Paper 4 Appendix G **Extracts from relevant documents relating to costing models used in practise and those used in preparing service performance reports**

Source	Costing models
AG-4 (Revised) *The Audit of Service Performance Reports*	A62. "The full and fair allocation of costs to outputs is one of the cornerstones of an efficient management control system. The information such systems generate should enable stakeholders and management to make decisions concerning resource use, budgetary implications, output pricing, and the extent of cross-subsidisation. Therefore, such systems can have a considerable effect on the disclosures in service performance reports." (paragraph A62) A63. "The audit focus should be on the underlying assumptions and the system. Therefore the Appointed Auditor is likely to concentrate on: (a) Testing the reasonableness of the underlying assumptions; (b) Ensuring the method of allocation is reasonable and supportable. (The allocation of overheads should follow a cause and effect relationship. The factors that cause the consumption of overheads are called "cost drivers". Although some proportion of overhead will not be traceable to a particular output, the aim is to identify a causal link wherever possible. Activity-based costing will be relevant for achieving a more accurate costing of outputs in some cases); and (c) Ensuring that there is consistency of treatment within the audit period (i.e. costs are allocated on the same basis as funds are appropriated or budgeted), and between audit periods where applicable."
TPA-9 *Service Performance Reporting*	TPA-9 *Service Performance Reporting* does not include any requirements or guidance on costing models that should be used for Service Performance Reporting purposes. It only provides high level guidance on performance measures and targets. TPA-9 paragraph 5.3 highlights that performance measures described in paragraph 5.2 should not be regarded as the only measures that may be used. If other dimensions are a priority for the purchaser and are measurable, then they should be used. Paragraph 5.11 states that judgement is needed to determine the most suitable performance measures. Staff note the use of high level principles used in TPA-9 rather than enforcing rules and requirements for reporting on service performance.
SEA Performance Information *The Proposed Suggested Guidelines for Voluntary Reporting of SEA Performance Information*, No.20-2, June 2009	*The Proposed Suggested Guidelines* do not provide any guidance on appropriate costing models that should be applied in SEA Performance Information Reporting. "The use of key measures within a SEA report should provide users with enough information to develop their own conclusions about important aspects of a government's performance without overwhelming them. The number and type of key measures reported may vary depending on the level of reporting, with additional measures included at more detailed levels of reporting". (paragraph 15)
Wikipedia *The free encyclopaedia* http://en.wikipedia.org/w/index.php?title=Special%3ASearch&redirs=0&search=costing+&fulltext=Search&ns0=1 F. Vigario *Managerial Accounting*, Second Edition, 2001	Staff note that the following cost models are some of the main costing models applied in practice by entities: • activity-based costing; • lean accounting (value stream costing); • grenzplankostenrechnung (GPK); • life cycle costing; • standard costing; • production cost modeling • resource consumption accounting; • throughput accounting; • transfer pricing; • weighted average costing; • actual costing; • variance reporting; • cost-plus pricing; and • complex transactional control systems.
Wikipedia *The free encyclopaedia* http://en.wikipedia.org/wiki/Activity-based_costing F. Vigario *Managerial Accounting*, Second Edition, 2001	Activity-based costing (ABC) *Background* ABC is a costing model that identifies activities in an organisation and assigns the cost of each activity resource to all products and services according to the actual consumption by each. It assigns more indirect costs (overhead) into direct costs. In this way an organisation can precisely estimate the cost of its individual products and services for the purposes of identifying and eliminating those which are unprofitable and lowering the prices of those which are overpriced.

