Chapter 2
Management Accounting

Abstract This chapter focuses on management accounting. Section 2.1 outlines the various (changing) roles that management accounting captures. Section 2.2 on the one hand elaborates an understanding of management accounting information and on the other hand gives information on the different roles of management accounting information within organizations. Finally, Sect. 2.3 categorizes accounting systems, gives further information on the various types and the respective fields of application of accounting systems within organizations and locates costing systems within this categorization.

2.1 The Roles of Management Accounting

In its most simple form, management accounting can be defined as collecting and recording useful accounting and statistical data as well as reporting them to decision makers (Crossman 1958; Singer 1961; Feltham 1968; Bruns and McKinnon 1993; Horngren et al. 2005). Early studies place management accounting in a service function with the scope to provide all levels of management with high-quality scorekeeping, attention-directing and problem-solving information (Simon et al. 1954). Crossman (1958) argues that management accounting provides management with data in order to establish policies, develop plans and control operations. Furthermore, in his definition Crossman (1958) includes analysis and interpretation and representation of data in accordance with the recipient's needs. Additionally, there is a separate division within management accounting which captures cost accounting, cost analysis, cost control and cost reduction (Crossman 1958). Singer (1961) and Bruns and McKinnon (1993) point out that management accounting captures collecting (financial) information which is useful. Usefulness in this context refers to decision-making relevance. In his elaborations Feltham (1968) focuses on the aspect of supplying management with information. He argues that management accountants play a keyrole in deciding which information should be produced. Bruns and McKinnon (1993) additionally argue that providing management with information captures two aspects, i.e., (1) the communication of information and

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(2) the control of the systems and processes by which information reaches the recipients, i.e., the managers. Furthermore, Bruns and McKinnon (1993) point out that information does not necessarily have to be solely quantitative as considered in early definitions of management accounting (e.g. Singer 1961) and that management accounting also captures the consideration of the nature of managerial work and the psychological processes inherent in decision-making (Brignall 1997).

There is evidence that the traditional accounting functions remain popular but, at the same time, management accounting transforms into new roles (Burns and Vaivio 2001; Burns and Yazdifar 2001). The literature provides a set of more comprehensive roles which management accounting should be aspiring. According to Cooper and Dart (2009) these roles are to be modern and business-oriented (Granlund and Lukka 1998b), to be an internal business consultant (Burns and Vaivio 2001), to be a strategic management consultant (Holtzman 2004) or to be a hybrid accountant (Burns and Baldvinsdotti 2005).

Granlund and Lukka (1998b) investigate management accounting practices in Finnish organizations. They argue that management accounting evolves as a more business oriented function, i.e., in addition to principals of financial analysis, management accounting captures good knowledge of the business the firm operates in, fluent communication skills and knowledge of (change) project management.

Burns and Vaivio (2001) refer to Coad (1999) and argue that the modern management accountant's role has changed from controller to business supporter or internal business accountant. Specifically, they mean that the management accountant nowadays is involved in topics such as strategy, information system implementation and change management. In addition to the role of internal business consultant, Coad (1999) refers to Kaplan (1995), Evans and Ashworth (1996) and Cooper (1996a,b) and argues that management accountants nowadays need to be skilled in the design of cost management systems and be involved in business decision processes.

Holtzman (2004) analyzes the change (management) accounting firms have undergone during the twentieth century and claims that management accountants have transformed from an information processing entity to strategic business advisors. Holtzman (2004) argues that changes in the environment (e.g., advanced communication technology) have led accounting firms to provide new services to its customers which, in consequence, has led to a redefinition of the management accountants' role within organizations.

Burns and Baldvinsdotti (2005) analyze the emergence of team-oriented management accounting roles and argue that nowadays management accountants need to have hybrid skills. Specifically, Burns and Baldvinsdotti (2005) argue that apart from the traditional roles, management accounting is becoming wider involved in integrated business situations, agendas and decision-making forums.

Järvenpää (2001) elaborates characteristics of the "new" hybrid management accountant. Analytical skills, instrumental accounting competence and independency remain of equal importance, while communication skills, cooperation and interpersonal skills, wide business management skills and the ability to understand large entities gain importance.

