

Improvement of Budgeting and the Success of Management Accounting: An Empirical Study

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Abstract

Traditional budgeting approaches may be inadequate for dynamic and complex business environments, which require high budgeting flexibility and adaptability. Empirical research on the different elements of improved approaches to budgeting and their effects on management accounting success is scarce. This study identifies shared elements of improved budgeting in the literature and tests whether and to what extent they contribute to management accounting success. A research model is tested by applying partial least squares-structural equation modelling to data collected from a cross-industry survey of 189 companies. The results show that simplicity, flexibility, and integration are elements of improved budgeting that promote management accounting success. Additionally, the extent of digital transformation mediates the positive effect of flexibility on budgeting.

Keywords: Better Budgeting; Beyond Budgeting; Digital Transformation; Management Accounting; Modern Budgeting; Traditional Budgeting

1. Introduction

Companies use budgeting, a component of management control systems (MCSs), for a variety of purposes in management accounting, among which control of costs is paramount for maximum financial

performance (De Waal, Hermkens-Janssen & Van de Ven, 2011). Becker (2014) justified the use of budgeting "...as an intra-organisational routine [...] and an institution in a social context" (p. 594). However, traditional budgeting approaches have been criticised for failing to consider corporate strategy, lacking sufficient mechanisms for updating and adjustment, obstructing interdepartmental knowledge exchange, and inflexibility (Hansen, Otley & Van der Stede, 2003; Liyanage & Gooneratne, 2021; Neely, Bourne & Adams, 2003).

Despite calls to replace existing budgeting approaches, an adequate budgeting solution that addresses all the above criticisms has not been found (Østergren & Stensaker, 2011). For example, the concepts of Beyond Budgeting and Better Budgeting have been suggested (Grady, Akroyd & Scott, 2017; Hansen et al., 2003; Hope & Fraser, 2003; Neely et al., 2003; Nguyen, Weigel & Hiebl, 2018; Yakhou & Sulzen, 2010), but evidence for the application of these approaches in practice is scarce (Liyanage & Gooneratne, 2021; Popesko et al., 2015). Modern Budgeting, another concept that was developed in German-speaking countries (Becker, Messner & Schäffer, 2020) and has diffused to practice (ICV, 2012), has also received little research attention. These improved budgeting approaches share several elements that may contribute to management accounting success: flexibility, integration, simplicity, and participation (Grady et al., 2017; Hansen, 2011; ICV, 2012; Sandalgaard & Bukh, 2014). However, empirical research on the potential positive effects of these elements is needed to help companies design budgeting systems. Therefore, the first aim of this paper is to empirically study the effects of the shared elements of improved budgeting on management accounting success.

Dynamic business environments are driven by information technologies, which can simplify business processes and improve the precision of process execution (Bredmar, 2017; Rikhardsson & Yigitbasioglu, 2018). These technologies vastly increase not only the amount but also the quality of information (Bergmann et al., 2020; Bhimani & Willcocks, 2014; Perkhofer, Walchshofer & Hofer, 2020). Since budgeting is a strongly information-based process, it can be assumed that improved budgeting practices require advanced information technologies and will consequently be favoured by digital transformation. Accordingly, the second aim of this study is to consider the role of digital transformation in the potential positive effects of the shared elements of improved budgeting approaches on management accounting success.

The remainder of this article is structured as follows. In section two, we develop the conceptual foundations by reviewing the characteristics of improved approaches to budgeting and contrasting them with traditional approaches. Furthermore, we discuss the concepts of management accounting success and digital transformation. In section three, the hypotheses are derived. Section four describes the collection of data from German companies of varying industries and sizes using an online questionnaire and data analysis using structural equation modelling (SEM) (Hair, Howard & Nitzl, 2020; Ringle, Wende & Becker, 2015). Section five presents the results, and section 6 ends the paper with a discussion of theoretical and practical implications, limitations and future research directions.

