IMPLEMENTATION OF IT SYSTEM IN SÜDZUCKER COMPANY

how our first IT system for Agro industry was born

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16 years ago, a member of the management board of the then **Ropczyce sugar factory** contacted my company Set(h) Systemy Informatyczne to ask if we could write a software that could help efficiently control the quantity and quality of purchased raw material, and manage its settlement. The project was very interesting and caused problems straight away, because raw material was bought those days in 40 points located in a radius of 180 km from Ropczyce. The software that had been used before required a person from Ropczyce sugar factory on site – which meant he had to go from one point to another.

Back them I was teaching databases at Rzeszów University of Technology, this is why Ropczyce sugar factory chose me to carry out consultations in the field of choosing the right ERP system. I proposed using Concord, a Danish system which nowadays is owned by Microsoft. It had been used by the sugar factory for quite a long time, however it didn't have a very important part connected with purchase of raw material. We signed a contract in May, and the campaign was supposed to launch in September. So we had 4 months to run the application which would allow to quickly gather information from the field and send it to department of raw materials of Ropczyce sugar factory, which in turn had the right to take appropriate actions – decreasing/increasing the amount of bought raw material depending on current situation.

The system was written by a team of four developers under my supervision, and indeed it was launched at the turn of September and October. In the meantime, a training for employees and inspectors was provided. Those people were not properly prepared as far as the technology was concerned, that is they were not able to use computers – one should bear in mind the fact that it was 1999 and many employees (people in their fifties and sixties) were coming to the training with their grandchildren who helped them use laptops (system was running on laptops in the field).

The team was composed of my students who, while performing contract work, were writing their diploma papers. I coordinated the subjects of the papers in such a way that all of them put together could be **a complete system** delivered to the client. This made people work with redoubled focus, because they simply wanted to write the best possible papers, and they were curious if their

solutions could be used in practice. Finally, they wrote their masters dissertations, and two of them even got awarded – one in a competition of Base company for the best masters dissertation written in base technology, and the other one by the Department of Electrical Engineering of our university.

> „The biggest advantage of the Plantator system is increase of the management level and good organization of raw material economy in both establishments. SI SET(H) consultants in a timely and reliable way gave support both during system changes and adjustments to the changing legal and business environment, as well as at the level of everyday work with users.”
>
> *Wojciech Krause*
> *Manager of planters clearing and organization at Nordzucker Poland S.A.*

In these circumstances **the first system for agro industry from Set(h) was born**. I was already quite experienced in the field of databases, I knew the issues of database replication, the mechanism of which had been fully used in the project, thanks to which the information about purchase of sugar beets in dispersed places went through to the department of raw materials in real time (the delay being 2-5 minutes), where the director could see current stock of purchased sugar beets in given points. He could use a special bar graph which refreshed every few minutes.

A magazine popular in that time, Computer World, even published an article about our actions – one of the paragraphs was entitled 'Sugar beet from the Internet'. Data being transmitted from remote points to the center by Internet was a complete novelty those days.

Owners of the sugar factory liked the system so much that they decided to use it in four other sugar factories. Soon, we had a system which was running in 4 sugar factories. Then a sugar factory in Strzyżów as well as all the factories from the East of Poland taken over by **Südzucker company** joined the common IT system for gathering information about purchased raw material.

Afterwards we learned that Südzucker bought also other sugar factories on the West and South-West of the country and another 16 factories became users of our system. This was the time when Poland joined the European Union. It was a very important moment for us: in 2005 we were supposed to rewrite and adapt our system to the requirements of regulated sugar market in the EU. The regulation was legally described under the common agricultural policy - Common Agriculture Politics. In order to find out what should be done so that the system suit the conditions of the controlled sugar market, we held two conferences with the participation of sugar groups which used our system. Three sugar groups used our system until 2004, after 5 years of our activity in agro industry. The companies were Südzucker, **Nordzucker** as well as **British Sugar Oversize.** The latter left Poland in 2009, but also took part in the transformation process in our country.

