Chapter 14
Object Oriented Modelling of Corporate Complexity Performance Balance Card: CBBC

Fatma Çınar and C. Coşkun Küçüközmen

Abstract Recent advances in computing and communications technology indicate that this progress and use of state of the art techniques will continue at a very rapid pace. This situation will inevitably increase companies' informational data input and output as a consequence. It is also obvious that companies need to process and convert both input and output in such a manner that valuable entities are created in return. We value data as a company asset to be visualised in the form of new generation graphics providing decision-makers with significant corporate information. By these ways executives who can realize and evaluate the overall picture more effectively will be able to take new steps forward in improving business efficiency. We hereby suggest an alternative object-oriented business modelling approach which is able to more comprehensively analyse problems with respect to relations and correlations in current company structure. Through our model we propose a new reporting system by restructuring available data to enable decision makers to have reports via a user friendly reporting system. We combine the data available in the system with data source Objects via the Java SQL-based database, then the Cortex is formed and an infrastructure is developed for making statistical inquiries. Thus, all data in a single pool of resources can be managed and integrated with the reports consolidated while summary reports which provide spontaneous pictures and graphics are provided to be displayed instantly.

Keywords Multi-dimensional performance evaluation model · Corporate finance · Complexity management · Complexity business balance card (CBBC)

F. Çınar (✉)
Capital Markets Board of Turkey, Ankara, Turkey
e-mail: fatma.cinar@spk.gov.tr

C. Coşkun Küçüközmen
School of Business, Izmir University of Economics, İzmir, Turkey
e-mail: coskun.kucukozmen@ieu.edu.tr

Ş.Ş. Erçetin and S. Banerjee (eds.), *Chaos, Complexity and Leadership 2013*,
Springer Proceedings in Complexity, DOI 10.1007/978-3-319-09710-7_14

14.1 Introduction

The last 3 decades have witnessed an unprecedented revolution in computing and communications technology and it seems that this progress and use of state of the art techniques will continue at a very rapid pace. This situation inevitably increases companies' informational data input and output as a consequence. Thus, companies need to process and convert both input and output in such a manner that valuable entities are created in return. We live in a data rich world, although not all of the information is valuable. Few (2009) states that software tools on the market vary in how effectively they can assist us in navigating the data analysis process, and no matter how well designed these tools are, the results they produce will depend on how skilled we are in employing them.

The data itself as a company asset to be visualised in the form of new generation graphics provides decision-makers with significant corporate information. Thus, executives who can realize and evaluate the overall picture more effectively are able to take a new step forward in improving business efficiency. As a result, the next step to be taken will improve the company's performance without the excessive expenditure of effort and resources. To the best of the authors' knowledge, this pioneering study argues that current techniques and models used to clarify and simplify complex data have been either insufficient or misleading. Thus, it is impossible to illustrate properly all multi-dimensional company variables with a two-dimensional diagram. The suggested alternative object-oriented business modelling approach is able to more comprehensively analyse problems with respect to relations and correlations in current company structure.

14.2 Business Modelling of Problem Areas

Current models in use are generally graphics based on mathematical and statistical models. Today as a result of the widespread use of databases, current models have also been studied within the framework of informatics. Despite improvements made based on scientific models, current techniques fail to reflect the dynamics of the contemporary business environment. Unfortunately, these techniques are stationary and in a structure that produces lagged outputs. Object-based features of computer software allow us to use this feature for the modelling of business processes. This approach is also suitable for users who are accustomed to utilizing object-based office programs. To explain this more clearly, once created, a *business problem domain model* can be used as a management tool, which helps to ensure the appropriate reaction given to the continuous improvement of operating performance or to changes in the business environment. In other words, such business models have served as basic intellectual tools to transform the companies from their *current situation* to the *status desired*. In this context, we can say that these models have the advantage of providing cost and operational gains of various alternative policies that can be tested without forcing the active processes of the company. In this way,

the user-friendly business model considerably simplifies processes and also creates its own market.