2. Conceptual Background

2.1 Improved versus Traditional Budgeting

Budgeting is part of operational planning and is based on factual and formal targets. Budgeting is oriented towards the long-term strategy of a company and maps this strategy onto financial sub-plans with a short time horizon of only one year. Operational planning thus ensures that strategic planning can be realised (Horngren et al., 2014). Operational planning typically follows a routine procedure with little deviation. The preparation of functional and formal target plans, also known as budgets, is based exclusively on past values (Bhimani et al., 2019). The budgeting process also includes budget adoption, monitoring, and deviation analysis (Horváth, Gleich & Seiter, 2020). This process enables companies to define measures and recommendations for action and to decide on changes (Merchant & Van der Stede, 2012).

The main criticisms of traditional budgeting are its lack of flexibility and responsiveness to changing environmental conditions. Traditional budgeting can also restrict creativity and competitiveness and encourage misconduct through, for example, games (Hope & Fraser, 1997; Neely et al., 2003). Among approaches to improve the budgeting process, the two most established in the literature are Beyond Budgeting and Better Budgeting (Liyanage & Gooneratne, 2021).

Beyond Budgeting was introduced in the late 1990s and waives budgeting completely. Instead, it establishes twelve principles for managing the business: six leadership principles and six management

process principles. These principles use alternative concepts to optimise forecasting, coordination, and motivation. Decision-making is decentralised, and targets are adjusted to the competition (Hope & Fraser, 1997, 2003). The six leadership principles are used to assign responsibilities within the company and ensure accountability for achieving the company's goals. The six management process principles complement the leadership principles by providing recommendations for greater flexibility and adaptability of control processes. For example, the planning process should be kept as lean as possible, and forecasts should be reviewed at short intervals (Becker et al., 2020; Grady et al., 2017). Incorporating external sources and integrating benchmarks into the creation of budget targets strengthens plausibility and avoids arbitrary target setting by managers (Hansen et al., 2003). Under Beyond Budgeting, companies can improve responsiveness and scope of action to ensure long-term competitiveness (Sandalgaard & Bukh, 2014).

In contrast to Beyond Budgeting, Better Budgeting adheres to budgeting. However, the budgeting process is less detailed than in traditional methods and can be adapted to the market orientation of the company. Increased analytical re-planning and the use of rolling forecasts are intended to improve forecasting accuracy and strategy integration (Horváth et al., 2020; Yakhou & Sulzen, 2010). Better Budgeting is not a single concept but consists of five different approaches that contribute to optimised budgeting in different ways (Neely et al., 2003): activity-based budgeting (ABB), which is the best-known approach; zero base budgeting; value-based budgeting; profit planning; and rolling budgets and forecasts. The rolling budgets and forecasts approach posits that regularly reviewing and adjusting budgets increases the accuracy of forecasts and adaptability to changing conditions (Hansen et al., 2003; Neely et al., 2003). However, the different approaches mostly improve individual aspects of budgeting and adhere to an inflexible annual horizon (Player, 2003).

Both Beyond Budgeting and Better Budgeting are academic concepts that have rarely been applied in practice (Libby & Lindsay, 2010). Neither approach fully addresses the criticisms of traditional budgeting, but each provides some important improvements. Better Budgeting identifies different steps that companies can adopt based on their individual needs. ABB focuses on improved planning in an uncertain and dynamic business environment. Rolling budgets and forecasts enable faster action and flexibility of established budgets. Beyond Budgeting can significantly improve performance evaluation by fostering radical decentralization

(Hansen et al., 2003). Libby & Lindsay (2010) found that companies that wanted to improve budgeting focused primarily on rolling forecasts and budgets, collecting more information from managers, linking strategic planning and budgeting, and reducing the level of detail in budget preparation. None completely abandoned budgeting as a control process, and all felt that budgets add value to organisation despite their expense. Hansen (2011) also found that rolling budgets lead to more information, which in turn can help improve the company's overall performance. Since Better Budgeting also advises the adoption of rolling budgets and forecasts (Yakhou & Sulzen, 2010), this methodology clearly provides more budgeting flexibility than Beyond Budgeting.

