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## **COSTING SYSTEMS IN THE TELECOMMUNICATIONS INDUSTRY**

### **Abstract**

Today's telecom market is multi-faceted, complex and unpredictable. The telecoms industry is at risk of becoming a low profit business. As the telecommunications industry continues to advance at breakneck speed, its costing systems will need to keep up. Originally designed based on the properties of legacy networks, price regulations for monopolistic services have generally utilized cost models adopting various costing methodologies. The increasing deployment of IP-based fixed and mobile infrastructure in combination with the still unanswered search for data monetization have intensified the pressure on the managerial accountants to review its costing systems for both regulatory and commercial cost analyses. Overall, this study provides valuable understandings into the nature of present costing systems adapted to today's fast evolving telecommunications environment.

**Key words:** Cost Accounting, Activity-Based Costing (ABC),  
Traditional Costing, Target Costing

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## **Introduction**

Telecommunication business has a number of objectives, including satisfying customers with high-quality products and services, quickly and on time; maintaining high levels of market penetration; satisfying the customers; providing a good working environment for employees; and being financially successful. The long-term financial success of any telco business depends on whether its prices exceed its costs by enough to finance growth, provide for reinvestment, and yield a satisfactory return to its stakeholders. If there are few competitors, it may be possible to simply mark up costs to establish a price that yields a sufficient profit. However, as competition increases, market forces influence prices significantly more. To achieve a sufficient margin over its costs, a telco company must manage those costs relative to the prices the market allows or the price the firm sets to achieve certain market penetration objectives. In the context of these characteristics, different costing models have evolved. Usually, cost models were tools used by regulators to monitor and control prices for access and interconnection services which are monopolistic in nature. Over time, operators have also developed cost models to analyze their own cost structures for regulatory and business purposes. With developments in new technology, services and regulations, cost models have gradually evolved to reflect these changes. At present, the capabilities of cost models have expanded and can be used for regulatory pricing (tariff regulations), profitability analysis (pricing strategies), regulatory accounting (accounting separation), and cost optimization, amongst other purposes. The adoption of a modern and sophisticated costing system was needed to assure public opinion, including the regulators and the new operators in the market, that costs were calculated based on a rational and reliable system, and furthermore that telco company was making serious efforts to improve its performance. The following sections include five main costing models in the telecommunication, namely, traditional costing system, activity-based costing, target costing, accounting separation and costing system for next generation networks.

## **1. RADITIONAL COSTING SYSTEM IN THE TELECOMMUNICATIONS SECTOR**

Given the high-technology nature of the telecommunications industry, its manufacturing overhead costs represent a significant proportion of its total costs. Many telecommunication companies have been used the traditional costing system to assign manufacturing overhead to units produced. Users of the traditional costing method make the assumption that the volume metric is the underlying driver of manufacturing overhead cost. Under traditional costing, accountants assign manufacturing costs only to products. Mainly, the traditional method of cost accounting refers to the allocation of manufacturing overhead costs to the products manufactured. The traditional method (also known as the conventional method) assigns or allocates the factory's indirect costs to the items manufactured on the basis of volume such as the number of units produced, the direct labor hours, or the minutes used. Traditional accounting fails to allocate nonmanufacturing costs that also are associated with the production of an item, such as administrative expenses. The trouble with traditional costing is that factory overhead may be much higher than the basis of allocation, so that a small change in the volume of resources consumed triggers a massive change in the amount of overhead applied. Such a large change in applied overhead is nonsensical, since there is not always a direct relationship between the volume of production resources and factory overhead. This is a particularly common issue in highly automated production environments, where factory overhead is quite large and direct labor is close to nonexistent. Companies commonly use traditional accounting in external financial reports because it provides a value for the cost of goods sold. When 'International Telecom's managers were faced with the prospect of competition being introduced in the EU telecommunications market [1, 2] they were not concerned in having a very sophisticated managerial accounting system. The traditional accounting system was no longer satisfying the costing needs of the telecommunication companies. Many of them abandoned this costing system and replaced it with more sophisticated systems.

