extension of time of project phases.

A low key users’ conscience about the integrated management systems, ERP. The mentioned implementation was the first of that kind of system implementations in that company. Because of that very often key users could not compare proposed functionalities of the implemented system with other system functionalities, and because of that theirs requirements are low.

Very low basic computer skills of most employees. According to project assumptions, basic computer skills training was not within the project scope. Most part of data is put to the system by peoples from the production, warehouses and purchasing areas. Within those areas the proportion of people without basic computer skills was the biggest. It influenced in direct way the quantity of service calls generated by those peoples in the support phase.

System modifications changing the model processes because of local legal requirements. Because of a lack of supplier’s project team experience, mentioned before, some client’s requirements have not been picked up during the analysis phase. That influenced moving the processes remodeling into the transition phase.

End users trainings made by outer training company without the supplier’s project team participation. Without any doubts outer training companies have a very big experience in system implementation, but all of them know standard system functionalities. In this case they did not know that specific system implementation and differences between system standards and implemented solutions. Trainings could be more effective with the supplier’s project team member’s participation because they have knowledge about business processes implemented in the company.

Network technical problems. Right after the system starts, network specialists started to do “network cleaning”. As a result, it caused a network access lack in essentials locations. Network restoration required a lot of time.

5. Conclusion

The rollout methodology can be used in production and commercial companies having the same activity profile. Major point of using this methodology is standardization of all of processes that function in a company according to a model implemented in the whole corporation. It is very important to remember that implementation works done in a foreign country to “model implementation” have more risk factors. Mostly it is a language barrier which very often is the main reason of a project delays. Additionally, in the article importance of team’s members’ activity has been demonstrated. Too many parallel different project works and not enough amounts of supplier’s consultants influence in a direct way the project task duration and is one of major risk factors influencing the whole project success. In this article some system implementation problems with the use of the rollout methodology have also been pointed out.
6. Literature


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THE INFORMATION FLOW MODELLING IN SOCIAL NETWORKS
IN THE ELECTRONIC ENVIRONMENT

Summary
There have been presented chosen models of marketing communication in the electronic environment and areas of decision support in a viral marketing in the article. They are carried out with the use of social networks on the Internet portals.

Keywords: Internet, social networks, viral marketing

1. Introduction
A development of computer technologies and establishing new business models have an influence on an environment evolution of marketing actions and create the demand for new methods of data processing. Using a connection structure within the frames of social networks, during analyses of consumers’ preferences, may be a data complement about demographic characteristics. It creates new possibilities of using so called viral marketing, where a basic assumption is to stimulate a message distribution within the frames of social connections. An aim of this article is to present chosen areas of decision support connected with the viral marketing and methods which provide a base for creating new solutions, which are orientated towards increasing the efficiency of marketing actions.

2. Influence analyses in social networks
The Internet popularisation contributed to creating a global communication system and establishment of many social networks based on the Global Network. Analysing relations between users may provide information not only for social sciences such as sociology, but it may bring notable economic benefits and support enterprises’ marketing activity. There were distinguished three types of contacts in virtual societies but at the same time they are also appropriate for social networks from a classical perspective (Fig. 1) [1]. Within a fist type (Densely knit group), members are characterised by many common features, they maintain permanent contact within their own group and weak contact with members of other community. Announcements are spread very quickly but their fluctuation is low. In the architecture of a second type (Ramified network), members more often establish contacts with external communities rather than within the frames of their network of contacts and they have diversified features. A third type (Glocalized network) is a „bridge” between homogeneous groups of the first type and heterogeneous groups of the second type.
A potential of a social network member is more and more often noticed in terms of its influence on other people. S. Miligram created a theory called „six-links chain of acquaintance” which assumes that any two people are separated from each other by other six people [7]. Miligram noticed that a small group of people is connected with everyone thanks to a few intermediaries and on the other hand, people are connected with each other thanks to this small group. In turn, E. Rosen determines such a person as a „Network Hub” what means a person which passes a message a higher number of people than [21] usual. Among network Hubs there were distinguished „Ordinary Hubs”, „Megahubs”, „Expert Hubs” and „Social Hubs”. There is a possibility of using mathematic and statistic methods which allow determining relations between members of social networks. They include the „HITS” (“Hypertext Induced Topic Search”) [11] algorithm which was designed by Jon Kleinberg and it is dedicated to searching and clustering junction in directed networks which are related e.g. to diffusion. It also finds its application in case of social networks. The algorithm divides elements into so called „concentrators” („Hubs”) and authorities. A particular junction in a network may be called a good concentrator when many other small concentrators appeal to it. The algorithm allows granting members of community a rank and this is why there is a possibility of diversification of acting methods for different users groups, what is especially important for the marketing activity of entities around which there are concentrated social networks such as community portals or Internet shops.

3. Marketing communication with the help of social networks

Structure of Internet application based on social networks, even in a first stage of the Internet development, gave a wide possibilities of marketing communicators distribution, using a scale effect and viral marketing assumptions [10]. There were introduced analytical models which enable measuring effects and influences in social networks. They are a natural direction of methods development which uses initial algorithms of knowledge data discovery and a direct marketing based on databases, which provide possibility of adjusting message content to receiver's
characteristics and they lower the uncertainty of campaign results (application areas were pointed out among others by C. X. Ling and C. Li [3]).

Within the frames of applications, P. Domingos and M. Richardson [6] defined a customer network value, which reflects not only a client's purchasing potential but also an ability to distribute a marketing message and recommend particular products or services. A formalized structure includes n potential customers, where Xi takes Bool's values from a set \{0, 1\} and represents an event of transaction realization, vertexes were identified as graph elements of network connections, which are a group of customers dependent on or connected with X\_i; N\_i={X\_i,1, X\_i,2, ..., X\_i,n_i}, which is included in a set X-{X\_i}. An identification of M\_i marketing actions with network elements and connected elements enabled a model construction based on Markov's networks presented in work [6], which provides a possibility of determining the customer network value.

In the area of the knowledge data discovery in the Internet, except typical directed methods towards processing WWW servers logs, there may be identified a group of integrated methods directed towards knowledge discovery from social network mining. One area is to use identification methods of social networks in data sets [17]. There are distinguished two fundamental approaches: linking objects into larger network structures and using agglomerative methods where every object is treated as one element concentration or a division method. In order to determine the graph quality division into communities, M.E. Newman and M. Grivan [18] defined a modular function which is determined on the basis of a distance between a number of edges within a chosen community and a value of connections for a network chosen at random. A base for processing data about network structures is an implementation of effective methods of knowledge data discovery from databases. The development of the electronic marketing enabled a gradual implementation of message, adjusting methods to receiver's parameters [22]. At the beginning there were implemented a simple targeting systems based on temporary parameters of a permanent or pulse emission; there were used geolocation parameters and available demographic data which come from the measurements directed towards a user. Another development direction includes a behavioural targeting [19] which is based on users’ behaviour patterns.

Analyses of network structures allow identifying new research areas and approaches verification during communication models organisation which were created while creating interactive media. Using marketing methods in accordance with the one to one model, defined by D.L. Hoffman and T. Novak [8], not always provide effects because of lack of data of information supports. In such a situation, it is possible to orientate marketing activities towards receivers connected with other elements of a social structure. Aggregate preferences of a community structure may be transferred onto a message receiver and lead to lowering uncertainty in comparison with its demographic and psychographics features. The communication model with the use of network structures was presented in Fig. 2, which combines elements of one to one and one to many communications and at the same time allows taking into consideration parameters from objects connected by preferences where parameters gained as a result of multilevel network structures processing are transferred to a message receiver.
Fig. 2. A model of marketing communication supported by network structures

There are distinguished stages of the communication process where a sender of N<sub>j</sub> message gains data sets connected with a receiver of O<sub>i</sub> message and Si social structure as well as preferences parameters. C<sub>j,k</sub> report is encoded into a form accepted by a medium and it is transmitted with the use of E<sub>j,m</sub> emission system to the receiver. Connecting the method of network patterns analysis with the communication model, gives possibility of integration with advertisement servers. Structure of the emission system which uses supporting parameters from elementary sets as well as advances the analysis of network structures enables moving aggregate parameters to users who are a part of a network of connections. Demands for loading k<sub>1</sub>, k<sub>2</sub>,…, k<sub>n</sub> advertisement messages are moved to MKSI communication module which is integrated with SI interactive environment where they are processed on the basis of PK advertisement campaign static parameters as well as BD data repository. To a module of network analyses goes information about U<sub>i</sub> user’s connected networks as well as aggregate data about preferences from social structures in which the user takes part. Data are processed with the use of collaborative filtration methods what allows adjusting message to receiver’s parameters.

4. Measurement methods of the marketing message effectiveness

A control of an advertising campaign (Fig. 3) [13] concerns results measurements on the basis of determined aims and expected activity. Results analyses are carried out one by one and they are a base for establishing corrective actions and an optimal tool structure used within the frames of the viral marketing campaign. Data which come from marketing message effectiveness analyses are used among others to evaluate actions and a level of realization of assumed aims. The result of archival campaigns allow us to answer questions if there was chosen an appropriate advertisement strategy, if its performance was correct and how true the model of advertisement effect turned out to be [9].

Fig. 3. A control process schema

Determining results of advertisement results within the frames of the viral marketing requires carrying out a series of researches connected with measuring short-term and long-term effects. Short-term effects concern economic effects and are particularly important in case of advertisement campaigns directed towards sales aims. It is not a method which provides a high accuracy because the sales depend on many factors. Long-term effects are connected with influencing receivers' emotional sphere what is especially significant in case of campaigns directed towards image aims. We use methods which examine opinions suitable for the marketing from a traditional perspective. Within this scope we may determine a message influence on client's attitudes, their behaviour or brand noticing. The effectiveness of viral marketing actions is considerably related to visiting WWW websites measured by information and Internet technologies. According to an ability criterion of carrying out measurements, we may distinguish viral contents into viral resources which make available a wide range of possibilities of spreading viral content and viral resources which make available limited possibilities within this scope. The first group includes contents based on a customer-server architecture and it makes it available thanks to stream media. The second group includes resources in a form of commuter files or text files. Such saved resources are a separate content and they spread without the server. Belonging to a group is flexible and determined by a multitude of communication channels through which the content is spread. Effectiveness researches of the first group is carried out according to an analysis of servers access registry files. Thanks to it, it is possible to determine data related to an Internet website (site-centric researches), among others interest in particular resources of a server, calling host IP number or on the basis of what requests there were transitions to resources [16]. In researches there is also used a measurement based on „tracking systems” which use a possibility of programming languages of Internet websites (dynamic WWW portals). A range of information provided by these systems is similar to the analysis of access registry files.

Another group of measurement methods provide information not only about website audience but also about receivers of viral contents. Within the frames of it, there is used so called „User's panel”, what means a long-term and permanent research method which monitors users’ activity by using software installed on their computers [20]. Thanks to this fact, it is possible to know their demographic and psychodemographic profile. A similar group of software consists of spying programs (Spyware) which record information about user’s activity in the Internet and then they send it to home servers. A personal profile of users may be also determined with the use of Internets services personalisation. The personalisation allows users’ segmentation and initial addressing advertisement resources to determined social groups but it is not sure if data are in accordance with the reality. Managing and controlling viral marketing actions is the most often in competences of advertising agencies. Specifications connected with using solutions are reserved or unavailable because of a commercial character of agency’s activity. To a lesser or greater degree they are made of above mentioned methods.

4. Conclusion

The determinants presented in the article are connected with a development of social networks in the Internet and they have influence on the electronic marketing and they determine evolution of marketing communication models, which are an indirect form between a mass and personalized communication. The influence of new conceptions causes marketing approaches verification and their adaptation to new conditions and possibilities. It stimulates a development of new fields of
researches and requires different look at users’ needs, which are changed with a change of expectations and a way of application functioning. The areas presented in the article as well as the solutions within the frames of adjusting message to customer’s preferences, show that there is a possibility of improving current applications by implementing systems of analyses of network connections, what may have influence on increasing the effectiveness marketing campaigns realized with the use of electronic media.

5. Literature


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OVERVIEW OF THE BUSINESS PERFORMANCE SOLUTIONS

Summary

The main aim of the present paper is to describe Business Performance Solutions (BPS), which are a subset of Business Analytics software category. BPS applications support strategy and performance management and financial management including profitability and costs optimization. The functionality of BPS software packages as well as main BPS vendors and products are presented in the paper.

Keywords: Business Performance Management, Balanced Scorecard, planning and budgeting, controlling, financial consolidation

1. Introduction

After introducing transactional ERP systems many enterprises built data warehouses and developed Business Intelligence applications by themselves. These homegrown solutions were often devoted to such areas as monitoring and reporting business results, planning and budgeting, financial and sales reporting and others. Nowadays more and more suppliers of information solutions have purpose-built software applications that are being offered as Business Performance Solution (BPS) packages. They are recommended to those firms, which are looking for integrated business analytics solutions for enterprise performance management and to those, which want to replace their homegrown solutions.

According to the Forrester Research Inc., Business Performance Solution is a purpose-built set of software applications consisting of applications for budgeting, forecasting, financial reporting, profitability analysis, and performance measurement [Hammermann 2009].

BPS category is a subset of a software category named Business Analytics, which encompasses the following segments: Data Warehouse generation and Data Warehouse management, query/reporting/analysis, advanced analytics, spatial information management analytics, financial performance and strategy management applications, Customer Relationship Management analytics, workforce analytics, supply chain production planning, services operation analytics and other supply chain analytics (see fig.1).

The specific feature of BPS is that it helps enterprises to link corporate strategies and objectives with operational activities measures and, in consequence, helps to drive them down to many individuals within the organization to encourage accountability and control. That is due to including Balance Scorecard application module in BPS package.

BPS is usually data warehouse-based system and uses Business Intelligence tools and methods, such as On-line Analytical Processing (OLAP) and data mining. The reports, analysis results and results of key performance indicators are presented on a corporate portal, which is a typical distribution channel in Business Intelligence systems.
According to the Forrester Research Inc., the BPS market will still grow, despite the financial crisis [1]. One can conclude that BPS are considered to be of great importance for more and more managers. In Polish literature Business Performance Solutions are hardly described. The goal of this paper is to present the functionality of BPS and the comparison of packages offered by main BPS vendors.

![IDC’s Business Analytics Taxonomy, 2007](source: [4])

*Fig. 1. IDCl’s Business Analytics Taxonomy, 2007*
2. The characteristics of Business Performance Solutions

Most of the Business Performance Solutions platforms consist of four main modules [1, 3]:
- Financial reporting and consolidation.
- Planning, budgeting, and forecasting.
- Strategy and performance measurement.
- Cost and profitability management.

The general architecture of BPS is presented on the following scheme (fig. 2).

![Business Performance Solutions Architecture](source: Own elaboration)
Financial Reporting and Consolidation applications produce reports focused on delivering financial statements based on the accounting results. Consolidation module usually operates on data warehouse where financial data coming from various divisions and departments is gathered. Their task is to support statutory consolidations according to generally accepted accounting principles (such as GAAP requirements). The second module supports reporting of both types of financial information: external and internal.

Planning, budgeting, and forecasting applications support planning, forecasting and controlling processes within the organization. The budgeting module allows to plan and control costs, expenses, incomes and revenues in multidimensional view. In addition, the planning solutions usually support a variety of scenario-based planning activities as well as forecasting processes that add value beyond that provided by traditional budgeting processes.

Strategy and performance measurements are essential for managing the business strategies. They deliver a platform for definition and implementation of strategies at any level, from departments to business lines and throughout the company. The applications allow defining, analyzing and reassessing the strategies over time. They support formal strategy management philosophies (e.g. the Balanced Scorecard) but might be adapted to business specific needs. The applications can display the strategy definition and objects in visual strategy maps. They help to populate, manage and monitor any kind of objectives. Scorecards are used for measuring the progress against the goals and objectives, whereas performance dashboards are used for displaying more detailed information by drilling down to the root-cause detail. Dashboards typically include a variety of key performance indicators (KPIs) that might include strategic scorecards as well as relevant comparisons against plans, budgets, forecasts, prior performance, and industry benchmark data (fig. 3). They are a common part of all BPS applications.

![Performance Dashboards](fig. 3. Performance dashboards – an example)
Cost and Profitability Management modules support implementation of detailed costing and profitability models and analysis, what is necessary for margins improvement. The models reflect business complexity and help organizations to analyze operating costs and overheads against revenues by product, customers, and lines of business. The applications often use activity-based costing as the methodology to develop sophisticated cost and profitability analytical models. The unit activity costs can be used as one of the measures in Balanced Scorecard.

3. BPS packages overview

At present six large vendors — IBM, Infor, Microsoft, Oracle, SAP, and SAS Institute — dominate the BPS market. That is the result of the market consolidation in the last few years, especially in 2007, when SAP overtook Business Objects [6], IBM – Cognos [7] and Oracle – Hyperion [2]. There is a number of business intelligence (BI), enterprise resource planning (ERP), specialists, and BPS pure plays on the market, which offer a variety of interesting alternatives. When choosing the BPS vendor it is necessary to learn the functionality of the products they offer, because the breadth of coverage of the BPS functional components can vary widely, and has no correlation to the overall size of the vendor, as shown in the more detailed vendor guide below (Table 1).

Table 1 A Guide To the BPS Vendors And Products

<table>
<thead>
<tr>
<th>Vendor</th>
<th>Key product(s)</th>
<th>Planning, budgeting, and forecasting</th>
<th>Financial consolidation</th>
<th>Strategy and measurement</th>
<th>Cost and profitability management</th>
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Source: Forrester Research Inc.
4. Conclusions

The BPS package is an integrated applications package that helps managers to monitor how the strategy, strategic and operational objectives are realized. It is based on the Data Warehouse technology and uses end-user Business Intelligence tools such as query and reporting tools, dashboards, scorecards, spreadsheets etc.. The analysis results (reports, tables, graphs, KPI, ratios, measures) can be embedded on a corporate portal platform and accessible via Internet Explorer or other web browser.

There are a lot of purpose-built BPS packages on the market, but not all of them offer all four functional components, which are necessary for effective business performance management.

Business Performance Solutions retrieve information from several sources in order to provide a unified and up-to-date view of the company performance. One must remember that the effectiveness of BPS is determined by the quality of source data, which is gathered in transactional databases.

5. Literature


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We discuss an approach to fuzzy linguistic summaries of data (bases) in the sense of Yager, i.e., for instance, if we have a (large) database on employees, and we are interested in a relation between the age and qualifications, then it may be summarized by, say, “most young employees are well qualified”. We present the derivation of such linguistic summaries in the context of Zadeh’s computing with words and perceptions paradigm, and consider his recent idea of a protoform to define and handle more general forms of summaries as proposed by Kacprzyk and Zadrożny. We present an implementation for a small to medium computer retailer, and show how data from the internet can qualitatively enhance the summarization results.

Keywords: decision making, decision support systems, data mining, linguistic summary, natural language generation

1. Introduction

We address the problem of how to deal with too large sets of data that are not comprehensible by the human user. We seek some highly human consistent data mining tools that are simple and possibly inexpensive, preferably based upon the use of (quasi)natural language.

We present an approach advocated in our works (cf. Kacprzyk [4], Kacprzyk, Yager and Zadrożny [7, 8, 9], Kacprzyk and Zadrożny [19, 24, 26]. We propose the use of linguistic data(base) summaries in the sense of Yager (cf. Yager [32], Kacprzyk and Yager [7], Kacprzyk, Yager and Zadrożny [8, 9]) whose essence is that a set of data, e.g. on employees can be summarized linguistically with respect to a an attribute(s) selected by the user or automatically, e.g. age and salaries, by linguistically quantified propositions, e.g. “almost all employees are well qualified”, “most young employees are well paid”, etc. These are simple, human consistent and intuitive statements which are also extremely scalable in a conceptual sense as they are meaningful for all sizes of data sets.

We present the essence of this approach to such summaries, with further extensions (cf. Kacprzyk and Yager [7], Kacprzyk, Yager and Zadrożny [8, 9]) from the perspective of Zadeh’s computing with words and perception paradigm (cf. Zadeh and Kacprzyk [40, 41]), in particular using Zadeh’s [39] concept of a protoform of a fuzzy linguistic summary, adopted to the context of linguistic summaries by Kacprzyk and Zadrożny [24, 26].

We show an implementation of the data summarization in a sales database of a computer retailer and show how this can support decision making.
The basic philosophy of the approach makes use of the computing with words and perception paradigm introduced by Zadeh in the mid-1990s (cf. Zadeh and Kacprzyk's [40, 41] books). Recently, Zadeh [39] introduced the concept of a protoform, and Kacprzyk and Zadrożyński [24, 26] showed that protoforms play a crucial role in the linguistic summarization. One should notice that most perceptions are summaries. For instance, a perception like "most Swedes are tall" is some sort of a summary. It can be represented in Zadeh's notation as "most As are Bs" which, by a further definition of a protoform as an abstracted summary, may be "QAs are Bs". Notice that we now have a more general, deinstantiated form of our point of departure (most Swedes are tall), and also of "most As are Bs". Most human reasoning is protoform based.

We present an implementation of Yager's [32, 33] idea, mainly using Kacprzyk and Yager's [7], and Kacprzyk, Yager and Zadrożyński's [8, 9] extensions. We employ Kacprzyk and Zadrożyński's [13, 21] interactive approach to linguistic summaries via Kacprzyk and Zadrożyński's [10, 11, 12] FQUERY for Access, a fuzzy querying add-on to Access. We show that by relating various types of linguistic summaries to fuzzy queries, with various elements known and sought, we arrive at a hierarchy of protoforms of linguistic summaries which was proposed and extensively studied in Kacprzyk and Zadrożyński [24, 26]. Finally, we present an application for a sales database of a computer retailer.

2. Linguistic Data Summaries via Fuzzy Logic with Linguistic Quantifiers

In Yager's [32, 33] linguistic summary of a set of data, we have: (1) \( V \) - a quality (attribute) of interest, with numeric and non-numeric (e.g. linguistic) values - e.g. salary in a database of workers, (2) \( Y = \{y_1, \ldots, y_n\} \) - a set of objects (records) that manifest quality \( V \), e.g. the set of workers; \( V(y_i) \) - values of quality \( V \) for object \( y_i \), (3) \( D = \{V(y_1), \ldots, V(y_n)\} \) - a set of data (database)

A linguistic summary of data set consists of:

- a summarizer \( S \) (e.g. young),
- a quantity in agreement \( Q \) (e.g. most),
- truth (validity) \( T \) - e.g. 0.7,

as, e.g., "\( T(\text{most of employees are young})=0.7 \)".

The calculation of the truth (validity) of a linguistic summary considered in this section is equivalent to the calculation of the truth value (from [0,1]) of a linguistically quantified statement (e.g., "most of the employees are young"), using either Zadeh's calculus of linguistically quantified statements (cf. Zadeh [37]) or Yager's OWA operators (cf. Yager and Kacprzyk [35]).