Byrne and Pierce (2007) investigate new characteristics of management accounting and distinguish skills at the individual level and roles at the activity level. At the skill-level they argue that management accountants inter alia need to have business knowledge, communication skills, IT- and technical skills and monitoring skills. Additionally, management accountants are characterized by flexibility, organizational influence and personal qualities. For the activity level, Byrne and Pierce (2007) argue that the management accountant faces the challenge of providing information and supporting decision-making and planing. Additionally, management accounting is characterized by providing management with periodic performance reporting and ad-hoc analyses, instructing operational managers, supporting business administration and being involved in project management.

Kelly and Pratt (1992) argue that management accounting fulfills a multiplicity of purposes and analyze actions in which management accountants are involved. For a systematization of roles they refer to Burchell et al. (1980) who define the following eight roles: (1) a rational/instrumental role, (2) a symbolic role, (3) a ritualistic role, (4) a mythical role, (5) a political/bargaining role, (6) a legitimating/retrospective rationalizing role, (7) a disciplinary role and (8) a repressing/dominating/ideological role. For the (1) rational/instrumental role, Kelly and Pratt (1992) argue that managers suffer from bounded rationality (Simon 1957) and, according to Simon et al. (1954), management accounting is in charge of providing scorekeeping, problem-solving and attention-directing information in order to induce rational decision-making. For the (2) symbolic role, Kelly and Pratt (1992) refer to Feldman and March (1981) and argue that management accounting is in charge of signaling others (within and outside the organization) that decisions are made rationally and that decision-makers are accountable for their decisions. The (3) ritualistic role refers to management accounting being responsible for setting rules and fixing parameters for processes within organizations. Specifically, this role focuses on relationships between collaborators within an organization, rather than the original activity of the organization itself. These relations are regarded to be ritualistic and management is in charge of controlling these interactions, fixing rules and setting parameters for interaction (Gambling 1987; Kelly and Pratt 1992). In order to outline the (4) mythical role of management accounting, Kelly and Pratt (1992) refer to Meyer (1983) and argue that the mythical role of accounting refers to the purpose of reducing complexity of comprehensive situations, i.e., management accounting is in charge of providing some solution to bounded rationality. In addition, Kelly and Pratt (1992) differentiate between the (3) ritualistic role and the (4) mythical role. They argue that the (3) ritualistic role focuses on controlling the behavior of those who are involved in rituals, while the (4) mythical role serves decision-makers. For the (5) political/bargaining role of management accounting, Kelly and Pratt (1992) state that organizations are a composition of individuals with potentially divergent interests where political processes are a feature of organizational life. They refer to Burchell et al. (1980) and argue that it is within the scope of management accounting to design information and accounting systems in order provide information to manage these political processes. For the (6) legitimating/retroperspective role, Kelly and Pratt (1992) claim that managers face complex decision-problems.

Once decisions are made, the decision-makers expect feedback on decisions, i.e., information on rationality of decisions based on previously defined criteria, whereby management accounting is in charge of providing this information. The (7) disciplinary role of management accounting captures the control of behavior and social practices within organizations. Kelly and Pratt (1992) refer to Knights and Collinson (1987) and argue that the disciplinary role of management accounting aims at supporting management in controlling labour. In addition, Cooper et al. (1981) show that this role of management accounting does not solely capture behavior control but also the control of agendas and issues. Finally, for the (8) repressing/dominating/ideological role, Kelly and Pratt (1992) argue that managers are in charge of protecting the interests of the owners of the organization. This involves understanding the relationship between managers, shareholders, capital and labour. Kelly and Pratt (1992) note that the words repressing, dominating and ideological, which are mainly used in a societal perspective of management accounting, might give way to terms like control, management and objectives. In order to monitor performance with respect to the owners' interests, surveillance systems need to be installed which are under the management accounting's area of responsibility.

The elaborations outlined above on the (changing) roles of management accounting are reflected in the literature on empirical research on management accounting tasks. In their investigation, Burns and Yazdifar (2001) analyze the changes in management accounting between 1995 and 2000. Inter alia their investigation includes tasks that were vitally important for management accountants within this period. The top three tasks are business performance evaluation, cost/financial control and interpreting/presenting management accounts. This is (at least partly) consistent with both the earlier and the newer conceptualizations of management accounting. Representing and providing management accounts is contained in early elaborations on management accounting (cf. inter alia Crossman 1958; Singer 1961; Feltham 1968). The task listed in the first place, i.e. business performance evaluation, is also captured by the political and the repressing/dominating/ideological role as elaborated by Kelly and Pratt (1992), cost/financial control is also considered in elaborations on the roles of management accounting (cf. inter alia Crossman 1958; Granlund and Lukka 1998a). Burns and Yazdifar (2001) rank the implementation/design of new information systems seventh in their list of top management accounting tasks. In elaborations on management accounting tasks (as outlined above) this feature has a prominent position. Bruns and McKinnon (1993), Burns and Vaivio (2001), Coad (1999), Kaplan (1995), Evans and Sridhar (1996), Cooper (1996a,b), Byrne and Pierce (2007) and Kelly and Pratt (1992) explicitly list information systems' design as a typical management accounting task. In their analysis of management accounting tasks, Russell et al. (1999) list five work activities that have gained more attention in the previous years, i.e., internal consulting, long-term/strategic planning, computer systems and operations, management of the accounting function, process improvement and performing economic analysis. As in case of the investigation of Burns and Yazdifar (2001), findings presented by Russell et al. (1999) are also reflected in the conceptualizations