Therefore, the success of modelling is embedded in the properties of modelling techniques. Costly real life experiences can be reduced significantly. *As time metric of performance increases the level of performance also rises.* Today, concerning each level of organisation, systems that illustrate how to design information in various strategic layers and how to achieve significant analysis of data along with hidden patterns, are required. Performance optimization for companies has now become more important than ever. Therefore, companies need to measure their performance in more realistic terms to make the best decisions. It has also become more important for companies to optimize their financial performance and to make the necessary decisions via measurements in order to maximize benefits to the business.

To serve this purpose, companies need to utilize *Integrated Theoretical Application* to transform their approach to *Object-Based Integrated Enterprise Performance Management Model* with *real-time risk analysis*. This makes measuring the real value of the company possible within the framework of integrated theoretical applications and integrated reporting systems. These models created for performance monitoring should also be compatible with the current dynamic environment in which the company operates. They should also be compatible with factors which are important for competition, such as innovation and flexibility.

14.3 Modelling with Object-Based Techniques of Management Structure

Development of new techniques and changing insights based on data management (informatics) has become a necessity for organizational success rather than simply an option. Our proposal is *Complexity Approach* that evaluates companies as *Object Oriented* organic and complex structures with informatics backbone, and not simply as mechanical and bureaucratic structures (see for example Hruby (1997) and Pedroni and Meyer (2009)). This approach is based on *General Systems Theory*, *Informatics* and *Chaos Theory*. Business concepts and techniques, and company processes are re-interpreted using a dynamic-cybernetics cognizance. This topic has been studied in detail by Kauffman Santa Fe Institute and many respective scholars (Holland 1992). In this study, we propose an *Object-Based Modelling* premised on information and Informatics as the most suitable model to realize subject approach.

14.4 Company as a Complex of Objects

The main feature that distinguishes *Object-Based Modelling,* the basic component of complexity approach based on *Object Oriented System,* from other management theories (*kaizen*) is that it defines the constituent parts of the components as

functional objects and their inter-relationships and their interaction in combination (see for example Holland (1992)). This situation is actually similar to the traditional *General Systems Theory* (GST) but cannot avoid being labelled as the *hierarchical composition mechanical parts*. Detection of complex organic compounds as functional Object (Object Oriented) hinges on the foundations of complexity approach (see for example Hruby (1997) and Pedroni and Meyer (2009)). This approach is capable of describing and explaining the behaviour of systems that cannot be explained by analytical approaches. Our basic model of interest will be the *Company Complex*. This is the intelligent modelling of complex and dynamic presence of main problem areas within the so-called company universe. These problem areas, which make up the organic structure of the company, will be modelled as Objects. This can be conceptualized as follows: *a business entity is a complex*, *consisting of Complex Objects.* In other words, entity and complexity have become synonymously identical in our model space.

14.5 Object-Based Business Modelling

Business Objects constitute the foundation of *Object-Based Complexity Management.* Every organization is a *complex* consisting of people. Even an organization which is run by a single person is considered as a *complex structured organization*. This is because complexity is *not* related with the number of the people, but the number of the necessary business processes (see for example Hollande (2006)). The complex structure of the organization is composed of vertically and horizontally linked relationships of *Business Objects.* A modern enterprise can be considered as a *Mega Object* composed of *Objects*, which are themselves composed of *Objects*. A sector that compromises several entities and the whole economy within the global system are also Mega Objects composed of units. An *organizationobject* can neither be detected nor interpreted irrespective of the *objects* independently (*Habitat Effect*). In other words, each *object* in the space of *objects* is the *object* of, or composed of their extension. Complexity Management perceives each individual of the organization as a self-governing administrator who governs, functions, time and relationships, as well as itself. In other words, a CEO and a warehouse keeper are similar objects, but whose roles and functions are different.

14.6 Architecture of Object: Properties and Methods

Object-oriented complex business universe objects are not dead mechanical entities. Each *object* is a dynamic and living organic-informatics structure, capable of receiving and recognizing impulses, and giving appropriate reactions. In conformity with the principles of *Object-Based* software; there must be *parametric structure properties* that define each object and a *set of methods* to determine their behaviour.

