FUNCTIONAL ANALYSIS OF INFORMATION SYSTEMS SUPPORTING THE PROCESS OF FACILITY MANAGEMENT

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Application of supporting management processes through the use of information systems is now becoming one of the basic requirements of market competition. Professional distributed systems not only facilitate collaboration with customers but also reduce operating costs. The aim of this analysis is to present the functionalities that may characterize management system, indicating their relevance to property managers. Market overview confront the expected functionality with the practical implementation of the identified solutions for the most popular systems for universal use. The summary of the significance of using CAFM software will be the review of selected commercial and municipal projects.

Keywords: IT systems, property management, support the management, functional analysis, IT audit

1. The essence of property management systems

Power management with the use of information systems is a mandatory approach. Practically every mainstream enterprise or organization shall apply such tools, using universal solutions or projects copyright.

For the purposes of the Land Administration Act dated August 21, 1997 year, the property management is to take all decisions and make all activities aimed at maintaining real estate in not deteriorated condition in accordance with its intended purpose, as well as a reasonable investment in the property. Permanent part of the practical work property manager is not only taking care of the maintenance of

facilities supplies function at the highest level, but also repetitive administrative tasks – financial and accounting controls and, above all strategic activities [3]. That are conducive information systems, which apart support these actions can be characterized by elements of analytical and decision-making based on the model of business intelligence. This eliminates not only the number of specialists required for operation of the board, but also reduces the risk of error generating activities of employees in the area of repetitive tasks.

Problem perfection system is based on the ability of the project to map business processes. Real estate management support systems are among the PMS - property management systems. The structure is based on relationship the client - server, but now increasingly popular solutions are those based on the cloud (as a service). PMS solutions are most often used by local governments, commercial property managers, hotel industry, largely residential and developers community [3].

2. Requirements for CAFM

Valid system should ensure the flow between the modules technical, administrative, financial and analytical in a manner transparent to the user and gives the greatest spectrum of possibilities. Users should only monitor the correctness of the results and generate conclusions about the current state of the property. Extension of the system should also be communication with the customer, allowing for fault reporting or information about problems. This reduces significantly the number of phone calls and absorption of employees.

Currently, the main determinant of choice for property management system is the price factor. For projects with CAFM (Computer – Aided Facility Management) group are distinguished: the price of the license and price of the implementation. The license price is quite disputable criterion - the value of the license should be a fraction of the cost of the management, but it is not a priority over the choice of system functionality and technological advancement. In the case of implementation, it is a factor that should be minimized, because the costs of training are often overestimated, while too low a level of quality offered.

It can be concluded that the primary functions CAFM systems are the absolute minimum requirements for software vendors. There are modules on real estate records, premises and tenants, including basic data on the managed assets and clients. Based on the database module operates clearing rents, which in addition to the classic records of claims and payments should work with the creation of any billing algorithms (keys), enabling the sharing of common costs to tenants.

With rents module should be coupled module utility billing and accounting counters. Regardless of the method for data extraction technology, costs should be

allocated to the tenant and settled in liabilities. Should also take into account the different forms of grants, consistent with the provisions of nationwide and local (housing allowances) and interest notes.

Modules records and rents should be linked to electronic banking module - home banking. Automated record keeping and accounting transfers and their automatic execution reduces the risk of human error. A convenient aspect would be also link the described module with the accountant module [12].

In terms of financial - accounting, the expected functionality is fully compliant with the current Accounting Act. In this area, the system should recognize the costs and revenues, including created a chart of accounts and making support for the tax.

Rental module is complemented by vindication module. It has not only analyse customer commitment to the administrator, but also include a legal aspect to recovery before the court, judicial and debt collectors.

In the area there is a wide economic additional functionality, i.e. invoicing module, recording cash services (if such is necessary in the company) or payroll - referring to the cost of the administrator, incurred in connection with the operation real estate [2].

Almost every business and property management functionality requires supervision and control. These elements ensure success and ability to raise additional funds for investment and improve their own situation in a competitive market. CAFM system should have a highly flexible and customizable module for controlling, supported by elements of the statistical analysis. The most convenient form should be a model of business intelligence, data warehousing and OLAP (OnLine Analytical Processing) service. Basic information, such as vacancy rates and average rents in the area are not already sufficient, and predefined analytical models are evolving. Management is using cartogram facilitating the addition of visual presentation.

In addition to the functionality of the system and reporting modules (which will undoubtedly facilitate the functioning), it becomes necessary to export the data to external systems (even so popular Excel spreadsheet). Of course, export format should meet the requirement of universality and be easily transferable between systems.

Administrative aspect mainly includes contact with clients, customers and internal circulation of documents. Internal module streamlines document workflow actions, accelerates the process of decision-making, and what is most important functions pro ecologically. Of course, it is necessary to extend the functionality of the legal unit, including management agreements and obligations, tenders, adopted resolutions and planned repairs, renovations or upgrades.