of management accounting outlined above. The internal consulting function is considered in the elaborations of Burns and Vaivio (2001), the long-term perspective is captured by the conceptualization of Holtzman (2004) and the management of the accounting function is covered by control of accounting processes (Bruns and McKinnon 1993), management skills and the ability to understand large entities (Järvenpää 2001) and the ritualistic role of management accounting (Kelly and Pratt 1992). As in the investigation of Burns and Yazdifar (2001), the study presented by Russell et al. (1999) suggests that management accounting systems play an important role in the context of management accounting tasks. In the investigation carried out by Cooper and Dart (2009) the top five activities associated with management accounting are the preparation and interpretation of management accounting information, the communication and presentation of financial information, leadership, development and implementation of management accounting systems and managing staff. Hence, similar to studies conducted by Burns and Yazdifar (2001) and Russell et al. (1999), tasks associated with collecting, generating and reporting information appear to be an important feature of management accounting.

2.2 Management Accounting Information

The elaborations on the roles of management accounting within organizations indicate that one major feature of management accounting is to provide decision makers with information (cf. Sect. 2.1). In this section various roles of management accounting information are described. First, Sect. 2.2.1 focuses on the distinction between management accounting data and management accounting information. In Sect. 2.2.2, the two roles of management accounting information, i.e., the decision-facilitating and the decision-influencing role, are outlined and differentiated from each other.

2.2.1 Management Accounting Data and Information

Liebenau and Backhouse (1990), Checkland and Holwell (1998) and McKinney and Yoos (2010) argue that there is no generally accepted definition of the terms data and information but there are clusters of ideas of what these terms might mean. According to Avison and Fitzgerald (1995), information has a meaning and stems from summarized data that is presented in a way that is useful to the information recipient, while data are described as unstructured facts. Laudon and Laudon (1991) refer to data as raw facts while they define information as data that has been shaped into a meaningful and useful form. Martin and Powell (1992) describe data as raw material of organizational life (i.e. numbers, words, symbols and syllables), while information is defined as processed data. Specifically, Martin and Powell

(1992) add that information is useful in managerial decision-making. From a more technical point of view, Ferstl and Sinz (2008) and Bauer and Goos (1991) argue that, in the context of information systems, data stands for a sequence of characters. This sequence of characters is interpreted according to a specific routine in order to generate information. Hansen and Neumann (2001) define data as the basis for information whereby information is also useful for the recipient. Hildebrand (1995) also reviews various definitions for the terms data and information and concludes that there is no perfect definition. Heinrich (1992) refers to information as knowledge about past, present and future states and events of the real world whereby knowledge is defined as information that is used in order to achieve objectives (cf. also Wittmann 1959).

Checkland and Holwell (1998) argue that the most common elements in definitions for the term data are raw facts and raw material. Definitions of information frequently contain the words shape, interpret, transform and process whereby all definitions of information describe data as the starting point in order to generate information. Eschenröder (1985) and Hildebrand (1995) additionally argue that in the economic context, information is associated with costs.

Buhaisi (2011) argues that accounting information assists managers in planning, evaluating and controlling operations. Several authors argue that accounting information should facilitate efforts in the controlling of costs, the improvement of productivity and the improvement of organizational processes (e.g. Johnson and Kaplan 1987; Demski 2008; Buhaisi 2011). Additionally, Buhaisi (2011) refers to Chadwick (1993) who outlines that accounting information captures all information which assists management in achieving objectives, formulating policies, monitoring and assessing performance, evaluating alternative scenarios, making plans, controlling operations, taking account of behavioral factors and a variety of other problems. Hansen and Mowen (1994) review which trends the outlined changes in the management accounting profession might be due to and conclude that (1) just-in-time manufacturing and emphasis on quality, (2) a higher diversity in product ranges and short product-life-cycles and (3) advances in information technology and computer integrated manufacturing are the main factors that drive the changes outlined above.