A linguistically quantified proposition, exemplified by "most experts are convinced", is written as "\( Q \) y's are \( F \)" where \( Q \) is a linguistic quantifier (e.g., most), \( Y = \{y\} \) is a set of objects (e.g., experts), and \( F \) is a (usually) fuzzy property (e.g., convinced). With importance added, \( B \), we get "\( QBY \)'s are \( F \)" , e.g., "most (\( Q \)) of the important (\( B \)) experts (\( y \)'s) are convinced (\( F \))". We seek truth( \( Qy \)'s are \( F \)) or truth( \( QBy \)'s are \( F \)) , respectively, knowing truth( y is \( F \)), \( \forall y \in Y \).
Using Zadeh's [37] fuzzy-logic-based calculus of linguistically quantified propositions, property $F$ and importance $B$ are represented by fuzzy sets in $Y$, and a (proportional, nondecreasing) linguistic quantifier $Q$ is assumed to be a fuzzy set in $[0,1]$ as, e.g.

\[
\mu_Q(x) = \begin{cases} 
1 & \text{for } x \geq 0.8 \\
2x - 0.6 & \text{for } 0.3 < x < 0.8 \\
0 & \text{for } x \leq 0.3 
\end{cases} \tag{1}
\]

Then:

\[
\text{truth}(Qy's \text{ are } F) = \mu_Q\left(\frac{1}{n} \sum_{i=1}^{n} \mu_F(y_i)\right) \tag{2}
\]
\[
\text{truth}(QBy's \text{ are } F) = \mu_Q\left(\frac{\sum_{i=1}^{n} (\mu_B(y_i) \land \mu_F(y_i))}{\sum_{i=1}^{n} \mu_B(y_i)}\right) \tag{3}
\]

We can also use an OWA operator (cf. Yager and Kacprzyk [35]) of dimension $p$ which is a mapping $O: [0,1]^p \rightarrow [0,1]$ if with $O$ is associated $W = [w_1, \ldots, w_p]^T$, $w_1 + \cdots + w_p = 1$, $w_i \in [0,1]$, a weighting vector, and ($b_i$ is the $i$-th largest element among $x_1, \ldots, x_p$) $B = [b_1, \ldots, b_p]$:

\[
O(x_1, \ldots, x_p) = w_1b_1 + \cdots + w_pb_p = W^T B \tag{4}
\]

Notice that $w_1 = \cdots = w_{p-1} = 0$ and $w_p = 1$ correspond to the aggregation related to the quantifier “for all” (i.e. taking into account the largest maximal element); $w_1 = 1$ and $w_2 = \cdots = w_p = 0$ correspond to that related to the quantifier “for at least one” (i.e. taking into account the minimal element), through all intermediate situations as, e.g. corresponding to a linguistic quantifier $Q$ when the OWA weights may be found as

\[
w_i = \mu_Q\left(\frac{i}{p}\right) - \mu_Q\left(\frac{i-1}{p}\right) \tag{5}
\]

For the OWA operators for importance qualified data, suppose that we have $A = [a_1, \ldots, a_p]$, and a vector of importances $V = [v_1, \ldots, v_p]$ such that $v_i \in [0,1]$ is the importance of $a_i$, $i = 1, \ldots, p$. $v_1 + \cdots + v_p = 1$. Then (4) becomes:

\[
O_V(x_1, \ldots, x_p) = \overline{w}_1b_1 + \cdots + \overline{w}_pb_p = \overline{W}^T B \tag{6}
\]

where

\[
\overline{w}_i = \mu_Q\left(\frac{i}{p}\right) \tag{7}
\]
\[ w_j = \mu_Q \left( \frac{j}{\sum_{k=1}^{p} u_k} \right) - \mu_Q \left( \frac{j-1}{\sum_{k=1}^{p} u_k} \right) \]  

(7)

in which \( u_k \) is the importance of \( b_k \), the \( k \)-largest element of \( A \) (i.e. the corresponding \( v_k \)).

3. A Fuzzy Querying Add-on for Formulating Linguistic Summaries

In Kacprzyk and Zadrożyń’s [3, 21] approach, it is assumed that in practice a fully automatic determination of an aspect that is interesting for the user is impossible, and \textit{interactivity}, i.e. user assistance, is in the definition of summarizers (indication of attributes and their combinations) necessary. This is via a user interface of a fuzzy querying add-on, FQUERY for Access which has been proposed and developed by Kacprzyk and Zadrożyń [10, 11, 12] inspired by Kacprzyk and Ziolkowski’s [28] and Kacprzyk, Zadrożyń and Ziolkowski’s [27] proposals of database queries with fuzzy linguistic quantifiers. Obviously, fuzzy queries directly correspond to summarizers in linguistic summaries. Thus, the derivation of a linguistic summary may proceed in an interactive (user-assisted) way as follows: (1) the user formulates a set of linguistic summaries of interest (relevance) using the fuzzy querying add-on, (2) the system retrieves records from the database and calculates the validity of each summary adopted, and (3) a most appropriate linguistic summary is chosen.

We restate linguistic summarization in the fuzzy querying context. The two propositions with fuzzy linguistic quantifiers (without and with importance) are now:

"Most records match query \( S \)"  
"Most records meeting conditions \( B \) match query \( S \)"  

(8)  
(9)

In database terminology, \( B \) corresponds to a \textit{filter} and (9) claims that \textit{most} records passing through \( B \) match query \( S \).

The concept of a protoform (Zadeh [39]) is highly relevant here. A protoform is defined as an abstract prototype, that is, for the query (summary) given by (8) and (9) as, respectively:

"Most \( R \)'s are \( S \)"  
"Most \( BR \)'s are \( S \)"  

(10)  
(11)

where \( R \) means "records", \( B \) is a filter, and \( S \) is a query.

Evidently, protoforms may form a hierarchy, and we can define higher level (more abstract) protoforms, e.g. replacing \textit{most} by a general linguistic quantifier \( Q \):

"\( QR \)'s are \( S \)"  
"\( QBR \)'s are \( S \)"  

(12)  
(13)

Basically, the more abstract forms correspond to cases in which we assume less about summaries sought. In Table 1 five basic types of linguistic summaries are shown.
Table 1: Classification of linguistic summaries

<table>
<thead>
<tr>
<th>Type</th>
<th>Given</th>
<th>Sought</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>S</td>
<td>Q</td>
<td>Simple summaries through ad-hoc queries</td>
</tr>
<tr>
<td>2</td>
<td>S B</td>
<td>Q</td>
<td>Conditional summaries through ad-hoc queries</td>
</tr>
<tr>
<td>3</td>
<td>Q S\text{structure}</td>
<td>S\text{value}</td>
<td>Simple value oriented summaries</td>
</tr>
<tr>
<td>4</td>
<td>Q S\text{structure} B</td>
<td>S\text{value}</td>
<td>Conditional value oriented summaries</td>
</tr>
<tr>
<td>5</td>
<td>Nothing</td>
<td>S B Q</td>
<td>General fuzzy rules</td>
</tr>
</tbody>
</table>

where S\text{structure} denotes that attributes and their connection in a summary are known, while S\text{value} denotes that these values are sought; some placeholders for numerical values are left.

Type 1 may be easily obtained by a simple extension of FQUERY. The user has to construct a query – a candidate summary, and it is to be determined which fraction of rows matches that query and which linguistic quantifier best denotes this fraction. Type 2 is a straightforward extension of Type 1 by adding a fuzzy filter. The summaries of Type 1 and 3 have been implemented as an extension to FQUERY for Access. For an extensive analysis of various issues related to the use of protoforms in the context of summarization, see Kacprzyk and Zadrożyń [24, 26].

4. Implementation

Our implementation concerns a computer retailer, and we deal with its sales database whose basic structure is shown in Table 2.

Table 2. The basic structure of the database (in the “dbf” type format)

<table>
<thead>
<tr>
<th>Attribute name</th>
<th>Attribute type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date</td>
<td>Date</td>
<td>Date of sale</td>
</tr>
<tr>
<td>Time</td>
<td>Time</td>
<td>Time of sale transaction</td>
</tr>
<tr>
<td>Name</td>
<td>Test</td>
<td>Name of the product</td>
</tr>
<tr>
<td>Amount (number)</td>
<td>Numeric</td>
<td>Number of products sold in the transaction</td>
</tr>
<tr>
<td>Price</td>
<td>Numeric</td>
<td>Unit price</td>
</tr>
<tr>
<td>Commission</td>
<td>Numeric</td>
<td>Commission (in %) on sale</td>
</tr>
<tr>
<td>Value</td>
<td>Numeric</td>
<td>Value = amount (number) x price; of the product</td>
</tr>
<tr>
<td>Discount</td>
<td>Numeric</td>
<td>Discount (in %) for transaction</td>
</tr>
<tr>
<td>Group</td>
<td>Test</td>
<td>Product group to which the product belongs</td>
</tr>
<tr>
<td>Transaction value</td>
<td>Numeric</td>
<td>Value of the whole transaction</td>
</tr>
<tr>
<td>Total sale to customer</td>
<td>Numeric</td>
<td>Total value of sales to the customer in fiscal year</td>
</tr>
<tr>
<td>Purchasing frequency</td>
<td>Numeric</td>
<td>Number of purchases by customer in fiscal year</td>
</tr>
<tr>
<td>Town</td>
<td>Test</td>
<td>Town where the customer lives or is based</td>
</tr>
</tbody>
</table>

We will now give some examples of linguistic summaries. First, suppose that we seek a relation between the commission and the type of goods sold. The best linguistic summaries obtained are as in Table 3.
Table 3. Linguistic summaries expressing relations between the group of products and commission

<table>
<thead>
<tr>
<th>Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>About ½ of sales of network elements is with a high commission</td>
</tr>
<tr>
<td>About ½ of sales of computers is with a medium commission</td>
</tr>
<tr>
<td>Much sales of accessories is with a high commission.</td>
</tr>
<tr>
<td>Much sales of components is with a low commission</td>
</tr>
<tr>
<td>About ½ of sales of software is with a low commission</td>
</tr>
<tr>
<td>About ½ of sales of computers is with a low commission</td>
</tr>
<tr>
<td>A few sales of components is without commission</td>
</tr>
<tr>
<td>A few sales of computers is with a high commission</td>
</tr>
<tr>
<td>Very few sales of printers is with a high commission</td>
</tr>
</tbody>
</table>

In Table 4 we show some linguistic summaries expressing relations between the attributes: size of customer, regularity of customer (purchasing frequency), date of sale, time of sale, commission, group of product and day of sale. This is an example of the most sophisticated form of linguistic summaries supported by the system described.

Table 4. Linguistic summaries expressing relations between the attributes: size of customer, regularity of customer (purchasing frequency), date of sale, time of sale, commission, group of product and day of sale

<table>
<thead>
<tr>
<th>Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Much sales on Saturday is about noon with a low commission</td>
</tr>
<tr>
<td>Much sales on Saturday is about noon for bigger customers</td>
</tr>
<tr>
<td>Much sales on Saturday is about noon</td>
</tr>
<tr>
<td>Much sales on Saturday is about noon for regular customers</td>
</tr>
<tr>
<td>A few sales for regular customers is with a low commission</td>
</tr>
<tr>
<td>A few sales for small customers is with a low commission</td>
</tr>
<tr>
<td>A few sales for one-time customers is with a low commission</td>
</tr>
<tr>
<td>Much sales for small customers is for nonregular customers</td>
</tr>
</tbody>
</table>

Notice that the linguistic summaries obtained provide much of relevant and useful information, and can help the decision maker make decisions.

Recently (cf. Kacprzyk and Zadrożyń [26]) we extended the above system. Notice that the above summaries involve only data from the own database. However, no company operates in a vacuum, and some external data (e.g. on climate when the operation and/or results depend on climatic conditions, national and global economic indicators, etc.) should be taken into account. In our system, climatic data are accounted for. Such data are widely available and the Internet is the best source of such data, inexpensive and easily available.

Now, relations between group of products, time of sale, temperature, precipitation, and type of customers, the best linguistic summaries (of both our “internal” data from the sales database, and “external” meteorological data from an Internet service) are as in Table 5.
Table 5. Linguistic summaries expressing relations between the attributes: group of products, time of sale, temperature, precipitation, and type of customers

<table>
<thead>
<tr>
<th>Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very few sales of software in hot days to individual customers</td>
</tr>
<tr>
<td>About 1/2 of sales of accessories in rainy days on weekends by the end of the year</td>
</tr>
<tr>
<td>About 1/3 of sales of computers in rainy days to individual customers</td>
</tr>
</tbody>
</table>

Notice that the use of external data gives a new quality to possible linguistic summaries.

5. Conclusion

We presented an interactive, fuzzy logic based approach to linguistic summarization of databases, human consistent and easily comprehensible by human beings. Through the use of Zadeh’s computing with words and perceptions paradigm, and of protoforms we attained a high human consistency and scalability. The implementation presented shows that linguistic summaries can be helpful for real life decision making in a company.

6. Literature


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APPLICATION FOR STOCK INVESTOR

Summary

In this paper an application for stock investor is described. The application helps the user make deliberate decisions on the stock market and minimise the risk of loss. It enables investor to create and manage his investment portfolio so that he has always direct access to data and statistics concerning all his transactions. The first part of the paper focuses on some techniques used for analysing historical stock data, which have been implemented in the application. Next, system requirements based and utilized technologies are described. The following section deals with implementation and final result description. At the end conclusions about performed system are summarized.

Keywords: Information system, stock market exchange,.NET platform, SQL Server, databases, network applications, technical analysis

1. Introduction

Globalization and internationalization of financial markets made that stock exchanges all over the world are strictly connected. Of course influence of New York Stock Exchange is much bigger than Warsaw Stock Exchange, but it does not brake the rule. Today’s financial crisis caused stock prices fall down everywhere. Situation changes very fast and stock trader has to react immediately. The question is how to utilise gathered knowledge to successfully trade stocks. Activity of stock exchange is very good documented, data about previous sessions are known and available. Trader can manage possessed knowledge using technical analysis. Technical analysis means studying of price market behaviours using calculations, illustrated on charts, which gives us prediction of future prices. Technical analysis can also be described as a financial markets technique that claims the ability to forecast the future direction of security prices through the study of past market data, primarily price and volume. Technical analysis bases on some observations which can be made while analysing stock market data. Technical analysts may employ models and trading rules based, for example, on price transformations, such as the Relative Strength Index (RSI), moving averages (e.g. MACD - Moving Average Convergence/Divergence) is the most common used indicator., regressions, inter-market and intra-market price correlations, cycles or, classically, through recognition and analysis of chart patterns. Technical analysts are seeking to identify price patterns and trends in financial markets. While technicians use various methods and tools, the study of price charts is primary. Technicians especially search for archetypal patterns, such as the well-known head and shoulders reversal pattern, and also study such indicators as price, volume, and moving averages of the price. There are of course known some share prices common behaviours such as for example, when price goes up through trend line it means that the price will still be
growing. These behaviours are called price formations. Additionally many technical analysts also follow indicators of investor psychology (market sentiment). Basically technical analysis leans on three global rules. The fist is: market action discounts everything. Based on the premise that all relevant information is already reflected by prices, technical analysts believe it is redundant to do fundamental analysis - they say news and news events do not significantly influence price. The second one is: prices move in trends. Technical analysts believe that prices trend. There can be three kinds of trends: up, down or sideway (flat). The third is: history tends to repeat itself. Technical analysts believe that investors collectively repeat the behaviour of the investors that preceded them. For example “This company’s technology will revolutionize its industry, therefore this stock will skyrocket” is example of investor sentiment repeating itself. To a technician, the emotions in the market may be irrational, but they exist. Because investor behaviour does repeat itself so often, technicians believe that recognizable (and predictable) price patterns will develop on a chart. Indicators serve three broad functions: to alert, to confirm and to predict. An indicator can act as an alert to study price action a little more closely. If momentum is warning, it may be a signal to watch for a break of support. Or, if there is a large positive divergence building, it may serve as an alert to watch for a resistance breakout. Indicators can be used to confirm other technical analysis tools. If there is a breakout on the price chart, a corresponding moving average crossover could serve to confirm the breakout. Or, if a stock breaks support, a corresponding low in the On-Balance-Volume could serve to confirm the weakness. Some investors and traders use indicators to predict the direction of future prices.

To effectively perform technical analysis investor has to use specialised software tools. Additionally such tools have to be Internet based applications, because stock exchange data are available through this channel. Today there are many applications that pretend to be very useful for stock exchange market player. But actually there is one leader – MetaStock that was created by Equis International Company that belongs to Reuters. MetaStock is a professional application for preparing very complicated technical analysis, optimisations and simulations. MetaStock key features and modules are:

- Indicator Builder it is a formula writing module with math and technical analysis functions. With this module user can design his own indicators and test them on the real data.
- The ExplorerTM. With The Explorer, user can sort and rank results to find only the securities with good profit potential. The Explorer can calculate the current value of users’ favourite indicators and calculate daily buy-and-sell signals.
- OptionScope® it is a tool for options traders to calculate option price and implied volatility based on the price of the underlying security.

For individual investor mentioned programme is very expensive and complicated. In case of box applications it is very common to pay for many programme elements that the user does not need. It is a market for simpler applications, easy to learn, but form the other side supporting main stock exchange indicators. Such application should prepare analysis, present it on charts, store data and simulate stock market operations, to give chance for not experienced investor to learn how to invest. We decided to create such application dedicated for Warsaw Stock Exchange. This paper aims at presenting design and implementation process of computer application which helps the user make deliberate decisions on the stock market and minimise the risk of loss. The application enables investor to create and manage its investment portfolio so that he has always direct access to data and statistics concerning all his transactions.
2. Requirements, design and implementation of the project

Now we outline the basic assumptions of the stock investor supporting application project. The main goal was to prepare tool that can prepare technical analysis and simulate stock market operations. Application should import real stock market data; we assume that such import will be done through internet. Because application is dedicated for Polish investor we limited to for Warsaw Stock Exchange. If somebody wants to deal with other market it is possible, but source of quotations is needed. User can analyse data in tabular (digital) and graphical form and make decisions. We do not assume that our system is integrated with brokerage houses; it means that if user wants really to buy shares he has to do it outside our system for example by phone order. The main feature of the application should be the possibility to simulate stock exchange market play. User can have virtual wallet and invest virtual money, but virtual decisions are connected with real market prices. In such situation user, after time period, can verify results and make an estimation of decisions. We assume that user can have more than one wallet. It gives him chance to compare two (or more) investment strategies, for example one wallet can be connected with real investor decision, the second with different possible strategy. Additionally we stipulate that our application can be used by more than one investor. As a consequence interface to manage user accounts was needed and we have to add administrator role. All data, historical quotations and history of operations for every user, should be stored permanently in the database.

Developing application must start from choosing developing application methodology. Nowadays, graphical developing tools help programmers create application interface very fast. The best choice for developing applications is to use prototyping method. It’s based on creating working skeleton of application, with static data, so potential user may go through and see all planned application behaviours. Thanks to that, application is more fitted to user requirements because from early developing phases, programmer is in touch with the end user who tells him whether the application is suitable for him or not. We followed this approach and process was started from prototypes. During the implementation we consulted with potential users frequently.

We decided to use the following technologies: Visual Studio 2008 Professional with C# as main programming language and relational database SQL Server 2005 with T-SQL – database language. It is possible to use free versions of mentioned software C# Express and SQL Server Express. To create charts there was used external library – ZedGraph. It was because .NET Framework even offers many graphic controls does not support charts, we decided to use ZedGraph, a free library for non-commercial use with big capabilities. This library integrates easily with C# code.

Architecture of stock investor system is relatively simple (see Fig. 1). Main application is installed on the client machine. Database may be installed on the same machine or on independent server. Quotations server is outside our system, we have chosen www.money.pl. This service is freely available during the stock exchange market session and contains data that are 15 minutes delayed from real time data, and after the session ends it contains end session data. When the user wants to update data on application, he connects to quotations server and retrieves data. Data are stored in the database and from that moment they will be visible in the user application. Every user activity like buying/selling shares, money operations and so on is stored in the database. Thanks to this when the database server is installed at client machine or available from the Internet, the user can connect to it from all over the world and has his virtual wallet and statistics with him.
Client application is divided into six main functional parts - components (see Fig. 2). The first StockMarket includes frontend which consists all windows forms, and utilizes ZedGraph library. For passing data between forms there were designed special type of classes which implements singleton design pattern. In all window forms, information is passed to such class and in new window there is created reference to this class. Thanks to that this object is a singleton object, it can’t exists twice in the application and data included in it is available in every place in application.
Frontend is a graphical user interface of the application. It contains all classes that represents programme windows, and other related objects like controls, classes for storing constants values. Figure 3 represents connections and flow between frontend windows. Each window has code to invoke methods from other system parts. Thanks to that all user interface is separated from application logic.

![Diagram](image)

**Fig. 3. Frontend windows flow**

Source: Own preparation

Component User contains methods to deals with user data. It realizes logging user to the system, adding/changing user data and status and retrieving users form DB. Next component Wallet is responsible for realizing operations on user virtual wallet. It contains methods for buying/selling shares, adding/removing money, counting wallet value for any date in the past and for the present time, retrieves wallet history like all past transactions, adding/removing money operations. StockData component contains methods to realize all functionality that has direct connection with data. It contains methods to retrieve data from database, search data with some conditions, and update data in DB form Internet source. Component StockMarketDataStructs contains all data structures that are used by other parts of the system. By data structures we mean classes, enumerators and other objects that store and describe data in the system. Those classes describe stock market application functionality. There are two minor components (not presented on Fig. 2) Constant contains constant classes with global fields, and StockMarketCommon contains common methods used in many places in application. Last main component is DBAccess
which separates functional tier form database. It contains methods to manage database connection and transactions.

We shortly describe system database (database schema detailed description is presented in[5]). There are following tables: Transactions, Companies, Current_Quotations, Historical_Quotations, Money_Manager, Users and Wallets. Transactions table is used to store all user transactions such as buying, selling shares. Thanks to that value of the wallet can be calculated for any past date. All company information like name, description are stored in Companies table. This table contains all companies that are now or were in the past on the exchange. Current quotations table is used to store latest quotations. As we mentioned earlier during the stock exchange market session it contains data that are 15 minutes delayed from real time data, and after the session ends it contains end session data. Historical quotations table contains previous session data. This data values are used to calculate indicators, prepare statistics and charts. Money manager table contains data that are affected operations on the user money. Those operations are: adding money to wallet and remove money from wallet. Users table stores all users’ presents on the system. Wallet table stores basic information about user wallets. It connects wallets to their owners. All changes (inserts, deletes, updates) on the database are realized using database stored procedures. Transactions used for this operations are committed not in procedure but in application method. Thanks to this we can call many stored procedures and after checking execution of them commit or rollback whole transaction.

3. System functionality

We describe now shortly system functionality. After programme is started if the user already has an account created in the system he can log in, by passing his user name and password and clicking “Log in” button. If not, he needs to create new account by clicking on the “Add new user” button. After that there will be displayed user management window. After proper authorization the user will see the main program window. If no data is displayed, click on the update button will connect to the www.money.pl website and download the latest quotations. After that all data in the grid will be updated with the latest available data in the source. Each quotation row presented in the main application window has a colour which tells if the company price fell or not in comparison to the last close price (price at the end of the previous day). The green colour means that company’s current price is bigger than the latest company’s close price, red one means opposite, and yellow tells that there is no difference between current price and the latest close price. After double clicking on the company row there will be presented company details window. There is a possibility to add this company to the wallet, show company’s charts or calculate indicator for the selected company. If user does not have a wallet created yet he need to create one. After creation of wallet user can add or sell shares, add money to wallet or remove it. All available actions are presented on the down left side of the screen. To buy share in the “Wallet management” window user should select the wallet in which want to put the bought share and click on the “Buy” button. In the displayed window write all information about transaction and click “Buy” button. To sell shares user has to select wallet and, on the list presented on the left, select company to be sold. In new window fill in transaction information and click “Sell” button. Removing money from the wallet is possible after click on the “Remove money” button and on the new window write the amount of money user want to remove. To see the wallet statistics user can click on the “Statistics” button. There will be displayed a new window where user need to write
date from and date to of analysis period. Each operation on the wallet such as buying or selling shares, or adding money is stored in database. In every moment user can view operations he made in the past. To see wallet history click on the “Operation history” button. In the new window one can select dates to generate history. On the grid there will be presented all wallet transactions in selected period of time (see Fig. 4). In the window there are two tabs. In the first one there are presented operations connected with shares. So there will be only buying or selling shares operations. In the second one there are only money operations like adding, removing money from the wallet.

![Fig. 4 Operation history grid window](source: Own preparation)

Most important is technical analysis, to calculate MACD indicator user has to click on the menu icon. On the displayed chart (Fig. 5), there are curves and some vertical lines. One of them (green) tells user to buy share in this day, other (red) suggests to sell share.
4. Conclusion

Prototyping methodology used to create stock investor application was very successful. We design and developed useful application. The functionality of the system has been changed several times to meet potential users’ expectations, they decided about location of each element so that it could fulfil their needs. In future this application will be extended with many new functionalities. The base of available stock market indicators will be extended, new ways of wallet profits analysis, such as average income from the specific time period, and many more useful elements will be added. Software tools chosen to implement our programme were very good. We have to note that in the future it is possible to connect our system to different database for example Oracle or MySQL. To summarize, our experience gained during the stock investor application shows that with prototyping and close cooperation with future users developers are able to courageously respond to requirements.

Fig. 5. MACD Chart

Source: Own preparation
5. Literature

CONTRIBUTIONS OF DATA MINING AND KNOWLEDGE DISCOVERY FOR THE IMPLEMENTATION OF KNOWLEDGE MANAGEMENT

Summary

In the article an attempt of the new approach’ analysis was taken for perceiving the economy in the context of the knowledge management. They made moving the current state of examinations closer, pointing at main assumptions and messages of applied computer technologies. An application was described and meaning of the technology was discussed „data mining” in the enterprise, particularly for her applying in managing relations with the customer.

