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Procedia Economics and Finance 23 (2015) 1009 – 1016

Procedia
Economics and Finance

www.elsevier.com/locate/procedia

2nd GLOBAL CONFERENCE on BUSINESS, ECONOMICS, MANAGEMENT and
TOURISM, 30-31 October 2014, Prague, Czech Republic

Reference Model of Cost Allocation and Profitability for Efficient Management of Corporate ICT

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Abstract

Managers require, more than ever, exact information about economic situation of their business. They need high-quality information not only about business as a whole but also detail information about individual departments, divisions and activities and its share on business added value. Usually it is easy to identify parameters linked to companies' profits and companies' costs because these are known. But when companies want to make deeper analysis of the detailed cost structures of each product or service, they have to analyse companies activities in higher detail and try to identify business processes, cost drivers, cost centres etc. All of these activities are primarily connected with accounting and financial perception of which is based on accounting methodologies like the Activity Base Costing (ABC) and others. One of the most important Corporate Performance Management (CPM) domains is "Profitability Modelling and Optimization" that contains tasks cost optimization, product profitability and What-If Analysis. The proposed conceptual model mainly focuses two areas – "Cost Allocation", and "Profitability Management". The paper further introduces the limitations of the model, its architecture (the different layers of the model). In the end, certain ideas are presented how the solution of the reference model should proceed

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Selection and/ peer-review under responsibility of Academic World Research and Education Center

Keywords: Profitability; Cost Allocation, Information Technologies, Model, Corporate Performance Management;

1. Introduction

Change to economic and, in part, also to social paradigms during the last decade has exerted much pressure on the

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measurement of results and performance on the micro-economic level. Performance and efficiency measurement has a long tradition both on the macro-economic and the micro-economic levels. Our recent history has known systems for measuring the performance of not only organizations, but also parts of them, such as organizational or project units, or virtual organizational structures (Střížová, 2013). It is essential for trustworthy measurement of all economic phenomena for decision-making purposes that the measurement system, including its indices, are based on systematic approach and thinking (Tavadyan, 2012). Using such approach, qualitative and quantitative methods of studying economic phenomena are combined, while maintaining a systems unity (Tavadyan, 2012).

2. State of Art

Business informatics defined in our conception is based on the (Retzer 2003). Modified definition describes Business Informatics as processes, equipment and employees providing IT services in the company indisputably became one of the key components of the business success in majority of business sectors. Research works conducted in the area of managing business informatics economics (Chen, Zhu, 2004; Day, Kauffman, March, 2007; Loebbecke, Wareham, 2003; Janke, 2011) confirm that companies make substantial investments in business informatics and their volume is still increasing. From this reason the importance of right cost allocation models is increasing.

In present, economic situation with persisting apparent elements of economic crisis, managers require, more than ever exact information about an economic situation of their businesses. They require good-quality information not only about business as a whole but also details about individual departments, divisions and activities. In order to evaluate profit or loss of activities connected with individual department, it is necessary to identify a lot of qualitative and quantitative parameters. Usually it is easy to identify parameters linked to companies' profits and companies' costs because these are known. But when companies want to make deeper analysis of the detailed cost structures of each product or service, they have to analyse companies activities in higher detail and try to identify business processes, cost drivers, cost centres etc. (Kral, 2010) All of these activities are primarily connected with accounting and financial perception of which is based on accounting methodologies like the Activity Base Costing (ABC) and others. One of the most important Corporate Performance Management (CPM) domains is "Profitability Modelling and Optimization" that contains tasks cost optimization, product profitability and What-If Analysis. Importance of this domain increases in current economic situation because more and more companies solve problem of cost optimization and revelation of hidden expenditures. Determination of net profit, on any level of detail could be very difficult especially in situation when company has high fixed costs. The main characteristic of fixed costs is that they are not directly interconnected with final output which produces the revenue. In case of majority, they could significantly warp the total amount of resources spend on particular objects and often manage company to loss.

But the CPM is not only accounting and management accounting but CPM is also frequently mentioned in a context of ICT and especially in a context of the Business Intelligence. (Howard, 2002) But what is the CPM and what is a purpose of the CPM?

The CPM is a set of activities and solutions for organizations' use to become more successful and stay ahead of their competitors. The CPM is aimed to solve the most critical tasks of executives and managers. (Cookins, 2009; Dimon, 2013).