In response to the rather complete abolition of budgeting advocated by Beyond Budgeting, the International Association of Controllars (ICV) developed Modern Budgeting, which has mostly been propagated in German-speaking countries (Becker et al., 2020). Unlike Beyond and Better Budgeting, Modern Budgeting has been implemented almost exclusively in practice, with little analysis in the scientific literature. The goal of Modern Budgeting is to take budgeting back to the core of formal target planning. 'Budgets should be able to be consistently, simply, and moreover, adaptively defined using an integrated concept linked to the strategy, targets and management system of a company' (ICV, 2012, p.19). Recommendations and foundations transform budgets into a central management tool, and rolling forecasts are complemented by sensitivity and scenario analyses. Furthermore, budgeting is structured in a participatory and addressee-oriented way to increase the participation of those responsible for the budget and the transparency and acceptance of the budgeting process (Frey, 2012). Table 1 summarises the main characteristics of the different approaches to budgeting.

Table 1. Comparison of Budgeting Approaches (Adopted from Horváth et al., 2020)

	<i>Traditional Budgeting</i>	<i>Modern Budgeting</i>	<i>Better Budgeting</i>	<i>Beyond Budgeting</i>
Goal	Transformation of the created plans into values	Targeted control to achieve corporate goals	Optimization of individual areas of planning	Change the entire management system
Intention	Support of horizontal and vertical interaction of different organizational goals	Retention of budgeting	Retention of budgeting	Abolition of budgets as fixed performance contracts
Result	Forecasting of budget-relevant factors; control and reporting of budget realization	Optimization of all weak points of traditional budgeting; enormous increase in efficiency and effectiveness	Improvement of selective weak points of planning; efficiency increase/cost reduction	Better corporate management through a return to employee-oriented management concepts
Motivation	Budget targets as incentives for employees to achieve corporate goals	Back to the core of planning	Stronger focus on market-oriented target setting	Self-adjusting target relative to internal/external comparison objects
Planning	Deviation of budget targets from corporate goals; focus on internal corporate parameters	Linking of planning with strategy, goals and management system; simple and environment-flexible design of budgets	Simplification and concentration on processes critical to success; increased consideration of strategic content in operational planning	Rolling planning focusing on monetary and non-monetary core variables; integrated operational and strategic planning; decentralization of planning

Despite widespread criticism, many companies continue to use budgeting (Libby & Lindsay, 2010). None of the alternatives described here provides a fully comprehensive solution, but each has unique advantages (Bourmistrov & Kaarbøe, 2013; Nguyen et al., 2018). A combination of the key principles and approaches of Beyond Budgeting, Better Budgeting, and Modern Budgeting might enable satisfactory optimisation of the budgeting process by improving flexibility, simplicity, participation, and integration (Grady et al., 2017; Hansen, 2011; ICV, 2012; Sandalgaard & Bukh, 2014).

2.2 Management Accounting Success

Budgeting is part of management accounting and contributes to its success (Hofmann et al., 2012; Horváth et al., 2020). However, management accounting success has not been clearly defined, and different indicators are used for different levels of success. A convenient approach is to measure the user's satisfaction with different tools and concepts, such as activity-based costing (Cinquini & Mitchell, 2005; Shields, 1995) or to measure the perceived achievement of the goals associated with the use of a tool (Knauer & Möslang, 2018).

In line with this reasoning, we consider management accounting success as a perceived state that includes the quality of information generated by management accounting and the method by which the information is generated. Accordingly, we differentiate between two success dimensions: effectiveness and efficiency. The effectiveness of management accounting measures whether the goals are being achieved (Tung, Baird & Schoch, 2011) and efficiency measures the relationship between benefits and costs. For instance, generating high-quality information can be very costly (less efficient) but can provide management with a better basis (more effective) for decision-making (Cinquini & Mitchell, 2005).