Keywords: information technology, knowledge management, information systems, data mining, CRM

1. Introduction

The revolution associated with implementing IT modern technologies in the sphere of the business administration is forcing into drawing new strategies of their development up. Innovative technologies replaced traditional methods of being a business person to quicker and more effective answers. The supported new economy is high technologies of the communication. Therefore, the majority of the organization is making implementations of modern solutions supported by the modern technology. The development of companies is attesting to the more and more great competition on the market and I will stuff, that the computer technology significantly will strengthen their position. Subjects making up one’s mind for more and more extended using the computer science in its activity widely comprehended.

2. Computer system in the business administration

In the economic theory, the entrepreneurship is being defined as the specific form of the work or as fourth (besides the work, the earth and capital) production factor. Main characteristics of entrepreneurs are among others an ability of noticing needs and improving ideas, abilities to exploit chances presenting themselves and a readiness to take a risk. About the success of the enterprise as the whole, abilities started deciding to the absorption of the innovation and fitness in implementing organizational and technological changes [1]. It concerns new technologies connected mainly with the processing of information. Enterprises are dependent directly from the ability of their employees for the conversion in new, computer conditions.

Nowadays building long-lasting bonds with customers is a very valuable ability, when on the market many competitive companies operate. Customers are delivering with company of more and more knowledge, and so the enterprise is an assimilation and integration for her. Companies being able to change the wisdom into the human capital, structural capital and the relation, which means
that capital of relations are becoming leaders, so the knowledge management is a tool of the competition for the enterprise [2].

In theory, as well as in practice, without the knowledge management the item of the enterprise in surroundings is in danger. The information system appropriate, appointed to it enables the radical efficiency rise of exploiting the had open and concealed wisdom who is happening with the knowledge common to the entire organization. Such a system, called Customer Relationship is introducing the Management to Fig. 1 [3].

Fig. 1. Stages Consumer Relationship Management on the knowledge base adapted from [2]

The knowledge about the preference, problems and remarks of individual customers or their very narrow groups constitutes capital requiring the professional management. Consumer Relationship Management he is focusing on creating and delivering innovative products and services, managing and reinforcing the relation with current and new partners and with suppliers, as well as improving, associated with customers, of practice and processes. Enterprises are trying to get the long-lasting competitive edge applying new, innovative technology. The knowledge management and managing relations with the customer have similar goals and they are very important to achieving success in the company. On Fig. 2 meaning of managing relations with the customer based on the knowledge base was described.
Knowledge acquired thanks to techniques Consumer Relationship Management lets the company build new channels of supplies, to get huge amounts of data needed for the decision making from present customers and to use them for creating individualizing matching offers systematically with need of the customer [4]. In Table 1 a comparison was described Consumer Relationship Management and of mass marketing. Marketing is a discipline concentrated on the one-way transmission, settled in practice and norms created with the thought of created sales of products for wide homogeneous markets and marketplace terraced houses.

Table 1 The mass marketing but managing Consumer Relationship Management

<table>
<thead>
<tr>
<th>The mass marketing</th>
<th>Consumer Relationship Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Selling of one product to many customers</td>
<td>Selling of many products to one customer</td>
</tr>
<tr>
<td>Getting the incessant stream of new clients</td>
<td>Getting the incessant stream of new orders from present customers</td>
</tr>
<tr>
<td>Discontinuous interaction with the customer</td>
<td>Constant interaction with the customer</td>
</tr>
<tr>
<td>Examining the customer</td>
<td>Participation of the customer</td>
</tr>
<tr>
<td>Physical cooperation with suppliers</td>
<td>Sharing the knowledge with suppliers</td>
</tr>
<tr>
<td>Concentration on a short stretch</td>
<td>Concentration on a long stretch</td>
</tr>
<tr>
<td>Economies of scale</td>
<td>Benefits of the scope</td>
</tr>
</tbody>
</table>

Adapted from [5]

Strategy Consumer Relationship Management is based on existing marketing conceptions of relation that is establishing relations with every customer „trainee” who are improving together with every next interaction. As the integrated strategy of the sale, marketing and services, he is based on coordinating action and he is helping to establish the long-term interaction with customers. The implementation of the technology in enterprises enables customers of the service level to guarantee them. The marketing action of enterprises is concentrated above all on the run-up purchase [5].

Enterprises are trying to plan out strategies designed more to the purpose of getting the participation “in the customer” than of market share and to measure one's success with the help of...
the indicator of the maintenance, capital of the customer and the effectiveness of data than of the return on investment and the market share. Increasingly the enterprise is directing the product at customers, rather than customers to products. In case of small and medium enterprises introducing modules of the computerization is much facilitated and effective functioning of the given organization [6].

Information systems functioning in enterprises don't allow for the precise segmentation of customers, but in combination with management systems with contacts with customers and advanced techniques of exploring data (data mining) strong tools for assisting marketing decisions constitute.

Contemporary computer systems are evolving in direction of much integration so far of separate systems in one, functional whole. Action of the system Consumer Relationship Management and using data is creating the cohesive whole but functions of reporting included in systems Consumer Relationship Management are helping in simpler and more effective of emphasizing the wisdom. Applying the data mining tools for deepening the process of managing contacts with customers is creating the integral integrity of given organization. In hereby drawing up examples of using data included in systems were given Consumer Relationship Management and applications data mining.

3. Data mining

Methods data mining are not still too popular and widely applied in Poland. Statistical methods and methods of the artificial intelligence that enable to discover unknown relations between data in collected dates set are being ranked among them. In the terminology the data mining is indicating processes of selection, the exploration and modeling, carried out on the bulk of data, leading for discovering unknown business models so far [7]. A simplification and an automation of the statistical data handling, leading from analysis of primary data to the construction of the appliqué model are a purpose [8]. Analysis is so assisting users and the managing staff in the decision making of customer loyalties aiming at increasing. All reports, analyses and balance sheets serve this purpose, and wide abilities let the configuration rapid changes of the manner of analysis and the presentation of data. To Figure 3 a process of discovering the knowledge who consists of interactive sequences was described.

Users are directing the given issue, called rules inquiries, in which they are specifying at the system of discovering the knowledge, what rules they are seeking as well as what data is supposed to be explore in the destination of discovering rules. The system of discovering the knowledge is using the algorithm suitable to the demanded type of rules of the data mining. In the destination of finding rules, the algorithm is sending to the exploration inquiries to the database management system. Found rules next are being filtered in order to consider criteria of the rule inquiry submitted by the user. In conclusion, the set of rules is being returned to the user as the result of asking him [9].

With example of applying systems Consumer Relationship Management and the data mining can be purchase of products by customers in supermarkets. On the basis of marketing data as well as the database led by the shop it is possible to notice the great plausibility of selection of a given product. At this work an example of the application of the method and classification of choice of given goods were described by the customer. On the basis of a few hundred data relations of
choice were marked out. In the table presented examples of transactions repeating itself of customers remained [10] [11].

- Cleaning data – removing inconsistent data
- Integration of data – linking data from various sources
- Selection of data – choice important (for the given problem) of data
- Transformation of data – suitable to the figure for date mining (e.g. adding up, aggregation)
- Date mining – using intelligent methods to getting the relation of models
- Evaluation of the relation – of relations it being interested in identifications get out of everyone
- Presentation of the knowledge

![Fig. 3 Process of discovering the knowledge](Source: [13])

Table 2. Relation of selection of the product by the customer

<table>
<thead>
<tr>
<th>Transactions</th>
<th>Shopping</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>C D</td>
</tr>
<tr>
<td>2</td>
<td>A B</td>
</tr>
<tr>
<td>3</td>
<td>A B C D</td>
</tr>
<tr>
<td>...</td>
<td>...</td>
</tr>
</tbody>
</table>

**Transaction** – Number of the transaction repeating itself at choice by the customer of the same products

**Shopping** – Purchase the more than one object by customers

In order to set the total number of cases appearing in this task a model was applied.

\[ R = 3^d - 2^{d+1} + 1, \]

where: \(d\) - the number of objects (A B C D), \(R\) - number of appearing of principles.
At the larger amount of data of objects the number will be changing in harmony with the mentioned above model. If we have thousands of $d$ numbers, estimating all possible elections of sets is impossible, since they won’t have the appropriate support. Of course there are programs to data mining being based on million of data.

A discussed problem of analysis of the basket whose the link between choice of purchased goods and purchasing it is portraying stayed in the article. Of course as the age, the demographic structure, or the profession he is fulfilling statistical data very important role in choice of the purchase (Fig. 4.)

![Decision Tree](image)

Fig. 4. Example of the decision tree whose the purchase of the larger quantity of goods enables by the consumer

Higher (1) udders the rule will look:

$$X \rightarrow Y$$

An inspection is establishing the rule “Whether people who purchased the X product, often choose the Y product”. If $X = \{A, B\}$ and $Y = \{C, D\}$ then we are creating the rule who is showing, that people who bought the product A, are also buying the B C product or D.

The SUMIFS function enables us to fit data criteria (remembering about the fact that we are converting Table. 2 into binary values)

$$=\text{SUMIFS}((\text{B5}="A"), \text{A_\text{IF}(B5}="B"). \text{B_\text{IF}(B5}="C"), \text{C_\text{IF}(B5}="D"), \text{D_\text{BinOne})))\text{1, IF(C5}="A"), \text{A_\text{IF}(C5}="B"), \text{B_\text{IF}(C5}="C"), \text{C_\text{IF}(C5}="D"), \text{D_\text{BinOne})))\text{1, IF(D5}="A"), \text{A_\text{IF}(D5}="B"), \text{B_\text{IF}(D5}="C"), \text{C_\text{IF}(D5}="D"), \text{D_\text{BinOne})))\text{1, IF(E5}="A"), \text{A_\text{IF}(E5}="B"), \text{B_\text{IF}(E5}="C"), \text{C_\text{IF}(E5}="D"), \text{D_\text{BinOne})))\text{1,$

**Support** (2) and **Confidence** (3)

**Support** is a measure of transactions whom all elements of the around both $X$ sets have and $Y$, that is products are being bought together. In the format the **support** can be calculated as the probability of the appropriate $X$ harvests and $Y$. The **support** is pointing at the total number of transactions for analysis.

$$\text{support} (X \rightarrow Y) = P(X \cup Y) = \frac{(X \cup Y)}{N}$$  \hspace{1cm} (2)
Confidence this conditional probability of the group to the purpose of getting the Y set given is X.

\[
\text{confidence}(X \rightarrow Y) = P(Y|X) = \frac{n(X \cup Y)}{n(X)}
\]  

(3)

Table 3. Analysis of rules of transaction customers

<table>
<thead>
<tr>
<th>id</th>
<th>X</th>
<th>Y</th>
<th>n(XUY)</th>
<th>N</th>
<th>% Support</th>
<th>n(X)</th>
<th>Confidence</th>
<th>Is in rules?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>A</td>
<td>B</td>
<td>2</td>
<td>7</td>
<td>29,00%</td>
<td>4</td>
<td>50,00%</td>
<td>X</td>
</tr>
<tr>
<td>2</td>
<td>A</td>
<td>C</td>
<td>2</td>
<td>7</td>
<td>29,00%</td>
<td>4</td>
<td>50,00%</td>
<td>X</td>
</tr>
<tr>
<td>...</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>D</td>
<td>A</td>
<td>3</td>
<td>7</td>
<td>43,00%</td>
<td>6</td>
<td>50,00%</td>
<td>X</td>
</tr>
<tr>
<td>...</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>B</td>
<td>A</td>
<td>1</td>
<td>7</td>
<td>14,00%</td>
<td>5</td>
<td>20,00%</td>
<td>X</td>
</tr>
<tr>
<td>15</td>
<td>C</td>
<td>A</td>
<td>2</td>
<td>7</td>
<td>29,00%</td>
<td>3</td>
<td>67,00%</td>
<td>V</td>
</tr>
<tr>
<td>16</td>
<td>C</td>
<td>B</td>
<td>2</td>
<td>7</td>
<td>29,00%</td>
<td>3</td>
<td>67,00%</td>
<td>V</td>
</tr>
<tr>
<td>...</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>B</td>
<td>D</td>
<td>4</td>
<td>7</td>
<td>57,00%</td>
<td>5</td>
<td>80,00%</td>
<td>V</td>
</tr>
<tr>
<td>17</td>
<td>C</td>
<td>D</td>
<td>3</td>
<td>7</td>
<td>43,00%</td>
<td>3</td>
<td>100,00%</td>
<td>V</td>
</tr>
</tbody>
</table>

Different thresholds value will be portraying broader or more rigorous principles.

For the example minsupport – 40 % and minconfidence till 80 % we can get principles whom the described below table is portraying.

Table 4. Thresholds value: the minsupport and the minconfidence

<table>
<thead>
<tr>
<th>id</th>
<th>X</th>
<th>Y</th>
<th>n(XUY)</th>
<th>N</th>
<th>% Support</th>
<th>n(X)</th>
<th>Confidence</th>
<th>Is in rules?</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>B</td>
<td>D</td>
<td>4</td>
<td>7</td>
<td>57,00%</td>
<td>5</td>
<td>80,00%</td>
<td>V</td>
</tr>
<tr>
<td>17</td>
<td>C</td>
<td>D</td>
<td>3</td>
<td>7</td>
<td>43,00%</td>
<td>3</td>
<td>100,00%</td>
<td>V</td>
</tr>
</tbody>
</table>

Obtained data is independent or dependent on nominal data or the category of types. In relation to the frequency of the model quantitative data was divided in a few real data the same as the age, the profession or a place of residence.

The regression is used to the purpose of automatic defining assessing functions and monetary values target. To figure 5 an example of the linear regression was presented: the supermarket wants to estimate the potential gain. They made an assumption that the return on sales was linearly dependent on the profit and the size of the household. Let’s assume that it is dependent also on the profession carried out. Function „is studying” of these relations in order to predict influences (in the process profit) from the key prospects [12]. Example of the non-linear regression: the supermarket is estimating the income of the attribute „age” to the potential gain. The value of the profit isn’t linearly dependent on the century.
Analysis of the substantial amount of tools given with advanced searching for trends or the anomaly is helping to analyses and to understand behaviors of the customer. Coming conclusions from analyses can contribute for increasing the effectiveness in areas, in whom it is desired. Methods date mining can be of help very much in backing the share of this type up. Built models are used for forecasting, which customers would be prone to purchase a given product [13]. Largely the form of analysis is noting differ much from analysis practiced for potential customers determining, what product to offer them (except for the fact that in such a case we have at our disposal the row of the information coming from earlier contacts with the customer). Every possibility of the transaction of the cross sale is treated as offering to the customer one product [14]. One forecasting model is answering every product. Next optimizing the offer towards all customers is crucial so that the offer or offers a customer will receive which, benefit both for the seller, and for the purchaser the most.

4. Conclusion

Contemporary organizations made a stop before the need to take complex, poorly structureless decisions. Dispersing sources of information, the decentralization of the process of the decision making causes, that previous management models are being shown the information insufficient. They in this situation propose, for organizations applying representing systems integrated, circle, being composed above all of a data warehouse. The data mining lets for conducting many valuable analyses concerning behaviors of customers, of shaping the pricing strategy, of forecasting the organization development, of optimization of logistic activities. Explicitly it is possible to state, that tools data mining can much streamline the process of concluding and hasten the cycle of creating the model.
5. Literature


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INFORMATION SYSTEMS AND KNOWLEDGE MANAGEMENT IN BUSINESSES

Summary

This paper aims to present the issue of knowledge management in businesses. The paper itself is an attempt to put forward a study analysing the role and the potential contribution of the new approach of the economy in the context of knowledge management and information systems. The study also discusses issues relating to formulation of knowledge management in businesses.

Keywords: information technology, knowledge management, information systems

1. Introduction

The revolution associated with the introduction of modern IT technologies to business management requires a preparation of new strategies in their development. The modern world has been dominated by information technology which is present in every area of our lives. The technical and technological progress, which could have been observed in the second half of the 20th century, has led to the invention of new and highly advanced (from the technological point of view) branches of industry. Moreover, the progress led also to revolutionary changes in methods and ways of production and management. Innovative technologies have replaced traditional methods of doing business with more time efficient and more effective solutions. The possibility of sending and sharing enormous quantities of data to any place in the world, has offered perfect conditions both for modern information society and economy based on knowledge to emerge.

Therefore, the majority of organizations introduce modern solutions backed by the modern technology [1]. The development of companies shows that the competition on the market is more and more visible. There is a shared belief that information technology will strengthen the position of a company on the market. In the modern global economy competitiveness of businesses depends on innovation and knowledge that the company has. The basis of knowledge development and innovation is information. Hence, the introduction of an adequate information system is a decisive factor in effective knowledge management and innovation in the businesses.

The introduction of innovative solutions requires appropriate subject matter and practical preparation of a business. The attitude of the management and all employees towards implemented technologies, which will greatly influence their behaviour, enables a dynamic development of the company and may denote gains for the company.

2. Knowledge management in business

In the theory of economy enterprise is defined as peculiar form of work or as the fourth (beside labour, land and capital) factor of production. The main characteristics of entrepreneurs are among others: the ability to notice needs and improve ideas, the skill to make the most of
occurring opportunities and readiness to take risk [2]. It seems that the success of a business begins to be determined by its ability to implement novelties and skilful introduction of organizational and technological changes. This applies to new technologies related mainly with processing data. Companies are directly dependent on their employee’s skills to adapt to new information-governed conditions.

Traditional company systems used mainly the market mechanism. The high efficiency of undertaken actions has been achieved thanks to the mass production and distribution. The economy began to be a success. The unlimited access to goods and services as well as the reduction of scarcity of some resources (for example, capital) contributed to the increase in efficiency, productivity and also economic progress. Building long-lasting ties with clients is a very precious skill when the competitiveness on the market is sharp. Knowledge management is a process aiming to form value and gain permanent advantage over competitors. This may be achieved by means of formulating, transferring and use of the knowledge obtained while contacting directly with the client in order to maximize the increase in the value of the company. Customers are the source of more and more data for companies, and so, the companies assimilate and integrate this knowledge. Companies which are able to turn the knowledge they posses into human capital, structural capital and relations, become leaders.

Knowledge management is a modern, system concept that consists in efficient use of the company’s knowledge resources. It embraces the sum of all processes associated with obtaining, locating, formulating, transferring, using and keeping the knowledge in order to achieve the company’s goals [3]. Knowledge management is especially marked by turning this knowledge into permanent value for the customers, employees and inquirers of the company. Knowledge management is generally based on two operations: gathering knowledge and making use of it. It is of utmost importance that these two functions be performed simultaneously.

It is possible to manage only selected as well as randomly chosen knowledge attributes. What is important is that the employee has to have access to complete ‘knowledge’. When the employee obtains all available data, processes them generating information and directs this information to the person who lacks it – only then will we have the correct understanding of the knowledge management process. Though there is no commonly accepted definition of knowledge management (both in theory and in practice), it has to be kept in mind that knowledge management:

- has to have a comprehensive nature;
- has to turn the company’s intellectual assets into economic result;
- has to be supported by four factors: leadership, corporate culture, technology and assessment system;
- has to unite people, and specifically those having knowledge with people who are in need of this knowledge;
- has to be a hybrid of human and technology;
- has to create a net [4].

In the ‘knowledge hierarchy’ if we apply appropriate interpretation and meaning to the data, we receive information. Information is nothing else than analysed and summed up data that may be transformed into formulae. To obtain knowledge one has to add action and application to the information. The use of formulae in a given context in order to achieve previously planned effects constitutes knowledge [5]. Knowledge may be called a three-stage hierarchy which enables taking action and decision-taking.
Knowledge management is one of the most widely discussed topics in management organization. The pivotal work might be seen as Nonaka and Takeuchi, which presents a new description of knowledge in an organisational context. Quotation of the Polanyi philosopher [6] it "We can know more than we can tell" is first given wide circulation. Nonaka has expanded on his interpretation of Polanyi and, in a crucial argument, makes the leap from "at a fundamental level knowledge is created by individuals" to "organisational knowledge creation in a corporate organisational setting". According to Japanese scholars, Nanaka and Takeuchi, knowledge may be divided into two kinds: explicit and tacit knowledge [7]. The explicit knowledge is knowledge that has been written down, codified and freely accessible for all employees of the company as well as for entities remaining outside the company. The tacit knowledge is individual, specific, difficult to formalize and known only to the person that possesses this knowledge [5].
Knowledge is created by individuals. For this reason a mechanism helping to turn tacit knowledge into explicit knowledge, which is freely available to every company, has been created. There are four ways to convert knowledge. These four ways of converting knowledge take the form of a knowledge spiral. The spiral consists of the following stages [7]:

- Socialization – from tacit to tacit knowledge. The key to obtain tacit knowledge within the socialization framework is the experience of the people that pass the knowledge to others. For example, teachers passing the knowledge onto their students, ‘brainstorming’ meetings.
- Externalization – from tacit to explicit knowledge. Tacit knowledge is presented as metaphors, analogies and models. Externalization is the key to creation of knowledge and provides new ideas based on tacit knowledge.
- Combination – from explicit to explicit knowledge. The degree of combination makes it possible to systematize the available knowledge by categorizing and standardizing the information that one possesses.
- Internalization – from explicit to tacit knowledge. Internalization allows absorbing the available knowledge in the tacit knowledge area, the so called ‘learning by doing’.

Creating companies based on knowledge favours actions that aim to improve the availability of information which serves as means to gain and keep the competitive advantage. These actions are backed by information technologies which constitute a perfect tool to use in the fight for competitiveness. Moreover, actions enable internal and external integration in a company.

3. Information system in the business administration

Knowledge management is one of the most important stages in the development of technology. For example, the invention of computer networks, which make it possible to split processed data to a greater number of computers, improves general efficiency [7].

Studies conducted in American companies show that knowledge suitable for managing the company may be found both in the formal documents and minds of employees. The outcomes of these studies are shown in Figure 2.

![Fig. 2. Knowledge Management (KM)](image)


Figure 2 depicts the division that explains two approaches to knowledge management: the division into formalized and personalized knowledge. The first may be found in databases in the form of data, information and electronic documents, while the latter may be found in the minds of
employees. Formalization focuses on codification, while personalization, as the term suggest, focuses on personalizing knowledge. However, both approaches require introduction of modern technologies as the foundation enabling people to use other people’s experiences [7].

Apart from human factors that aid knowledge management in the process of managing a company, the process of knowledge management is also influenced by information systems. To apply the appropriate knowledge management method it is crucial to discern information from knowledge and to understand the relation between them. Information is a class of knowledge which includes data, procedures and rules that are listed and freely accessible in a given company. Knowledge that is made available takes also other forms such as: documents, training aids, directions for use and other gathered data. Another type of knowledge, the so called tacit knowledge, is concealed in the human mind. This tacit knowledge is the outcome of experience, predispositions and skills displayed by the employees. It is not written down and constitutes the key intellectual capital. The explicit knowledge may be used by means of appropriate databases and information technologies. In contrast to explicit knowledge, it is impossible to obtain tacit knowledge even from the best databases [8].

Data mining involves processing relations between information in databases and tacit knowledge as well as experiences of the employees. It allows the usage of knowledge resources in a company, so that a material and permanent competitive advantage can be achieved. Functions of knowledge management system, which thanks to the application of IT systems will improve its effects, are shown in Table 1[9].

### Table 1. Aiding system for knowledge management

<table>
<thead>
<tr>
<th>TOOLS</th>
<th>CREATE</th>
<th>CONSOLIDATE</th>
<th>ORGANIZE</th>
<th>SHARE</th>
<th>USE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>- discovery, - articulation, - to request, - discuss.</td>
<td>- digitized, - documented, - extraction, - storage.</td>
<td>- and the setting up structures, - cataloging, - inventory, - a summary, - analysis.</td>
<td>- presenting, - transfer, - find, - notice.</td>
<td>- interpret, - use, - improve, - operate, - learning.</td>
</tr>
<tr>
<td>PEOPLE</td>
<td>- public knowledge, - hidden knowledge, - experience, - learning</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Adapted from: Probst, G., Raub, S. and K. Romhardt, Zarządzanie wiedzą w organizacji, Kraków, Oficyna Ekonomiczna, 2002

The idea behind the creation of information systems was a speedy information circulation process in a business. There have been many goals, but the most important was economy in its broader sense, that is: saving the resources. Information system is a set of factors encompassing the whole process of business management: planning, decision-taking, managing workforce and controlling the company’s resources so that the goals that have been planned, could be achieved in a skilful and efficient way. Information system has to provide information indispensable for its users to efficiently manage the business [10].
Information is the main element of the process of management. As a consequence, the means of obtaining, gathering, interpreting and transmitting information are constantly improved. The element responsible for communication in information systems is an information circulation module that has been designed especially for this purpose. This element is responsible for an efficient and proper delivery of messages to the addressee [11]. The information circulation process is a standard that establishes the rules of sending specific groups of data to a given system. In order to conduct a thorough analysis of the environment one has to gather information from the outside. The gathered information, together with the messages incoming from an external entity, create the most valuable base of knowledge for a decision-maker – namely – knowledge essential for planning future strategies.