Complemented document circulation is the system of communication with partners and customers, both the web site and the internal email system. Communication is understood not only in the form of active and passive but with access to the assigned groups of information and the ability to change certain parameters relating to the lease, without the involvement of the employee. This reduces not only the costs but the general management and minimizes the time of customers, which is very appreciated aspect.

Typically administrative functionality linked with automated information generated by the system and the need to provide specific facts audience is serial correspondence (and a record of correspondence). Its classic form can be extended to notification by email and messages. For each of the users of the system would be a convenient addition of a typical PIM (Personal Information Manager), with an alert function on significant dates, personalization and full adaptation to specific audiences.

Of course cannot forget about such a fundamental element of which is the technical records of objects and places of module failure and planned investments. The ability to handle CAD (Computer Aided Design) documentation and survey data in the form of GIS (Geographic Information System) digital mapping and storage of energy certificates is very convenient [2].

The technology which software is made of one of the most important criteria for choosing a solution for the company. The system should use the latest technology and information which will allow the company, at no additional cost, to have the current arrangements for an extended period of time. Equally important is the ability to easily find the implementation of new modules and upgrades, which will increase the level of safety for the services offered. Currently, the most popular and most practical theory subscription fee for the use of the software in the cloud. A company that provides software provides also a high level of security and ensure quality of service, but the long-term costs may be higher here than those incurred in the classical licenses.

Referring to the technological element and extend the capabilities of specific additives interesting is the recognition of its own programming language in the system. It will facilitate the parameter setting via scripts written by our own IT team, without having to wait for producer responses for the implementation of new features.

The solution to which a few years ago it seemed literary fiction is the use of telemetry and remote sensing. Equipment associated with the system will not be able to read utility meters, checking the technical condition of buildings and detect failures, but above all, give a chance for automated responses and corrective actions to protect the object with the users. At stake is not only a safety issue but

also the convenience of customers who are not cyclically engaged i. e. the meter readings.

Very important, but often downplayed element is the user interface. Its ergonomics and simplification will help to reduce the cost of training staff and decrease reluctance to new solutions. In addition, customers and partners with more gladly accept the possibility of using the system to carry out certain tasks or communication itself. Important here is the flexibility and freedom to adapt to individual user preferences.

Relationships and CAFM systems requirements is presented in Figure 1, creating a kind of diagram to the expectations of client software provider.
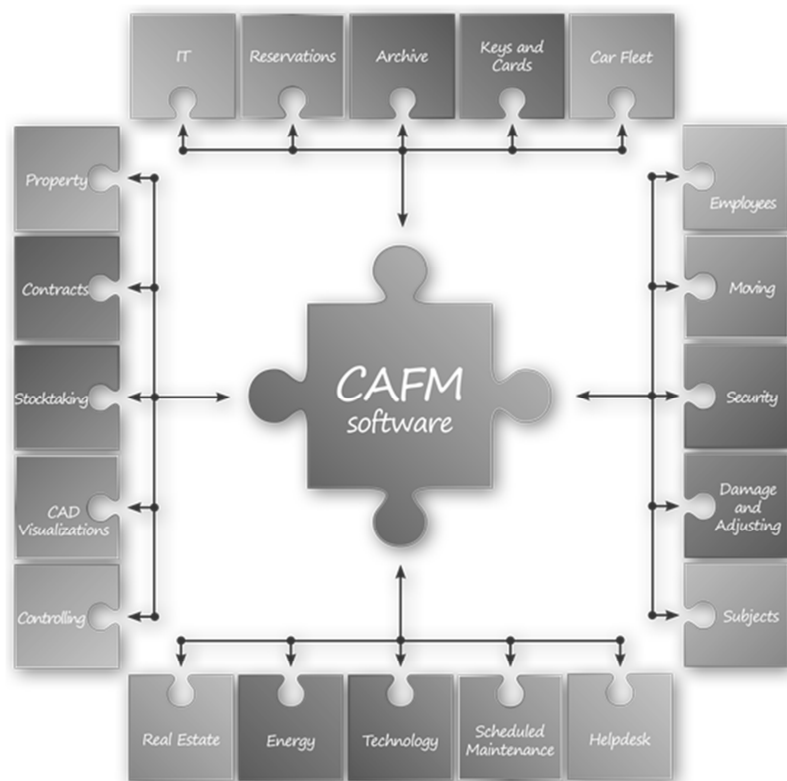
Figure 1. Requirements and relationships for CAFM software. *Source*: Gravity Group

Unquestionable support but a necessity arising from the popularization of management systems becomes an independent oversight of the software, regardless of whether it relates to real estate or any other sector. Ensuring compliance objectives of the company or other institution and the efforts of IT to support the

management and diagnosis of the current state of information technology and matching business activities, is auditing information systems. Currently the most popular institution acting in this area is ISACA (Information Systems Audit and Control Association). It allows the company to ensure the quality and effectiveness of the delivered system, increasing confidence in the compatibility of the requirements to the system at its actual functionality. Institutions and companies that decide to implement this solution or copyright, or universal, should conduct an audit of compliance in the areas of design, application and security [4].