Participants of both conferences we held had to pay to attend them, whereas we prepared a series of lectures connected with issues that our system resolved.

The first conference took place in Ustrzyki Górne in 2002, that is in the period when new ideas were coming and people knew Poland was going to join the EU soon. During a discussion panel, representatives of sugar manufacturing groups could express their opinions on what they already had in our system and what they would expect. It was not a big problem to held such conferences,

because the sugar market is geographically divided and groups did not compete with each other.

The second conference took place in 2004, that is just before Polish accession to the EU, in Český Krumlov – a beautiful city, a UNESCO World Heritage Site. We rented a whole tenement house which was a hotel, restaurant, and a room at the same time. We organized presentations and meetings to touch upon the topics connected with system functioning and possible improvements. Some questions were not and have not been clearly described in the EU regulations, so we had to invent new solutions for given issues.

These two conferences helped us a lot develop our system. The system is still running in Nordzucker, Südzucker however is going to carry out so called 'harmonization', which means turning off some functionalities of our system, and keeping only the ones with which it cannot deal.

During the peak season, when all the factories were still running, only in Südzucker our system served for about 25 factories associated in four legal entities which changed their configuration over time. About 50 inspectors used to carry out controls in the field, several hundred point of sales kept track of raw material purchases. On the basis of the number of licenses in Südzucker, one might conclude that there were 150-300 system users in various configurations – many versions were available; for production plants, a central version for accountancy, for agronomists, for field points of purchase and for laboratory, the latter still being functional. So, it can be clearly observed that there were many applications working together for one database, where we skillfully managed to configure and launch the mechanisms of replication and automatic data exchange whose delay between entering data in the field and their displaying in the central database was only few minutes.

The implementation in Südzucker entailed for us an order from **Nordzucker** which simply saw that the system was functional and order a one for itself. Obviously we had to appropriately adapt it to Nordzucker's needs, as the plant had different parameters.

Nordzucker benefited from the fact that:

- The system was developing and was used by another company.

- Set(h) company increased its protection level.

- Know – how was shared to the benefit of all involved parties.

- We organized conferences which allowed us to determine certain needs to be consequently implemented into the system.

- Sugar groups exchanged sugar beets – growers. As this is a limited production, this function turned out very useful. A trouble-free exchange of information was possible because everything was entered into our system.

- What is more, every time a new regulation on control of sugar market was introduced, we were asked 'how is it done by another group?'. In such

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case we would ask the other group if we can reveal the information and always there were no objections to share this know-how, so it was easier to work out the best common solution of a problem.

For us, the direct benefit was that British Sugar generated an order to Philip Morris which back then was looking for a solution in the field of purchase of tobacco and was observing other companies functioning on the controlled market of the EU. Philip Morris asked to see the system of British Sugar. Having explained the functionalities and the quality of our service, maintenance and costs, we signed a contract with Philip Morris.

> „Services being subject to the implementation agreement were done professionally and on time. At the moment, work and development of the system are supported on the basis of well-defined service contract..“
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> **Barbara Śladowska**
> *Enabling System Manager, Finance and IS Department, Philip Morris Polska*

Benefits of our software

Before our software was deployed, information about the purchase status in, for example, Südzucker collection points, was collected by employee. Such employee was on permanent business trip travelling for 3 months from one collection point to another. Visiting 40 points took him about 10 days, therefore when the information was finally passed on to the sugar mills, it was already invalid.

Furthermore, data structures that we prepared allowed data analysis for their validity. We took some steps that – thanks to the analysis of such an amount of data in one database –

led to the detection of fraud in particular collection points (these points had already been in the spotlight as the director had some suspicions), and consequently to dismissal of an employee who was found guilty with immediate effect in the labour court.

Additionally, our application provides current information about the raw material quality, which allows the users to properly set the production capacity and arrange for transport. It has significantly lowered the costs of obtaining raw material: a designated employee no longer has to travel from processing plant to another as information is immediately available at headquarters, which gives time to plan high transport costs. These are very useful and measurably beneficial solutions.