Many research conducted in a past decade (e.g. Parmenter, 2007; Remenyi, 2007, Muhammad, 2010; Chandler, 2007 in Czech conditions Novotny, 2009; Maryska, 2010) show that management and measuring of companies performance is difficult. Similar conclusions are valid also for the area of measuring of performance in ICT (Remenyi, Bannister, Money, 2007; Varian, Farrell, Shapiro, 2004; Gomolski, 2004).

Before modern CPM solutions became available, companies usually struggled with fundamental processes. One of results is financial process such as month-end close and an annual budget. Approaches that solved these processes were usually labor-intensive and linked with a lot of errors. One of the reasons was that employees were not using appropriate tools. The best example for financial processes was using various spreadsheet applications that were not used only in a past but also at present.

During time an advanced companies has developed their proper companies' solutions with all disadvantages and advantages results from in-house solutions like high price, little or no best practices etc. One of prerequisites was BI that provides data required for analysis.

These in-house solutions were often accompany by a lot of kinds of reports that were running around organization, each telling their own version of truth, typically based on different sets of interpreted data, conflicting with one another because already existing reports never exactly fulfil needs of new users. These troubles were one of key factors that encourage companies to implement BI solutions that were the first step to implementation of the CPM applications.

The objective of the paper is to present the conceptual design of the “Reference Model of Cost Allocation and Profitability for Efficient Management of Corporate ICT”, which is based on general CPM principles while enhancing them with current trends both in corporate ICT management and the management of the company as a whole. A second goal of presenting the model design to professional public is to facilitate expert discussion of the model during its design stage. The system has been designed within an academic project at the Faculty of Computer Science and Statistics of the Economic University in Prague and in cooperation with Profinit, a. s.

3. Model

3.1. Purpose and Meaning of the Model

The goal of the model is to provide solution of two corporate tasks that are currently in the centre of attention. These tasks are “Cost Allocation” and “Profitability Management”. The solution of these is closely connected with the involvement of analysis, which we regard as a natural part of solving both the tasks.

For both tasks, key “Dimensions”, “Metrics”, “Drivers” and “Activities” will be determined during the formulation of the model, which are generally solved within corporate ICT (general reference model), however, the proposed concrete solution will not be strongly attached to this identified set, it will only be based on it. The objective of the model is to propose a solution that can be easily customized to meet the requirements of a concrete company in which the model is deployed. This will be achieved by implementing maximum logic through dimensions and parametric cubes.

However, it should be added for the completeness' sake that for specific companies or specific allocation rules or profitability analyses, change of the reference model (solution code) proper can also be expected. These changes will then consist mainly in extending the reference model.

3.2. Assumptions and Limitations of Model Design

The assumption of the model to be deployed in companies of various types is the identification of assumptions, limitations and requirements the target solution must fulfil. The model design is based on the following limitations, assumptions and requirements:

- The proposed model must support easy and relatively fast integration into the corporate architecture.
- The design of the overall model must be a general design that can be adopted to concrete conditions and requirements of the target organization.
- The model will be designed so that it does not have to be extended in the technical sense, i.e., no primary development is required (new coding on the basic level of the model), but all modifications can be implemented only through fine-tuning within the dimensions.
- During the model preparation, any required dimensions and key metrics used in the tasks solved within the relevant area must be identified.
- With respect to process management, efforts will be made to reflect standard processes in the management of corporations and corporate ICT as described in the reference models of corporate ICT management, such as ITIL, CobiT, etc.

Except these direct limitations, other factors must be taken into account as well, those connected with the implementation of the model in the target company, which are listed in Section “Factors of Model Implementation”.

3.3. Architecture

The architecture of the model presented in Figure 1 is based on the traditional architecture of BI solution, which is adopted for the purposes of the model, with an aim of integrating it in the corporate architecture of a typical organization.

The model is primarily based on consolidated data sources, which are in an organization normally represented by the data warehouse (Company’s DWH) in the layer “Data”. If the structure, detail and contents of the data in the data warehouse are not sufficient for the analytic tasks to be performed in the designed model, other data sources will be used (Transaction Data Sources, External Data). Over the layer “Data”, it is always necessary to prepare the data integration tools within which the data is imported and processed according to the requirements and needs of the target system. Within the processing of data from the “Data” layer to higher-level layers, also issues of data quality are handled. The two layers mentioned so far – “Data” and “Data Integration” – are not the primary objective of the proposed model and will always be specific for each implementation.