![Fig. 3. The structure of knowledge management system](source)


The condition for implementing assignments in a business is simply basing on efficient solutions. The equipment ought to aid interpersonal communication for example by means of recording the communication between people, gathering the recordings, classification of contents and drawing conclusions. Due to such information an access to knowledge resources is possible. The knowledge management system is indispensable when creating and managing thousands of legal regulations, judgements as well as, beside others, for the main activity of a given market segment that appears in businesses. The lack of solutions causes independent execution of assignments by various individuals and so the learning process on the company level is inefficient [12].
4. Conclusion

Present times are marked by a rapid acceleration of processes associated with development. There is a vast increase in knowledge and accessing knowledge becomes more and more global. The most developed countries base their companies on a constantly growing interrelation between knowledge and information. Knowledge management is more and more often perceived as a condition for a proper and speedy, both economic and social, development. In the context of knowledge management the notion of ‘technology’ denotes ‘tools for knowledge management’. These tools are determined as broadly defined technologies that aid and enable creation, codification and knowledge transfer.

Saturated markets, unsteadiness of products and shorter and shorter lifespan of products, common copying of market successes or finally imperfection of traditional management systems are the reasons for which a successful realization of goals set by businesses is sought in constant improvements, in implementing modern information systems and especially in knowledge management.

5. Literature:

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KNOWLEDGE MANAGEMENT IN E-BUSINESS STRATEGY

Summary

E-business has changed the way economy operates. Lack of geographical and time boundaries forces organization to rethink its organization. End of last century was dominated by optimization process to make enterprise more efficient. Internet, global competition has revealed that BPR is not enough. The main economy factor became information and knowledge. Organizations which were data reach started to look for solution to make them knowledge reach and such a concept became Knowledge Management (KM). Article presents methodical aspects of KM ideas, usage of KM solutions in electronic economy. It points why KM should be a part of organization e-business strategy, or can even be a transactional asset on electronic market.

Keywords: knowledge management, e-business, BPR, e-knowledge, i-knowledge

1. Introduction

Nowadays, more then whenever, organizations must try harder to follow constant changes and growing global competition based on Internet. To succeed in this multi-channel, extremely fast information processing environment, enterprise must optimally use its individual and corporate knowledge. Active participation in electronic economy forces organizations to give up operating due to strict plans towards constant market monitoring and immediate actions in case of any changes. However, to be able for such behavior policy it is necessary to optimize processes and information resources in both areas: internal and external.

First period of e-business was characterized by creation of very attractive Internet image of organization without any care about internal matters. During electronic economy development it was noticed that good quality of “Internet face” required also proper internal process organization – adjusted to very unstable Internet environment. The period of those adjustments was dominated by the attitude based on business process reengineering (BPR). The range of those changes concerned mainly supply chain management, customer relationship management – areas, which were crucial for enterprises.

Parallel to process optimization more attention was focused on information resources, because it usually determines efficiency in present business. There appeared new discipline called knowledge management. The reasons of its development, as information society, information technology expansion or observation of huge data sets (databases) kept in organization, caused dynamic evolution of methods and techniques of knowledge management. Internet environment emphasized advantages of knowledge or experience sharing neutralizing geographical and time boundaries. The best example here is concept of virtual organization.

Of course to fully use potential of “knowledge capital” you must overcome many barriers (technological, sociological) as e.g. heterogeneity of information, which is or should be kept in
electronic form, or just simply human lack of willingness to share his knowledge or experience. However enterprises, which seriously treat Internet as future, began to include knowledge management in their strategy of e-business development.

2. Place of knowledge management in e-business environment

E-business embodies the most pervasive, disruptive, and disconcerting form of change: it leave no aspect of managing organizations untouched, it challenges long-accepted business models, and organization leaders have little to draw on from their past experience to manage its effects. The new technologies as the heart of e-business open up myriad possibilities not just to reconsider the re-engineering of existing processes but also to design, develop, and deploy fundamentally new ways of conceiving and executing business processes.[1] The evolution of the information-processing paradigm over the last four decades to build intelligence and manage change in business functions and processes has generally progressed over three phases:

1. Automation: increased efficiency of operations;
2. Rationalization of procedures: streamlining of procedures and eliminating obvious bottlenecks that are revealed by automation for enhanced efficiency of operations;
3. Re-engineering: radical redesign of business processes that depends upon information technology intensive radical redesign of workflows and work processes. [3]

The last stage resulted within very complex, integrated IT solutions like ERP systems. It provided high level of data sharing across internal functions with simplification of information processing for each of the internal functions. However the disadvantage of the total integration of data related to business processes was the lack of agility and flexibility required for quick adaptation.

![Fig. 1. Relationship of knowledge management and e-business self](http://www.stevedenning.com/index.htm)

Source: [http://www.stevedenning.com/index.htm](http://www.stevedenning.com/index.htm)

The new world of business puts less premium on playing by pre-defined rules and more on understanding and adapting as the rules of the game as well as the game itself keep changing. Examples of such changing business rules, conventions, and assumptions are evident in the emergence of virtual corporations and business ecosystems, and are most prominently visible in dot-com enterprises living in ‘Internet time’. [2] (Fig. 1) In electronic economy organization can
not be stable – its architecture, processes of marketing, sale and distribution must be constantly questioned:

- How e-business is affecting or might affect each core operating process?
- Whether and how the organization is or might be able to use e-business to affect change in the core operating processes?
- Why e-business is causing the need for change in core operating processes? [1]

E-business constitutes the ability of a company to electronically connect, in multiple ways, to many organizations, both internal and external, for many different purposes. It allows an organization to execute electronically with any individual entity along the entire process. Increasingly, e-business allows an organization to establish real-time connections simultaneously among numerous entities for some specific purpose. It is dramatically reshaping every transactional business process: from developing new products and managing customer relationships to acquiring human resources. And, by increasing traditionally largely separates processes, e-business in effect creates what might well be described as new business processes.[5]

Steven Kerr has the following description about the state of business strategy for the new world in Planning Review: “The future is moving so quickly that you can’t predict it … We have put a tremendous emphasis on quick response instead of planning. We will continue to be surprised, but we won’t be surprised that we are surprised. We will anticipate the surprise.” In that economy where only certainty is uncertainty, the one sure source of lasting competitive advantage is knowledge.[4]

Organizations have come to realize how important it is to “know what they know” and be able to make maximum use of the knowledge. This knowledge resides in many different places such as: databases, knowledge bases, filing cabinets and people’s head and are distributed right across the enterprise.[5] Old attitude based on process reengineering is not enough to extract knowledge. Organization as whole must be constantly reinvented (Fig. 2). Process of knowledge extraction can be hard and requires specific IT support, social support and proper management.

![Fig. 2. From “Old world” to E-World of Business: Knowledge management for “Paradigm shift”](source: Malhotra Y. (2001) Knowledge Management for E-Business Performance...)

The answer to reorganization of information is knowledge management as a set of tools, technologies, practices and processes that aid employees in displaying, categorizing, filtering and making inferences from information. This, in turn, helps workers transform information into
usable knowledge that can deliver a solid business benefit. When implemented as an integrated solution, KM technologies can:

- Decrease time-to-output by enabling e-Business employees to make faster, better-informed decisions.
- Reduce errors and increase efficiency by enabling effective decision-making at lower levels of an organization’s hierarchy.
- Minimize the time spent “reinventing the wheel” by capturing best-known methods and other expertise, and making this knowledge available throughout the enterprise.
- Increase productivity through just-in-time learning solutions that turn novices into experts faster.
- Foster innovation and raise customer satisfaction by enabling organizations to exploit the full value of their knowledge assets.[6]

Knowledge management solutions used to support e-business may be placed on the most popular network architecture: client – server. On the client side we can find information retrieval applications in form of intelligent agents, which automates work connected with searching or assuming phase. Other solution can be presented as highly personalized working desktop of the user, with all crucial information displayed in proper form on one screen. It also includes intelligent 3D graphic generation and relationship mapping. All for better and faster understanding huge sets of data in summarized form. Some sophisticated solutions offer natural language processing which really encourages people to share their knowledge and experience, because of effortless of phase of codifying it. On the server side knowledge management applications can support Internet or Intranet content categorization, which offers user proper set of information – this solutions can be a part of EIP technology. Other software can enable organization experts or communities to create and make accessible their knowledge (codify and distribute databases or sets of cases) to any pointed user.

An example of such a platform can be Hyperwave eKnowledge Suite provided by Fujitsu-Siemens. The origins of this software were started in 1999 and its popularity makes it still updated and developed. The platform consist of main modules (K-landscape, ProjectWare and FlexTEAM) which enables communication with external databases, knowledge validation, contribution and reuse.(Fig. 3)

![Fig. 3. Organization of e-Knowledge software](http://solutions.fujitsu-siemens.com/)
e-Knowledge is more than just another technical solution. It offers leverage to any individual’s personal knowledge, through using and sharing knowledge with others and with the organizations itself. This is what we call the “GATA Age”, for “Give Away and Take Away”, which means that giving information stimulates others to do the same in return. As a result, people will learn from each other. e-Knowledge is your individual knowledge exchange platform, integrated in the company-wide knowledge management network.\cite{7}

As it was with BPR attitude, where the most important matter for organization became a client, the same value was transferred to e-business. First supportive applications where focused on customer relationship management and called e-CRM. In process of gaining information about clients, organization must look at several internal (purchase or marketing databases) but also external (e.g. website logs) sources. The goal is very clear – to optimize relation value between company and its customers.\cite{8}

\begin{figure}[h]
\centering
\includegraphics[width=0.5\textwidth]{ecrm.png}
\caption{eCRM Expands on CRM}
\end{figure}


The difference between traditional CRM and e-CRM application is that in Internet environment the customer deals the interaction with company \cite{8}. Of course company can track and partly control customer behavior during visiting company web site. For example, usually to buy something user must register in the on-line shop and leave his data. In case he will come back, company can use those previous information as knowledge about customer preferences and stimulate him by promotion, polls or competitions to desired behavior (usually next purchase). To prepare such a “individual” strategy for one unique customer one of special personalization techniques must be applied:

- Rule-based reasoning – predefined rules assigning to customer based on given information.
- Collaborative filtering – automatic comparison of one customer features to other ones and grouping them
- Inference models – Data Mining techniques to search for customer behavior patterns.

e-CRM application developed very sophisticated platform to keep and built customer loyalty including Customer Centric Information Store, Analysis and Segmentation Engine,
Personalization Engine, Broadcast Engine and final Transaction Engine. All cooperate in chain and have a feedback loop to enable company to learn from taken actions [9]

To enhance organization success with KM, experts offer the following suggestions:

- Match the tool to the task. Technologies should support corporate goals and values, not exist for their own sake. Start by looking at the tasks a given workgroup performs and choose technologies that are suitable for the tasks at hand.
- Look for compatibility with existing tools and user tasks. Choose solutions that expand on the functionality of familiar tools and employ common techniques and usage styles.
- Put all the pieces in place before introducing the KM technology. As with other new solutions, installing the application is just a start. To make the most of your KM investment, make sure you define robust business processes, train your users, educate them on the expected benefits and provide motivation and incentives for use.

Knowledge management is a key to join bright new ideas (bases of success in e-economy) with proper IT solution (which will strongly support those unique initiatives). Organization must very carefully check what are its knowledge (or experience) resources and never underestimate any of it. The future is global knowledge sharing and to follow that direction KM must become a part of whole e-business strategy. (Fig. 5)

![Knowledge Management & E-Business Strategy](image)

**Fig. 5. Knowledge Management & E-Business Strategy**


### 3. Concepts of e-knowledge as type e-business

E-learning initiatives were started in last century. The need for distance learning occurred to be very big so the platforms, courses and companies (including schools and universities) started such a project. However they can be considered as mediators – to prepare a course you need information. If it’s already in electronic form then the extremely expensive phase of on-line course creation is faster and cheaper. Popularity of electronic materials usage made their publishers willing to take part in electronic economy as “good” provider. The concept of e-knowledge has appeared.

E-knowledge is enabling not only the emergence of new best practices but also the reinvention of the fundamental business models and strategies that exist for e-learning and knowledge management. [11] Of course there are almost the same problems as were pointed previously according to traditional knowledge like: effective sharing, exploitation, and creation of knowledge. If we base the solution on network (Internet) environment then the problem can be described as
representing the results to others in a form that is accessible, easily comprehensible, and useful, even if others are separated by time or distance from the source of the knowledge. This representation of content and context is what we call e-knowledge. One important aspect of e-knowledge is being able to unbundle content in ways that facilitate subsequent editing and recombination. Another aspect is being able to identify other contexts, in which content might be relevant, if it can first be generalized from its original form then repurposed to suit the new context.[10]

E-knowledge consists of knowledge objects and knowledge flows that combine content, context, and insights on application. E-knowledge also emerges from interactivity within and among communities of practice and from the troves of tacit knowledge and tradecraft that can be understood only through conversations with knowledgeable practitioners. [11].

e-Knowledge is rendered from digital content where “content” itself can take many forms depending on the user or application—as data, metadata, transactions, performance logs, structured and unstructured information, etc. Following on, one person’s “information” may be another’s “knowledge” due to the intrinsic malleability of things digital. E-knowledge is easily repurposed and recombined with other e-knowledge. The effortless of this process created a chance to treat knowledge as a commercial good. This attitude enabled development of processes and marketplaces for the exchange of digital content that have never before been possible.[10] E-knowledge commerce consists of the transactions based on the sharing of knowledge. These transactions can involve the exchange of digital context and/or tacit knowledge through interactivity. Transactable e-knowledge can be exchanged for free or for fee.[11]

The e-Knowledge Industry consists of the individuals and enterprises that create, store, and exchange digital content, add value to it, and/or aggregate content, and serve demand for e-knowledge. We can find there publishers, new media companies, content developer companies, professional societies and associations, companies, colleges and universities, and other knowledge-creating enterprises. In addition, individual professionals, faculty, and practitioners are empowered by the emerging influence of e-knowledge to create their own content, knowledge and insight and offer it for exchange.[10](Fig. 6)

E-knowledge is technologically realized by the fusion of e-learning and knowledge management and through the networking of knowledge workers. Transactable e-knowledge and knowledge networking will become the core of knowledge sharing.
4. Conclusion

To summarize, knowledge management provides an organizational framework which supports understanding and guiding the e-business transformation of operating processes. Time and expertise are the core of every e-Business. Knowledge management technologies help company make the most of both of them. It also improves fuller use of hard-gathered corporate knowledge capital — whether that capital consists of the wealth of CRM data collected from your e-Commerce Web site, or the expertise of your senior executives (in form of case base). In the background, there were developed Data Mining techniques based on Internet environment, called WEB Mining. The goal and usefulness for Knowledge Management is to find patterns, categorize or group web site visitors and present them the most personalized offer (content, goods or services).

There appeared bright new concept of connecting knowledge management and e-learning (considered as a part of e-business). The future of trade via Internet is considered as next step of present situation, when we sale or buy information. Next decades will change the trade good into knowledge offered on horizontal or vertical electronic marketplaces. Of course WEB mining tools should show its potential in e-Knowledge world, where “product” (knowledge) personalization will become a key to success.

As we can notice data transformed into information then into knowledge has become crucial part of present business. BPR is not enough. Quoting after C.K. Prahalad and V. Ramaswamy “Companies spent the 20th century creating and managing efficiencies. They must spend the 21st century creating and managing experiences”. If the company wants to succeed at e-Business, Knowledge Management must be an integral part of your e-Business strategy.
5. Literature


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MULTI-CRITERIA METHODS IN EVALUATION OF QUALITY OF MANAGEMENT INFORMATION SYSTEMS

Summary
The main aim of this article is to present detailed analysis of Information Technology quality estimation methods used to evaluate MIS available in Poland. In addition, there was made a quality evaluation models according to AHP and PROMETHEE, which were used to hierarchical alignment of discussed systems. Conclusion consists array of Management Information Systems which are lined up to fit substantial, technological and economical factors.

Keywords: Management Information Systems, MCDA, AHP, PROMETHEE

1. Introduction
Management Information Systems are used to support small and medium-sized enterprises which are the basis of the economy in the world. In Poland, the volume of small and medium-sized enterprises is about 95% of all companies (more than 3.5 million). [38, 9] Their economic impact is significant and contributes not only to GDP growth but also to create new workplaces.

Management Information Systems [35, 12, 17, 3, 15, 20, 21] are directly related to information and are geared towards an efficient and flow of information [14] between lower levels and management. Nowadays all information systems, which are an interdisciplinary field of science derived from the science of economics, management, psychology and computer science.

2. Management Information Systems
It is difficult to define set of criteria based on systems features that could be a starting point for the model [11, 26] of their classification. Many scientists [10] suggest a division of Management Information Systems according to levels of management. However, the most popular classification of information systems is according to the role that remains in the company. According to the two-level system typology [20] MIS can be divide in order to their functions, destination and the solutions.

The usage of an integrated management system entails many benefits [11, 27, 33, 23, 25] such as the ability to create all kind of reports, savings of time, ease of system upgrades management and maintenance, system backup, sharing the computer equipment. The most important steps after decision of implementing a MIS in a company are [6]:

- system selection;
- system implementation;
- system operation.

Selection [32, 42] of the best system that matches to the business profile is very difficult task. [27] Implementation [33] of the system launch a long process of adapting the company and
employees to new technology and habits. The last step is personnel training [30], and the proper usage of implemented system, which ensures that it will soon incurred costs [36] will be covered by the benefits arising from the system operation.

3. Methods for evaluation of Information Systems

Intangible benefits are often overlooked in the process of evaluating IT, because of difficulties in their estimation. Usually managers evaluate economical benefits of the investment using ROI indicator as a main instrument of evaluation. In order to take under consideration also intangible benefits there was created a number of methods which are useful in estimation the investment in IT area. This part of the science uses methods like game theory or simulations.

In the recent years several decision aid methods or decision support systems have been proposed to help in the selection of the best compromise alternatives. In order to ensure transparency during the decision making process multi-criteria decision analysis is vitally important. The multicriterion modelling [2, 8, 34, 37] helps evaluate a set of discrete actions, in example alternatives, projects or proposals. It is more realistic, since it takes pseudo-constraints for what they really are: elements involved in the decision. In multicriterion analysis all factors in the decision process will be evaluated separately as criteria affecting the decision. Selection of the most suitable method depends on the criteria [25] that enable systems classification. According to a huge amount of systems variety it is hard to define unique and suitable to all systems criteria. However from this part of classification – defining suitable criteria – depends all results of methods used in evaluation. So criteria should be chosen as they describe all systems as good as they can.

Due to the variety of management information systems currently available in the market it is difficult to create a good and simple method of systems evaluation. The main reason is that all systems offered on the market differ in functionality, used platforms and served parts of the market as well and therefore is not easy to define clear, specific characteristics for all systems that could become the basis for the evaluation methods.

3.1. The criterion for the evaluation of MIS

The problem of the selection or the ranking of alternatives submitted to a multicriteria evaluation is not an easy problem [4]. Usually the main criterion for information system selection [23] is price. Other, relevant factors that influent on the further exploitation of the system are often forgotten. Therefore, the first step in the evaluation of information systems was to determine the most important characteristics [5] that describe MIS in way of having a significant impact on their diversity and system selection.

To select diagnostic features taxonomy and factor analysis has been used. Due to this method all attributes were divided into groups made up of the uniformed items. The criteria for the assessment are divided into three main groups [23]:

1. Course criteria for the assessment of information systems.
2. Technology criteria for the assessment of information systems.
3. Economic criteria for evaluating information systems.
**Table 1. Criterion of evaluation of MIS**

<table>
<thead>
<tr>
<th>modules</th>
<th>technology</th>
<th>price</th>
</tr>
</thead>
<tbody>
<tr>
<td>accountancy</td>
<td>operating system</td>
<td>prime cost</td>
</tr>
<tr>
<td>warehouse</td>
<td>database</td>
<td>hidden costs</td>
</tr>
<tr>
<td>production</td>
<td>interaction with other app.</td>
<td>implementation costs</td>
</tr>
<tr>
<td>fixed assets</td>
<td>language</td>
<td>update costs</td>
</tr>
<tr>
<td>salary</td>
<td>report generator</td>
<td>training costs</td>
</tr>
<tr>
<td>human resources</td>
<td>adaptation without changes in the company</td>
<td>service costs</td>
</tr>
<tr>
<td>EDI</td>
<td>evolution of system</td>
<td></td>
</tr>
<tr>
<td>CRM</td>
<td>modifications</td>
<td></td>
</tr>
<tr>
<td>reports</td>
<td>trainings</td>
<td></td>
</tr>
<tr>
<td>number of extra modules</td>
<td>support</td>
<td></td>
</tr>
<tr>
<td></td>
<td>interface</td>
<td></td>
</tr>
<tr>
<td></td>
<td>customer satisfaction</td>
<td></td>
</tr>
</tbody>
</table>

Source: Own study

However, to AHP [24, 31] evaluation criterions were divided into hierarchy levels as it is shown on the picture below.

The study was subjected to the most popular eleven [33] for the Polish market systems management:

- Assigned for small enterprises:
  - Microsoft CRM 3.0,
  - SYMFONIA Start,
  - CDN Klasyka,
  - WA-PRO Start,

- Assigned for medium enterprises:
  - CDN Optima,
  - CDN XL Standard,
  - SYMFONIA Premium,
  - RAKSQL,
  - WA-PRO Biznes,
  - WA-PRO Prestiž,
  - SAP Business All-In-One.

All data were taken from providers’ marketing information, websites, branch reports [39, 40, 41, 43, 44, 45, 46].
3.2. Management Information Systems evaluation models

3.2.1. Model of hierarchy alignment of all criteria

First classification was made by using the model of hierarchy alignment of all criterion describing Management Information Systems. It uses three main characteristic [36] as a starting point to analysis.

- Course criteria;
- Technology criteria;
- Economic criteria.

Second level of criteria was shown in table 1. According to this method all characteristics in each level will be compared and according to the appropriate algorithm the best match will be chosen in each level.

In order to receive above results the following formula was used:

\[
\text{MIS classification} = \frac{\text{nr of available modules}}{\text{nr of extra modules}} \times \frac{\text{operating system}}{\text{report generator}} \times \frac{\text{evolution of system}}{\text{modifications}} \times \frac{\text{support}}{\text{customer satisfaction}} \times \frac{\text{interface}}{\text{prime cost}} \times \frac{\text{hidden costs}}{\text{implementation costs}} \times \frac{\text{update costs}}{\text{training costs}} \times \frac{\text{servis costs}}{}
\]

Source: Own study
where:
- \( n \) – criterium number,
- \( x \) – value.

The results of the tested systems according to the first algorithm: a system related with the individual level of criteria suggests that the system offered by SAP meets two of the three of tested criteria. The least suited system is Microsoft CRM 3.0, which is a system designed to manage relationships with customers only. Findings are shown in a table below.

**Table 2. System related with the individual level of criteria**

<table>
<thead>
<tr>
<th>Modules [%]</th>
<th>Microsoft CRM 3.0</th>
<th>CDN Klasyka</th>
<th>CDN Opt!ma</th>
<th>CDN XL Standard</th>
<th>Symfonia Start</th>
<th>Symfonia Premium</th>
<th>RAKS SQL</th>
<th>WA-PRO Premium</th>
<th>WA-PRO Biznes</th>
<th>WA-PRO Prestiż</th>
<th>SAP Business All-In-One</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technology [%]</td>
<td>37.5</td>
<td>42.5</td>
<td>57.5</td>
<td>57.5</td>
<td>44.1</td>
<td>67.5</td>
<td>65.8</td>
<td>45</td>
<td>76.6</td>
<td>74.1</td>
<td>88.3</td>
</tr>
<tr>
<td>Price [%]</td>
<td>27.9</td>
<td>20.9</td>
<td>9.7</td>
<td>5.6</td>
<td>100</td>
<td>11.4</td>
<td>11.9</td>
<td>65.1</td>
<td>13</td>
<td>7.8</td>
<td>1.8</td>
</tr>
</tbody>
</table>

Source: Own study

Evaluation according to the second algorithm (system relevant to all criteria) lines up all systems and shows which system is the most suitable to small and medium enterprises. It shows which system is the best one and has the lowest price connected with high levelled technology. Results are shown in a table below.

