Benefits of Management Information Systems and Important Conditions for Successful Implementation and Running

Ing. David Michálek

Vedoucí práce: Doc. Ing. Martin Zralý, CSc.

Abstract

The objective of this paper is to describe some of the main benefits of implementation of management information system in today's company, and also describe in which cases the system can contribute to making the work of managers and other key employees easier and to improving their results. This description of benefits is the objective of the first part of paper. Then, in the second part, I discuss some of the key conditions which are required to be met in order to implement and run the management information system in the company in the way to provide maximum utility.

Keywords

Management information system, implementation, MIS, ERP

1. Specification of Fundamental Terms

I use a couple of key terms in the article, which have to be specified closer:

- *Information system* – in general context, this term can refer to any system capable of providing information to its' users. However, this doesn't necessarily mean any relation to a software solution. Information system is, for example, accounting in the form of "paper" account books, as it used to be done in the past. In this article, the term "information system" is used more specifically and, unless expressly stated to represent something else, I use the term "information system" to represent a software product for supporting information systems.

- *ERP system* – sometimes also referred to as "basic system" or "operations system", the "ERP" abbreviation comes from English and means "Enterprise Resource Planning". This term refers to systems used for planning and management of enterprise resources. Such systems are commonly used in everyday operations of the company (therefore are sometimes referred to as "operations systems"). Typical areas these systems focus on include accounting, stock details, human resources and others.

- *MIS, management information system* – while ERP system serves for "normal daily operations", MIS is usually system for purposes of management. Its power lies mainly in a different approach to data and different options of data presentation. It also offers some highly sophisticated tools for planning. The MIS almost always works in collaboration with ERP system, which provides some of the data for MIS. More detailed characteristics of MIS will be described further in this article.

2. Benefits of Management Information System for Enterprise Management

This part of the paper contains a brief description of some reasons for deploying management information systems in companies and also the main benefits of MIS for management.

2.1. Motivation for MIS Deployment

Nowadays, managing a company (unless talking about very small companies consisting of a couple of people) is almost unimaginable without a software support represented by information systems. The first enterprise information system that companies acquire is usually an ERP system, which can be in the form of accounting system, human resources management system or it can cover some other areas. Larger companies usually decide to buy some more complex ERP system solutions, capable of providing information support of everyday operations in all (or at least majority of) key areas. Typical representatives of such systems are SAP, Helios, MFG/PRO and others.

These products, although often irreplaceable tools for everyday activities (including accounting, billing, stock details and others) aren't usually capable of providing sufficiently good support and data for a manager's work. Information stored in ERP systems are often well structured for everyday "operational" use, but unfortunately, often not very well structured for the needs of decision making support and other related tasks.

Next step in the development of company's information systems is thus usually acquiring a management information system (MIS). It usually (at least partly) utilizes the data of ERP system, but using the suitable representation, such data are given a new information value. A high-quality MIS can provide the company some of the following benefits:

- Comprehensible, quick and anytime-available (ad hoc) reporting
- Reducing exhausting routine work and unblocking staff capacities for really creative activities
- Properly structured information
- Faster planning, capability of variant planning and modeling impacts of various market situations

2.2. Benefits for Reporting and Analyses

Reporting can be conceived as a system of intercompany statements and reports, utilized not only for controlling and evaluating results achieved in past period. Outputs in the form of statements and reports should also be used for decisions about measures for improving company performance in the future. Unfortunately, even nowadays, many companies see the regular reporting as routine, exhausting and not very popular activity. We often see a "fight for data" every time after accounts final. These data are then filled into many more or less standardized tables. As the complexity and size of the company grows, the "bottom-up journey" of the data, ergo the process of getting the data from lower-level organization units to the top management, which should be the user of these reports, is more and more thorny and lengthy.

As time goes on, most companies inevitably reach the point when reports created in the aforementioned way can no longer be used for efficient company management. The reason is simple – at the time the responsible managers get the reports, the information presented are usually obsolete or completely "dead" and unsatisfactory for the purposes of management. Especially nowadays, in the times of hard competition, hardly anyone can afford to manage a

company using obsolete information. There are business branches where management based on "a couple of weeks old" information is almost the same as prophecy from crystal ball or so called "window method", which means a situation when a manager looks out of the window, thinks the things over a little bit and then makes a decision, without any supporting documents, based only on intuition.

Properly designed MIS can be the right solution for the situation mentioned in the previous paragraph. The data can be available anytime, real-time, and, thanks to properly designed report structures and link to ERP system, MIS can provide necessary information virtually immediately, without any delays and without risk of mistakes, made by manual processing of huge amounts of data.