2.3 Digital Transformation

The literature often considers fundamental digital transformation a form of change that is synonymous with the incremental improvement of processes and structures through new technologies. The wide variety of definitions of terms can also create confusion. 'Digitisation' is the conversion of analogue information and processes into digital versions, such as the scanning of paper documents (Legner et al., 2017).

‘Digitalisation’ is the improvement of business processes or business models based on digital technologies. This paper adopts Hanna (2016, p. 27) definition of digital transformation: ‘deep structural changes in the economy and society brought about by harnessing the full potential of the ICT revolution [...] with the aim of building a smart economy and society.’ Digital transformation can also be described as the metamorphosis of a company into an organisation that can create and provide digital value propositions concurrently with the use of digital technologies in business processes (Legner et al., 2017; Vial, 2019).

Digital technologies are integrated information systems that exchange data. Mathematical and statistical functions allow the integrated systems to generate paths and classify data into specific groups, which can be used to make predictions that are more precise than those made by traditional information systems (Andreassen, 2020; Rossmann & Wald, 2024). The advent of big data is allowing companies to constantly acquire an increasing variety of repeatedly updated data at high speed. These data are incorporated into the calculation of mathematical and statistical functions (Gandomi & Haider, 2015). Digital technologies that are capable of statistical learning, such as machine learning, can steadily increase computational power, ultimately leading to the improved detection of relationships and correlations in data (Andreassen, 2020).

3. Hypothesis Development

3.1 Improved Budgeting & Management Accounting Success

3.1.1 Simplicity

According to De Waal et al. (2011), up to 30 percent of available management time is spent on budgeting due to, among other reasons, an excessively high level of detail or unnecessarily frequent reviews of the budgeting process. Complexity can arise from an excessive level of detail, which makes budgeting time-consuming and requires more coordination. Increased planning loops must also be gone through if too many different levels of management are involved in creating the budget (De Waal et al., 2011; Libby & Lindsay, 2010).

Adequate planning, reconciliation and coordination efforts can significantly reduce this time expenditure (Libby & Lindsay, 2010). Some studies have also called for keeping the process as lean as possible

(Østergren & Stensaker, 2011), such as by aligning the individual steps of the process (Bourmistrov & Kaarbøe, 2013; Sivabalan et al., 2009). A simplified budgeting process reduces complexity and uses only benefit-generating tools that are necessary to perform the task of budget formulation (Frey, 2012); non-beneficial budgeting tools are eliminated. The formulation of action plans allows companies to review different options and establish the scope of action (Sivabalan et al., 2009). Therefore, the following hypothesis is suggested:

Hypothesis 1: Simplicity of budgeting process is positively associated with management accounting success.

3.1.2 Flexibility

Ekholm and Wallin (2011) found a negative relationship between environmental uncertainty and the perceived usefulness of fixed annual budgets. By contrast, the relationship between environmental uncertainty and the perceived usefulness of flexible budgets was positive. Flexibility enables management accounting to react more quickly to opportunities and risks. External causes of budget variances are often blamed for a company's failure or failure to meet its goals (Merchant & Van der Stede, 2012). Flexible budgeting enables strategic uncertainty to be diagnosed. The budget is compared to the actual results and subjected to various scenarios that reflect, for example, different market demands or raw material prices (Oyadomari et al., 2018; Radu and Giju, 2015). This approach reveals whether internal or external factors are causing variances and permits more accurate management decisions.

Scenarios are a suitable tool for incorporating fluctuations into a plan. The creation of scenarios can illustrate various possible developments in the future by recording ‘interactions between internal and external performance drivers’ (Palermo, 2018, p. 3) and enable the adaptation of strategy to future conditions even before budgets are prepared (Becker et al., 2016; Bourmistrov & Kaarbøe, 2013; Palermo, 2018; Sponem & Lambert, 2015). By evaluating scenarios, managers can make decisions and adjustments more quickly (Oyadomari et al., 2018). Moreover, this interactive use of budgets provides an improved information base that will ultimately increase the financial strength of the company (Sitepu, Appuhami & Su, 2020).