	In a business organisation, the ABC methodology assigns an organisation's resource costs through activities to the products and services provided to its customers. It is generally used as a tool for understanding product and customer cost and profitability. As such, ABC has predominantly been used to support strategic decisions such as pricing, outsourcing and identification and measurement of process improvement initiatives. *Approach to ABC:* 1. determine the activities that relate to the overheads; 2. quantify the activity cost; 3. determine the cost drivers associated with the activity; 4. determine the cost driver rates by dividing the activity cost by the cost driver volume; and 5. apply the rates calculated to a product. *Advantages* • activity-based costing helps to identify inefficient products, departments and activities; • it helps to allocate more resources on profitable products, departments and activities; • it helps to control the cost at an individual level and on a departmental level; • it helps to find unnecessary costs; • it improves cost estimation as cost behaviour understanding is improved; and • it improves strategic decision making in the pricing of products, improving the product range by discontinuing old products and promoting new ones. *Disadvantages* • ABC has been attempted by 60% of US organisations with only 20% having sustained it (Bain & Co). 80% of organisations still use traditional full-absorption standard costing, regardless of the negative business management impact; • ABC systems design is “too complex”; • ABC software standalone; not IT integrated; • ABC treats cost allocation to an activity as absolute, certain and linear; • It uses a small sample of historical data and extrapolates the information for long-term costing and decision making requirements; • ABC is historic and lacks relevance; • ABC costs will vary significantly according to the choice of cost drivers and activities; • ABC is a conventional system and does not address the modern competitive business environment; • ABC systems used for retrospective analysis, not direct business management (successful implementations use ABC to actually do business planning); • a relatively costly accounting methodology; • it is considered to be complex and a highly wasteful method; and • some overhead costs are difficult to assign to products and customers, such as the chief executive's salary. These costs are not assigned to products and customers because there is no meaningful method. This lump of unallocated overhead costs must nevertheless be met by contributions from each of the products. Although some may argue that costs untraceable to activities should be "arbitrarily allocated" to products, it is important to realize that the only purpose of ABC is to provide information to management. Therefore, there is no reason to assign any cost in an arbitrary manner.
Brian H Maskell *What is Lean Accounting* http://www.maskell.com/lean_accounting/subpages/lean_accounting/components/What_is_Lean_Accounting.pdf Wikipedia *The free encyclopaedia* http://en.wikipedia.org/wiki/Lean_accounting	Value stream costing applied in Lean accounting *Background* • The purpose of this accounting model is to move from traditional accounting methods to a system that measures and motivates excellent business practices. • This was developed by Toyota and other Japanese companies. • There is no or little allocation of overheads. • The objective is to eliminate waste, free up capacity, speed up the process, eliminate errors & defects, and make the process clear and understandable. • While this method is primarily used within manufacturing, the approach has proven useful in many other areas including healthcare, construction, financial services, governments, and other industries. Lean Accounting does not require the traditional management accounting methods like standard costing, activity-based costing, variance reporting, cost-plus pricing, complex transactional control systems, and untimely & confusing financial reports. These are replaced by: • focused performance measurements • simple summary direct costing of the value streams • decision-making and reporting using a *box score* • financial reports that are timely and presented in "plain English" that everyone can understand • radical simplification and elimination of transactional control systems by eliminating the need for them • driving lean changes from a deep understanding of the value created for the customers

- eliminating traditional budgeting through monthly sales, operations, and financial planning processes (SOFP)
- value-based pricing
- correct understanding of the financial impact of lean change

Typical measurements include:

- productivity (sales/person);
- process control (on-time shipment to customer requirement);
- flow (dock-to-dock days or hours);
- quality & standardised work (first time through without scrap or rework);
- linearity and overall improvement (average cost);
- people participating in CI; and
- safety (safety cross showing lost time, accidents, near-misses, etc.).

Tools for implementing Value stream costing include:

- value stream mapping; current & future state;
- kaizen (lean continuous improvement);
- PDCA problem solving;
- performance measurement linkage chart; linking metrics for cell/process, value streams, plant & corporate reporting to the business strategy, target costs, and lean improvement;
- value stream performance boards containing break-through and continuous improvement projects;
- box scores showing value stream performance;
- cost management;
- value stream costing;
- value stream income statements;
- accounting processes that support lean transformation;
- customer & supplier value and cost management;
- target costing;
- value stream cost and capacity analysis;
- current state & future state value stream maps;
- box scores showing operational, financial, and capacity changes from lean improvement. Plan for financial benefit from the lean changes;
- transaction elimination matrix; and
- process maps showing controls and SOX risks.

Box score card

Staff note that many entities that use this costing model use the box score card. Below is an illustration of a box score card. The standard format of the box score shows a 3-dimensional view of value stream performance; operational performance measurements, financial performance, and how the value stream capacity is being used.