Thus, all business units of the organization and the people as well as their identity and roles in each position are clearly identified in advance. Their level of success will be the *Performance of Objects* of the organization. Accordingly, a *business object* should be considered as an active organizational unit whose job/duty definitions are well-defined and equipped with *impulse and response capacity* against specific reactions. Accordingly, *software objects* both host data and command against external stimuli (such as mouse clicks or using touch sensitive screens) and are interactive modules that can react. These units, as in software, may be observed in organizations or in natural habitat. Especially, the nature exhibits the perfect examples of *object originstructuring*. All living things exhibit a structure originated from the Object. Naturally, the most complex structured basic *object* is the human himself.

14.7 Complex Structure in the Active /Professional Object: Agent

The active *object of objects* of an organization is *Agents*. *Basic objects* are the first to be determined by the sector the company operates and their business lines. Following this process, new objects are created and hence active/professional *agent objects* are formed upon this expansion. In conventional management science these are sections and departments.

14.8 Control and Coordination Balance Object of Business Objects: CORTEX

It is *Cortex Object* that employs all *objects* of the organization and information systems as a backbone. The function and dynamics of organizations are executed by *Cortex* which indeed is an *Object of Control Coordination and Balance.* Conventional management science refers to this as *management*. In *complexity management*, *Cortex* executes the functions beyond management. *Cortex is the basic Object of all organizations*. We can observe an organization formed solely of a *Cortex,* but we cannot observe an organization without its *Cortex*. *Cortex is the most basic Object of Object based modelling. Modelling in our study will take place around the Cortex.*

We need some certain criteria to refer to corporate balance. Criteria should be parallel with the strategies determined by the strategic management. To ensure that the strategy is well received, perception of change, studies conducted under the leadership of management, the definition of concepts, harmonizing the organization with the strategy, motivating people and all sub-factors related should be harmonized as a whole with the *Complexity of Business Balance Card* model and the

Financial Performance Assessment Methods. Since the assessment criteria differ according to the sector's structure, sector-based sensitivities should be taken into account when formulating models. Inputs of a company may be machinery, personnel, financial resources, or informatics. Outputs can be staff, financial and informatics performance. Transformation process is the implementation of organizational process to transform these inputs into goods and services.

Outputs are the goods and services produced by the organization. Feedback is the rearrangement of inputs with the support of information provided by outputs. Environment is the social, economic and political values where the organization takes place.

14.9 CORTEX Coordinated Relations Management Model: Sycamore Tree

The strategic business unit of the model is composed of *Agents*. Two types of nested structure of business units are *Agent-Objects.* Object relations with other agents, functional and strategic integration of operational responsibilities, delegating integral business responsibilities (performance-project groups) have a weighted impact on management processes of network units. Agent-Objects integrated with informatics backbone of autonomous work groups constitute the backbone of the system by jointly operating their own leadership to work in cooperation with other operating business units from various levels. All *Agent-Objects* are associated with *Cortex* and under its control. *Cortex* is the system that uses information systems as a backbone of all *objects* of the organization. For example, one cannot think of a hotel without beds, a hospital without an operating room and an advertising company without a design-workshop. Other similar examples are banking and transportation, and these sectors cannot be imagined without a computer system. Therefore, the backbone performs the strategic functions in a system that is composed of *object of objects* which ensures continuity of the integrity of the system. The performance *objects* on the right hand side of the *fishbone diagram* refer to *tangible agents,* while the left hand side refers to *intangible agents*. On both sides of the *performance object* resembles ecosystems and living organisms, just reflecting each other, and many are likened to the fractal structure. Nearly all fractals are self-similar, if not completely all, at least most of them have this feature. The parts of the body in self-similar objects or components resemble the whole body. Three-dimensional *Sierpinsky pyramids* are typical of this structure. Each fishbone on *Sycamore Tree* diagram is the *object of the objects*. In other words, the organic structure of the *objects* is displayed as a fractal hierarchy among *objects* both vertically and horizontally within the matrix.