Moreover, it turned out over time that it is possible to collect a lot more information that may be of interest to the department of raw materials, e.g. information on the sown areas, the size of fields, intended crops. It not only helped to better plan agricultural production (meaning where, how much and what agricultural products to buy in the next season) but also to appoint prospective farmers as well as those who may have already resigned from beet production in favour of other products. Over time, the number of such information was increasing.

The software naturally evolved towards logistics and currently ongoing projects.

Meet the Farm Chart

Farm Chart is a project that we want to develop based on knowledge we gained while writing the software for sugar companies, Philip Morris, Good Mills, PepsiCo, or for companies dealing with the purchase and redistribution of fresh fruit and vegetables. This is a system/application /set of information on both the farm itself and the adjourning fields. As far as the former is concerned, such set covers the farm

description, the description of agricultural equipment used on the farm to help with farming in addition to the farmer's demand for various appliances. As for the fields and plantations, such application includes information on individual fields, both small and large, such as tilling methods, condition of crops, and in particular, crop forecast. Then we compare the forecasts with the actual crop. Farm Chart also covers (i) fertilizer recommendations (what fertilizer to choose and what doses to apply to obtain the bests results the at minimal cost of fertilization) and (ii) agronomic recommendations, that is post-control information that will be entered by an agronomist following an observation of a given field and (iii) information on pest to be destroyed with a chemical or biological agent applied in recommended dose. Farm Chart is going to have much more information (we are still working on its concept) but it has already become an element of software deployed in Südzucker, Nordzucker, Philip Morris, PepsiCo.

Logistics and its development

As far logistics in food and agriculture industry is concerned, the transport planning, the performance of transport-related tasks, the settlement of transport and issues relating to the optimization of transport have been important elements of software dedicated to agriculture industry, This was particularly important in Südzucker, which has more than 20 production plants and approximately 1000 collection points and farmlands. We made calculations that allowed us to determine what kinds of agricultural products, on what days, from which fields and to which processing plants are to be delivered so that these plants neither stand idle nor have excessive reserves. It other words, the point is to make sure that processing plants can take in everything the farmers managed to harvest. Thus, in the area of logistics we deal with both optimization and purely operational matters, such as transport-related

tasks, instructions, lists, or specifications of consignments already settled and those for settlement, based on which carriers issue invoices to our customers.

Fuel management software resulted from our observation of software market and incoming signals that mobile applications would soon have a big role to play. A few years ago, when mobile applications market was not developed yet, we proceeded to the first project in the area of fuel transport. Our situation worked to our advantage as we already had the know-how in the area of transport. If truth be told, we acquired knowledge of transport regarding the agricultural products market, not the fuel market, but we knew what a driver should do, what information he should be provided with, how to control the tasks performance and what information on tasks performance is really important. In this case we combined our desire to develop towards mobile applications and our expertise of logistics software system for trucks transport.

Continuous development has led us to drones

I first heard of drones about six years ago, when I met with their producer and designer. He said drones had the potential to be used in agriculture. He knew our core business entailed development of software for agriculture and assumed that his knowledge of drones can be effectively combined with our knowledge of software for agricultural industries. We investigated these devices and we tried to make big companies, including Südzucker or Bayer Club Science – a company we had the pleasure to work for in a short time – interested in drones, but their representatives said it was too early. This is the reason why this project has been dormant recently. We are well aware of the fact that drones can be very helpful as a lot ofinteresting information on the crops condition can be obtained this way. This

means that farm businesses would no longer have to rely only on information entered by the farmer or by the inspector but also on information based on measurement of certain parameters. That is why drones are seriously considered sa part of the Farm Chart project for those agricultural producers who are particularly interested in observing their fields from the air. An interest in drones is growing which means we are working on a very promising device, not just strictly scientific, dead-end project never to be deployed in business.

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