In accordance with the understanding of data and information outlined above, in this simulation study, agents interact with MAS and enter data into these systems. The MAS transforms data into information. Hence, MAS represent the transformation-procedure from data to information and MAS provide decision-makers with information which is useful for managerial decision-making. In the accounting literature, it is widely accepted that accounting information can serve two distinct roles (cf. Wall and Greiling 2011). In line with the distinction originally made by Demski and Feltham (1976) the roles of accounting information are typically divided into the (1) decision-facilitating and the (2) decision-influencing role. These two roles are outlined in Sect. 2.2.2.

2.2.2 The Decision-Facilitating and the Decision-Influencing Role of Accounting Information

According to Demski and Feltham (1976), *decision-facilitating information* is given to the decision-maker ex-ante to the decision. Hence, decision-facilitating information is a direct input into the decision-making process and is expected to help the decision-maker to make better decisions (Evans et al. 1994; Wall and Greiling 2011). According to Sprinkle (2003), the purpose of this type of information is to reduce the ex-ante uncertainty of the decision at hand (cf. also Demski and Feltham 1976; Tiessen and Waterhouse 1983), to revise the decision-makers beliefs (cf. also Baiman 1982) and assist in problem-solving (cf. also Simon et al. 1954; Emsley 2005). Sprinkle (2003) adds that the use of decision-facilitating information improves the decision-maker's knowledge and, hence, enhances their ability to make decisions that also meet the organizational objectives. This type of information plays a role in judgements and decisions that concern both the past (e.g., performance evaluation) and the future (e.g., planning). Sprinkle (2003) argues that performance evaluation in the context of decision-facilitating information is different from managerial performance evaluation. In particular, he argues that decision-facilitating information might also be used to asses prior choices and decisions with the aim of improving future performance.

Decision-influencing information, on the contrary, is provided ex-post to the selection and implementation of the decision. Decision-influencing accounting information is used to overcome organizational control problems due to selfish behavior (Jensen and Meckling 1976; Baiman 1982), i.e. it helps to ensure that decision-makers exhibit behavior that is oriented toward the organizational objectives (Sunder 1997; Indjejikian 1999; Sprinkle 2003). This type of accounting information is used to evaluate the decision-maker's choices ex-post to decision-making (cf. also Demski and Feltham 1976; Tiessen and Waterhouse 1983), to evaluate performance (cf. also Baiman 1982) and fulfill the scorekeeping function (cf. Simon et al. 1954), i.e. decision-influencing information also captures information used for compliance reporting (Emsley 2005). Hence, decision-influencing accounting information also supports the attention-directing function of information. The use of the decision-influencing information aims at affecting the decision-maker's behavior, i.e., via monitoring of behavior and measurement and evaluation of performance, which subsequently are rewarded or penalized, individual behavior is affected (Sprinkle 2003; Wall and Greiling 2011). The performance evaluation purpose of decision-facilitating information, on the contrary, aims at making better decisions in the future by evaluating performance of past decisions. Evans et al. (1994) argue that basing the decision-maker's compensation on decision-influencing information, i.e., information on the performance of the previously made and implemented decision, might more efficiently induce the manager to make decisions that are congruent with the owner's objectives.

2.3 Types of Management Accounting Systems

According to Horngren and Harrison (1992) and Weygandt et al. (1993), the scope of MAS is to produce (financial) reports which are used by managers in order to make decisions. MAS can be both, computerized systems and manual systems. Typically, each organization designs its system in order to achieve organizational objectives such as control and acceptable cost-benefit relationship.