**Table 3. System relevant to all criteria**

<table>
<thead>
<tr>
<th>Modules [%]</th>
<th>Microsoft CRM 3.0</th>
<th>CDN Klasyka</th>
<th>CDN Opt!ma</th>
<th>CDN XL Standard</th>
<th>Symfonia Start</th>
<th>Symfonia Premium</th>
<th>RAKS SQL</th>
<th>WA-PRO Premium</th>
<th>WA-PRO Biznes</th>
<th>WA-PRO Prestiż</th>
<th>SAP Business All-In-One</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technology [%]</td>
<td>25.52</td>
<td>35.98</td>
<td>52.04</td>
<td>54.38</td>
<td>55.46</td>
<td>48.51</td>
<td>59.27</td>
<td>44.11</td>
<td>48.41</td>
<td>49.56</td>
<td>63.39</td>
</tr>
</tbody>
</table>

Source: Own study

Graphic representation shows that for small business the most cost-effective is the Symfonia Start. For medium-sized enterprises, despite the high price of implementation, functionally and technologically the most appropriate system is SAP Business All-In-One.
On the second place is RAKS SQL. The most important thing is that despite the huge difference in the price of these two systems, their position in the ranking differs in only about three percentage points. The conclusion is, that not all criteria influence on the results with the same strength. That is the point why in next part are shown all criteria with added weights. To each criterion was added its importance regarding to other. The most important receives a value 1, the less – 0. Detailed specification is presented in table 4.

Table 4. Weights of the criteria

<table>
<thead>
<tr>
<th>modules</th>
<th>weight</th>
<th>technology</th>
<th>weight</th>
<th>price</th>
<th>weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>accountancy</td>
<td>0,5</td>
<td>operating system</td>
<td>0,3</td>
<td>prime cost</td>
<td>1</td>
</tr>
<tr>
<td>warehouse</td>
<td>0,5</td>
<td>database</td>
<td>0,3</td>
<td>hidden costs</td>
<td>0,5</td>
</tr>
<tr>
<td>production</td>
<td>0,5</td>
<td>interaction with other app.</td>
<td>0,4</td>
<td>implementation costs</td>
<td>0,8</td>
</tr>
<tr>
<td>fixed assets</td>
<td>0,5</td>
<td>language</td>
<td>0,2</td>
<td>update costs</td>
<td>0,8</td>
</tr>
<tr>
<td>salary</td>
<td>0,5</td>
<td>report generator</td>
<td>1</td>
<td>training costs</td>
<td>0,4</td>
</tr>
<tr>
<td>human resources</td>
<td>0,5</td>
<td>adaptation without changes in the company</td>
<td>0,3</td>
<td>servis costs</td>
<td>0,2</td>
</tr>
<tr>
<td>EDI</td>
<td>0,5</td>
<td>evolution of system</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CRM</td>
<td>0,5</td>
<td>modifications</td>
<td>0,4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>reports</td>
<td>0,5</td>
<td>trainings</td>
<td>0,8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>number of extra modules</td>
<td>1</td>
<td>support</td>
<td>0,6</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>interface</td>
<td>0,7</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>customer satisfaction</td>
<td>0,8</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
According to the findings presented in table 5, the most appropriate system for small enterprises is as previously Symfonia Start. It achieves 50.7% of all criteria, it is 4.76% less than in previous research, but still this system in the first one. All systems for small business have the same alignment as in previous estimation. However, for medium-sized enterprises the best match is still system powered by SAP. It achieves better result as in previous research. It meets all criteria in 69.57%.

Table 5. Results received according to each criterion

<table>
<thead>
<tr>
<th></th>
<th>Microsoft CRM 3.0</th>
<th>Symfonia Premium</th>
<th>CDN Klasyka</th>
<th>WA-PRO Lines</th>
<th>WA-PRO Prestiz</th>
<th>Symfonia Start</th>
<th>RAKS SQL</th>
<th>SAP Business All-in-One</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modules [%]</td>
<td>9.00</td>
<td>54.00</td>
<td>36.00</td>
<td>45.00</td>
<td>18.00</td>
<td>18.00</td>
<td>18.00</td>
<td>90.00</td>
</tr>
<tr>
<td>Technology [%]</td>
<td>19.90</td>
<td>20.80</td>
<td>34.10</td>
<td>45.00</td>
<td>21.30</td>
<td>34.10</td>
<td>22.10</td>
<td>41.30</td>
</tr>
<tr>
<td>Price [%]</td>
<td>33.33</td>
<td>20.00</td>
<td>33.33</td>
<td>20.00</td>
<td>11.11</td>
<td>100.00</td>
<td>100.00</td>
<td>16.67</td>
</tr>
<tr>
<td>Sum [%]</td>
<td>62.23</td>
<td>94.80</td>
<td>103.43</td>
<td>110.00</td>
<td>110.11</td>
<td>139.30</td>
<td>152.10</td>
<td>128.77</td>
</tr>
<tr>
<td>% of achieved criteria</td>
<td>20.74</td>
<td>31.60</td>
<td>34.48</td>
<td>36.67</td>
<td>36.70</td>
<td>46.43</td>
<td>50.70</td>
<td>42.92</td>
</tr>
</tbody>
</table>

Source: Own study

As the table above presents, results achieved in the second research were comparable with the first one. However used method seems to be better than previous one, because weights added to each of criterions indicates more suitable adjustment to decision maker requires regarding the best information system.

3.2.2. Analytic Hierarchy Process (AHP)

In this method decision problem is decomposed into a hierarchy of more easily comprehended sub-problems, each of which can be analyzed independently. Once the hierarchy is built, the decision makers evaluate its various elements by comparing them to one another in pairs. In making the comparisons, it can be used concrete data about the elements, or judgments about the elements’ relative meaning and importance. The AHP [24, 25, 31] converts these evaluations to numerical values that can be processed and compared over the entire range of the problem.
A numerical weight or priority is derived for each element of the hierarchy, allowing diverse and often incommensurable elements to be compared to one another in a rational and consistent way. This capability distinguishes the AHP from other decision making techniques.

In the final step of the process, numerical priorities are derived for each of the decision alternatives. Results of this method are presented in Figure 4.

According to AHP method the best match for small business is Microsoft CRM 3.0. For medium-sized enterprises most suitable system is SAP All-In-One Business. Results received with this method differ from previous one. Leader – Symfonia Start – according to this method and used weights is the least suitable system.
3.2.3. Preference Ranking Organisation METHOD for Enrichment Evaluations (PROMETHEE)

PROMETHEE makes abundant use of the notion of pseudo-criterion. This methodology is known as one of the most efficient but also one of the easiest in the field [4].

Unlike AHP, PROMETHEE allows the user to directly use the data of the problem in a simple multicriteria table [51]. The decision-maker has to define his own scales of measure (without limitation), to indicate his priorities and his preferences for every criterion. PROMETHEE automatically calculates the robustness of the current classification for each criterion.

According to results the most appropriate Management Information System for small enterprises is Symfonia Start. All results are presented on the figure 5.

![Fig. 5. MIS classification for small companies according to PROMETHEE method](image)

Source: Own study

On figure 6 are presented results received for medium-sized companies. According to PROMETHEE method the leader is CDN Optima. Second place takes CDN XL Standard and Symfonia Premium. At the top are systems which were abandoned in previous research.
As the comparison of AHP and PROMETHEE methods some divergence were received. As it was presented above another MIS achieved decision-makers requires.

4. Conclusion

After the research, the classification of Management Information Systems (matched for previously established criteria compliance) was prepared.

In the general classification of systems intended for small and medium sized companies, Symfonia Start (made by Sage) appeared to be the leader. Despite being almost always in the middle of the criterions’ comparison list (leading only in “price” criterion), in the final summary it was on the top. WA-PRO Start (which was the best in the “technology” criterion) took the second place. Comarch product – CDN Klasyka – took the third place. The bottom of the list closes Microsoft CRM 3.0 due to the little number of available modules, high technological requirements and price. The purpose of this comparison was not only to compare system in general, but also to show if one-module systems can compete in market with multi-module systems.

The research on systems dedicated to medium sized companies resulted in SAP Business All-In-One leadership, even despite very high price. Next places in this comparison was taken by RAKS SQL, CDN XL Standard, CDN Opt!ma, WA-PRO Prestiż and WA-PRO Biznes. It is worth to notice that despite the WA-PRO system has low price and it has rich technology offer, its public reputation is quite poor. This leads those systems to the bottom of the comparison list.

According to AHP method (criteria and weights) the most suitable system for small business is Microsoft CRM 3.0, then CDN Klasyka, WA-PRO Start and at least Symfonia Start. For medium enterprises The best match is as previous system powered by SAP. Then RAKS SQL, CDN XL Standard, CDN Opt!ma, WA-PRO Prestiż, WA-PRO Biznes and Symfonia Premium.

The method PROMETHEE presents some advantages over AHP. AHP is based on a principle of pair-wise evaluation of alternatives, according to a built-in scale valued from 1 to 9. So, for
every pair of alternatives and every used criterion, the user has to indicate his preference of an alternative on every other. If, such as recommended within the framework of AHP, the user makes decomposition downward from the generic to the specific, it will force the user to perform a huge number of comparisons and to remain coherent by establishing the relations of dominance. This last point is commonly viewed as a major problem with AHP.

However results received by this method have some difference then previous one. Although the best match for small business is Symfonia Start, on the second place is Microsoft CRM 3.0. Even though for medium-sized enterprises the best match is CDN Opt!ma and WA-PRO Biznes – result is not meet in previous research.

5. Literature

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LOGISTIC MANAGEMENT AND INNOVATIONS AS A FACTOR 
OF COMPETITIVE ADVANTAGE IN CATERING – CASE STUDY

Summary
This paper presents gastronomy and catering services management methods basing on a case study. The source of success was reaching a leading position in providing services. The high quality of provided services was ensured by simplification of non-bureaucratic activities based on a trust both in PR with own workers, outsourcers, and deliverers and also with customers. It was also reached thanks to innovative logistic and organizational solutions, desired investments in equipment and materials, respecting hygienic standards, as well as using foreign patterns. The practice applied by managers enabled them to play a role of integrators in a chain value and decided about competitiveness in a global market economy.

Keywords: management, logistics, gastronomy & catering services, logistic management, delivery chain, value chain

1. Introduction

Contemporary views on management of companies operating in conditions of the global economy shows clearly the need to build the network of cooperating companies in order to ensure competitiveness of provided products and services [Boyar, Kinder 2007].

The need for creating conceptions, principles and tools for achieving such an effectiveness of cooperation is justified in the sector of SMEs operating in farm and food business, as the specificity of this kind of business consists in its seasonal character, natural determinants and in a considerable degree of dispersing economic subjects which is historically determined.

This issue is particularly important at present, at the time of global economic crisis.

Catering and gastronomic companies perform an important part in building vertical networks of cooperation representing a dynamically developing sector of modern services at the time of work specialization. Companies of this type are the last link in the food supply chain described by the name of "from the field to the table". As such they can perform the role of the integrator coordinating actions in the entire value chain - of supplying food, and they can often be a link deciding about the success both of suppliers of the healthy, tasty and safe food, food processing industry workers, as well as the prosperity of supporting contractors (dealing with the setting, music, recreation, etc.)

However, the quality of catering and gastronomic services depends to a large extent on their promptness. Therefore both internal logistic solutions, as well as issues connected with cooperating with suppliers and customers, are crucial factors deciding on the success of such companies.
Tools and solutions applied by companies operating in service sector, and discussed in this paper as a case study, may represent a valuable contribution to the analysis of systems and management methods applied by them.

These solutions can determine not only the success of catering and gastronomic services, but to a considerable degree also developing forms of the cooperation of subjects in the value chain, beneficial for the entire sector of national food economy.

2. Description of an object of research

Lewiccy catering company took part in the examination. The company mission is: “Confidence and solidity of provided services as to satisfy the customer”. Managers try to build up and to support both mutual trust and the solidity of provided services. The specificity of this activity is to satisfy the customer that is directly transferred into financial results of the company. In order to get this satisfaction, achieving and keeping the high quality of provided services is necessary.

One of crucial factors influencing quality is appropriate managing flows of raw materials, half-finished products and products, according to the 5R principle [Coyle et al 2002] which assumes delivering the right product or service to the right place, in the right time, in the right amount and of the right quality. Other factors are also mentioned in the literature, such as the right cost of the order completion, which is essential for both sides of the supply order - contractors and customers. The high level of confidence between the company and suppliers help to keep the right level of the product quality and their acceptable price.

The factor of confidence is particularly essential in cooperation networks of SMEs from the agricultural-food sector assessed in the TOWARDS project [Kinder 2007]. This factor was one of the foundation on which the success of General Electric, one of the biggest and the most competing companies in the world. The main author of successes achieved between 1980 and 2000 based the culture and fundamental values of his company just on limiting formality of actions and replacing bureaucracy with trusting all company workers, regardless of their post and position in the hierarchy.

Welch proved in management practice that trust does give the flexibility to the company, and its effectiveness and the efficiency of action is incomparably higher than in highly made bureaucratic units [Krames 2008]. Many customers of the company which was the object of research pay in cash e.g. for organising the wedding, and indirect customers for a formal dance held a hundred days before the school-leaving exams, known in Poland as studniówka, or parties organized by colleges and companies.

The structure of customers using collective feeding has changed diametrically. Ten years ago, feeding students was subsidized to a large extent. Present feeding is comparable in its quantitative volume to the state from 10 years ago, but students do not usually buy complete meals (not a two-course dinners). In this way, the company changed the scope of culinary services from the canteen mode to the restaurant mode. The department of catering, having a hundred per cent share in profits, was broaden significantly.

The company leases the building from University of Technology and Life Science in Bydgoszcz. The rent for the lease was reduced, in exchange for that, the company charges the lowest profit margins from the academic community and provides services just as to cover the prime costs, or even below their level (on average, a student spends 5 zloty per day on food and
he or she doesn’t want to spend more, while the company must adapt its offer to fit this amount). Therefore, culinary services are provided to cover the prime costs, and they only make a profit in the form of leasing buildings from the university, necessary to provide other services offered by the company.

The company is employing 20 constants of workers but 50 persons doing odd jobs, but with times (a dozen or so times a year) against 30-40 persons more. In weekends on average 10 additional persons are getting a job.

Organizing some events is a challenging task as they take place parallel and by turns. On this account, internal logistics was entirely restructured and is run in following stages. It wouldn’t be possible without computer support, enabling to control the course of all processes. The so-called computer starting lists were used, created in order to arrange the organization of supplies - for needs of the receipt or packing goods. This method enables such work organization so that individual warehouses were packed in the right order and in the right time, this way transported products can be unpacked in the right order.

Thanks to that the range of services increased significantly, and even in the busiest periods organizing two parties for 500 people or 10 Holy Communion parties is possible at the same time.

The maximum number of people who can be served by the catering and gastronomic company being the subject of research is about 1000-1500 people during one event connected with high costs of amortization. There is also an alternative of the possibility to borrow additional settings from Warsaw Company, however the cost of such a solution depends on individual agreements and its profitability is difficult to predict.

The company not only predicts the possibility of widening the range of services, but has been developing successively for 5 years. Considering the level of services from 2003 as 100%, at present, in 2008 it would raise to 300%. It is an almost geometrical progress. In spite of the fact that the number of students has not changed, the amount of gastronomic offers has increased several times.

3. Circulation of information and logistics management

Steering and controlling services are definitely improved by possessing equipment and place settings by the company. It also improves conditions of the use, and the degree of care of the equipment; thanks to that the life-span of the equipment is increased, and maintaining the high quality of services is possible. Together with the increase in the range of services, logistic processes are more and more complex what forced the company to use computer support. The quality and incentive systems are admittedly based on the hired workforce and temporarily employed workers, but the core of the staff are the people who have proven to be reliable, responsible and trustworthy.

Both the head chef and the manager are held responsible for their decisions, but - moreover - all competences and entitlements are delegated to them. They are responsible for effects of their decisions before the owner what is visible in their appropriately high pays. The same rules of responsibility and competence are handed down the management ladder to the people working on subordinate, lower ranks of the hierarchy.

The aim of supply operating in a logistic system is to minimize costs of supplying, overcoming technical and organizational barriers connected with the transport and stock services, and getting both certainty and rhythmicality of supplying raw materials. According to Ficoń
it might be achieved as a result of providing possibly permanent connections with suppliers, synchronizing all streams of supplies considering quantitative and temporal relations, providing transport and warehouses, controlling quality, and also thanks to the appropriate system of registering the control of these processes. One of the crucial factors of the success achieved by the company being the subject of research is, according to the managers, quick correction of decisions possible thanks to permanent monitoring of actions in progress.

Supplying the company with basic food products is based on contacts with permanent suppliers and largely is based on the confidence. Some of suppliers - farmers not only provide their products, but also other, supplementing and essential elements of meals which are not offered by them. Therefore they are suppliers not only of the first level, but also of the second one.

This solution ensures the quality and the promptness of supplies of the products, which are provided by suppliers of the first row indirectly (e.g. vegetables).

In this way, the supply chain is shortened what allows improving the circulation of information, materials and means of payment, to facilitate the inspection of implementing orders, and - as a result - allows reducing service costs and ensures the final customers more satisfaction.

Such methods of action in management of the company which is the object of research allows to manage the entire value chain to a considerable extent [Drucker 2007] contributing to the final success in the form of a satisfied final customer who is not interested in the fact that the quality and the prize of services do not depend only on the Lewiccy company, but also on their suppliers, subcontractors etc.

Unofficial agreements and a mutual confidence play a crucial role, as in case of the low quality of products or the fraud, an unreliable source is immediately eliminated. The majority of supplied raw materials, and often also ordering additional transport means is implemented in the Lewiccy Company without any planned ordering cycle and circulation of documents, but if such a need appears, a phone order is sufficient. Findings of research carried out in production companies confirm that 70% of orders are completed with the use of the phone, 90% with the use of the fax, and even 70% through the Internet [Bendkowski, Radziejowska 2005]. One of the model examples of partnership with suppliers is 15-year-lasting connections with the meat supplier – during this time the supplier had to adapt his activity to new conditions in order to fulfill requirements of the European Union regulations concerning hygienic requirements.

At the same time, fundamental changes in the company logistics concerning supplies have occurred. While earlier the company purchased materials on its own on the wholesale market, at present it mostly uses the developed network of suppliers delivering products, half-finished products and raw materials directly to the company. Financial flows including payment in cash directly after the delivery are the encouragement to applying such solutions.

Such a way of settlement facilitates operational activity – a transaction is immediately finished and all goods stored in warehouses are not liabilities, but are already paid. This situation facilitates managing, controlling and assessing the company, and gives the access to occurring shortcoming. Payments for provided services are confirmed in writing; however the principle of “gentlemen agreement” is applied to the majority of regular customers. Transparent rules are applied, and agreements with customers concerning real payment deadlines are binding. A few percents of considerable delays do not influence on current cash flows.

Leadership in the vertical network of the food supply chain is possible thanks to extorting the appropriate quality of food raw materials on the one hand, and thanks to food supply and documenting its origin on the other hand. In spite of a real cut of raw material prices on the
market, the company—in order to keep the appropriate level of provided services—often decides to purchase more expensive products of the higher quality. The reason of such actions is often a large content of substitutes in cheaper raw materials, which often lowers the quality.

Such actions are also accepted by customers of the company who agree on a bit higher price in exchange for keeping right quality parameters. Keeping the high level of services and minimizing the economic risk are possible thanks to the managers’ broad experience, but also thanks to obeying procedures required by the European Union, such qualifying certificates, the documentation concerning expiry dates of food products, etc.

A result of globalization is the possibility of opening the company to the international market, and thanks to that it may use new products influencing on the form and the range of provided services, e.g. changing the interior décor according to the latest trends and fashion, gastronomic machines unavailable earlier (cast-iron frying pans, heating devices, small barrels to keep soups), etc. It enabled to implement more interesting musical setting, using the air-conditioning to ensure better conditions for customers, or widening the range of offered products.

The company makes use of a wide range of outsourcing services, employing reliable musical teams, cameramen and photographers, DJs, or people holding sports and recreational classes. The company demands a lot from outsourcers—almost 80% of musical teams do not meet the standards, however only those contractors are chosen who adapt their offer to requirements of the company and take critical comments into consideration.

The company performs also the advisory role while the customer assesses the offer, e.g. choosing music performers, filming events, choosing combination of cakes and their ornaments—suggesting the solutions which have been well-tried earlier. Workers also carry out the so-called “blind tests” to assess not only the quality, but also customers’ tastes concerning ordered products. Seeking out price leaders not only amongst wholesale suppliers, but also retail shops, is applied and thanks to it purchasing products of high quality for the lowest on the market price. Such actions allow the company to retain a high position among leaders of catering services.

To guarantee the leading position on the market with the greatest potential and to avoid inefficiency of using resources of seasonal character (e.g. in the holiday season when there are no students) tents are used while organizing summer events, or providing catering services for building companies in autumn or winter. It allows to use the sources much fully. However, outsourcing is not used for implementation of all vital elements of actions.

Instead of using washing service, it was decided to purchase a washing machine and a press, and to employ the person operating them, what enabled not only to reduce the costs, but also to improve the quality and the promptness of these services.

In order to keep the deadlines and to hold the quality of services at the busiest time, it was decided to increase supplies, e.g. of tablecloths as to prevent them from being a factor limiting the potential of the company.

4. Automation of the process of serving meals as an element of rational management

Lines distributing meals were another well thought out innovative solution improving actions of the company, as well as ensuring the desirable level of services. Two such lines were developed. One of them, implemented earlier, was equipped with a 3-meter transmission belt enabling the transfer of dishes with portions put distributed with three velocities. Such a transmission belt was constructed with little capital investment, however it enabled noticeable
improvements. It is possible to place 8 to 13 people alternately on both sides of this belt, together with containers where portions of meals are put. The easiness of using the line was proved by workers’ fast adaptation to its use.

The other 4-meter belt has a few improvements. Among other things, it is possible to fluently regulate the belt speed, to install a device counting the number of served portions, and at the end of the belt a photocell was put to stop the entire process of serving in case when a person serving portions does not manage to collect them from the line. However, the purchase of ready solutions of this type offered by foreign producers is possible, their price is repeatedly higher. Managers were encouraged to develop such a technological line for serving meals by their earlier experience and relatively low level of difficulty of making the device. At present, both lines are regarded as essential in current gastronomic and catering activity. Innovations presented above have became an integral element of rational management of preparing meals, constituting one of crucial parts of gastronomic and catering services.

5. Work organization in the process of the providing services

The need to save documentation and restrictive procedures of the food control also extorted on the manager of the company implementing procedures of managing waste. According to Coyle and et al [2002] including problems of waste logistics may contribute to achieving not only of the greater efficiency and effectiveness, but also public approval. It was essential to sing the agreement with the company dealing with disposal of the waste after close segregation into groups of glass, paper and others. Organic waste after grinding is removed to the sewage system.

Organizational changes were made in actions implemented after providing the service in order to guarantee the effective and efficient waste segregation with the simultaneous reduction of relatively high costs of waste disposal. The service provided not in the seat of the company requires at the beginning the service of 6 people who arrange tables and chairs, set tables, prepare the place to distribute and to prepare meals. Gradually, the number of staff members is rising and during the party or the meeting it reaches the number of even 20 people. All these people take part in closing the event, that is they clean, take away dishes and chairs, tables and segregate waste.

In order to minimize costs connected with the recycling, according to the managers it is profitable to purchase e.g., boned meat, even if its price is higher. During cleaning preliminary selection of waste is carried out into plastic, paper, glass, and organic solid and liquid wastes.

Organic wastes are put into the grinder which minces them into small pieces and thanks to that they can be channeled with large amounts for water to the council sewers. They constitute even to ¾ of all waste, so such a way of removing them does not generate additional costs. The rest of waste, such as small cartons, bottle caps, skewers and other plastic or glass packages are packed into rubbish bags and collected by a special service company.