3. A review of selected universal solutions

One of the most comprehensive property management systems is package Granit, that is addressed to a wide range of large and very large customers. It offers all the functionality associated with running a business management through classic modules, such as finance and accounting, community housing, rent, utilities, debt collection, repairs and investment, human resources and others. Innovation distinguished modules for generating reports reporting period of lower system load using the data warehouse to facilitate payment transactions contact the bank, electronic document circulation, collector of media including billing management (working with PocketPC devices) and two very powerful: a web portal for communication with tenants along with the history of the implementation of commitments and data relating to the premises and the module map, including support for digital maps [10].

Interesting and fairly well-known program is the Sizan offered by the Regional Centre for Informatics Ltd.. It is dedicated to local government units, HA – Facilities (Housing Association Facilities), cooperatives, communities, property management companies and companies in order to exploit for their own facilities. The system consists of five subsystems logically related dues, debt, financial - accounting, buildings, Records of the Communities and Buildings, and settlement. The system is not so complete and implementation may be subjected to a selected group of functions. Receivables subsystem includes all records and accounts to tenants, together with cash and bank modules allowing a comfortable operation and management of payments. Recovery subsystem includes legal elements (the case in the court, judicial and enforcement officers). Accountant finance module developed on the basis of the chart of accounts structure builds balance, accounts for the costs, hedge counterparties and attribution, and includes basic reporting tool. Registration Subsystem oversees energy certificates, specifies the technical parameters, failures, planning and filing repairs. Settlement module determines the number of units available, and it is associated with applications pending, also refers the situation in the real estate [9].

The solution based on the cloud Axxerion is the system, consisting of a very large number of modules and functionality. Property management module, contacts, contracts, proposals and employees complement each other allowing for access to the whole information about the managed properties. Technical support is key management module increases the level of security and flexibility of the project. Project management module facilitates investment operations manager and simplifies the financial analysis. The versatility allows you to use the software for commercial centers - with the function of entertainment events, offices and hotels. Rely on a cloud system increases safety and reduces the costs associated with maintaining their own servers.

TelkomBud program, is dedicated to commercial galleries and office objects. The executor of the solution is ProgPol company offering the product as highly customizable and able to link up with the current firmware (without migration). In addition to the functionality of a typical for this type of program, covers the requirements and deadlines, books of a building, a lease, operating agreement, or a data bank for land - related modules of the importance of investment activity [11].

Perseus WM program is quite rich functional but simple system, built on the basis of modules. The disadvantage is specific GUI (Graphical User Interface), that despite the readability of brings to mind previous systems. It contains the basic elements characteristic of these types of programs offering full compatibility with spreadsheets (Excel, Open Office). Additional modules of the system are: Home Banking with the possibility of cooperation with banks and automatic transfer posting, Group Office allows you to access the Internet, exposing module transfers and cash reports.

At the end of the review it is worth recalling the oldest application, which was the precursor to the development of CAFM systems in Poland. It is the ADA's Pixel, addressed to cooperatives and condominiums. This system is very limited in its design and technology, which is a form of data files with a common structure. Each module is a separate program ADA "rents" collecting charges for the use of the premises, "media" including data on collective and individual counters, "costs" relating to the operating costs of facilities, "cash", "program financially accountant" and "web "which financial module tenant files on the internet along with the history of payments. ADA package can also be expanded with additional modules contributions, DCM and cooperating number of separate programs. Unfortunately, quite out-dated structure makes it very difficult at present to use the tool, despite its versatility and flexibility.

All of these programs are characterized by a modular service. Only one supports only commercial real estate, while the other is characterized by high versatility. Still rare is CAD file and GIS map service. Summary comparison of functionality these systems is presented in the Table 1.