The tasks which MAS serve appear to be a firm basis in order to categorize types of MAS systematically (Seicht 1990; Möws 1991; Ebert 2000; Horngren et al. 2005; Ewert and Wagenhofer 2008). Illetschko (1984), Seicht (1990) and Ebert (2000) distinguish between (1) financial accounting systems, (2) cost accounting systems, (3) budgeting systems and (4) systems that capture business statistics. At the same time, Illetschko (1984) adds that MAS might also be categorized on the basis of their purposes within an organization and lists three possible clusters of MAS-types, i.e. MAS for (1) control purposes, (2) planning purposes and (3) the provision of information. Horngren et al. (2005) provide a more detailed list of MAS-purposes. In particular, they list five purposes for which accounting systems potentially provide information, i.e., (1) the formulation of overall strategies and long-range plans, (2) resource allocation decisions, (3) cost planning and cost control, (4) performance measurement and evaluation of people and (5) meeting external regulatory and reporting requirements. At the same time, Horngren et al. (2005) add that all these purposes require a different representation or reporting mode. Horngren et al. (2005) distinguish between management accounting systems for decision making (i.e., cost accounting systems, capital budgeting systems), planning and budgetary control systems and management control systems. Furthermore, MAS can be differentiated on the basis of information recipients, i.e. internal and external accounting systems (Hummel and Männel 1986; Kilger 1992; Schneider 1997; Ebert 2000; Möller et al. 2005; Ewert and Wagenhofer 2008; Götze 2010). Based on the recipients of the provided information, Hansen and Mowen (1994) distinguish between financial and management accounting systems, whereby financial accounting systems capture information systems that primarily serve external information recipients and management accounting systems provide information for internal recipients. Additionally, Schneider (1997), Möws (1991) and Möller et al. (2005) distinguish between MAS on the basis of time-relation, i.e. MAS that are oriented towards the past (financial accounting, cost accounting, calculation for control purposes) and MAS that are oriented towards the future (financial planning, cost planning, calculation for planning purposes). Furthermore, Möws (1991) differentiates the determination of (financial) information and analysis. For the process of determination of information, Möws (1991) lists financial and cost accounting systems while analysis is captured by business statistic systems. Ewert and Wagenhofer (2008) also distinguish between internal and external accounting systems whereby financial accounting systems serve external accounting purposes and costing systems and capital budgeting and accounting systems are categorized as internal accounting systems. It might be assumed that business statistics are implicitly included in the other types of accounting systems.

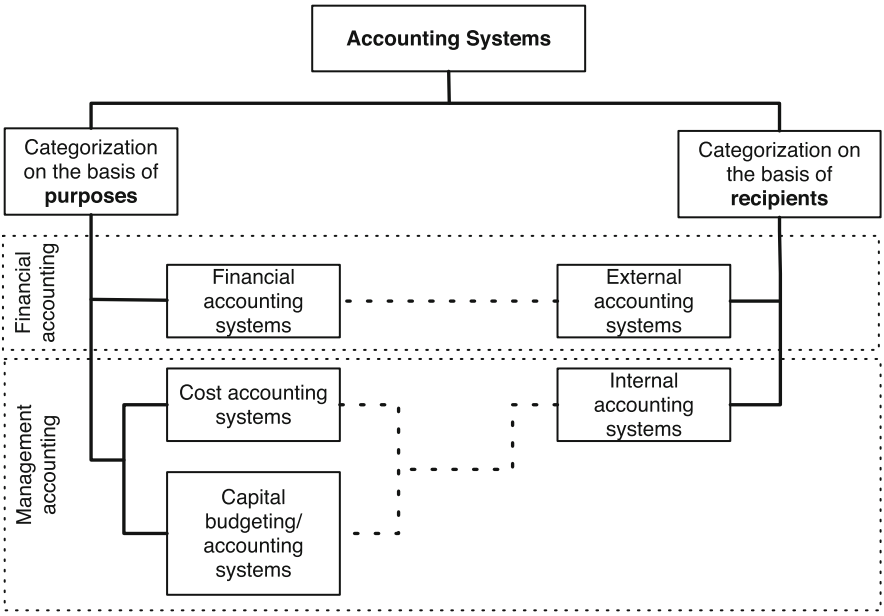

Fig. 2.1 Classification of accounting systems

Based on the approaches to classify MAS outlined above, the classification applied in this study distinguishes between MAS on the basis of information recipients and purposes of MAS. On the one hand, accounting systems are categorized as internal and external systems, respectively, where information systems for external purposes are financial accounting systems and information systems for internal purposes are MAS. On the other hand, this study distinguishes between financial accounting systems, cost accounting systems and capital budgeting and capital accounting systems (cf. also Fig. 2.1). This categorization follows Ewert and Wagenhofer (2008) and assumes business statistics to be implicitly included in the other types of MAS. In addition, planning systems, as considered in the categorization of Seicht (1990), are considered to be a function of all types of accounting systems, i.e., all types of accounting systems can be extended by ex-ante planning. This follows the argumentation of Illetschko (1984). Financial accounting systems are classified as external accounting systems while cost accounting systems and capital budgeting systems are subsumed under management accounting systems which primarily provide information for internal recipients. Hansen and Mowen (1994) add that both financial and management accounting systems are part of an entire accounting system whereby all information is often derived from the same set of data, which in many cases is data for external accounting purposes (with is often adapted for internal accounting purposes). Many organizations expand the existing data set in order to satisfy the needs of internal information recipients. For the characterization of the accounting system applied in this simulation study cf. Sect. 4.1.