## **2. ACTIVITY-BASED COSTING IN THE TELECOMMUNICATIONS SECTOR**

From the time when it was introduced in 1980's, the Activity-Based Costing (ABC) model has been broadly recognized in theory as one of the most superior cost and profit measurement methods and tool for overhead costs assignment to products, services, customers or other cost objects.<sup>1</sup> Overall, ABC has in large extent made obsolete the traditional cost management systems based on arbitrary overhead costs allocation, and enabled much higher level of accuracy in determination of actual costs of production as it seeks to identify the real cause-effect relationships in the process of indirect costs assignment. Furthermore, it has become a base for development of new management and controlling approaches, such as Activity-Based Management and Activity-Based Budgeting.<sup>2</sup> Even though the geneses of ABC are in the production industry, the model has been proved to be even more valid and beneficial for the services industries, more implicitly in the banking, health institutions and education and telecommunication sector. Practically all the costs in these ranges are overheads and fix over period of time, in contrast to manufacturing where still, the major portion of costs are direct and variable to the volume of production and sales. ABC in service entities have to take, first of all, the customer behavior into account which is feature distinguishing these system from Activity-Based Costing as used in manufacturing enterprises. In manufacturing firms only the cost of marketing, selling, order handling, delivery and service of the products might be customer-specific. Used for service companies, in contrast, even the basic operating costs of standard service are determined by customer behavior.<sup>3</sup>

The possible problems in implementing ABC in telecommunication sector are mainly related to complexity and continuous technological and market changes. However, there are also some subjective reasons, such as: inadequate communication among employees, lack of management commitment and vision accompanied by the employees' resistance on implementing system of detailed tracking of their day-by-day activities. Some

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<sup>1</sup> **Kaplan, R., and Bruns, W:** "Accounting and management: A field study perspective." Harvard Business School Press. Boston, Massachusetts, 1997

<sup>2</sup> **Cokins, G:** "Activity-Based Cost Management: An executive's guide." John Wiley & Sons, Inc., New York, 2001

<sup>3</sup> **Kaplan, R., Cooper, R:** "Cost & effect: Using integrated cost systems to drive profitability and performance." Harvard Business School Press, Boston Massachusetts, 1998, pp. 181-201

of those issues could be solved by applying of the less complex Time-Driven Activity-Based Costing method. The time-driven approach avoids the costly, time-consuming and subjective activity-surveying task of conventional ABC. It uses time equations that directly and automatically assign resource costs to the activities performed and transactions processed. Only two parameters need to be estimated: the capacity cost rate for the department and the capacity usage by each transaction processed in the department. It is evident that the TDABC model solves the issues of complexity and expensiveness of the conventional ABC, yet there might be certain concerns related to simplified process of activity mapping and threats for losing some opportunities in the area of Activity-Based Management. However, TDABC could be seriously considered as an option in all cases where there are constraints regarding the implementation and maintenance costs and processes' complexity.<sup>4</sup> In regards to the benefits, it is obvious that successful implementation of ABC/M in telecom providers could result in much better understanding of profit drivers throughout the technical and commercial processes, but certainly the most important is that the company can gain significant long-run competitive advantage in the area of pricing and cost controlling, which are considered to be the key success factors in this continuously changing industry segment. Carrying out of ABC/M requires engagement of sophisticated software application that will support tracking and analyzing of massive volume of data throughout the period. Globally, there are several software tools already established as a 'top of class' systems in this area: SAP, Oracle, Acorn Systems, QPR Cost Control and SAS. As an ultimate purpose of ABC implementation is to support and improve the decision making process, it is of crucial importance that ABC/M system has to be in some way integrated in the overall performance management and measurement system of the company. The clients are more interested in employing integrated solutions with the rest of their systems, i.e. prefer the built-in ABC functionalities in the ERP and EPM systems in use.

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<sup>4</sup> **Kaplan, R., and Anderson, S:** "Time-Driven Activity-Based Costing: A simpler and more powerful path to higher profits." Harvard Business School Press, Boston Massachusetts, 2007, pp. 123-128

### **3. TARGET COSTING IN THE TELECOMMUNICATIONS SECTOR**

To compete effectively in today's emerging telecommunication market, telco's must be customer-oriented, hence they must simultaneously address the issues of time/speed, quality and cost in product planning and development and this is the rationale behind the technique of target costing. The fundamental objective of target costing is very straightforward. It is to enable management to manage the telecommunication business to be profitable in a very competitive marketplace. Target costing is a mechanism for determining selling. The object of target costing is to identify the production cost of a proposed product so that, when sold, it generates the desired profit.<sup>5</sup> Target costing can be defined as a cost management tool for deducing the overall cost of a product over its entire life cycle with the help of the production, engineering, research and design, marketing, and accounting departments. Also, target costing can be described as a method of determining the cost of a product or service based on the price that customers are willing to pay. The target costing process requires the cost-oriented coordination of all product-related organizational functions.<sup>6</sup> Common to most definitions is a process founded on a competitive market environment; market prices driving cost (and investment) decisions; cost planning, management, and reduction occur early in the design and development process; and cross-functional team involvement, including the management accountant. In effect, target costing is a proactive cost planning, cost management, and cost reduction practice whereby costs are planned and managed out of a product and service early in the design and development cycle, rather than during the latter stages of product development. Target costing obviously applies to new telco products and services. It also applies to service modifications or succeeding generations of products.