Another budgeting task is to identify projects that may fail. Cancelling or restructuring such projects prevents excessive investment, which will weaken company performance (Dunk, 2011). More frequent budget revision increases the likelihood of detection of potential bad investments (Hansen & Van der Stede, 2004). Sivabalan et al. (2009) found that rolling forecasts not only drive and improve organisational learning but also effectively support the preparation of annual budgets. Thus, it can be concluded that rolling forecasts optimise budgeting performance (Hansen & Van der Stede, 2004).

For these reasons, the following hypothesis is formulated:

Hypothesis 2: Flexibility of budgeting process is positively associated with management accounting success.

3.1.3 Integration

In integrated planning, budgets reflect corporate strategy so that long-term strategic goals can be achieved (Skærbæk and Tryggestad, 2010). Integrated planning ensures that departments collaborate successfully, and that budgeting is aligned with long-term planning. This avoids an excessively short-term focus and barriers to cooperation between different divisions (De Waal et al., 2011).

Equally important is the integration of IT with minimal interfaces, which increases the quality of data and provides a uniform basis for decision-making (Chapman & Kihn, 2009; Nelson, Todd & Wixom, 2005). Integration also includes linking budgets to strategy and formulating strategy through budgets (Skærbæk & Tryggestad, 2010).

Incentive systems can be used to reward the individual success of budget managers and assess budget control performance (Frey, 2012; Govindarajan, 1984). Only an efficient and effective process can enhance the success of a particular organisational unit (Hansen & Van der Stede, 2004).

This discussion gives rise to the following hypothesis:

Hypothesis 3: Integrated budgeting is positively related to management accounting success.

3.1.4 Participation

Budget creation requires the involvement of different stakeholders (Hansen & Van der Stede, 2004). An essential part of the process is motivating those responsible for ensuring that the budget achieves its goals (Ihantola, 2010). Adequate participation can improve the quality of the budgeting process and clarify reporting for specific addressees (ICV, 2012). Hansen and Van der Stede (2004) argued that not every budget use requires the same level of participation. Frey (2012) also concluded that only those people for whom participation is meaningful should be involved in the process. Targeted participation should promote employees' understanding of the corporate or business unit strategy and increase transparency and acceptance. Frey also highlighted addressee participation by arguing that information regarding budgeting should be prepared and presented in a way that meets the needs of the recipient. For these reasons, the following hypothesis is formulated:

Hypothesis 4: Meaningful participation and addressee-oriented preparation of budget information is positively related to management accounting success.

3.2 Digital Transformation and Budgeting

Simplicity, flexibility, integration, and participation/addressee orientation in improved budgeting require digital transformation, including the use of integrated information systems, big data, and machine learning. Therefore, the introduction of improved budgeting should trigger digital transformation processes. Digital transformation sharply increases data volume (Bhimani & Willcocks, 2014; Coyne, Coyne & Walker, 2018). Suitable systems can transform these data into information for decision-making (Wamba et al., 2017; Warren, Moffitt & Byrnes, 2015). Information is important for budgeting but must be high quality for inclusion in the decision-making process (Kornacker et al., 2011).

Digital transformation can also improve management accounting by allowing processes to be executed more efficiently and effectively. Therefore, we hypothesise that digital transformation acts as a mediator between the four elements of improved budgeting and management accounting success. These mediation effects are supposed to be complementary, i.e., exist at the same time and in the same direction as the direct effects (Zhao, Lynch & Chen, 2010).

Improved information bases supported by predictive or prescriptive analytics provide management accounting with hints on how to reduce costs or save time (Appelbaum et al., 2017). Such guidance minimises reconciliation rounds and, accordingly, the time spent on budgeting. Consequently, by generating higher-quality information, digital transformation should simplify and accelerate the budgeting process and foster management accounting success.

Hypothesis 5: Digital transformation mediates the relationship between simplicity and management accounting success.