2.3.1 Financial Accounting Systems

Financial accounting systems primarily produce information for external recipients. Morse et al. (1988), Seicht (1990) and Hansen and Mowen (1994) compare MAS to financial accounting systems and characterize financial accounting systems as (1) an externally focused system, (2) oriented towards externally imposed rules (determined by law and generally accepted accounting principles while the characterization of MAS is aligned to the specific needs of the organization), (3) oriented towards the past, (4) a system that evaluates and gives information on the organization as a whole, (5) a self-contained system and (6) a system that focuses on financial operations while MAS also focus on the organizational transformation processes. Morse et al. (1988) outline that financial accounting systems are information processing systems that primarily generate general-purpose reports for the respective organization. In particular, these are reports on financial operations, i.e., (1) income statement and (2) statement of cash-flows, and reports of financial position, i.e., (3) balance sheet. Additionally, financial accounting systems keep track of the organization's assets, obligations and the payment of debts (Morse et al. 1988; Wagenhofer and Ewert 2002). Wagenhofer and Ewert (2002) add that organizations that are listed on the stock exchange are required to provide interim reports. In addition, listed organizations often provide ad-hoc reports on effects that might affect the share prices.

The (1) income statement shows revenues and expenses during a specific period of time and any gains or losses within this time period. The (2) statement of cash-flows summarizes inflows and outflows of cash and the (3) balance-sheet reports the economic health of an organization at a specific point of time, i.e., it shows assets and claims on assets (Morse et al. 1988; Wagenhofer and Ewert 2002; Ewert and Wagenhofer 2008).

Although financial accounting gives a comprehensive overview, it has little value in day-to-day operations. Due to the fact that it is oriented towards the past, information is too aggregated and it is not action-oriented, managers often find little value in financial accounting information (Morse et al. 1988). Of course, for the originally intended information recipients of financial accounting systems, the provided information shows a certain usefulness in decision-making, e.g., provided information helps potential future shareholders to make better informed decisions about whether or not to purchase shares (Wagenhofer and Ewert 2002).

2.3.2 Management Accounting Systems

In contrast to financial accounting systems, MAS provide information for decision-makers within organizations and capture orientation towards the past and towards the future. In contrast to financial accounting systems, Morse et al. (1988), Seicht (1990) and Hansen and Mowen (1994) characterize MAS as (1) internally focused

with (2) no mandatory rules, (3) it focuses also on the future, (4) it allows for internal evaluation of segments (also under the aspect of behavioral controlling), (5) it provides detailed information and (6) MAS are typically broad and multidisciplinary systems.

MAS can be subdivided into cost accounting systems and capital planning and budgeting systems, respectively. Sections 2.3.2.1 and 2.3.2.2 differentiate between cost accounting systems and capital planning and budgeting systems.

2.3.2.1 Cost Accounting Systems

Cost accounting systems are primarily applied in the context of planning, evaluation and coordination of decisions within organizations whereby these decisions are typically short-dated (Ewert and Wagenhofer 2008). In contrast to financial accounting systems (which are primarily based on revenues and expenses), information provided by cost accounting systems is based on the consumption and production of goods and services within certain time periods (Seicht 1990; Ebert 2000; Ewert and Wagenhofer 2008).