As the first step, the telco company determines what the market is willing to pay for a service. Three main players are taken into consideration: customers, competitors, and a company's senior management. The telecom operator must understand customer's perceived value of a service as well

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<sup>5</sup> **Cooper, R. & Kaplan, R:** "Activity-based systems: measuring the costs of resource usage." *Accounting Horizon*, 6(3), 1992, pp. 1-13

<sup>6</sup> **Krsteovski, D., and Mancheski, Gj:** "Managerial Accounting: Modeling Customer Lifetime Value - an Application in the Telecommunication Industry." *European Journal of Business and Social Sciences*, Vol. 5, No. 01. 2016, pp. 64-77

as their attitude for purchasing services. The telco company must take into account competitors alternative and substitute services. This is because customers are shoppers and will shop around for the best price and value. The senior management must define and adjust strategies to meet the company' objectives. The second step is determining target profit margin – profit margins must be to satisfy the expectations of both the company and its owners. Two approaches can be used to determine the desired profit margin: baseline experiences and capital budgeting using lifecycle analysis. The last step calculates the allowable service cost – the maximum allowable service cost is calculated as the net between the target selling price and the target profit margin.

Many telco companies use target costing together with an activity-based-costing (ABC) system. Target costing requires a company to first determine what a customer will pay for a service and then work backwards to design service and production process that will generate a desired of profit. ABC provides data on the costs of the various activities needed to lunch the service. Knowing the costs of activities allows service and services process designers to be able to predict the effects of their designs on the service's cost. Target costing essentially takes activity-based costs and uses them for strategic product decisions.

#### **4. ACCOUNTING SEPARATION SYSTEM**

Accounting separation (AS) should ensure that the costs of a wholesale input are based on the cost of producing the product in question, ideally incremental costs as well as a mark-up for joint and common costs. A coherent accounting separation system records the costs of the individual elements / components of the network. It then sets out how these are used by the several wholesale services. Furthermore, it shows the relationship of the costs of these wholesale services to the prices of these services (including a reasonable return on capital). Finally, it demonstrates that the retail arm of the incumbent network pays for these services on this basis. All this has to occur in accordance with a published methodology and an independent auditor has to endorse that this is in fact what has occurred. In order to calculate the costs of a service, the following information are required:

- (i) Network elements could in theory either be posted on a Historical Cost Accounting (HCA) or Current Cost Accounting (CCA) basis. CCA is preferred because it means that the network is being charged for on its cost of replacement. This encourages rational further investment by new entrants and incumbents.
- (ii) Long Run Incremental Costs (LRIC) plus a contribution to the recovery of fixed common costs of an efficient operator are preferred. However, fully allocated costs could be used in the short term and are likely, if properly implemented, to give a figure that does not vary extravagantly from the LRIC figure.
- (iii) The cost elements of at least all wholesale services should be included. However, the analysis needs to be more detailed, since service will use a number of network elements. A complete system would costs of all the services, including the potentially leveraged wholesale and retail markets.
- (iv) Usage volumes are necessary in order to apportion costs of network elements between the particular wholesale services that are using them.
- (v) The cost of a particular network element will include a reasonable rate of return on capital. Weighted Average Cost of Capital (WACC) needs to be agreed set by the regulator, after consulting both the incumbent and new entrants in a transparent process.
- (vi) The attribution model should set out how all costs and assets including joint and common costs are allocated between network components, and, critically between the wholesale part of the business and the retail business. The wholesale business must not be attributed costs that should be ascribed to the retail business.
- (vii) The transfer prices paid by the incumbent's retail arm (with explicit comparison with the costs of the input based on the underlying network elements).
- (viii) The AS system should also show a statement by independent auditors that the separated accounts can be reconciled back to the company's financial statements and that the separated accounts have been constructed in accordance with the attribution methodology.

When implementing AS, it is key to work towards results that are consistent with the operators' strategy and current price regulations. Implementation of AS should be efficient, minimizing the workload by

simplifying allocation processes to the extent possible. AS projects conclude several stages: define separated businesses, identify cost and revenue base, develop allocation processes and tools, identify driver values and reporting, documentation and audit. Separated accounts have different systems and software requirements compared to statutory accounts: flexibility, transparency and affordability are the key elements.