The subsequent three layers (“Data Management”, “Applications Platform”, “End-User Experience”), which are marked in dashed line, are the subject of the proposed model. During the model design, a general model of data warehouse/mart will be developed, which will be used solely for the purposes of the developed model. This data warehouse/mart will support the implementation of the tasks of cost allocation, profitability and management in their context of performed analytic tasks.

The last layer (“End-User Experience”) is a layer that will allow for user-friendly access of the technologies by which the tasks of cost allocation and profitability are solved.

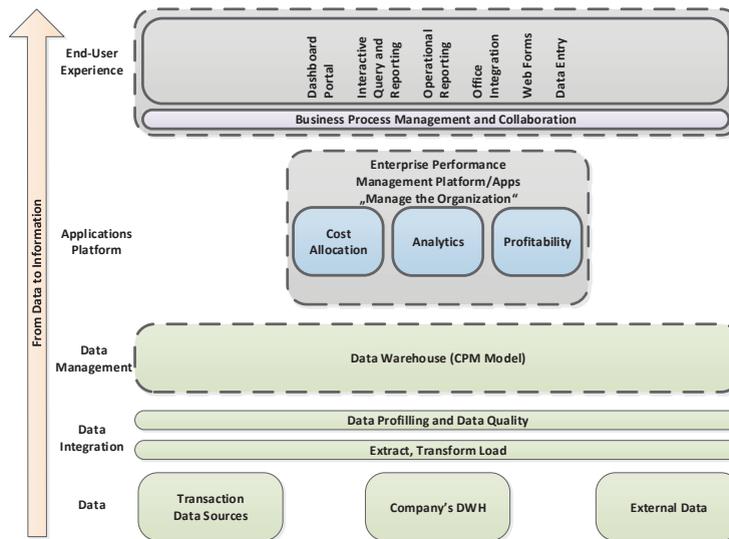


Fig. 1. Architecture of the Model Source: Author

3.3.1. Data Management Layer

The data model and the data warehouse developed according to it must cover the needs implied from the analytic tasks to be performed over it.

Figure 2 presents the conceptual design of the data model, containing the key entities and elements that must be possible to record in the target solution and which will be used by the subsequent analytic layer.

The conceptual model is divided into four compact sections, which are further detailed up to the level of physical data model, which is implemented in the selected database technology. The conceptual model is divided into the areas “Finance and Management Accounting”, “Production Entity”, “Cost Allocation Entity” and “Other Entity”. Each of these areas covers a specific field. For “Cost Allocation Entity”, this involves mainly the data related to the definition of cost allocation parameters, which includes the definition of dimensions “Cost Centre”, “Cost Drivers”, “Activities and Processes”. In the area “Production Entity”, this is data implied from day-to-day operation of the company, which includes sales of products and services, i.e., the company's products, definition of their prices and discounts, etc. The area “Finance and Management Accounting” focuses the field of data sources that are related to financial and management accounting.