The problems mentioned above also result in completely inadequate stress of controlling department staff in some companies. Although reporting is of course one of controller's activities, it shouldn't be the main one, because contemporary controlling is far from being just reporting.

Unfortunately, we constantly face the fact that many companies see their controlling department as some kind of "reports factory" and the staff spend most of their time by absolutely routine activities, instead of doing analyses or providing really efficient management support. This means wasting of valuable potential, which could be used much better for further company development. Statistics show that "controllers" of some companies spend as much as 70 % of their time by processing data to requested form. In such situation, it's natural that controllers simply don't have enough time for creating qualified conclusions and making suggestions for the management, although it should be the most important part of their work. Therefore, valuable manpower and knowledge is suppressed by routine.

To maximize the utility of available information, it's necessary to structure it properly. That's one of the reasons why the ERP systems aren't usually very suitable for higher level of management. Management and decision-making requires, aside from precision and availability, also a proper structure of the information, enabling managers to perform required analyses and draw required conclusions from the information available. In this context, especially OLAP (On-Line Analytical Processing) technology based management information systems seem irreplaceable. Unlike classical "two dimensional" database tables, the data in OLAP database are represented in the form of so called "multidimensional data cubes", where every data can be described by a combination of elements of selected dimensions.

As an example, we can assume this combination – "Customers total" (1st dimension – Customer), "Beer 10°" (2nd dimension – Product), "Budget" (3rd dimension – Plan version), "2010" (4th dimension – Year), "January" (5th dimension – Period) and "Volume sold (pieces)" (6th dimension - Indicator). Proper combination of elements from various dimensions can then help to achieve creating various "views" of the same data, which is an invaluable feature for management support. Product manager can look at sales of different product lines for all customers, regional manager can look at sales in different regions for all products and so on. In doing so, creating a new "view" fully according to user's needs is a matter of a few moments, if the data structures are designed properly.

2.3. Benefits for Planning

So far, we have discussed the benefits of management information systems mainly in the context of reporting improvements and proper information structuring. Benefits for planning, however, are no less important. Modern MIS can offer various tools for efficient planning support.

Planning is a key activity in the majority of nowadays companies. A well known proverb says: "The key characteristic of winners is the ability to plan their success". Planning is a process of creating a plan, which should then represent an obligation for all the people in the company, or a "standard" that everyone involved is trying to meet or even achieve results that are better than planned ones. According to classical concept, plans can be classified by planning period length as long-term (strategic – usually a couple of years), mid-term (tactical – the most common example is annual plan) and short-term (operative – the planning period can be a couple of months in this case). The annual plan plays a key role in most companies, so we will focus on it further.

Annual plan is a document that is created every year. It should cover all key areas of the enterprise (sales, production, investments, finance…). The importance of the annual plan is usually reflected in the laboriousness of its creation. In many companies, creating of annual plan is multi-level difficult process, which takes a couple of months to complete, requiring attention of company's key employees. The work on creating the plan is often very exhausting, therefore it is quite common that after creation, the annual plan becomes a kind of "idol" for the next year and changes or corrections are made in very rare and exceptional cases. Many companies then see their annual plan as a document which is created mainly because "it has to be made", but its' practical contribution is usually very little.

Even a well-created annual plan may not be enough – companies in some branches simply can't rely on the fact that plan based on the values from the end of a certain year will make any sense in the middle of the next year. It's necessary to use other, more sophisticated approaches to planning, for example variant planning (creating multiple variants based on possible scenarios of future situation) or so called "sliding planning", creating regular updated forecasts for the next period (i.e., 6 months) based on recent trends.

Quality management information system can provide a substantial simplification of planning process, speed up the planning and provide tools for creating variants, updated forecasting or prognoses based on statistic methods. Thanks to proper tools and data structures, OLAP based MIS enables users to quickly create plans for the next period using for example extrapolation techniques. The data can then be further adjusted and "refined", whereas OLAP data structure maintains data consistency in various views – if we change the total sum for products, the consistency is maintained and automatic calculation for "customers" view is done, to reflect product adjustment.

Thanks to tools simplifying routine work and ensuring data consistency, it's possible to perform easy recalculation according to updated future forecasts, create variant versions or use sliding planning techniques. Thanks to link between key areas (sales planning, cost and profit calculation, financial management…), the impact of changes made to sales plan immediately reflected in other areas.