		7/3/2009	7/10/2009	7/17/2009	7/24/2009	7/31/2009	9/23/2009	9/30/2009	GOAL
OPERATIONAL	Units per Person	214	194	241	241	229			272
	On-Time Shipment	97.20%	98.00%	98.00%	96.00%	96.00%			98.50%
	First Time Thru	72%	82%	95%	72%	86%			95%
	Dock-to-Dock Days	8.9	8.5	9	12	8.9			7.1
	Average Cost	$68.51	$46.50	$40.72	$47.73	$43.53			$39.01
	AP days - AR days	8	8	8.8	8	8			8
CAPACITY	Productive	31%	35%	31%	31%	31%			31%
	Non-Productive	56%	62%	56%	41%	41%			41%
	Available Capacity	13%	3%	13%	28%	28%			28%
FINANCIAL	Revenue	$1,611,456	$1,816,986	$1,816,986	$1,816,986	$1,816,986			$1,954,006
	Material Costs	$490,296	$674,183	$581,926	$767,819	$642,825			$625,810
	Conversion Costs	$497,933	$559,091	$498,129	$498,129	$511,720			$486,804
	Inventory	$221,163	$211,223	$223,648	$296,197	$289,966			$176,433
	Value Stream Profit	$623,227	$583,712	$736,931	$551,038	$662,441			$841,393
	Value Stream ROS	38.67%	32.13%	40.56%	30.33%	36.46%			43.06%

Advantages

- provide relevant and thorough accounting, control, and measurement systems;
- not complex and highly wasteful like ABC;
- working to eliminate cost allocations rather than finding complicated methods of allocation;
- takes more into account than just the financial metrics of the organisation.
- takes into account individual activities, processes and parameters within each activity or process that contain non-dollar units that better represent the company's standing;
- identify and resolve the root causes of the problems that create the lack of control;
- fully complies with all statutory and generally accepted accounting requirements in the United States and Europe, including the unique requirements of German, Swiss, and Italian regulation. Lean accounting also complies with the increasingly popular International Accounting Standards (IAS) that is seeking to create a single world-wide approach. When moving from traditional accounting methods to lean accounting there is no "change of accounting" because the external reporting outcome of lean

	accounting uses the same accrual based actual costing required by GAAP and statutory regulations. There is an argument that lean accounting lends itself better to statutory regulations because they require reporting at actual cost. Lean accounting uses actual costs throughout, whereas traditional accounting uses standard costs that must then be adjusted to actual costing for external reporting; • simple summary direct costing of the value streams; and • there is little or no allocation of 'overheads. *Disadvantages* • There are as yet no published cases of the use of lean accounting outside of manufacturing.
Strategic Finance Magazine *German Cost Accounting*, Paul A. Sharman, December 2003, pages 30-38 Wikipedia *The free encyclopaedia* http://en.wikipedia.org/wiki/Grenzplankostenrechnung	Grenzplankostenrechnung (GPK) *Background* GPK is a German costing methodology, designed to provide a consistent and accurate application of how managerial costs are calculated and assigned to a product or service. The GPK methodology has become the standard for cost accounting in Germany and has also been adopted by many entities throughout Sweden, Norway, Austria, France and Netherlands. GPK is about marginal costing instead of full costing, short-term decision support instead of long-term and cost centres instead of activities and processes. With GPK's marginal-based approach, internal service and saleable product/service costs should only reflect the direct and indirect costs that can be linked to individual outputs (whether final product or support service) on a causal basis (referred to as the *principle of causality*). Proportional costs in GPK consist of direct and indirect costs that will vary with the particular output. Proportional costs provide the first contribution margin level that supports short-term decisions and once proportional costs are subtracted from revenue, it reveals whether the product or service is profitable or not. GPK practices have varied, for example, not all adopters adhere to strict marginal practices such as the pre-allocation of fixed costs based on planned product/service volumes. GPK adopters often calculate a standard per-unit-rate for fixed product/service costs and a separate per-unit-rate for proportional product/service costs. The balance of costs not causally assignable to the lowest level product or service can be assigned at yet higher levels within the marginal costing system's multi-level Profit & Loss (P&L) statement. For example, with GPK, fixed costs that relate to a product group or a product line (e.g., R&D, advertising costs) are assigned to the product group or product line reporting/management dimension in the P&L. This marginal costing approach offers managers greater flexibility to view, analyze and monitor costs (e.g., all product and cost-to-serve costs) for their area of responsibility. Thus GPK assigns all costs to the P&L but it does not fully absorb to the lowest level product or service. GPK's multi-dimensional marginal view of the organisation supports operational managers with the most relevant information for strategic decision-making purposes about "what products or services to offer" and at "what price to sell them". *Characteristics of GPK* • Costs centres plan resource consumption rates as either proportional or fixed relative to outputs • Cost centres are structured around activities with activity drivers and resources with resource drivers • Cost centre charge rates are calculated and charged to consuming departments at budget rate • Business modelling software allows planning / modelling • GL cost centre structure embeds costs into the management system *Principles applied* • Admin, sales & marketing OH added after calculating product-specific cost • Dedicated overhead (e.g. product group marketing costs) allocated by segment • Equipment, product R&D cost applied at the product group level *Advantages* • provides meaningful insight and analysis of accounting information that benefits internal users, such as controllers, project managers, plant managers, versus other traditional costing systems that primarily focus on analyzing the firm's profitability from an external reporting perspective complying with financial standards; • GPK marginal system unites and addresses the needs of both financial and managerial accounting functionality and costing requirements; and • provides relevant information for strategic decision-making purposes. *Disadvantages* • the entities that apply this costing system tend to use ERP (Enterprise Resource Planning) software (e.g., SAP) and they tend to reside in industries with highly complex processes. However, GPK is not exclusive to highly complex organisations;