Ebert (2000) characterizes cost accounting systems as the set of methods and systems that aim at determining, allocating and evaluating costs and performance (in terms of provided goods and services) that result out of operations in order to provide information for decision-influencing and decision-facilitating purposes. Möws (1991) gives a more detailed view on the purposes of cost accounting systems, i.e. (1) determining short-dated profit or loss, (2) determining valuations that are also used for financial accounting purposes, (3) evaluating economic efficiency and (5) providing information for decision-making. In his elaborations Möws (1991) does not consider the decision-influencing purpose of cost accounting information. For (1) determining short-dated profit or loss, Möws (1991) argues that the determination of profit or loss can typically be found in the area of responsibility of financial accounting. Due to the fact that decision-makers typically need this information for short-dated periods (and financial accounting normally performs this task annually), cost accounting is also in charge of providing this information for periods which are shorter than 1 year. In addition, cost accounting systems provide this information not only at the organizational level but also on the product, product-group of organizational-unit level. In some cases financial accounting and cost accounting are interrelated, i.e., (2) cost accounting determines valuations that are used for financial accounting purposes (Möws 1991; Wagenhofer and Ewert 2002). This for example captures the valuation of unfinished and finished goods at production costs. With respect to (3) the evaluation of economic efficiency, in contrast to financial accounting systems, cost accounting systems typically differentiate between operational and non-operational profit or loss and are based on the consumption and production of goods and services. Finally, Möws (1991) argues that cost accounting is in charge of providing information for decision-making whereby this purpose appears to be multi-facetted. Specifically, Möws (1991) lists that cost accounting information might be used for determining (1) prices for

both sales and intra company accounting for goods and services, (2) (short-dated) upper and lower limits for sales prices, (3) the economic order quantity, (4) the optimized production program, (5) the optimal replacement-time for assets. Thus, cost accounting information appears to be widely used in organizational decision-making. Additionally, Ebert (2000) and Ewert and Wagenhofer (2008) argue that cost accounting information might also be used for decision-influencing purposes (cf. also Sect. 2.2.2), i.e., to motivate individuals towards organizational objectives. In order to characterize costing systems, Götze (2010) refers to Hummel and Männel (1986) and argues that costing systems are (1) an element of internal accounting, (2) are based on imputed numbers, (3) have a short-dated perspective, (4) provide an income statement and (5) are provided regularly and voluntarily. In order to outline the purposes of costing systems, Götze (2010) additionally refers to Schweitzer and Küpper (2008) and summarizes the respective tasks as (1) mapping and documenting the whole organizational production process, (2) providing information for planning and control purposes, (3) providing information for behavioral management and (5) providing a valuation base for processed and finished goods as well as for assets. In his elaborations on costing systems' characteristics, Zimmerman (2011) is partially in line with the characterizations of costing systems outlined above. He argues that costing systems (1) provide information necessary to assess profitability of products or services, to set optimal prices and market the products or services, (2) provide information in order to detect information on inefficiencies and ensure minimal cost of production, (3) if combined with reward schemes, provide incentives for managers to behave in the organization's interest, (4) support financial and tax accounting functions and (5) contribute more to firm value than they cost. Hence, Zimmerman (2011) considers the decision-facilitating and the decision-influencing perspective, the interrelation of financial and cost accounting systems and additionally adds a cost-benefit perspective.

Horngren et al. (2005) distinguish between two basic types of costing systems, i.e., (1) job costing systems and (2) process costing systems. At the same time they add that organizations do not apply neither pure job costing systems nor pure process costing systems. Organizations rather combine elements of both types in order to build an organization-specific costing system. For (1) job costing systems, costs are assigned to distinct units or batches of products whereby the specific product is often custom-made. In case of (2) process costing systems, the costs of products or services are determined on the base of broad averages. Process costing systems are typically applied for mass-produced goods while job costing systems are applied for cases in which goods are produced for a specific customer.

Types of costing systems can also be divided into full costing systems and marginal costing systems. In addition, costing systems can be used for ex-post cost determination or ex-ante cost planning (cf. inter alia Seicht 1990; Ebert 2000). Marginal costing systems consider the cost structure, i.e., marginal costing systems differentiate fixed and variable cost components while full costing systems totally exclude the cost structure from consideration. In case of full costing systems, all costs, i.e., fixed and variable costs, are considered in cost allocation and are

allocated to products and services. In case of marginal costing systems, only the variable costs are considered in cost allocation. Fixed costs are directly transferred to the calculation of income (Möws 1991). These two typologies are extreme characterizations whereby mixed forms of costing systems are possible. Both types of costing systems can be extended by ex-ante planned costs. Consequently, if ex-ante planned costs are available, these costing systems allow for evaluation of deviations from planned costs. Ebert (2000) argues that the advantages of full costing systems lie in the simplifications and acceleration of cost allocation and information provision. In contrast to marginal costing systems, full costing systems do solely allow for a simple calculation of deviations from planned costs while marginal costing systems give the possibility of a more detailed evaluation.