For example, brewery can, relatively easily, get an answer to the question "What impact will the announced raise of consumption tax rate from 1st January have on the distribution of sales, variable costs and demands of production capacities in the upcoming months?"

3. Important Requirements for Successful Implementation and Running of MIS

This part describes some of the key conditions that have to be met in order to ensure maximum utility and long-term benefits of the management information system.

3.1. Made-to-measure System is Not Only IT Department Business

The first condition for successful implementation of MIS that will have desirable benefits for a company is to understand the role of MIS within the company and adequate approach of all people involved. If the system is to be "made-to-measure", correspond to the processes within a company and be really helpful tool, then it's absolutely necessary that all the responsible people get involved as early as the design stage, before the implementation itself. Unfortunately, sometimes we see the situation when MIS is understood as task for IT or database specialists and the involvement of specialists from other areas is very little or none at all. Actually, the situation should be completely different.

The IT department should only provide necessary IT help and support, but the actual design has to be made with an active cooperation with the specialists from the areas to be affected by MIS. It's probably fairly hard to imagine that it's possible to make a made-to-measure suit without active cooperation of its future owner. The same situation is with MIS – it's very difficult and often even impossible to design appropriate MIS when the key specialists of affected areas pay very little or none attention to the MIS implementation.

If the system is to provide the best support for sales planning, it's necessary that sales managers and other staff play an active role in the design of MIS, as these people are the ones who have the best knowledge of planning processes, needs and problems they encounter in sales planning. The same situation is in other areas – the best specialists for cost and profit calculation are probably controllers, whereas production modules are probably best designed with active cooperation of production manager.

Together with better correspondence with real processes within the company, another effect of key areas specialist involvement can be the possibility of discovering hidden reserves within current processes. When the MIS is in a design stage before actual implementation or in the stage of prototype presentation, it often happens that responsible specialists get a little bit different view of the stuff and find out that there is a room for improvement within the existing processes. Such "necessity to think in a different way" can then bring other benefits.

To illustrate the above mentioned situation, I will use one real life example. At the time of MIS prototype presentation to the customer, it was discovered that the percentage of actual discounts in some combinations of product-customer exceeds the maximum declared by business manager, in other words, some customers get excessive discounts. In the discussion that followed, it turned out that there is a maximum discount that the sales representatives can offer. However, there is no "control mechanism" integrated in the company processes that would "deny" the order in case of exceeding the maximum "allowed" discount. Furthermore, unsuitable data structure in ERP system made it virtually impossible (or very difficult and not performed very often) to check actual overall business terms of realized orders. All that was required for such "discovery" was only a different view of existing data and an active cooperation of specialist from affected area.

Last, but certainly not least important benefit of active cooperation of the specialists from involved areas on the design and implementation of MIS is their stronger identification with the new system. The users get much stronger feeling that "system is here for them", not that

"they are here for the system". Generally, it can be said that if all the design and implementation work is being handed over to the IT specialists, without active involvement of other key personnel, the MIS can then become just a "luxury add-on" of existing ERP system and the investment may not bring the desirable effect for enterprise management.

3.2. Properly Designed Data Flows and Structures

Modern management information system in bigger companies typically processes quite large amounts of data. Therefore, it's necessary to design proper data flows and data structures. Data flows in this context refer mainly to link between MIS and existing enterprise ERP and also eventual "manual inputs" of data directly into MIS. These data flows need to be organized so that the management system can get the required data on time, in suitable form and at the same time, it's necessary to eliminate necessity of exhausting "manual work" as much as possible, which decreases a risk of data input error.

A buffer and unifying node on the path of data from "the neighborhood" (ERP system, manual inputs…) into MIS is represented by structured data warehouse. That's the place where the data are retrieved from various sources, processed, purified (we get rid of redundant or invalid inputs) and consequently imported into actual data structures of management information system. Well designed data warehouse, with seamless link to the ERP system the MIS gets data from, is one of important premises for long-term seamless function of MIS.

There is also other data-related factor with impact on the final quality of MIS implementation in the company – design of corresponding data structures. In this context, it's necessary to realize, what to expect from MIS in the terms of required level of detail. Management information system, as the name suggests, is intended for the needs of management. When the managers of companies analyze economic results and make decisions about future strategy, they don't usually at every single invoice, but prefer having the data in certain level of aggregation. The MIS works with the data in the same way and aggregates them. It's necessary to find and choose level of aggregation that offers corresponding level of detail, but on the other hand, doesn't provide unnecessary detailed information, which can lead to confusing data structuring and also unwanted "swelling" of database and related longer response.