The dynamics and complexity of organisational environments are increasing (Bourmistrov & Kaarbøe, 2013). Flexible budgeting enables a more agile response to strategic uncertainty. Improving forecasts and reducing barriers in the execution of scenario analyses are essential for mapping dynamics (Bergmann et al., 2020). Forecasting technologies and data analysis programs transform the data mountains available through big data into high-quality information (Möller, Schäffer & Verbeeten, 2020). Companies operating in competitive markets characterised by high uncertainty perform better when they have high forecasting accuracy (Becker et al., 2016; Palermo, 2018). Digital technologies can allow scenarios to be run quickly, thus adding significant value to short-term and long-term planning.

Hypothesis 6: Digital transformation mediates the relationship between flexibility and management accounting success.

Integrated planning ensures that budgets reflect corporate strategy to achieve long-term strategic goals (De Waal et al., 2011; Skærbæk and Tryggestad, 2010). Improving the integration of the budgeting process through the use of digital tools such as digital platforms can trigger an increase in digital transformation (Corsi et al., 2017). Kornacker et al. (2011) found that IT systems can provide the increase in quality required for integration and promote the use of more meaningful instruments in budgeting. Furthermore, ‘computers usually outperform humans in the execution of repetitive mathematical tasks’ (Bergmann et al., 2020, p. 32) and new digital technologies can also be used to automate other repetitive processes. As a result of automation, processes and systems become interconnected and can communicate with each other (Kokina & Blanchette, 2019). This allows management accounting to more easily

transform business strategy into action plans and integrate strategic and operational aspects of planning (Bredmar, 2017).

Hypothesis 7: Digital transformation mediates the relationship between integration and management accounting success.

Finally, digital information systems are needed to pool knowledge and make it available to those in charge (Bredmar, 2017). Increasing information availability improves reporting on specific financial and non-financial topics and facilitates decision-making (Mancini et al., 2017).

Hypothesis 8: Digital transformation mediates the relationships of participation and addressee orientation and management accounting success.

4. Research Methodology

4.1 Data & Sample

To test the hypotheses, data were collected from management accountants with budgeting experience in German companies in all economic sectors using an online questionnaire. The questionnaire included questions on progress in digital transformation, management accounting success, the budgeting process, and the shared elements of improved budgeting derived from the literature.

Sample selection was an important challenge. All individuals involved in budgeting in an organisation were eligible to participate in the study. However, the population was unknown because there is no database of budgeting experts. Consequently, selecting and accessing appropriate contacts were problematic, and a random sample could not be drawn from a defined population. As an alternative, various channels were used to reach budgeting experts, including management accounting groups on social networks such as Xing and LinkedIn and advertising in the ICV newsletter. It can therefore be assumed that all respondents had a direct connection to budgeting in their organisation. Additionally, a market research institute was commissioned to obtain data. Again, only randomly selected budgeting experts participated in the survey. To avoid nested data, the survey was not administered to multiple employees of the same company.

After cleaning the data sets, the sample totalled 189 participants. The data were tested for non-response bias and bias with respect to the different sources used. For this purpose, the respective groups were subjected to permutation in SmartPLS (Matthews, 2017). No significant differences were found. Additionally, two different remedies were used to control for common method bias (Podsakoff, MacKenzie & Podsakoff, 2012). Procedurally, proximal and psychological separation of the independent and dependent variables were performed to reduce similar response patterns among the respondents (Podsakoff et al., 2003). Statistically, Harman's single-factor test was conducted. The result was 46.76 percent, which is below the threshold of 50 percent. Accordingly, the presence of a factor that would explain most of the variance and bias in the interpretation and analysis of the results was ruled out (Podsakoff et al., 2003).

Of the participants, 39% were department heads, and 38% were area managers. The remaining participants were either employees of the finance or management accounting department or managing directors. In terms of tenure, 56% of the participants had one to five years of experience in digital transformation, and 29% had six to ten years of experience. Among the companies, 60% had 500 or fewer employees, and 38% had more than 500 employees. In addition, 53% of the companies operated in the manufacturing sector, 13% in the construction industry, and 34% in other sectors (see Table 2).