Another categorization of costing systems which is widely applied in literature is the division into sophisticated (i.e., activity based costing) and non-sophisticated costing systems (i.e., product costing systems, other types than activity based costing systems) (e.g. Gosselin 1997; Clarke et al. 1999; Brown et al. 2004; Al-Omiri and Drury 2007; Brierley 2008). Not at least because of the categorization of product costing systems (i.e., other types than activity based costing systems) this categorization appears to be very narrow and simple (Al-Omiri and Drury 2007; Brierley 2008). Amongst others, Abernethy et al. (2001) and Al-Omiri and Drury (2007) have elaborated a more detailed differentiation of types of costing systems.

The basis for the level of sophistication as elaborated by Abernethy et al. (2001) is three-dimensional. They argue that there are two extreme characterizations, i.e., (1) lowly sophisticated costing systems that consider one organization wide cost pools that use cost drivers at the unit-level and apply responsibility based cost pools and (2) highly sophisticated costing systems that are characterized by many cost pools, hierarchical cost drivers and activity cost pools. As in case of the distinction by Horngren et al. (2005), these two types of costing systems are best viewed as ends of a continuum where many organizations might combine elements of both characterizations. Al-Omiri and Drury (2007) similarly distinguish between highly and lowly sophisticated costing systems. Specifically, they argue that lowly sophisticated systems are simple direct costing systems while highly sophisticated costing systems are activity based costing systems. They determine the level of sophistication on the base of the number of cost pools and cost drivers, the method of cost allocation in the first step (allocation to cost pools) and the allocation method in further steps of cost allocation (e.g. whether the allocation is based on transaction or duration drivers).

2.3.2.2 Capital Budgeting and Capital Accounting Systems

The purpose of this final cluster of internal accounting systems is twofold. On the one hand, capital budgeting systems support decision-makers in assessing potential investments with respect to cost effectiveness. On the other hand, capital accounting systems support decision-makers in controlling and planning liquidity (Ewert and Wagenhofer 2008).

Capital budgeting systems support management in making decisions in the context of capital investment decisions. In particular, capital budgeting systems help to determine whether or not a capital investment will earn back the original outlay and in addition provide a reasonable return. This type of decisions usually involves large amounts of organizational resources at risk and, at the same time, affects the future development of the organization (Morse et al. 1988; Zimmerman 2011). Horngren et al. (2002, 2005) additionally state that capital budgeting systems usually focus on capital investment decisions that span many years. This differentiates capital budgeting systems from income determination and planning which usually focus on the current period. Capital investment decisions usually involve cash inflows and outflows that accrue at different points in time which are usually answered by adding accrued interest of discounting of cash-flows (Möller et al. 2005). For the process of capital budgeting, Clive et al. (1990) refer to King (1975) and argue that the capital budgeting process consists of six steps, i.e. (1) project generation, (2) estimation of cash-flows, (3) progress through the organization, (4) analysis and selection of projects, (5) authorization of expenditures and (6) post-audit investigations. In the step of (1) project generation, potential investments are selected for which in step (2) potential cash-flows are estimated. In step (3), i.e., progress through the organization, Clive et al. (1990) argue that certain projects require approval of top-management (cf. also Scapens et al. 1982). In step (4), i.e., analysis and selection of projects, the selected projects are evaluated with respect to the fact that cash inflows and outflows usually realize at different points in time. Step (5), authorization of expenditures, captures the final decision (usually made by top management) on whether or not to invest into the selected project. Finally, step (6) captures a post-audit investigation, i.e., after a certain period of time actual results might be gained which potentially provide input for control purposes. Capital budgeting systems particularly support management in step (4), i.e., the analysis and selection of projects.

Capital accounting systems support management in planning and controlling liquidity. In the context of capital accounting systems another interrelation of external and internal accounting envisions, i.e., capital budgeting systems are also used for external accounting purposes (Ewert and Wagenhofer 2008). In particular, the cashflow-statements are similar to capital budgeting systems (cf. also Sect. 2.3.1). In addition, capital budgeting systems consider the planning of cash inflows and outflows, give a detailed plan that outline all sources and uses of cash and, furthermore, are applied for control purposes. The cash budget is affected by planned operations and is heavily integrated into the corporate planning process (Morse et al. 1988; Horngren et al. 2002). The capital accounting system provides a cash budget which predicts the cash positions at a given level of operations and helps to control cash-flows with respect to cash idles and unnecessary cash deficiencies (Horngren et al. 2005).

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