	GPK is also applied to less complex businesses and will reap the same informational insights; • GPK is a marginal costing system and is decidedly more comprehensive than most U.S. cost management systems because of the level of organisational planning and control and its emphasis on accurate operational modeling; • data integrity required therefore clean-up required prior to launching GPK; • high amount of set-up work; and • not a perfect fit for all areas –e.g. Information Services.
Globusz® Publishing. *Standard Cost*, Chapter 4 http://www.globusz.com/ebooks/Costing/00000014.htm F. Vigario *Managerial Accounting*, Second Edition, 2001	Standard costing *Background* The CIMA, London has defined standard cost as "a predetermined cost which is calculated from management's standards of efficient operations and the relevant necessary expenditure." They are the predetermined costs on technical estimate of material labour and overhead for a selected period of time and for a prescribed set of working conditions. In other words, a standard cost is a planned cost for a unit of product or service rendered. An important part of standard cost accounting is a variance analysis which breaks down the variation between actual cost and standard costs into various components (volume variation, material cost variation, labor cost variation, etc.) so managers can understand *why costs were different from what was planned* and take appropriate action to correct the situation. • standard costing is a system that enables management to analyse deviations from budget so that future costs can be controlled more effectively; • standard costs are predetermined target costs which should be incurred in production; • allows entities to easily analyse what is going wrong and rectify the problem in the following accounting period; and • standard costing is a management control technique for every activity. It is not only useful for cost control purposes but is also helpful in production planning and policy formulation. It allows management by exception. *Advantages* • *Efficiency measurement*-- The comparison of actual costs with standard costs enables the management to evaluate performance of various cost centres. In the absence of standard costing system, actual costs of different period may be compared to measure efficiency. It is not proper to compare costs of different period because circumstance of both the periods may be different. Still, a decision about base period can be made with which actual performance can be compared. • *Finding of variance*-- The performance variances are determined by comparing actual costs with standard costs. Management is able to spot out the place of inefficiencies. It can fix responsibility for deviation in performance. It is possible to take corrective measures at the earliest. A regular check on various expenditures is also ensured by standard cost system. • *Management by exception*-- The targets of different individuals are fixed if the performance is according to predetermined standards. In this case, there is nothing to worry. The attention of the management is drawn only when actual performance is less than the budgeted performance. Management by exception means that everybody is given a target to be achieved and management need not supervise each and everything. The responsibilities are fixed and every body tries to achieve his/her targets. • *Cost control*-- Every costing system aims at cost control and cost reduction. The standards are being constantly analysed and an effort is made to improve efficiency. Whenever a variance occurs, the reasons are studied and immediate corrective measures are undertaken. The action taken in spotting weak points enables cost control system. • *Right decisions*-- It enables and provides useful information to the management in taking important decisions. For example, the problem created by inflating, rising prices. It can also be used to provide incentive plans for employees etc. • *Eliminating inefficiencies*-- The setting of standards for different elements of cost requires a detailed study of different aspects. The standards are set differently for manufacturing, administrative and selling expenses. Improved methods are used for setting these standards. The determination of manufacturing expenses will require time and motion study for labour and effective material control devices for materials. Similar studies will be needed for finding other expenses. All these studies will make it possible to eliminate inefficiencies at different steps. *Disadvantages* • standard costing cannot be used in those organisations where non-standard products are produced. If the production is undertaken according to the customer specifications, then each job will involve different amount of expenditures; • the process of setting standards is a difficult task, as it requires technical skills. The time and motion study is required to be undertaken for this purpose. These studies require a lot of time and money; • there are no inset circumstances to be considered for fixing standards. The conditions under which standards are fixed do not remain static. With the change in circumstances, if the standards are not revised the same become impracticable; and