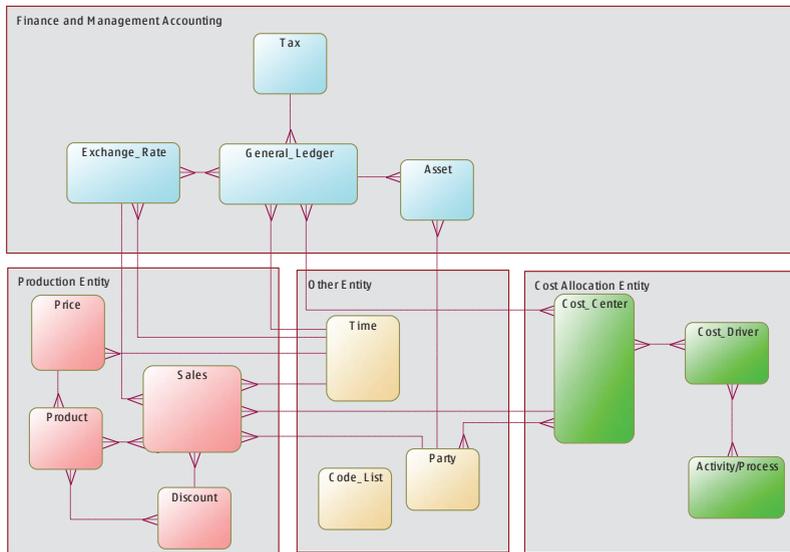


Fig. 2. Conceptual Model Source: Authors

3.3.2. Application Platform Layer – Cost Allocation Principles

The following Figures describe the main principles of cost allocation. The first Figure, describing the main principle of cascade cost allocation; the abbreviations CC1-CC4 represent the different cost centres that can exist in a company. As an illustration, CC1 can be, for instance, Management (assets, structures, etc.), CC2 = ICT, CC3 = Personnel Department, etc. The determination of the “Cost Centre” must always be in the form of a dimension so that their number could be dynamically modified and corresponded of the needs and requirements of the organization implementing the model. The result is determination of the different cost types.

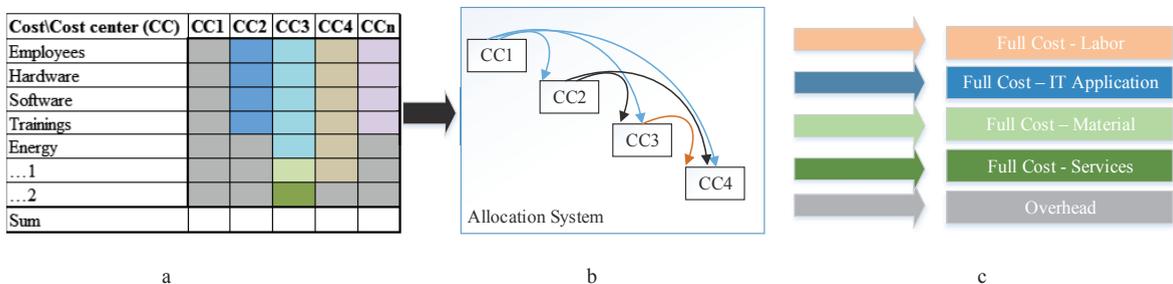


Fig. 3.a-b-c Cost Allocation Principles – 1, Source: Authors

The following Figure describes the applications of the method “Activity Based Costing”, which is based on the total costs by type and these are further broken down by the defined “Drives” into “Activities”. Activities subsequently form the process the result of which is a concrete product or service. The costs of product or service thus determined are added to the total cost calculation of direct and indirect costs, which are then compared to the revenue. “Revenue” enters the calculation as an external element. For ICT, “Revenue” can consist, for instance, of income from the sales of ICT services. The result of comparing the total costs and the total “Revenue” (either in detail of a concrete product or all products of the organization as a whole), the profit or loss is determined.

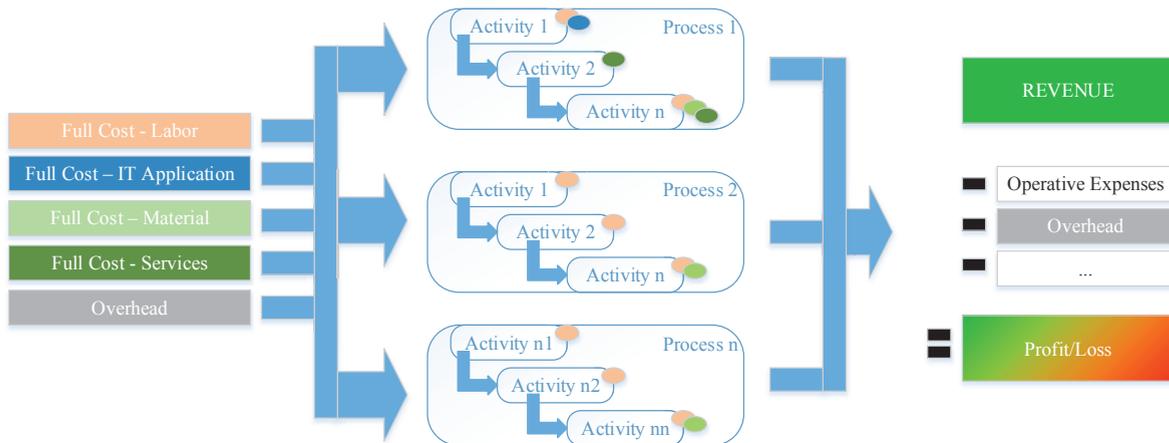


Figure 4: Cost Allocation Principles – 2, Source: Authors

In a more detail from the view of cost allocation, the model allows the following:

- Solution based on cost solution through cascade allocation, which cannot be directly assigned to products.
- Provides environment for allocation of costs to products.
- The solution comprises both allocation and a reporting basis for evaluation and analyses.
- The solution is independent of the definition of time evaluation; it only depends on the frequency of filling the model's data repository with data. The frequency can be days, weeks and even months.
- In a more detail from the view of profitability, the model allows the following:
- Solution for allocation of revenues and in particular costs on the product/contract level.
- The solution contents reporting basis for evaluation and analyses.
- Calculation of profitability is irregular, as needed by the managers.

3.3.3. Presentation Layer

In the model design, we expect the use of two main types of presentation and analytic-presentation layers:

- Native tools and the selected environment, i.e., the tool Cognos Express/Cognos TM1.
- The tool Microsoft Excel.

The first group of tools provides full functionality implied by the fact that these are native tools. As for the tool Microsoft Excel, the functionality of the solution is provided by a plug-in module, which implements in the tool Microsoft Excel full functionality of the systems Cognos Express/Cognos TM1.

3.4. Factors of Implementing the Model

In developing the model and subsequent deployment of the whole system, several key questions must be answered at the beginning, the reflection of which impacts the preparation of the proposed model:

- Which are the current and possibly expected main issues in the economics and management of development and operation of corporate ICT, and what are their solution priorities?
- Are some of the standard methodologies (ITIL, CobiT, etc.) used in solving the ICT, or a proprietary methodology or model?
- Has the knowledge level of the corporate ICT maturity been analysed, and what was the outcome?
- Is the management of corporate ICT based on service management and on service level agreements (SLAs)?
- Is there documentation for the system of corporate ICT management and its databases that could be used for obtaining data and subsequent transformation of them for the proposed metrics and dimensions? Is there data and meta-data usable for design and population of the proposed metrics and dimensions?
- What level of data detail will be required for analytic tasks in managing the corporate ICT's economy?
- Which key metrics are required for the corporate ICT management system (KPI)? Are some of them currently used?
- How the costs of ICT personnel monitored and what are is the place of cost analyses in the corporate ICT management?
- These questions can be considered essential in considering practical solution and deployment of the system in corporate ICT management. It is clear that answers to these questions will differ company by company.

According to the differences, it will be necessary to modify:

- the proposed solution using parameters,
- and to adopt the proposed model to suit the needs and requirements of the representatives of the companies in which it is being deployed.

4. Conclusions

Based on research of literature, identified shortcomings and experience from design of other reference models, we expect benefits of the proposed model both in theory and in practice.

Practical verification and the proposed model will be used both for practical application in companies and will be further available to students, who will able to visualize the issues of cost allocation and profitability on the model and support of these tasks by hardware. Last but not least, the proposed solution will enable students to comprehend the design of similar models on the selected platform.

We expect that the following will be available for practical use:

- Identification of key metrics that can be used in solving of cost allocation, profitability and related analytic tasks.
- Design of the main dimensions that are essential for solving these economic tasks.
- The reference model, which will facilitate the following:
 - increasing the awareness of the relation between the corporate ICT and the other organizational units of the company through the design of drivers and activities provided by the corporate ICT, and used by the other parts of the company,
 - commission a tool supporting the company's management in the decision-making in the field of corporate ICT.
- The methodology for implementing the proposed model in the company – identification of the implementation process including the procedures and potential customization of the proposed model to suit the characteristics of the target company.

The benefits of the proposed model for theory can be formulated in the following aspects:

- Research of the cost allocation and profitability issues in the context of corporate ICT.
- Extending the theoretical basis of cost allocation and profitability in the corporate ICT.
- Identification of suitable dimensions and their characteristics.
- Design of the model and its architecture.

5. Open Issues

Further design of the model will consist in solving in particular the following issues:

- Which are the key “Cost Drivers” that will enable correct cost allocation of corporate ICT services?
- What are the key activities in providing ICT services and creation of corporate ICT products?
- Which analytic tasks are most important within the cost allocation and profitability management?
- How can the proposed model be optimally integrated into the company's ICT architecture?

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