In order to speed up the process of washing and sorting dishes, the company worked out its own organization and methodology of proceedings. The cutlery is put into big drink dishes which are filled with water so the dishes do not cake in transport. Plates and other dishes can be put in containers in which previously contained food, and they are easily transported to the seat of the company where they are stored in automatic dishwashers.

An interesting solution applied by the company is using treated, filtered water to wash the dishes.

Considering the fact that the hardness of local water exceeds 23-degree scale of hardness
worked out in Germany as it is on the level of about 26°, it leaves streaks on washed dishes requiring manual polishing. The labour intensity of such a process is great enough that extra costs connected with treating water compensate for costs connected with additional working hours of a specially appointed worker. The entire process of washing and segregating dishes and other devices after the event usually takes a day, and in case of big events or longer distances even a one and half a day.

6. Conclusion

The result of the case study shows that methods applied by the Board of directors both for managing personnel (incentive systems), as well as for relations with customers, suppliers and subcontractors (the way of preparing and implementing offers, settling and implementing supplies and supporting services), and also for managing material and financial resources, are characterized by effectiveness, pragmatism and efficiency. It is proved by the position of the company as leader gastronomic and catering services on the Bydgoszcz market.

The analyzed management model is regarded as one of the best practices applied in this branch of economy by leading contemporary managers [Krames 2008] thanks to applied innovative logistic and organizational solutions, the way of controlling the quality of supplies of raw materials and supporting services, and PR based on trust and non-formal activity.

Good relations with permanent and temporary workers, suppliers and subcontractors guarantee implementing accepted orders fully, at the same time allowing to minimize the costs connected with an increase in bureaucracy in case of lack of trust, ensuring an efficient flow of information, and on the other hand they reduce costs of the control and ensure the high quality with considerably less supervision, not only inside the company, but also in the value chain.

The company culture, based on confidence, stimulates workers’ creativity and commitment. Simple logistic and organizational solutions effectively support actions aiming at increasing the range of activity with the optimal use of owned and purchased resources. Innovative solutions in preparing meals, the interior decor and the menu based on European models are the key to success of the company; they prove that premises describing the vision of its development are realistic.

Therefore, the opinion of the manager and the owner running the company that the base for thinking about the future and the development of his company is care of its image in the future, even enlarging the risk (e.g. by taking money from customers only after providing the service, and pausing suppliers immediately after placing an order) is well-grounded and confirmed by the well-tried practice.
7. Literature


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Summary

The article presents the matter of identification of economic recession symptoms on the global market, occurring in the local economies. It discusses the utility of the official statistic information resources for the description of the social and economic phenomena formation, in crisis conditions and pointing to the necessity of differentiation of these resources in many internal factors in the company (e.g. dependant on its own factors) and the external factors which create the same determining its functioning. The author points out the effect of synergy, resulting from the implementation of the information complementary system and points out to the factor that shapes the quality of (considering the global symptoms of the crisis phenomena infiltrating the local economies). The considered matter is illustrated with some examples of Opole region phenomena and the current official statistic data, on the background of the current economic phenomena proper for the country, scale and affecting the subjects and regions of Poland independently of their localization.

Key words: crisis, recession, global economy, identificators of crisis, public statistics, synergy, statistic data, statistic information, knowledge management

1. Introduction

A change is the only certainty in the market economy. It makes the process of permanent management as its standard of business and management functioning in this economical system.

Aspects of social changes and changes in an enterprise economy, a region, in a country arouse some interest, agitation and even public discussion if they are associated with bigger population independently of their character. In every case managers, businessmen and direct beneficiaries of the results of these changes start processes of finding out of their reasons.

Management of economical subjects and management of economical and regional development by public administrative services in conditions of global financial crisis states the current subject.

Various character of matters and their significance for practicians of management and economy in terms of globalization of markets, economical integration of European countries and systems creating chains of market value and also natural which means off crisis difficulties in running the companies in a perspective of local economical situation and individual opportunities of functioning makes us consider knowledge management problems in crisis circumstances. Extensive matters and their limited publishing formula determines the focus of the article on matters connected with identification of aspects of the global crisis in our regional economy which
is the subject of bigger interest and investigation of voivodes in recent weeks. The interested are looking for information which would illustrate the matter. It would enable them to monitor local situation and first of all they would be able to open the mechanisms of protecting businessmen and local community from painful effects of recession which means that they would give them some basis for efficient knowledge management in crisis conditions.

2. Crisis in the mirror of the subject literature

“Crisis” from a Greek criterion is a recognizable sign, from Latin a criterion is a kind of measure [1]. Literature of the subject defines the matter of crisis in various ways. Kopaliński explains crisis as a period of a breakthrough recession, a decisive turn[1]. The other source describes crisis as a turning-point for better or worse changes [2],and the other understands this economical category as a period of a turning-point and a potential change in functioning [3] which means that the breakthrough in functioning can be an intensive development, overproduction or even lowering of economic activity which means that all the aspects of the phenomenon can be located within the meaning of the considered notion.

Professional literature differentiates macro-economic scale of a crisis from a company crisis. A macro-scale crisis the literature presents as a phase of some favourable circumstances of a cycle and treats it as a result of some changes in the pace of industrial growth. The company crisis is described as a moment or a phase of some development processes where its resources or potentials of growth have been finished, badly allocated which endangers its longer existence is the result of some unexpected and unintended disturbances in functioning of organizations distracting it from the state of relative internal balance evoked by the conflicts of interests, evaluation and assessment of a company as a whole by the internal and external groups of interests, first of all by owners shareholders or capital donors who expect a certain growth rate from their investments [4].

The literature reference to some definitions of crisis and the quoted differenciation become crucial for the public discussion which is open in Poland in connection to some information about the global financial crisis and some attempts to identify the manifestations of global crisis in Polish economic organizations and certain regions of our country.

3. Statistic data in identification of the global crisis

Specific interest of practicians of management who are looking for some manifestations of the global crisis in enterprises and regions of our country has been focused on the monthly Statistic Office Reports concerning the social and economic situation of our provinces. Subject bulletins report the data concerning – the average employment rate in the companies sector, the number of registered unemployed people and the unemployment rate, the average gross salary in industry, the number of new flats built or the level of production sold, the level of construction industry production or the level of retail sale, the wholesale rate or purchasing centre prices. The statistic data published in official statements of statistic offices state information illustrating the level of the dimensions of a certain economic category. They state an example of this kind of information the individual consideration of which is not reliable for assessing of complex phenomena, especially for assessing of social and economic situation in the context of global financial crisis. We can illustrate the truthfulness of this statement with an example of some statistic information taken from the official statement about social and economic situation of Opole province concerning November 2008 where the average employment in the company sector, this year, was 99.7%
thousand people and was of 2.2% higher in comparison to November, last year and of 0.3% lower in comparison to last month [5].

On the basis of the employment growth of 2.2% in comparison to analogical month of the previous year, what we can read in the quoted information, it is difficult to decide if Opole province does not suffer from any consequences of the global financial crisis and we cannot state as well if the first symptoms of the crisis appear only because there was a decrease of 0.3% in comparison to the previous month, which was published in the official statement for the previous month (in comparison to October 2008). We cannot conclude in any companies in Opole province go bankrupt or crash on the basis of the given decrease of employment. Analogically to the information above, we cannot say that because in November 2008 employment in the hotels of our region dropped, our Opole hotel sector was hurt by the influence of the global crisis. Similarly we cannot disregard the information searching for some symptoms of the global recession in our province. Correctness of the above reasoning confirms the clash of the information with the information describing a category given for salaries. Statistics for Opole region for November 2008 state that gross salaries in the company sector of this province were increased of 7.7% in comparison to November 2007 and of 1.9% in comparison to October 2008. Confrontation of information about the employment and the salaries that in spite of the fact that the employment dropped in November 2008 in comparison to October 2008 of 0.3, the salaries were increased of 1.9%. Therefore, an analyst cannot state if the considered categories demonstrate lack of symptoms of the global crisis in Opole province and he cannot also suggest that of the symptoms of the crisis appear. Instead of the find conclusions he should consider off crisis reasons differenciating the statistic data, in a given period which means to check to what extent the changes of the statistic data are caused by the crisis of a company evoked according to professional literature, by the factors which have their source inside the company. He should find out if the reasons of statistic changes do not result for example from restructurizations which are done in the companies or from introduction of systems of effective organization of work which lower the employment, and increase the efficiency of the lower number of the staff, who give the enterprise the income on the level that enables the owner to increase the salaries of the employed. A keen analyst will investigate if at that time there was not any automatization introduced in the production processes or for example an integrated computerization in their information systems, which in a natural way:
- support a person at work,
- helps the opportunities of gradual growth of quality of produced goods and a decrease of (reduction of) costs, and also effectiveness of managers decisions, etc. Independently of above, we can enlarge our reasoning by broadening of subject analysis with statistic information which on the basis of the country register REGON illustrates the number of new economic subjects in Opole region in November 2008 or the number of the closed ones. If the number of these subjects increased, the number of places of employment also increased. It means that the new companies noticed somewhere on the market an opportunity to start running a business, an area, a niche of a low barrier for entering the market. If the number of subjects stayed at the same level for the last few months, the reasoning about lack of the global crisis influence would be reinforced. Its existence can, not be also proved by the possible drop in the number of subjects, if we do not clash the state with the size of events more or less connected with the considered category of the phenomenon.
Assignation of the symptoms of the global financial crisis in a circle of Polish enterprises and regions appears to be insufficient if it is based only on some statistic data. Deeper analysis taking into consideration two kinds of factors broadening the spectre of its final conclusion is very important.

Mainly it concerns:

a) The external factors – which equally, in a harmful, way affect the level of results of economic subjects independently of their country location, its size or business, for example the policy of banks [2], channels of crisis transmission [9] or the prices of electricity, which have gone up in 2008 and again in January 2009 [11]. Companies calculated in their business plans 15% of increase of electricity while its real level went up of 40%, creating a step increase of production costs and a decrease of competitiveness of Polish companies on the United Europe market because, for example in Germany, Czech Republic and in Slovak Republic prices of electricity went down [1]. Information about a drastic increase of electricity prices in Poland due to a 50% increase of coal prices [4] and the fact that an excise for electricity in Poland is one of the highest in Europe [1], can be crucial for conclusions considering the global financial crisis. In conditions of the internal country increase of energy prices we can consider the problems of Polish companies caused by the influence of the global financial crisis, as very controversial.

b) Internal factors – dependent on a company and determining the effectiveness of its performance where we can enumerate efficiency of the management organization of work processes and others. This scale of a company analysis enables us to identify the errors made by the very company in its performance. In consequence it enables us to identify the factors which evoke problems in functioning of a company and not related to the global financial crisis. They cannot be attributed to the crisis even when the problems of the company occur at the same time as the crisis in the world.

4. Conclusions

A crisis is not a statistic category, so the above considerations prove the fact that statistic information does not explain the causes of occurrence of a certain social and economic state but it only brings us nearer to the recognition (knowledge) of some social and economic phenomena, and to the setting of their trends or tendencies. The information supports the process of recognition (of reasoning) but it does not give us ready and plain answers. It also supports the process of decision-taking and the management knowledge of people who run the process. The wider the spectre of factors for analysis and the economic categories described with the statistic data, the bigger the probability of the accuracy of diagnosis is. The statistic data stating an aggregated information, a resultant of certain individual data, even in an extended number or variety, they will state an inadequate measure to point out the reasons of the occurrence of certain social and economic situations if they are the only ones on the basis of which we conclude and they can be useless if they are out of reach of the economy practitioners. It means that some efficient support for economy practitioners by means of statistic information resources is related to the quality of cooperation of the statistic environment and the environment of the economy practitioners.
5. Literature


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INFORMATION TECHNOLOGY IN FORMULATION OF TRANSPARENCY STRATEGIES FOR FOOD CHAIN AND SUPPLY MANAGEMENT IN POLAND

Summary

The key aim of this paper is the presentation of current trends in the development of food distribution systems in Poland and their likely remodelling towards supply chains and networks. Described in the paper models, in particular Collaborative Extended Enterprise cannot be applied, unless project GS-1 is implemented, as it enables realisation of the traceability concept with respect to movement of food and related information. Therefore, to create food supply chains and networks based on information technology it is crucial to make them transparent as a prerequisite for the remodelling of food supply chains in Poland.

Key words: IT, Transparency Strategies, Food Supply Management, Poland

1. Introduction

Acceleration of changes in the food market occurring after Poland’s accession to the European Union in 2004 caused an increased variability and fragmentation of the food market. As a consequence, the significance of food quality for the buyers is rising continuously. Higher importance of food quality is driven by the principles of quality management, having roots in the principles developed by E. Deming. The fragmentation of the food market and the rising significance of quality are accompanied by the need to reconstruct the traditional and build modern food supply chains and networks.

2. Megatrends and their impact on the food market

The enlargement of the European Union in May 2004 by ten new states has boosted the earlier trends in the conditions of food market in terms of economics, demography, social and cultural, and legal aspects, as well as technology and the protection of natural environment, leading to increased competitiveness [W. Szymanowski 2005, W. Szymanowski 2006, Trienekens, van der Vorst 2006].

- In economics, the enlargement boosted the client-oriented approach and the search for higher cost and revenue effectiveness via a change of the demand and supply proportions, leading to higher prices of food due to, among others, its improved quality. This tendency is exemplified in the following:
- alignment between food production and distribution systems vs. customer expectations thanks to innovations that are introduced to food production and sale;
- determination of new revenue and cost solutions in quality assurance and health safety thanks to better transparency of food chains and supply networks;
- impact of the Community Laws related to health protection [General Food Law...

**In demography, social and cultural, and legal aspects**, the conditions of food production, distribution and trading are impacted by:

- *EU and domestic laws and regulations of other international institutions, among others World Trade Organization, related to food compliance with health requirements related to humans and animals*;
- the expectations and behaviours of consumers as regards food (whether practical, easy, organic, innovative or exotic, i.e. from cuisines of entire world) thanks to changes in the consumption model and knowledge of food values and safety issues;
- changes in the structure of consumer demography driven by the occupational activity of women, greater number of single and two-person households, higher age of the society in Europe and the English-speaking world, as compared to the current demographic surplus and related food demand observed in the countries to the South, i.e. Asia, Africa and South America that are characterised with wider wealth gap in the society.

**In the area of natural environment**, the operational conditions of the food supply chains and networks are impacted by:

- the changing climate that causes natural disasters (flood, drought, hail, soil erosion) impacting lower food output;
- consumption and shortage of energy and water that causes lower food production and deteriorated distribution and trade;
- higher cost of crude oil and fuels that drives significance of agricultural products, such as rape and grains intended for production of bio-fuels;
- recycling of packaging materials and waste generated during food production, distribution and trade;
- development of new environment-friendly bio-packages and the implementation of the Kyoto Treaty by new countries to limit gas and waste emissions to the environment (water and soil).

**In technology**, products based in bio-technology and genetic modifications that leverage changes in transport and telecommunications, impact improved quality of production and distribution and food safety.

The above phenomena (Chart 1) lead to an increase in the *variability and fragmentation of food market* catering for individualised needs of consumers [Szymanowski 2004, Safety 2006], through:

- increased consumption of exotic foods from various cultures;
- increased demand for organic food;
- increased consumption of food away from home via collective catering services that provide convenient and fast foods;
- increased demand for functional special-purpose food featuring diversified content of fats, vitamins and other nutrients to support the treatment and prevention of civilisation diseases or improving mental or physical fitness.
The phenomenon of business expanding beyond the national borders has been strengthening since 1950s. It was and is related to the lifting of barriers in international trade, expansion of super-national corporations in charge of almost three quarters of all trade, and revolution in transport and communication. Networking is among the key drivers of globalisation, i.e. the use of Internet resources (World Wide Web) in trade as a business tool for the creation and exchange of new value and execution of low-cost e-transactions. E-commerce crosses all barriers of time and space by providing Internet-integrated logistics to support businesses.

Partnership-based logistic chains and networks are an instrument able to meet the aforesaid market needs, in particular with respect to the emerging markets. Such chains and networks should be financed with public funds and joint public and private undertakings.

The development of logistic chains on the international scale is related to certain prerequisite factors that can be grouped as follows:

- higher needs and expectations of customers and the market in respect of products and services;
- globalisation of supply and distribution markets;
- availability of natural and human resources;
- deregulation and the economic policy;
- development of information and communication technology (ICT).
Following are the key conditions that drive the needs and expectations of customers and the market:

- Fragmentation of buyer markets. The creation and satisfaction of individualised needs and expectations of smaller buyer groups leading to, thanks to ICT, establishment of a market with symmetric one-to-one relation;
- Product life. The majority of sectors is mature and need tools to retain customers rather than win new buyers. Such tools include product line management, handling of promotional activity, adding new value for customers, e.g. via extra information;
- Higher degree of innovation. This tendency is reflected in the large number of new products, production processes and organisational solutions, all leading to shorter product life and higher logistic requirements in terms of both size, time, destination and services, which apart from transport, storage and packaging also include servicing, insurance, financing, payment monitoring and information to customers;
- Compressed prices. The above conditions lead to higher competition on the domestic markets giving rise to fights for customers and price reductions.

The main drivers of supply chain development are, in respect of globalisation of supply and distribution:

- Centralisation and geographic concentration of distribution via closing of local and domestic hubs in 1990s in favour of pan-European logistic centres. The process of minimising the quantity of logistic hubs is accompanied with their stronger geographic presence in the area of Benelux, with the Netherlands holding to almost 56% of hubs. These logistic centres are ready for multi- and inter-modal transport, i.e. transport that occurs across various platforms and means, and provide comprehensive logistic services via virtual logistic platforms;
- Logistic services outsourced through specialist logistic service providers, called Fourth Party Logistics, or 4PL. Their mother companies are in possession of own transport and storage resources and establish logistic operators that provide high-quality service across entire Europe for reduced prices;
- New production and storage technology invented based on the development of the production infrastructure and in particular the implementation of new IT solutions that provide new interactive ways of supplier-buyer contact. The new technologies used in the organisation of production include flexible organisation of production-processes synchronised with order flow, inventory management (Continuous Replenishment Process) leading to a large reduction of stock required from suppliers.
- New techniques in demand and sales planning. By initiative of large retail networks acting in cooperation with large food suppliers, a concept of Efficient Customer Response has been coned at the beginning of 1990s. Efficient Customer Response means a customer-oriented supply chain intended to better satisfy the needs and cause higher sales and cost reduction. This issue is addressed in Collaborative Planning, Forecasting and Replanishment (CPFR), which supports the synchronisation of forecasting and planning across retail networks and producers, yielding higher effectiveness of both. At the same time, it provides grounds to separate daughter companies specialising in logistics.

Another group of prerequisite conditions is the access to natural and human resources, with
a focus on building of long-term relations with pre-defined groups of suppliers and determination of the form of such relations, rules of access to natural resources for production and logistic purposes, and rules of the use of human resources and personnel. It also relates to the rules of management of post-production waste, such as packaging harmful for the natural environment, in the most effective manner via utilisation logistics.

**Deregulation** means the creation of the **European transport policy**, which aims at developing the **Trans-European Network (TEN)**, as a consequence of the Maastricht Treaty of 1995. The network is the primary component in the infrastructure of logistic networks that process large and frequent cargo. In 1997, **Transport Infrastructure Needs Assessment** was founded by the European Union, a programme intended to procure financing for the core investments in the transport infrastructure.

The programme for the development of the logistic centres as hubs able to provide comprehensive servicing for all transport and **intermodal cargo** will contribute to a lower burden for the truck transport, less impact on the natural environment and improved quality of life in the conurbations.

### 2. Development and Impact of Information and Communication Technology on Remodelling of Food Supply Chains and Networks – current trends in the development of food distributions systems in Poland

The last group of conditions that determine the development of supply chains is related to the **Information and Communication Technology (ICT)**. This includes the need to design a global **all-industry information standard** that would assure compatibility of basic data across products and services offered by various trade partners. Such standard is satisfied via **Global Data Synchronisation (GDS)**, a model built based on a certified network of national electronic product catalogues, developed using EAN-UCC -**European Article Number Association and Unified Code Council**. It is commonly referred to as the bar code system used in wholesale and retail, as well as in logistics and transport. The applications of EAN-UCC expand and today it is the key language in digitisation of trade. EAN-UCC is used in **Electronic Data Inter-change (EDI)**, a technique leveraging non-paper carriers of information to connect IT systems of trading parties and send standard documents such as invoices, orders, production schedules in the electronic version. EDI’s advantages include full independence of any single hardware or software platform. The global standard for EDI is WebEDI that uses the World Wide Web to connect trading parties.

The change from the **production-oriented approach towards customer focus** is possible via cooperation with supply chains and networks that should operate based on the principle of partnership and use joint resources to track and monitor the flow to: increase the added value by enabling international sale of products and services, observance of quality standards and food safety, incorporation of expertise, technology and new organisational models. It necessitates designing the **strategy for remodelling of supply chains**, which will increase the competitiveness of entire chains rather than singular actors. The strategy will incorporate information technology to improve its transparency based on quality standards, food safety and innovation in the introduction of new products, technology and organisational models for the market. This aim will be realised based on the abovementioned prerequisite conditions, by applying the **process-based approach** in accordance with Deming’s **PDCA principle** (Plan-Do-Check-Act) that enforces sustained improvement.
The key aim of this paper is the presentation of current trends in the development of food distributions systems in Poland and their likely remodelling towards supply chains and networks. The new circumstances at the emerging markets such as Poland, in particular after its accession to the European Union, create new market challenges to overcome with the use of information technology. The new technology will also support the remodelling of supply chains and networks based on the transparency strategy by improving the chain effectiveness, and build partnership relations between the actors by increasing their competitiveness.

To justify such hypothesis I shall use a series of arguments which follow. First of all, there is the impact of specific economic trends and management schools on the evolution of the management model for supply chains and networks, as observed after 1950s and at the beginning of the 21st century. Such approach enables a presentation of the varied stages in the development of supply chains and networks, with the next stage based on the progress of information technology. Information technology can be implemented once the principle of remodelling of supply chains and networks is applied based on the incremental approach of Davenport and Deming’s PDCA rule. The target is the opportunity to build a reference model, founded on best practices, that would incorporate the concepts of Extended Enterprise and Collaborative Extended Enterprise.

Another argument is the forms of trade that experience the fastest pace of development thanks to the market globalisation, and their evolution in the World, Europe and Poland, with a special focus on whole and retail sale. The new forms of wholesale trade that have emerged during the transitory period of the Polish economy are related to wholesale markets, commodities exchange, tenders and the differences between them. An example of the latest form of trade that uses information technology is the Warsaw Commodities Exchange. Another tool is the distribution service centres that support wholesale and large retail networks. The rising role of information technology for the remodelling of supply chains is accompanied by changes in the logistic infrastructure. An example is the logistic centres. Their specialist operations can be exemplified via the evolutionary model of Wielkopolska Agri-Horticultural Wholesale Market PLC.

Another argument for the role of information technology in the remodelling of supply chains is their application in the management of production plants that are the second link in the supply chain after the retailer networks. The implementation of the concept of referential model of Manufacturing Planning and Control (MPC) and its evolution towards planning support systems, i.e. Material Requirement Planning/Enterprise Requirement Planning (MRP-ERP), has been documented via the implementation of planning support systems in the food processing industry. The future directions for the development of planning support information systems in the food industry that use quality and time management will, via tools such as CPFR, realise the concepts of Extended Enterprise and Collaborative Extended Enterprise.

The next argument for the future role of information technology in the remodelling of food supply chains is the directions of application of the Internet for the development of alternative channels of distribution in the area of wholesale and retail. Wholesale uses trade and logistic platforms. For example NetBrokers which is the largest e-wholesale platform for agricultural and
foodstuffs in the Central Europe. In retail, alternative channels of distribution are applied via e-shop model. The pros and cons of e-sales will be presented using the example of Poland’s oldest hipermarket, ToTu, and the hybrid sales platform of PiotrPawel food store. The reports on operations of on-line shops in Poland, prepared by the Batory Foundation and the Office for Consumer Protection, indicate the next tendencies for this rapidly developing alternative food sales channel. Another tool that supports the role of information technology is e-auction – a platform connecting both individual and small business buyers. The best known example of application of e-auctions is the fruits and vegetable exchange operating in the Netherlands.