Maximum level of detail is usually determined by the data we are able to get from ERP system. Minimum level of detail is determined by requirements of the future users in order to ensure efficiency of the system. The goal is to find an adequate compromise within this range, so that the information in MIS can be analyzed in sufficiently detailed level and, on the contrary, so that there isn't "too much data", which could lead to information overload and unnecessary long system response because of high computing capacity demands caused by processing large volumes of data.

We can use the following example to illustrate the above mentioned problem. Lets' assume the design of customer dimension in an insurance company. Insurance company can have let's say 50 000 of small (or bigger) individual customers. This is the detail level we can achieve in ERP system and get data for it. In ERP, this level of detail makes sense, because all the invoices, contracts and other data are registered to a particular customer. The question is: "do we need such level of detail in MIS too?" The answer is quite clear – not at all. The point of MIS is not to look at individual customers, the analyses and planning in MIS need a higher level of aggregation – structuring customers into regions and within regions into individuals or corporations is usually sufficient. The same example can be the period dimension. It isn't usually necessary to have details of individual days. In this context, it's good to realize that

MIS isn't (and under no circumstances should be) a "substitute" for ERP system. It's not a system for daily invoicing; it's not intended for stock details. MIS supplements the functionality of ERP systems and its different view of data provides the managers tools for more efficient enterprise management.

3.3. Open Structure and System Modularity

Not even the best system can be designed and implemented to be satisfactory "forever". Companies change, their products change, some intercompany processes change and therefore even the MIS can't stand aside of these changes. In fact, the MIS should be able to "grow together with the company". Thus, it's highly useful when the system structure is "open" or "modular", so that new features can be added or existing features can be adjusted whenever necessary without the necessity of making fundamental (or in other words extensive and expensive) changes to the system setup and features.

Good MIS should be made in the style of "less is more" instead of "impressing the user with lots of useless features" and offer rather smaller and more efficient solution, that will show better correspondence to the company process characteristics. If it's required, or in other words if the users find out that it's necessary, it's possible to extend the features and adjust the system to the new conditions. However, it's good to have this in mind in the stages of initial design and create a system that is efficient, but still rugged enough to "handle" future extensions.

3.4. Quality User Training

If the system is to provide a maximum utility, then, aside from quality design and corresponding quality of the following implementation, it's also necessary to provide a high-quality training of future users. This may seem as natural thing, but the fact is, that many companies tend to underestimate the importance of new system training. Usually, the more intuitive the system seems to be, the less effort is put to do a proper training. Then, it can easily happen that the users don't even know what all the system can do and use only a small percentage of its actual power. The consequence is that the MIS then seems to "not meet the expectations" in the terms of making the work easier. The question is, however, whether this state of things is caused by the system, or by its users.

Experience shows that it's – at least for more complex implementations – good to do two phase system user training. The first training phase should be done as early as the implementation is finished and should be focused on "basic operations", so that the users are familiar with system control elements, know what the particular features are good for and are able to use them. Unfortunately, same as it's insufficient to tell a person that car has a steering wheel, gear stick, gas and brake pedal to make him or her a good driver, the basic system user training is not sufficient to teach people how to use the system efficiently.

Therefore, it's highly recommended to organize - after some time, when the users get quite familiar with the basic features of the system and encounter first problems and practically solved tasks - another "advanced training" focused on more efficient work and on teaching the users how to efficiently solve their common tasks with the help of MIS. This training, based on real-life examples, can be a very valuable source of practical information that can enable users to work with MIS in a more efficient way and to use its full potential.

4. Conclusion

I have described some of the main benefits of management information systems for enterprise management. Together with these benefits, I have also described some (but certainly not all) important factors for success of MIS implementation. It's evident that well programmed MIS is not enough for successful implementation. It's absolutely essential to handle other aspects as well, especially those not directly related to "technical solution". The market offer of management information systems is quite wide, but maximum utility can be only provided by those which are also backed up by excellent methodology, aside from "piece of great programming work".

References

[1] Houser, V., Matyáš, O.: Exekutivní informační systémy na příkladu systému BNS. Oeconomica, Prague, 2010. ISBN 978-80-245-1598-4

[2] Michálek, D.: Knowledge Management ve společnosti Inekon Systems. Diploma thesis, Czech Technical University in Prague, Faculty of Mechanical Engineering, Department of Management and Economics, Prague, 2009.

[3] Molnár, Z.: Efektivnost informačních systémů, Grada, Prague, 2000.
ISBN 80-7169-410-X

[4] Internal documents of the company Inekon Systems s.r.o.