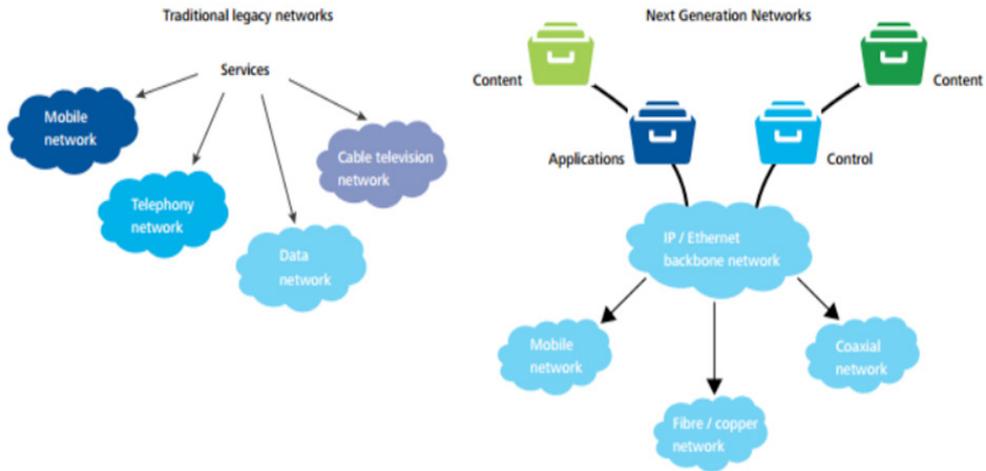
## **5. COSTING SYSTEM FOR NEXT GENERATION NETWORKS (NGN)**

NGN has been defined by the International Telecommunication Union as “a packet-based network able to provide services including telecommunication services and able to make use of multiple broadband, quality of service enabled transport technologies and in which service-related functions are independent from underlying transport-related technologies”. It is an IP-based network with a multi-layer architecture for services, control, transport, and access. Traditional switches are replaced by media gateways and soft switches. In traditional legacy networks, each service is operated on its own dedicated network – fixed line telephony on public switched telephone networks (PSTNs), mobile voice services on mobile networks, television broadcasting on satellite and cable networks, etc. These networks are designed independently and specifically for a single service. NGN offers services independent of the type of network because it is a converged multi-service network, as illustrated in Exhibit 1. These differences will impact current cost modeling methodologies. As multi-service platforms, NGN networks would have much higher fixed shared and/or common costs as compared to legacy networks. Consequently, an effective cost allocation method of services is required. In traditional cost models for circuit-switched networks, cost allocation to services was commonly performed through a network utilization routing table. Network routing scenarios were defined for each particular service using the principle of cost causality and costs have been allocated via degree of utilization of network elements to their corresponding services.<sup>7</sup>

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<sup>7</sup> **Wuppermann, J., and Mekanand, T:** “Costing Methodology for Next Generation Networks”, Deloitte Paper, 2014. Available at <https://www2.deloitte.com/mm/en/pages/technology-media-and-telecommunications/articles/costing-for-ngn.html>, September 2017

**Exhibit 1.** Architectural differences between traditional legacy networks and next generation networks



Source: Deloitte, Technology, Media & Telecommunications p.2

Present costing approaches and methodologies have been designed based on the characteristics of legacy networks and thus are effective when used to model costs of legacy networks. The emergence of NGNs, however, presents a new set of considerations for telecommunications companies as it is much more difficult to apply the traditional cost causality principles. NGNs can have significant impacts on the traditional costing systems, including cost allocation, treatment of incremental costs, and regulations based on LRIC.

### **Conclusion**

The telecommunications industry nowadays operates in a very competitive market; with the full outline of competition into the telecommunications sector. Its business activities were redefined and focused on providing international telecommunications, its organizational structure was transformed, and its managerial accounting was changed. One of the main changes is introduction of ABC not just for generating costing data to assist managers, but also to respond to legal-institutional obligations to provide exhaustive and structured costing data, at any time. The adoption of ABC fulfilled expectations for modernization in ‘International Telecom’,

created by the reorganisation of EU telecommunications sector. Furthermore, operators are transforming their networks to enhance the capacity and capability for new services. In doing so, introduction of new technologies creates challenges for cost accounting. Accountants and regulators need to carefully think through how to allocate within the new core infrastructure, in terms of the basis for apportionment and the data and methods that are required to support this. Nevertheless, the costing of NGN networks is still in its infancy as legacy networks are gradually replaced by NGN networks around the world. Costing methodologies and regulations must develop hand-in-hand with technological developments, keeping in mind that the objective of cost models is to reflect the reality of networks.

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