Another advantage of information technology for the remodelling of food supply chains is the opportunity to monitor and direct cargo (raw materials, foodstuffs and components) thanks to the changes that have been made to the EU and Polish laws to secure food and health safety of the Polish nation. The concept of traceability of cargo from the source up to destination, and the results of its implementation are illustrated well in the European and global best practices. The rules of organisation and operation of such systems are evidenced in the example of pig farm network quality management applied on the borderline of the Netherlands and Germany.

The creation of global infrastructure for cargo identification and tracking in form of the GS-1 system will enable formulation and implementation of supply chain strategies that incorporate the principle of transparency and are realised in two forms – cost leadership in food supply mass markets, which use outsourcing, and the differentiation strategy, which ensures food safety on niche markets.

The Extended Enterprise model can be associated with 3 principal directions of activity:

- Creation of supply chains for fresh food with large retail networks acting as chain integrators. For example, the TESCO network in the Great Britain after the outburst of the mad cow disease;
- Creation of supply chains for processed food with food producers acting as chain integrators, and the remodelling based on process reengineering;
- Model of cooperation between large food producers and large retail networks that use purchasing platforms for that purpose.

The procedures for the application of the Extended Enterprise model, and Cooperating Extended Enterprise in particular, covering: agricultural producers, food processing and the markets providing supply with agricultural raw products and their sales, should be developed on the basis of Deming’s principle of sustained improvement in supply chains: Plan-Do-Check-Act (PDCA). Virtual trade platforms should be inherent elements of Extended Enterprise.

3. Conclusion

The above models, in particular Collaborative Extended Enterprise, cannot be applied, unless project GS-1 is implemented, as it enables realisation of the traceability concept with respect to movement of food and related information. Therefore, to create food supply chains and networks based on information technology it is crucial to make them transparent as a prerequisite for the remodelling of food supply chains in Poland.
4. Literature

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METHODS OF MANAGING THE BRANCH ORGANIZATION OF AGRICULTURAL MANUFACTURERS SHOWN ON THE EXAMPLE OF EMPLOYERS-SHARECROPPERS AND LAND OWNERS ASSOCIATION (PART I)

Summary

Nowadays, common engagement in cases supporting local development and actions taken in cooperation with branch organizations and other institutions interested in using development chances in the present budgetary perspective become important. A specific character of the agricultural branch caused the necessity of specialization of enterprises and business institutions.

Employers-Sharecroppers and Land Owners Association seated in Bydgoszcz is an organization established in 2000 after joining two agricultural organizations. The association is a network joining approximately 100 members from kujawsko-pomorskie province - farms and small and medium companies.

The goal of the research was the analysis of management methods applied in the organization. The research indicates that the organization actively participates in consulting the design of acts, decrees or resolutions which can exhibit significant influence on the socio-economic situation of the employers in the future. As an example, the participation in consulting the design of the act on managing agricultural properties of the treasury can be mentioned. In order to increase the effectiveness of operation and to gain benefits for its members, the association continuously cooperates with organizations it is a member of. The work will present the results of the research obtained by the University within the frame of cooperation with the Association in order to allow knowledge transfer to the Sector of Small and Medium Companies and Agriculture through the participation (partnership) in the project entitled “Migrating networks from a producer TOWARDS a market orientation within the agri-food sector” - 6th Framework Programme of the European Union, TOWARDS project.

Keywords: branch organization of agricultural manufacturers, management, manufacturers’ network

1. Introduction

In order to gain competitive benefits in global economy conditions agri-food companies are forced to strengthen their relationships with economic surroundings. According to Drucker, this necessity is conditioned by closer and closer relations between suppliers and receivers forced to offer to their clients the values and solutions more attractive than competitors. In this sector one can observe a non-uniform distribution of the system of forces in supply chains. A dispersion of
resources’ manufacturers and their insufficient consolidation result in the fact that they cannot be real partners for distributive-processing networks. Most agricultural enterprises that are members of the Association are the former national farms. Their functioning bases on the land leased from the Treasury. They underwent adaptation processes\(^1\),\(^2\), and are subject to chances and threats resulting from a few important issues:

- farms’ proprietary status.
- changes in the scale, structure and technology of manufacturing processes.
- changes of market structure – receivers, suppliers and competitors.
- a changed status of national family farms and their situation in relation to the companies that are former national farms (commonly abbreviated as “PGR”).
- valid standards regarding healthy and safe food and other regulations resulting from the membership of Poland in the European Union.
- changes of information-communication channels connecting companies with their surroundings due to e-economy development.

2. The goal, method and organization of the research

TOWARDS project entitled „Migrating networks from a producer TOWARDS market orientation within the agri-food sector” is realized within the frame of the so called Specific Support Action (SSA), co-financed by the European Union within 6th Framework for the research project regarding RTD (Research and Technology Development). The main goal of TOWARDS project is the support of traditional, producer and region-oriented organizations – networks and associations from agri-food sector in their migration into innovative client and market-oriented organizations. It can be achieved by the development and implementation of evaluation tools in their activity and exchange of experiences with other similar organizations and units working on the European level. Associations, unions, federations and other organizations from agri-food sector wanting to share the knowledge regarding innovations within this sector could participate in the project.

Within the scope of this project studies in branch organization of kujawsko-pomorskie province were performed (Employers-Sharecroppers and Land Owners Association –the leader of agri-food networks). Employers-Sharecroppers and Land Owners Association seated in Bydgoszcz is an organization established in 2000 after joining two agricultural organizations: association and union. It functions basing on the Act on employers’ organizations (from 1991). Currently, the association joins almost 100 members from Kujawy & Pomorze province, - farms and small and medium companies from rural areas.

Within the project an in-depth interview with Association’s managing staff and a case-study of a large-area farm were also made. The studies were performed in the years 2007-2008.

\(^1\) Żętara W. 1996. Restrukturyzacja i prywatyzacja sektora państwowego w rolnictwie jako narzędzia w procesach doskonalenia organizacji gospodarstw. (Restructuring and privatization of national companies in agriculture as a tool of improving the processes of farms organization) Zesz. Nauk. ATR 199, Rolnictwo 40., p. 105-111.

3. Results and discussion

The analysis indicates that apart from the membership in network organizations of local and national range the Association cooperates with other branch organizations including those outside agriculture. In order to increase the effectiveness of operation and to gain benefits for its members the Association continuously cooperates with organizations it is a member of: the Federation of Employers-Sharecroppers and Land Owners Associations in Warsaw, Polish Chamber of Commerce in Warsaw and the Agreement of the Agricultural Organizations from Kujawy & Pomorze province. It supports the functioning of economic entities and people conducting agricultural or extra-agricultural economic activity. There is also another important form of operation - educative-informative activity performed in a systematic way for interested members. The main goal of the Association is the representation of the environment of employers and sharecroppers against the authorities and institutions and the participation in consulting processes regarding documents having significant meaning for agriculture, rural areas and initiative development. It is worth to mention that in 2007 the Association signed an agreement on cooperation with The University of Technology and Life Sciences in Bydgoszcz, which allows the transfer of knowledge to agriculture and the sector of small and medium companies.

It can be observed that important characteristics of the Association are the engagement in cases related to the development of the region and the activities undertaken in cooperation with organizations, institutions and other entities interested in the Association, like the agricultural employers’ organization; it is in continuous cooperation with the Federation of Associations in Warsaw actively participating in consulting planned acts, decrees or resolutions which can have a significant influence on the socio-economic conditions of the employers in the future. As an example, one can mention the participation in consulting the design of the act on managing agricultural properties of the treasury.

Within the project an in-depth interview with Association’s managing staff was made as well. It turns out that within the developed network one can indicate effective exchange of information, experiences and willingness of cooperation despite increasing competitiveness between those companies. However, mutual confidence of partners within the network is slowly increasing, which causes an increasing level of cooperation within the organization. One can notice the plans of establishing producers’ groups and associating manufacturers of particular groups of goods. Thus, the development of the network is continuous, new goals are selected and their realization is monitored. Moreover, client-oriented, cooperative unions of entrepreneurs created in order to achieve global expansion are observed. It is realized by intensified sharing of knowledge within economic, marketing and technology areas, lobbying for strengthening the lease and other actions. Until now a long-term cooperation with public organizations and the protection of intellectual property rights seem to be neglected. There exists a common awareness that ways of communication using IT have more and more significant meaning in business activity. Asked if the organization and the companies had their own brand, the managing staff indicated that the network had achieved its position after a few years of activity and was recognized in its environment. Network members – companies aim to achieve their brand and position on the local market, which is, however, not an easy case.
4. Conclusions

The Association as an employers’ organization responds to the needs of agricultural entrepreneurs interested in developing and increasing the competitiveness of their companies and also in introducing innovations. One can expect improvements regarding the above due to, among the others, the exchange of good practices and patterns used by partners from the EU, at least within the enterprises like TOWARS project.

5. Literature

1. Project no 518702 entitled: „Migrating networks from a producer TOWARDS market orientation within the agri-food sector” realized by the Faculty of Management at UTLS in the Institute of IT in Management and in the Department of Management Engineering.

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3 Project no 518702 entitled: „Migrating networks from a producer TOWARDS market orientation within the agri-food sector” realized by the Faculty of Management at UTLS in the Institute of IT in Management and in the Department of Management Engineering.
METHODS OF MANAGING THE BRANCH ORGANIZATION OF AGRICULTURAL MANUFACTURERS SHOWN ON THE EXAMPLE OF POLISH FEDERATION OF CATTLE BREEDERS AND DAIRY FARMERS (PART II)

Summary

The Federation of Breeders of Cattle and Producers of Milk was founded in 1995 in Warsaw as a result of the initiative of cattle breeders and milk producers. Its idea was motivated by the decentralization and full nationalization of farms in Poland. It is an independent, voluntary and autonomous organization consisting of 6,800 rows of members concentrated in regional associations and proper members. They are individual breeders, national households, companies of the treasury and private ones, cooperative and leased households. Since July 1st 2006 the Federation has had its representatives in all provinces in the country. Since July 1st 2004 the Federation of Breeders of Cattle and Producers of Milk in Warsaw is the only entity in Poland authorized by the Minister of Agriculture and Villages Development to keep records on farm cattle of dairy races.

The aim of the article is to show management methods in organization composed of farming producers of the same business. The Federation is representing businesses and defending rights of its members particularly by: subtracting strategic action connected with cattle raising and the production of the milk, supporting cattle raising and the production of the milk, undertaking tasks in cattle raising and the production of the milk, of more than regional or nationwide character, accepting farm programs and coordinating their realization and helping members of the organization in their statutory activity.

In the present work research findings which the University has obtained will stay as a part of the cooperation with the Association in order to enable the transfer of knowledge for the small business sector and farming through the participation in the framework of the partnership in the “Migrating networks from a producer Towards market orientation within the agri-food sector” - 6th Framework Programme of the European Union, TOWARDS project1

Keywords: branch organization of agricultural manufacturers, management, manufacturers’ network

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1 Project no 518702 entitled: „Migrating networks from a producer TOWARDS market orientation within the agri-food sector” carried out at the Faculty of Management at UTLS in the Institute of IT in Management and in the Department of Management Engineering.
1. Introduction

Dairy sector is one of the significant branches of agri-food sector in Poland. Functioning in the European Union allowed the change of activity in such a way that many dairy farmers used the EU aid in a short time by e.g. the modernization of friendly technological lines, the improvement of quality standards regarding the hygiene of milking, milk storage, ensuring good conditions of existence for animals and the application of environment protection rules.

In currently unfavourable economic situation the activities of Polish Federation of Cattle Breeders and Dairy Farmers aims at strengthening its members, making international markets available and satisfying the clients as much as possible. An activity strategy defined as a the results of the TOWARDS project (6th Framework) carried out in cooperation with the Faculty of Management at UTLS entitled “Migrating networks from a producer TOWARDS market orientation within the agri-food sector” indicates methods and resources necessary for strengthening the position of the network and its members on the market.

2. The goal, method and organization of the research

The purpose of of this article is to indicate the methods of managing an organization consisting of agricultural manufacturers from the same branch. Polish Federation of Cattle Breeders and Dairy Farmers represents and protects the rights of its members, in particular: performs strategic actions related to cattle breeding and dairy farming, supports cattle breeding and dairy farming, carries out tasks related to cattle breeding and dairy farming of more than local and national character, accepts breeding programmes and coordinates their realization and helps its members in their statutory activities.

Within the project an in-depth interview with the managing staff and a case-study were also performed. The studies were performed in the years 2007-2008.

3. Results and discussion

Polish Federation of Cattle Breeders and Dairy Farmers in Warsaw was established in 1995 by cattle breeders and dairy farmers who wished to decentralize and fully socialize breeding in Poland. It is an independent, voluntary, self-governing organization embracing 6,800 members gathered in local specialized units. They are individual breeders, national companies, companies owned by the Treasury and private ones, co-operatives and leased farms. Since July 1st 2006 Polish Federation has had representatives in every province in Poland. Since July 1st 2004 Polish Federation of Cattle Breeders and Dairy Farmers in Warsaw is the only entity in Poland authorized by Minister of Agriculture and Rural Development to keep records of milk variety cattle.

The board of the PFCBDF consisting of the representatives of provincial unions runs the federation on behalf of the breeders. The votes are counted equally and proportionally to the number of breeders. This methods of management, and responsibility and competence distribution results e.g. in the fact that breeding documentation is currently very quickly adapted to valid regulations which makes breeding and manufacturing work more efficient.

The strategic goal of the federation is the maximization of efficiency at a minimum unit expenses and the maintenance of the wellbeing of animals, healthy food and the meeting the requirements of environmental protection. Regarding knowledge management, the board of the PFCBDF stated that during the farmers’ meetings informing about proper livestock feeding is the
most important. Changes are necessary since they are forced by a quick genetic progress and a necessity to adapt production technology to the new cattle traits.

Dairying according to GUS (Central Statistical Office of Poland)

According to GUS, in June 2008 the population of cattle in Poland reached the number of 57,567,000, showing an increase in comparison to the previous year. The increase of the cattle population in general reached 1,1% this year, and – in particular:

- population of calves younger than 1 year increased by 1,9%,
- population of young cattle (1-2 years) increased by 2,8%,
- population of adult cattle (2 years and more) increased by 0,1%,
- the number of cows increased only by 0,7% and milk cows by 0,2%.

Dairymen and milk producers expect very difficult times for Polish dairying. If in the past years the problem was mainly related to milk quotas which limited the development of milk production, then now an important factor is the profitability of this type of production within the quotas. The situation of many dairies is complicated by very unfavourable market conditions. Financial difficulties of the dairies are caused by increasing production costs, a strong Polish currency and a collapse of the exportation in the branch.

The lowering of production costs should be a superior goal both in processing plants and in farms. EU’s retreat from subsidizing export additionally deepened an unfavourable situation (export from Poland fell by over a half). Moreover, dairy producers indicate a troublesome cooperation with retail networks. The latter use an unfavourable situation of dairy producers on the market and drastically reduce purchasing prices of dairy products while simultaneously keeping retail prices at a high level. It causes the stagnation on the demand side for milk and dairy products which indirectly causes a reduced competitiveness and the emergence of financial difficulties for the dairies. Such a situation entails subsequent serious consequences. Dairies systematically reduce purchasing prices of milk (currently the best dairy in Kujawsko-Pomorskie province offers 1,00 - 1,10 PLN for one litre of milk, some of the dairies in Poland lowered the price even to 0,6 - 0,7 PLN per litre while it is estimated that the profitability threshold is about 1,00 PLN per litre). Therefore, milk production gives fewer and fewer profits and sometimes losses. That is why one can observe an increasing interest in the programme of discontinuation of milk production and giving milk quota to the Agricultural Market Agency for a financial compensation, mostly in the case of farmers with 10-15 milkers.

That is why, in the currently unfavourable economic situation, the activity of Polish Federation of Cattle Breeders and Dairy Farmers aiming at strengthening its members, making international markets available to them, and satisfying the customers as much as possible should be taken into account.

An activity strategy defined as a result of the TRADOS project (6th Framework) carried out in cooperation with the Faculty of Management at UTLS, “Migrating networks from a producer TOWARDS market orientation within the agri-food sector”, indicates methods and resources necessary for strengthening the position of a network and its members on the market. Strategic defined goals put emphasis on the necessity to take actions in order to increase the competitiveness (production efficiency and quality), cooperate within the Federation and other agricultural organizations and between the stakeholders of the agri-food sector in Poland, on communication and effective knowledge absorption and sharing. In particular, the completion of the process of network infrastructure privatization seems to be an important task in order to become independent
of the state. The implementation of the latest technological solutions both in breeding and in production seems to be essential as well. An intensified application of electronic communication channels in response to the needs of modern consultancy, trainings and marketing is also included in the list of priorities. This type of actions will allow to better meet the expectations of customers regarding healthy food and simultaneously ensure the wellbeing of animals and meeting the standards of environment protection.

The companies described above can contribute to a successful migration of Polish Federation of Cattle Breeders and Dairy Farmers from a traditional production organization to an innovative federation entering international markets and satisfying the increasing needs of the customers.

4. Conclusions

Results of the analysis performed within TOWARDS project indicate that in order to strengthen the market position of the producers’ network it is recommended to take the following steps:

- A broader branch cooperation of farmers with the whole EU according to the pattern of good cooperation in Poland and following the Act on breeding animals.
- Farmers’ agreement is to be made in order to change the regulations limiting the rights of the unions and strengthening branch organizations, e.g. in order to improve the competitiveness of the farms.
- An increase of the support for water companies and the solution of the problem of managing inter-commune ditches.
- The implementation of the EU’s regulation. For example, the liquidation of small slaughterhouses resulting from decisions issued by veterinary services was a mistake according to the representatives of Polish breeders.
- The development of Polish certification authorized by the Federation in order to improve the monitoring and control over the quality of production agents – procedures, Federation’s affiliated laboratories.
- Making the branch independent of the State regarding breeding.
- Performing trainings with the use of IT communication tools.
- Restoring the importance of training, and implementation, of model farms.
- The use of the Internet to communicate with other branch organizations in the EU.

5. Literature

1. Project no 518702 entitled: „Migrating networks from a producer TOWARDS market orientation within the agri-food sector” realized by the Faculty of Management at UTLS in the Institute of IT in Management and in the Department of Management Engineering.
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RECENZJA MONOGRAFII JERZEGO KISIELNICKIEGO
PT. „SYSTEMY INFORMATYCZNE ZARZĄDZANIA”
WYDAWNICTWO PLACET 2008 ROK

Dwudziesty tom wydawnictwa Studia i Materiały Polskiego Stowarzyszenia Zarządzania Wiedzą jedną z otwierających nowy rok edycji, co uzasadnia wprowadzenie do tematyki wydawnictwa recenzji dostojnych, ścieśle związanych z problematyką zarządzania wiedzą publikacji. Pozycją ze wszech miar zasługującą na inaugurację tej inicjatywy, jest ze względu na tytuł monografii pt „Systemy Informatyczne Zarządzania”, której treści ścieśle są związane z zarządzaniem wiedzą a ogromny dorobek wydawniczy autora zapewniającego ofertę sukcesywnie aktualizowanych prac - Prof. dr hab. Jerzego Kisielnickiego, służy edukacji wielu pokoleń informatyków. Koncepcja realizacji tej pracy zdaniem autora reprezentuje podejście projektowo zasobowe z podziałem jej treści na pięć części.

Część I zawiera wprowadzenie do systemów informacyjnych z określeniem ich roli w procesie zarządzania.

Zarządzanie informacją i wiedzą stanowi pierwszy rozdział tej części pracy, co wyznacza nowe priorytety w podejściu do problemu roli wiedzy w organizacji. Podrozdziały pt. „Wiedza i jej rola w zarządzaniu” oraz „ Kapitał intelektualny i jego tworzenie” stanowią uzupełnienie podanych wcześniej definicji informacji przekładających się na zasoby informacyjne ilustrowane na przykładzie systemu SAP. Przyjęty przez autora szeroki zakres problematyki i mała objętość treści nie ułatwiają czytelnikowi percepcję idei formułowanych przez autora.


Część II obejmuje zarządzanie projektami czyli tworzenie, wdrażanie i doskonalenie systemów informacyjnych.

Rozdział 5 inaugurujący część II zawiera omówienie projektu systemu informatycznego, precyzując podejście projektowe w zarządzaniu oraz specyfikuje zasoby niezbędne w projektowaniu w tym wybór metod projektowania. W drugim podrozdziale uwzględniono organizację, system komunikacji w zespołach projektowych w procesie projektowania. Autor zwraca uwagę na potrzebę zmian organizacji wykonania projektu w przypadku implementacji
Ludomir Drelichowski

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systemu typu ERP w stosunku do projektowania rozwiązań specyficznych w ramach danego podmiotu prac.

Rozdział 6 pt. „Analiza organizacji” rozpoczyna się podrozdziałem dotyczącym cyklu życia systemu w aspekcie analizy systemowej, przechodząc w procedury analizy oraz użytkowników systemu i ich identyfikację o łącznej objętości 6 stron. Czwarty podrozdział ujmuje identyfikację celów systemu, a wskazując ograniczenia w ich realizacji, autor eksponuje konieczność uwzględnienia rozwojowych funkcji systemu we wszystkich jego funkcjonalnościach. W podrozdziale piątym autor szeroko omawia metody stosowane w analizie organizacji, eksponując cel stopnia zaspokajania potrzeb użytkowników systemu informacyjnego. Dla analizy potrzeb informacyjnych użytkowników autor krótko omawia sześć podejść metodycznych i zaleca wykorzystanie kilku z nich w sposób określony w projekcie. Autor zwraca uwagę na sposób opracowania diagramów związku powiązań między obiektami, co jest ważne w podejściu obiektywym. W podrozdziale szóstym autor omawia komputerowe wspomaganie analizy na przykładzie systemu ADONIS, prezentując specyfikację najważniejszych dla tych zastosowań narzędzi typu BPA Tools i case.

Rozdział siódmy a w nim podrozdział 1, ujmuje proces projektowania systemu informacyjnego zarządzania, w którym autor wyróżnia w funkcji czasu podejścia diagnostyczne i prognozy we wierszu działań warianty kaskadowy, ewolucyjny, przyrostowy i spiralny (z zastosowaniem prototypowania). Graficzna specyfikacja faz projektowania w każdej z tych metod, z autorskimi rekomendacjami niektórych podejść to pomocne wskazania dla czytelnika. Podrozdział 2 zawiera specyfikację licznych metod i technik projektowania oraz porównanie notacji trzech standardów metody obiektywnej a przykładem jest model danych dla dokumentu ubezpieczeniowego. Zawarte w podrozdziale 3 omówienie metod case odzwierciedla odraczone od wielu dziesiątków lat nadzieje na radykalny stopień wydajności prac projektowych, którego oddalanie się przypomina fatamorgana. Omówiony w podrozdziale 4 proces zarządzania jakością prac projektowych jest potraktowany wnikliwie. Autor wychoǳi od pojecia sprawności i skuteczności a jakość projektu rozpatruje przez przyznaną jakość wyrobu i jakości wykonania usługi z uwzględnieniem kontroli bierniej, czynnej i częściowej. W zarządzaniu projektem autor szczegółowo omawia metodę TQM ze specyfikacją – 14 zasad postępowania i kało jakości Deminga tzw. Systemu PDCA. Koncepcja „zero defektów, diagram Ishikawy, metoda kasein (nieustających usprawnień) oraz Metoda ISO 9000 wyczerpująco sygnalizują problem podejścia do zapewnienia jakości w projektowaniu systemów informacyjnych. W podrozdziale 5 autor omawia problem doskonalenia projektu z zastosowaniem metody reengineeringu oraz X engineeringu, którego skala zastosowań jest ograniczona stopniem determinacji zarządu i kadry użytkownika systemu, której zastosowanie autor ilustruje przykładem Urzędu Wojewódzkiego w Białymstoku. W podrozdziale 6 omawiana jest procedura strategii realizacji procesu tworzenia systemu informacyjnego organizacji F2 – analiza sytuacji zawierającej omówienie zbioru strategii, ich ograniczenia, kryteria ocen i weryfikacji.

1. Modele optymalizacyjne – efektywnie wykorzystywane zwłaszcza w systemach logistycznych,
2. Modele symulacyjne pozwalające odwzorować przewidywane konsekwencje podjętych decyzji i z podziałem na pięć faz zawierających:
   F1 – sformułowanie problemu,
   F2 – analiza sytuacji zawierającej omówienie zbioru strategii, ich ograniczenia, kryteria ocen i weryfikacji,
   F3 – sformułowanie strategii projektowej,
F 4 - weryfikacja i F 5 – realizacja.