	• the fixing of responsibility is not an easy task. The variances are to be classified into controllable and uncontrollable variances. Standard costing is applicable only for controllable variances. For instance, if the industry changed the technology then the system will not be suitable. In that case, we will have to change or revise the standards. A frequent revision of standards will become costly.
Electric Power Research Institute *Asymptotic Mean And Variance Of Electric Power Generation System Production Costs Via Recursive Computation Of The Fundamental Matrix Of A Markov Chain*, Fen-Ru Shih , Mainak Mazumdar **http://www.pitt.edu/~mmazumd/Bloomm1.doc**	Production costing models *Background* Production costing models are used in the electric power industry to forecast the expected amount of electricity produced by different power generation units and the expected cost of producing electricity for a given power generation system. These forecasts are extensively used by the industry for financial and capacity planning, fuel management and operational planning. The production cost models account for the expected variation of load (i.e., demand for power) over time and the uncertainty in the utilization of the generating units resulting from their failures and repairs. The production cost of a power generating system over a given time interval is obtained by adding the amounts of energy produced by each unit in megawatt-hours (MWH) multiplied by its operating cost ($/MWH). The major component of the operating cost for each unit is its cost of fuel. The amount of energy produced by each unit is a random variable because it is dependent on the uncertainty in the load and the utilization of the generating units due to the possibility of failures. The production cost is thus also a random variable. The steady-state expected production costs of the generation system are estimated in the model by using the load duration curve (LDC) in place of the chronological sequence of loads. The LDC is equivalent to the empirical survivor function obtained from the hourly load sequence over the time period of interest. *Advantages* • It assists in forecasting the expected amount of electricity produced by different power generation units; and • It assists in forecasting the expected cost of producing electricity. *Disadvantages* • Very complex • Specific to electric power industry • Requires the use of detailed systems
AASB 102 *Inventories*	IFRS requirements “9 Inventories shall be measured at the lower of cost and net realisable value.” *Costs of Purchase* “11 The costs of purchase of inventories comprise the purchase price, import duties and other taxes (other than those subsequently recoverable by the entity from the taxing authorities), and transport, handling and other costs directly attributable to the acquisition of finished goods, materials and services. Trade discounts, rebates and other similar items are deducted in determining the costs of purchase.” *Costs of Conversion* “12 The costs of conversion of inventories include costs directly related to the units of production, such as direct labour. They also include a systematic allocation of fixed and variable production overheads that are incurred in converting materials into finished goods. Fixed production overheads are those indirect costs of production that remain relatively Constant regardless of the volume of production, such as depreciation and maintenance of factory buildings and equipment, and the cost of factory management and administration. Variable production overheads are those indirect costs of production that vary directly, or nearly directly, with the volume of production, such as indirect materials and indirect labour.” “13 The allocation of fixed production overheads to the costs of conversion is based on the normal capacity of the production facilities. Normal capacity is the production expected to be achieved on average over a number of periods or seasons under normal circumstances, taking into account the loss of capacity resulting from planned maintenance. The actual level of production may be used if it approximates normal capacity. The amount of fixed overhead allocated to each unit of production is not increased as a consequence of low production or idle plant. Unallocated overheads are recognised as an expense in the period in which they are incurred. In periods of abnormally high production, the amount of fixed overhead allocated to each unit of production is decreased so that inventories are not measured above cost. Variable production overheads are allocated to each unit of production on the basis of the actual use of the production facilities.” “14 A production process may result in more than one product being produced simultaneously. This is the case, for example, when joint products are produced or when there is a main product and a by-product. When the costs of conversion of each product are not separately identifiable, they are allocated between the products on a rational and consistent basis. The allocation may be based, for example, on the relative sales value of each product either at the stage in the production process when the products become separately identifiable, or at the completion of production.

	Most by-products, by their nature, are immaterial. When this is the case, they are often measured at net realisable value and this value is deducted from the cost of the main product. As a result, the carrying amount of the main product is not materially different from its cost." *Other Costs* "15 Other costs are included in the cost of inventories only to the extent that they are incurred in bringing the inventories to their present location and condition. For example, it may be appropriate to include non-production overheads or the costs of designing products for specific customers in the cost of inventories." "16 Examples of costs excluded from the cost of inventories and recognised as expenses in the period in which they are incurred are: (a) abnormal amounts of wasted materials, labour or other production costs; (b) storage costs, unless those costs are necessary in the production process before a further production stage; (c) administrative overheads that do not contribute to bringing inventories to their present location and condition; and (d) selling costs."