Table 2. Sample Composition

Position of respondents	Department heads	Area managers	Employees / managing directors of finance / management accounting
	39%	38%	23%
Experience in digital transformation	<1 year	1-5 years	6-10 years
	15%	56%	29%
Company size	< 500 employees	> 500 employess	n.s.
	60%	38%	2%
Industry	Manufacturing	Construction	Other
	53%	13%	34%

4.2 Measurement

When available, validated scales were used (see Table 3). All constructs and items were measured on a seven-point Likert-scale ranging

from 1 ‘strongly disagree’ to 7 ‘strongly agree’. The management accounting success scale encompassed the ability of management accounting to present information in a comprehensive and realistic way that is easy to understand and to make the methods and techniques used to achieve this comprehensible. Bauer (2002) four-item scale was used. To measure simplicity, flexibility, integration, and participation and addressee orientation in budgeting, the scales of Frey (2012) were used and adapted to additional requirements in the literature specified in section 2. Since there are no validated scales for the relationship between budgeting and digital transformation, four items were developed. The study participants were asked if their budgeting was digitalised, whether digital technologies were heavily used in budgeting, if digital technologies made budgeting simpler, and whether budgeting was strongly influenced by digital transformation. The control variables included industry sector, number of employees, and sales revenue (Bruns & Waterhouse, 1975; Chenhall, 2003; Merchant, 1981).

4.3 Analysis

Structural equation modelling (SEM) was chosen to test the hypotheses and investigate latent constructs. SEM allows the parallel modelling of relationships between numerous independent and dependent constructs (Baines & Langfield-smith, 2003). Partial least squares (PLS) regression is particularly suited to the present analysis because of the relatively small sample (Chin, 2010). PLS allows modelling without the limitations of covariance-based SEM, and a normal distribution of the data is not mandatory (Hair et al., 2012; Nitzl, 2016). The model was tested with SmartPLS 3.0 software (Hair et al., 2017; Ringle et al., 2015) using the path-weighting scheme and nonparametric bootstrapping (5,000 replications), which should reveal standard errors (Tenenhaus et al., 2005) and demonstrate the statistical significance of each path coefficient (Chapman & Kihn, 2009; Fayard et al., 2012; Lee et al., 2011). All constructs were tested for construct validity and reliability and found to be appropriate.

5. Results

5.1 Measurement Model Results

The hypotheses were tested by confirmatory composite analysis according to Hair et al. (2020). All constructs were first-order and exhibited reflective character. A PLS algorithm was used to determine the item loadings and their statistical significance (Hair, Ringle & Sarstedt, 2011). All but three of the items had loadings greater than 0.7 (Chin, 2010); the three exceptions had loadings of 0.682, 0.677, and 0.688 (see Table 3). As these items were important for the constructs of simplicity, flexibility and integration and demonstrated high statistical significance ($p < 0.001$), the constructs were not adjusted for these three items. In addition, t values were determined using bootstrapping. All values were well above the benchmark criterion of 1.96 (Hair et al., 2011), supporting the reliability of the indicators for all first-order constructs. Next, the composite reliability (CR) of the constructs was tested. The constructs of improved budgeting, management accounting success, and digital transformation in budgeting were all above the recommended value of 0.7 and did not exceed the value of 0.95. Accordingly, all constructs were internally consistent. Third, convergence validity was determined using estimates of the average variance extracted (AVE).

The average AVE was approximately 65.4% for the construct of improved budgeting, 71% for the construct of management accounting success, and 77.3% for the construct of digital transformation in budgeting; all are above the recommended value of 50% (Chin, 1998). The final step in the evaluation of the formative measurement model was assessing discriminant validity using the Fornell-Larcker criterion, which is met when the square root of a construct is higher than the correlations of that construct with other latent constructs (Fornell & Larcker, 1981; Hulland, 1999). The evidence of empirical independence is presented in the appendix.