Wymienione fazy dzieli autor na ustalane sekwencyjnie w kolejnych fazach kroki specyfikujące bardziej szczegółowe parametry realizacji tych faz. W ostatnim podrozdziale omówiono komputerowe wspomaganie projektowania na przykładzie systemu ARIS.

Rozdział ósmy zawiera omówienie wdrażania systemów informacyjnych rozpatrywanych w aspekcie cyklu życia systemu, co pozwala uściślić uwarunkowania tego procesu. W podrozdziale 2 omówiono procedurę wdrażania systemu rozpatrywaną przez przyszto wdrożenia całościowego, cząstkowego i równoległego. Wdrażanie całościowe należy do najbardziej efektywnych, jednak jest obarczone najwyższym ryzykiem, ze względu na złożoność całego przedsięwzięcia. W ostatnim podrozdziale omówiono wdrożenia systemu ARIS.

W podrozdziale 3 „zarządzanie procesem wdrażania” autor omawia szereg czynników, które w różnych warunkach przyczyniają się do różnicowania rezultatów prowadzenia wdrożeń.

W podrozdziale 4 omawiane są czynniki wpływające na efektywność wdrażania systemu w przewidzianych trzech następujących etapach:
E-1 - rozmrożenie traktowane jako proces oddziaływania na pracowników uświadomiających sobie nieuchronność zmian.
E-2 - wprowadzanie zmian istniejących rozwiązań i uczenie się nowych ról.
E-3 - zamrożenie - integracja nowych ról i interakcji personalnych.

W podrozdziale 5 zaprezentowano metodykę projektowania firmy Lawson Software, która składa się z etapu 1 - definicji projektu, etapu 2 - projektowania procesów gospodarczych i etapu 3 - konfigurowania rozwiązania, etapu 4 – wdrażania oraz etapu 5 – rozpoczęcia eksploatacji.

W części 3 autor zawarł rozdziały od 9 do 12, ujmując w nich:
1. Charakterystykę zasobów informacyjnych i ich struktur,
2. Zarządzanie zasobami informacyjnymi rozumiane jako komunikacja i ochrona zasobów,
3. Charakterystykę podstawowych systemów informacyjnych w zarządzaniu,
4. Zintegrowane systemy informacyjne klasy MRP II / ERP I i II.

Krótką charakterystykę zasobów informacyjnych w podrozdziale 9.1, autor przechodzi szerzej do omówienia danych i modeli danych w bazach danych, w których przybliża identyfikację rekordów danych źródłowych z określonymi podsystemami informacyjnymi i komputerowymi bazami informacji, które służą ich archiwizacji i przetwarzaniu. Autor omawia szczegółowo szereg ważnych funkcjonalności niezbędnych w systemach zarządzania bazami danych (SZBD) oraz roli języka SQL w rozszerzaniu tych możliwości. W omawianiu modeli danych autor wyróżnia dane elementarne i złożone w segmenty oraz modele wysokiego poziomu złożoności - konceptualne, modele użytkowe i modele wewnętrzne – niskiego poziomu. Wyróżniono także strukturę hierarchiczną o związkach podrzedno-nadrzędnych, strukturę drzewiastą i strukturę sieciową modelu danych. Kolejno omówiono model relacyjny w prowadzony przez E.E. Codda oraz strukturę obiektową.
W podrozdziale 9.3 omówiono hurtownię danych jako element rozwoju baz danych. Autor eksponuje następujące niezwykle istotne cechy hurtowni danych wyrażające się:
- ukierunkowaniem tematycznym,
- zintegrowaniem poprzez rozbudowę bazy kodowej rekordów,
- nienależnością, tj. nie podleganiem archiwizacji po zakończeniu roku rozliczeniowego,
- wariantowaniem w czasie – uwzględniającym temporalne zależności.

Autor podkreśla, że hurtownia danych stanowi technologiczne zaplecze do rozwoju business intelligence. Na schematach autor ilustruje dane wejściowe jako operacyjne, historyczne i zewnętrzne, które poddane transformacji tworzą zbiór hurtowni danych uzupełniony słownikami, co pozwala generować raporty, analizy i odpowiedzi na pytania. Kolejne dwa schematy prezentują hurtownie danych powiązane z oprogramowaniem OLAP (On-Line Analitic Process) i Data Mining zapewniających wspomaganie procesów decyzyjnych użytkowników systemu.

W podrozdziale 9.4. omówiono następujące bazy modeli i procedur:
1. Modele optymalizacyjne – efektywnie wykorzystywane zwłaszcza w systemach logistycznych.
2. Modele symulacyjne pozwalające odwzorować przewidywane konsekwencje podjętych decyzji.
3. Modele prognozowania w tym prognozy ostrzegawcze.
4. Gry decyzyjne szczególnie przydatne w warunkach ryzyka i zmian.
5. Modele graficzne PERT CPM szeroko wykorzystywane w systemach zarządzania projektami.

W podrozdziale 9.5 autor omawia bazy wiedzy zdefiniowane jako zbiór reguł, faktów, procedur zapisanych w określony sposób, który ma za zadanie sformułowanie i rozwijanie określonego przez użytkownika problemu. Wyróżniono baze wiedzy systemu doradczego mającą charakter ekspertowy i zawierającą repozytorium wiedzy z danej dziedziny lub dziedzin priorytetowych dla użytkowników. Webowa baza wiedzy, którą wyróżnia autor jako konsekwencję rozwoju technologii internetowych charakteryzuje się występowaniem wielu różnych form jej kreowania i dystrybucji.

W podrozdziale 9.6 wyróżniono bazę tekstową XML jako język przetwarzania tego typu baz.

W rozdziale 10.1 omówiono systemy komunikacji z zasobami informacyjnymi podporządkowując ich kryteria oceny systemów informacyjnych omawianych w poprzednich rozdziałach – co podkreśla istotę zmian niezbędnego interfejs użytkownika. Celowe wydaje się przypomnienie za autorem kryteriów komunikacji wyłonionych przez ACM:
- możliwość przedstawienia zewnętrznej struktury danych,
- wydajność,
- możliwość przeszukiwania bazy danych według rozmaitych kryteriów,
- wiarygodność, - tajność, - bezpieczeństwo, - sprzężenie z przeszłością,
- sprzężenie z przyszłością, - możliwość strojenia i migracji danych,
- język zapytań wysokiego poziomu.

W komunikacji związanej z eksploatacją narzędzi data mining występują:
- odkrywanie zależności, - klasyfikacja, - grupowanie,
- odkrywanie podobieństw na podstawie wzorców.

Omawiane są również stosowane dla baz tekstowych Systemy Zarządzania Obiegami Dokumentów (EDMS) oraz Oprogramowanie Lotus Notes/Domino stosowane do zarządzania zasobami informacyjnymi w organizacji. Oprogramowanie klasy work flow przepływem danych to kolejny standard wspomagania zarządzania sieciowymi powiązaniami czynności i procesami pracy.
W podrozdziale 10.2 omówiono niezwykle ważne dla bezpieczeństwa organizacji i użytkowników problemy ochrony zasobów informacyjnych. Punkt wyjścia dla rozwiązań tego problemu stanowi audyt środków technicznych i oprogramowania stosowanych systemów oraz ludzi zajmujących się tymi zasobami. Wyróżniono zagrożenia wewnętrzne i zewnętrzne, z których część może wynikać z lekkościłośliwości lub przyczyn losowych powodujących możliwość fizycznego uszkodzenia nośników danych. Wśród wrogich działań przeciwko systemom informacyjnym wyróżniono: hacking (włamania do zbiórów), Cracking (przelamywanie systemów ochrony), Phreaking, Dialing (podszywanie się pod numer użytkownika), Sniffing (podслушивание в целях добycia базы), Phishing (fałszywe e-maile), Web.hijacking (przekierowanie klientów na falszywe adresy sklepów i banków).

Ministerstwo Obrony USA wyodrębnia cztery kategorie poziomów ochrony zasobów informacyjnych od najniższego D – do A systemu o najwyższym poziomie bezpieczeństwa.

W rozdziale 11 omówiono charakterystykę podstawowych systemów informacyjnych, które wykonano w ramach krótkiej prezentacji typologii i oprogramowania wspomagającego procesy informacyjne oraz systemy transakcyjne. Szerzej omówiono w podrozdziale 11.4. system wyszukiwania informacji i informowania kierownictwa.

Autor omawia problem w następującym ujęciu:
- Systemów Informowania Kierownictwa (SIK),
- Systemów Wyszukiwania Informacji (SWI),
- Systemów Monitorowania Kierownictwa (SMoK).

Jeżeli pierwsze dwa rozwiązania zostały już wypracowane, to SMoK jest ciągle nie dość precyzyjnie rozstrzygnięty w warstwie rozwiązań projektowych.

W podrozdziale 11.5. dotyczącym systemów doradczych wyróżniono Systemy Wspomagania Decyzji (SWD), Systemy Ekspertowe (SE), System Wspomagania Decyzji Najwyższego Kierownictwa (EIS), Business Intelligence (BI) oraz e-Business Intelligence (e-BI). Ten kompleks rozwiązań systemowych stanowi znacznie bardziej w stosunku do dotychczas omawianych zróżnicowany zakresem i niepowtarzalny standard. Autor podaje przykład wspomagania decyzji kадrowych, który ilustruje złożoność problemu w tym stosunkowo dobrze ustrukturyzowanym obszarze podejmowania decyzji. Kilka schematów związanych z technologiami BI zamieszczonych w tym rozdziale stanowi cenne wskazywania autora. Podrozdział 11.6. pt. „Zastosowanie systemu doradczego na przykładzie systemu kreowania cen biletów lotniczych” ilustruje pewien zakres problemów utylitarnych w tych zastosowaniach.

W rozdziale 12 omówiono problematykę zastosowań zintegrowanych systemów informacyjnych do zarządzania MRP II i ERP I i II. Autor przypomina dwie pierwsze generacje systemu MRP I i MRP II wraz ze specyfiką struktury systemu zintegrowanego zgodnej ze standardem (APICS). Zastosowanie tych systemów pozwoliło osiągnąć efektywność i stabilność produkcji oraz dystrybucję wyrobów dużych przedsiębiorstw. System MRP II uzupełniony o planowanie zasobów finansowych doprowadził do powstania standardu ERP (Enterprice Resource Planing - Planowanie Zasobów Przedsiębiorstwa). Autor szerzej prezentuje ewolucję systemu ERP w okresie ostatnich lat na przykładzie systemu SAP. W ostatnim podrozdziale zamykającym część 3 książki autor prezentuje strukturę i elementy składowe popularnego w Polsce systemu zintegrowanego IFS Applications.

Część 4 składająca się z czterech rozdziałów dotyczy zastosowań technologii internetowych w zarządzaniu i jej skutków w postaci wirtualizacji organizacji. E zarządzanie definiuje autor jako tę część zarządzania, która jest realizowana przez zastosowanie sieci komputerowych – co byłoby
dyskusyjne bez uzupełnienia w drugim zdaniu, że najczęściej taką siecią jest sieć internetowa. E-
zarządzanie obejmuje między innymi e- biznes, e administrację i e - edukację. W uzupełnieniu
autor wskazuje i objaśnia symbole B2B (Business to Business), C2C (Customer to Customer)
G2C(Government to Citizen) oraz wiele kombinacji pośrednich.
W podrozdziale 13.2 autor omawia e- zarządzanie w elektronicznej gospodarce rozumianej jako ta
część gospodarki zarówno krajowej jak i międzynarodowej, w której stosowana jest TI.
Technologie informacyjno - komunikacyjne powiązane z pojęciami nowej ekonomii tworzą
infrastrukturę e - rynku prowadzącą do radykalnych zmian stosowanych od kilkuset lat modeli
działalności przedsiębiorstw. Pojęcia e – kierownika i e – pracownika stanowią podmioty e-
zarządzania kreujące nowe role interpersonalne, powiązania informacyjne – interaktywne
i uprawnienia decyzyjne – decentralizacja. Te nowe relacje autor szeroko objaśnia poglądami
autorytetów naukowych z zakresu tej problematyki.
W podrozdziale 13.3 autor zrezygnował z uzupełnienia w drugim zdaniu,
autor wskazuje i objaśnia sygnał kolejnej fali zmian.
Podpis elektroniczny jako element uwierzytelniania przesyłanych internetowo
informacji oraz metoda ich ochrony, zamykają rozdział 13.
Rozdział 14 obejmuje różne aspekty wirtualizacji i wirtualnych organizacji, którą autor
definiuje jako nowy typ organizacji często nazywany organizacją przyszłościowej, która mogła
powstać dzięki sieci internetowej i dużych baz danych(352). Rozwiązania dotyczące rozszerzenia
funkcji realizowanych przez tradycyjne organizacje, uzasadniają tworzenie organizacji
wirtualnych budowanych cały czas dla realizacji określonych projektów. Przykładem podanym przez
autora jest uniwersytet wirtualny tworzony w ramach UMCS w Lublinie oraz Wyższej Szkoły
Humanistyczno-Ekonomicznej w Łodzi. W obszernym komentarzu dotyczącym organizacji
wirtualnych autor eksponuje rolę sieciowej komunikacji oraz funkcje cyberprzestrzeni
i mobilności organizacji do tworzenia organizacji o charakterze wirtualnym.
W podrozdziale 14.2. omawiano technologie wirtualne w aspekcie możliwości rozszerzania
e – zarządzania rozumianego jako rodzaj technologii informacyjnych, „która pozwala na
oddziaływanie na sterowane przez komputer środowisko rzeczywiste, bądź emuLOWANE
komputerowo”. W tabeli IV.3 autor zamieścił zestawienie podmiotów działań i sfer działania
technologii wirtualnych (Biznes, Administracja, Edukacja, Kultura). Autor przypomina również
ważne w rozwiązaniach technologii przetwarzania pojęcie maszyny wirtualnej. Rozważania
wirtualizacji zamyka technologia tworzenia wirtualnych modeli graficznych rzeczywistości z
wykorzystaniem techniki rastrowej oraz wektorowo. W podrozdziale 14.3 efekty i bariery
zastrzoszenia wirtualizacji rozpatrywane są w aspekcie efektów technicznych, ekonomicznych,
organizacyjnych i socjo – psychologicznych. W analogicznych aspektach autor rozpatruje bariery
ich rozwój, kończąc rozwiązania podziałem puenty zatytułowaną „Co dalej?”
W rozdziale 15 autor omawia ilustrowane praktycznymi rozwiązaniami przykłady zastosowań
technologii e – zarządzania w gospodarce w aspekcie promocji i marketingu, zamówień, płatności
oraz dostaw. Autor omawia elementy technologiczne rozwiązań handlu internetowego, kończąc
na rozwiązaniami systemu CRM (Customer Relationship Management). Rola e – bankowości
jako czynnika dynamizującego i obniżającego koszty działalności banku, tworzącego
infrastrukturę współczesnego biznesu omawiana jest w kolejnym podrozdziale. Niezwykle ważna
rola współczesnej e -logistyki jest omawiana przez autora w aspekcie funkcjonalności oprogramowania wyodrębnianego dla tych celów w dużych firmach logistycznych. Autor eksponuje ważną funkcję systemu SCM (Supply Chain Management – Zarządzanie Łańcuchem Dostaw). Logistyka globalna, wsparcie mapami numerycznymi GIS oraz GPS umożliwiające outsourcing logistyki, także w odniesieniu do dużych firm, pozwoliły osiągnąć 20 do 45% oszczędności w stosunku do indywidualnych rozwiązań tego problemu stosowanych wcześniej w przedsiębiorstwach. Rozdział szesnasty zamyka omówienie systemu Amadeus, niezwykle funkcjonalnego do tworzenia rozwiązań e-learningowych a nie wymagającego zakupu licencji.

Część 5 obejmuje społeczny, ekonomiczny i prawny aspekt zastosowań technologii informacyjnych, skupiając się w podrozdziale 17.1 na roli TI w transformacji infrastruktury zarządzania i działań niezbędnych do powstania społeczeństwa informacyjnego. Autor sam stwierdza, że chociaż rozważania te wykraczają poza podstawowy zakres ukierunkowania tematyki, to niemożliwe jest pominięcie makro uwarunkowań funkcjonowania organizacji bez identyfikacji problemów makro – czyli całego pasma. Autor zwraca uwagę na oddziaływania restrukturyzacyjne wynikające z rewolucji informacyjnej, które w warunkach naszego kraju są wzmocnione przez konieczność transformacji gospodarki. Istotne jest również postrzeganie skutków ekspansji technologii internetowej dla rozwoju globalizacji światowej gospodarki, której nową siłę napędową stanowi ekspansja nowych możliwości komunikacyjnych.

W podrozdziale 17.2 omówiono problem kontekstu etycznego w zastosowaniu technologii informacyjnych. Autor wymienia trzy dziedziny podstawowe dla etyki zarządzania określające:

- stosunek organizacji do pracownika,
- stosunek pracownika do organizacji,
- stosunek organizacji do innych podmiotów gospodarczych a szczególnie do klientów i organizacji współdziałających.

Wyeksponowane w tym rozdziale problemy etyki zarządzania nabrały szczególnego znaczenia po ujawnieniu w końcu roku 2008 niewyobrażalnej skali nieetycznych zachowań idoli światowego biznesu, do których należał Bernard Madoff i wiele osób z kadry menedżerskiej czołowych banków oraz instytucji finansowych. Autor słusznie podnosi problem ryzyka związanego z wiarygodnością funkcjonowania organizacji wirtualnych, w których niezawodność wymaga współdziałania wszystkich partnerów (także najślabszych ogniw) w warunkach niskich obwarowań formalno-prawnych. W podrozdziale 17.3. autor omawia e- edukację i jej rolę w tworzeniu nowoczesnego społeczeństwa. Na schemacie V.I. autor prezentuje elementy składowe procesu nauczania na odległość łącząc zasoby internetowe z równoległym funkcjonowaniem baz danych, modeli i wiedzy, które poprzez informatyczną platformę nauczania zapewniają komunikację nauczyciela i ucznia. Wyeksponowane przez autora pięć elementów warunkujących efektywność stosowania tej technologii, musi być respektowane w całej rozciągłości dla uzyskania sukcesu. Podrozdział ten autor kończy analizą trzech podstawowych strategii nauczania z zastosowaniem TI tj. – asynchroniczną, - synchroniczną i konwergencyjną - związaną z zastosowaniem różnych platform e-learningowych. W podrozdziale 17.4. autor podejmuje problem omówienia wybranych środków oddziaływania TI na społeczeństwo. Omówiono witrynę internetową z jej rolą promocyjną informacyjną dotyczącą wszelkich organizacji. Szczególnie ważne jest eksponowanie sylwetek osób kluczowych dla danej organizacji oraz aktualizacja informacji prezentowanych w tych witrynach. Najczęściej występują następujące serwisy informacyjne:

- reklamowe, - informacyjne, - sprzedażowe i - rozrywkowe.
Portale nie są zdefiniowaną formą organizacyjną technologii internetowych, stanowiąc platformę informacyjno-komunikacyjną, których funkcje autor trafnie ilustruje przykładami. Bardzo wyczerpująco autor przedstawił funkcje blogów oraz ich rolę łączącą sfery komunikacji prywatno-publicznej – co w szczególności dotyczy polityków. Podrozdział 17.5. dotyczy cyberterroryzmu jako zagrożenia w budowie społeczeństwa informacyjnego. Autor ekspонuje zagrożenia wynikające z eksploatacji systemów sterowania SCADA (Supervisory Control And Data Acquisition) wykorzystywane do sterowania systemami przestrzennymi z zastosowaniem publicznych sieci komunikacyjnych (np. sieci ciepłownicze, wodociągowe, gazowe). Dotyczy to również problemu oddziaływania na światową społeczność, co stosuje Al-Kaïda. Transakcje finansowe i giełdy papierów wartościowych to kolejny wrażliwy na cyberterroryzm obszar zastosowań TI.

Rozdział 18 obejmuje ekonomiczny kontekst zastosowań technologii informacyjnej i jest niezwykle ważnym rozdziałem podbudowanym wysokim poziomem dorobku autora w tym zakresie. Cytując stanowiska światowych autorytetów z tego zakresu z publikacji z ostatnich lat, autor prezentuje własny punkt widzenia, podkreślając fakt unowocześnienia systemu zarządzania jako przesłanki uzasadniającej efektywność nakładów na zastosowania technologii informacyjnych. W podrozdziale 18.2. autor krótko omawia następujące czynniki wpływające na efektywność zastosowań TI: - techniczne, - ekonomiczne, - organizacyjne, - socjologiczno-psychologiczne i - prawne. W podrozdziale 18.3. zawarto elementy oceny efektywności TI – w aspekcie korzyści i barier. Autor wskazuje na potrzebę udzielenia odpowiedzi na następujące dwa pytania:

1. Jaki udział w efektach organizacji ma TI?
2. Jak wpływa TI na wyniki organizacji, czyli jakie zachodzi tu sprzężenie zwrotne?

Zwrócono uwagę na efekt synergiczny, którego uchwylenie i wskazanie pozwala wykazać osiągnięcie rezultatu bezspornego. Na rysunku V.5. autor ilustruje zalecany sposób rachunku efektywności przez przyjaz tryb poszczególnych funkcjonalności systemu i rodzaju efektów – technicznych, ekonomicznych, organizacyjnych, socjologiczno-psychologicznych. W podrozdziale 18.4 omówiono proces decyzyjny wybór wariantu realizacji TI. Autor eksponeje podejście z zastosowaniem drzew decyzyjnych jako metody pomocnej w rozstrzygnięciu tego trudnego problemu. Wobec barier autor wyróżnia bezwzględne, względne i pozarne, które mogą być rozpatrywane w kategoriach: - technicznych, - ekonomicznych, - organizacyjnych, - socjologiczno-psychologicznych i - prawnych. W podrozdziale 18.5. omówiono problemy metody rachunku oceny efektywności ekonomicznej zastosowań TI. Autor zwraca uwagę na potrzebę stosowania zasad rachunku efektywności ekonomicznej inwestycji jako metodycznych rozwiązań problemu. W podrozdziale 18.6. zawarto autorskie propozycje rozwiązań systemowej oceny efektywności ekonomicznej zastosowań TI. Zawarta w tym rozdziale propozycja metodyczna zasługuje na rekomendację jako rozwiązania zawierające algorytmy i źródła informacji ujęte w macierzach, które stanowią oprzyrządowanie dla rozwiązywania tego problemu. Treści zawarte w podrozdziale 18.7. dotyczą wyników badań uzyskanych w ramach programu badawczego Diebolda, ocen wynikających z wyników badań własnych i ciekawych przykładów doświadczeń firm USA. Prowadzą one do rekomendacji następującego sześcioletowego postępowania:

E1. określenie kluczowych obszarów działania przedsiębiorstwa,
E2. określenie czynników ograniczających realizację celów,
E3. analiza wszystkich pozytywów i negatywów związanych z komputeryzacją,
E4. analiza kosztów i zysków,
E5. przygotowanie obiektów.
E6 szkolenie.
Dziękniający rozdział zamyka pracę dotyczyc prawnego kontekstu zastosowań technologii informacyjnych. Autor zwraca uwagę, że powszechność stosowania IT, musiała doprowadzić do powstania nowych regulacji prawnych. Dla ilustracji tego problemu autor cytuje zawarte w kodeksie karnym okresy pozbawienia wolności za określonego typu przestępstwa. Mobilność TI wymaga międzynarodowej współpracy w zwalczaniu tego typu przestępstw. Warto również pamiętać o aspektach ochrony praw autorskich twórców i pracodawców w kategorii wartości niematerialnych i prawnych.

Niniejsza publikacja stanowiła szczególnie trudne wyzwanie ze względu na wyjątkowy dorobek autora w zakresie prac związanych z Informatyką Ekonomiczną. Szeroka lista adresatów tej pozykcji książkowej stanowiącej syntezę dotyczącą zastosowań technologii informacyjnych w zarządzaniu oznacza, że o celowości tej publikacji(recenzji) zdecyduje reakcja jej odbiorców, którym synteza ta może wskazać aspekty zgodne z ich zainteresowaniami, z których warto skorzystać zgodnie z własnymi preferencjami. Jeżeli tego efektu nie uda się osiągnąć pozostanie cel jakim jest inauguracja autorskich recenzji rekomendujących publikacje książkowe ważne z punktu widzenia zarządzania wiedzą w serii Studia i Materiały PSZW.

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