The fishbone illustrates the unlimited coordination of objects before and after and the control and their internal balance. Accurate perception and interpretation of *Object-Based Business Modelling*—and *Sycamore Tree* (*Complexity of Business Balance Card* (*CBBC*)—in a complex business universe will constitute the base for

Table 14.1 CBBC diagram model

CORTEX		
Stakeholder Relations	LAN	Competitions Relations
State Relations		Customer Relations
Information & Communications Technologies	WAN	Product Relations
Innovation Relations		Marketing Relations
Global Environment Relations		Financial Environment Relations

successful management. Our proposed *Sycamore Tree* diagram augmented with communication technologies, will give in-depth perspectives to the management through our *operating business units approach* (Merih and Çınar 2013) (Table 14.1).

14.10 Information as a Fundamental Business Object: Numerical and Graphical Data Mining

Data and information are active objects, and have gained much importance, as much as capital in today's organizations. Informatics object contains information about data, software, charts, tables and various reporting tools. All active data sources and reporting tools send and receive information to and from the related objects. *Object-based* software also supports the exchange of information together with the *agent object* carrying information of any kind is associated with *Cortex*. For example, any transaction to be transmitted to *Cortex* in *CBBC diagram*, such as a balance sheet which is an *agent of an object*, consists of the reports based on general accounting principles. Agents have a number of behavioural methods. All categorical and numerical variables that take place in performance analysis of *business objects* are *objects* that vary depending on the company business line. These variables reveal the *processobjects* that affect information and having a direct impact on the performance of *objects*.

Conventional techniques and methods fail to respond to the needs of today's businesses. Thus, using existing methods is a waste of time, effort, energy and money. Therefore, instead of conventional command and control method, the proposed *Cortex* should be adopted.

14.11 Conclusion

In this study, we design and propose a reporting system. By restructuring available data the system enables decision makers to have reports via a user friendly reporting system. The data available in the system is combined with data source *Objects* via

the *Java SQL-based database*, the *Cortex* is formed and an infrastructure is developed for making statistical inquiries. Thus, all data in a single pool of resources can be managed and integrated with the reports consolidated while summary reports which provide spontaneous pictures and graphics are provided to be displayed instantly. *Business Intelligence Interactive Dashboards* combined with pop-up menus and slideshows will provide commercial data/enterprise applications/graphics/tables/photos clearly exposes and enable decision makers only with a few clicks to access data in an interactive format to work and plan and test future business processes. Through this model, complex organizational structures operating in an increasingly competitive environment can be systematically reported. These reports will include management functions of the company. Since analytical approach to events in perspective is no longer sufficient, complex methods of thinking in organizations is a requirement rather than a necessity.

References

Few S (2009) Now you see it, simple visualization techniques for quantitative analysis. Analytics Press, Oakland, California

Holland JH (1992) Adaptation in natural and artificial systems: an introductory analysis with applications to biology, control, and artificial intelligence. Mass MIT Press, Cambridge

Holland JH (2006) Studying complex adaptive systems. J Syst Sci Complex 19(1):1–8. http://hdl.handle.net/2027.42/41486

Hruby P (1997) The object-oriented model for a development process. Navision Software a/s, Frydenlunds Allé 6, 2950 Vedbaek, Denmark

http://www.riskonomi.com/wp/?p=2016. Accessed 29 Nov 2013

http://www.econanadolu.org/en/index.php/articles2013/3683. Accessed 29 Nov 2013

http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.83.8689&rep=rep1&type=pdf. Accessed 10 Jan 2014

http://www.cs.sfu.ca/CourseCentral/354/zaiane/material/notes/Chapter1/node6.html. Accessed 13 Jan 2014

http://se.ethz.ch/~meyer/publications/teaching/oomodeling.pdf. Accessed 14 Jan 2014

http://www.techopedia.com/definition/28584/object-oriented-modeling-oom. Accessed 14 Jan 2014

Merih K, Çınar F (2013) Modelling of corporate performance in multi-dimensional complex structured organizations: "CBBC" approach. In: Econ Anadolu 2013: Anadolu international conference in economics III, Eskişehir, 19–21 June 2013

Pedroni M, Meyer B (2009) Object-oriented modeling of object-oriented concepts: A case study in structuring an educational domain. Chair of software engineering, ETH Zurich Switzerland. fmichela.pedroni|bertrand.meyerg@inf.ethz.ch