Table 1. Comparison of CAFM systems

	Granit	Sizan	Axxerion	TelkomBud	Perseus	ADA
Developer	*DomConsult*	*WOI*	*Unima 2000*	*ProgPol*	*Perseus*	*Pixel*
Module	+	+	+	+	+	+
rents	+	+		+	+	+
media	+	+		+	+	+
vindication	+	+		+		
accountancy	+	+	+	+	+	+
renovations	+			+		
real estate registry	+	+	+	+		
staff	+	+	+			
controlling	+		+	+	+	
GIS map	+			+		
CAD files	+		+	+		
PIM module			+	+		
internet portal	+			+	+	+
contract management		+	+	+		
Expendability				+		
OLAP service	+			+		
Target group	Housing communities, cooperatives, municipalities, companies	Housing communities, cooperatives, municipalities, companies	Housing communities, cooperatives, shopping malls, office buildings	Shopping malls, office buildings	Housing communities, cooperatives, accountancies	Housing communities, cooperatives
Additional funcionality	Cooperation with the PocketPC		Key management system based on the cloud	The possibility of linking with the current system, fully compatible with MS Office	Full compatibility with MS Office, Home Banking	Modules as separate programs

Source: own preparation on the basis of data system developers

4. The popularity of CAFM software

Polish companies have introduced their own property management systems rather seldom, but they did not fully realize the tasks set by the authorities. One exception is the company Est-On and from 2011 Echo Investment Property Management, real estate management company which is one of the two largest Polish developers - Echo Investment. Solution based on a distributed architecture used there is very specific and original. It condenses the special characteristics of systems in the area of economic management - information, advisory, taking into account the technical aspect of the control subjects. The system complements the classical solution of the management software for control over the work of the technical installations which ensures uninterrupted operation of the object. So demanding specification is associated with the requirements of the client and the type of managed properties - office buildings and shopping centers, where a break in the normal functioning generate significant financial loss tenants. It is worth mentioning that the entity manages sixteen properties with a total area of 370 000 m2, performing services to 820 commercial tenants. Expenditure incurred for the construction of such an extensive system of multi-dimensional turn - both in terms of convenient and low-cost real estate management as well as from the point of view reputation building.

The rarity of such solutions in the enterprise may be the result of their innovative in the Polish market and the lack of original solutions. Universal software is often too inflexible and addressed to numerous but smaller customers, they are housing associations, community or logistics operators. Another reason for the lack of popularity may be a factor implementations that are virtually never-ending process, and quite expensive for the company. Group of factors that reduce the popularity of the software closes the lack of awareness on the part of the customer, in terms of improvements that the system can make to the functioning of the institution or company and the hostility of middle and lower administrative level, fearing for their positions [1].

PMS solution also uses a large number of local government units, mainly in the cities and municipalities. This simplifies the management of objects and part of the city's own municipal. Reduced costs and ease of operation of the offices of reaching out to the residents of difficult communication technology (elderly and disabled).

The first example of a fairly large involvement in the development of an integrated management system is real estate investment Krakow, who announced a tender for the realization of an information system for property management Małopolska and provincial units. The budget of the project, in this case amounted to 1.6 million PLN, being co-financed by the European Regional Development Fund (ERDF) under the Małopolska Regional Operational Programme for the years

2007 - 2013. The Company carries out the project was Granit FM. The system consisted of 11 modules, allowing you to create a coherent whole. One of the main elements of a resource management module, which is a database of administrative, technical, legal and surveying the possible cooperation with CAD data. The module supports the management of parcels, buildings and structures, using them for statutory purposes e.g. The deployment of personnel and equipment of their jobs, and also for auxiliary purposes, e.g. parking places, etc. Fixed asset management was covered in a separate module, allowing you to keep records and accounts assets in accordance with accounting principles. Other modules include records of people, routine procedures (collecting and supervising the implementation of the terms of cyclical and non-cyclical work on existing buildings) and counter module, which supports recording utility meters for each of the resources [5].

Radom is another city involving property management system for the administration of their own assets. Tender for the supply and implementation of property management information system technology client - server was announced in 2008. The distinguishing feature of the project were very detailed records of the Terms of Reference for the expectations of the system. The project budget amounted to 95 000 PLN, the executor was SoftHard company [6].

Experience gained in the implementation of the project for the Radom, SoftHard company used in the implementation of the corresponding solutions for Szczecin. The tender was realized in 2013, including the transfer of existing processes and functional subsystems used with the training of employees [7].

Łódź is the last described example of system implementation, whose size is quite large. In the management of cities and villages is 60 thousand. premises, 10 000 buildings, 6 000 real estate, and rental services are offered to 200 000 residents. The tender was announced in 2013, with a budget oscillating around 1 million PLN. The Company's planned project was Sacer [8].

5. Conclusion

In the paper are characterized the key elements of the functionality of the property management systems, aimed to support the work of property managers. Certain key requirements that favour contracting with respect to companies implementing software to support. It explains common property management systems, as well as provides examples of their use in real projects. The analysis clearly shows that the use of information systems has a positive effect on the efficiency and quality of property management. However, universal systems do not ensure the implementation of all the needs of users of the software. System to provide full support in all aspects of real estate management, must be created according to individual orders of the management unit, which however generates

significant costs. Therefore, few companies in Poland introduced their own property management systems, but uses them huge number of local government units.

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