Table 3. Measurement Model

Construct	Item	Loadings	t-value
Simplicity AVE = 0.648 CR = 0.901 $\alpha = 0.870$	Our organizations' budgeting is characterized by lean processes.	0.782	18.705
	Our budgeting process is limited to the essential content relevant to management.	0.835	22.134
	Our budgeting only uses beneficial instruments.	0.848	39.360
	The input variables for our budgeting are limited to the most necessary.	0.682	11.709
	The level of detail in our budgeting is appropriate.	0.865	43.244
Flexibility AVE = 0.684 CR = 0.915 $\alpha = 0.883$	The willingness for changes and sensitivities is high in our organizations' budgeting process.	0.833	28.203
	Running scenarios in our budgeting process is easy.	0.905	65.730
	Our resources are redeployed in a flexible and controlled manner.	0.874	40.373
	Our budgeting is characterized by rolling forecasts.	0.677	11.953
	The degrees of freedom/ scope in our budgeting are large.	0.828	31.674
Integration AVE = 0.618 CR = 0.919 $\alpha = 0.896$	Our reporting, strategy, planning and forecasting processes are intertwined.	0.767	20.408
	Short- and long-term goals are integrated into our budgeting.	0.848	39.037
	Strategic, medium-term and operational planning are integrated in our budgeting.	0.834	34.186
	Our budgeting process is characterized by concrete but little mutually derivable specifications.	0.747	17.034
	Incentive systems are integrated into our budgeting process.	0.755	17.314
	Action planning is integrated into our budgeting process.	0.852	42.477
	IT is integrated in our budgeting.	0.688	14.944
Participation and Addressee-Oriented AVE = 0.668 CR = 0.889 $\alpha = 0.833$	The budgeting of our organization is addressee oriented.	0.749	18.491
	The participation of our budget managers in the budgeting process promotes transparency and acceptance of the budget.	0.835	27.828
	Participation in the budgeting process promotes employees' understanding of our corporate or business unit strategy.	0.875	41.445
	The information of our budgeting process is prepared according to the groups of addressees.	0.805	23.463
Management Accounting Success AVE = 0.710 CR = 0.907 $\alpha = 0.864$	With its information system, our management accounting comprehensively and realistically maps the actual conditions.	0.844	33.910
	The information from our management accounting is very accurate.	0.877	50.164
	Our management accounting uses comprehensible methods and techniques.	0.803	20.363
	The reports provided from our management accounting department are easy to understand.	0.845	31.534
Digital Transformation of Budgeting AVE = 0.773 CR = 0.931 $\alpha = 0.901$	Our budgeting process is digitized.	0.920	88.198
	Our budgeting process makes strong use of digital technologies.	0.930	77.385
	Our budgeting is easier because of digital transformation.	0.897	45.418
	Digital transformation is having a major impact on our budgeting.	0.757	14.404

5.2 Structural Model Results

First, we tested for collinearity by calculating the variance inflation factor (VIF) values of the constructs. All VIF values were below the threshold value of 5, indicating that the correlations between the constructs were not too high (Hair et al., 2013). Second, we calculated the path coefficients. After performing bootstrapping, some elements of improved budgeting did not have a significant positive impact on management accounting success. Only a simple ($\beta = 0.174$; $p < 0.05$), flexible ($\beta = 0.178$; $p < 0.1$), or integrated ($\beta = 0.436$; $p < 0.01$) process increased success; integration had a significantly stronger effect than simplicity or flexibility. Accordingly, hypotheses H1, H2, and H3 were supported. Participation and addressee orientation did not increase management accounting success ($\beta = 0.023$; $p = 0.762$); thus, H4 was rejected (see Figure 1). The construct of digital transformation in budgeting mediated the relationship between the construct of improved budgeting and management accounting success. This was demonstrated by bootstrapping, which led to a higher test strength of indirect effects (Hair et al., 2017). Among the path coefficients, only flexibility ($\beta = 0.475$; $p < 0.01$) had a significantly greater impact on management accounting success when budgeting was digitalised. Since both the indirect and direct effects were positive, complementary mediation can be concluded (Zhao et al., 2010). Simplicity ($\beta = 0.080$; $p = 0.286$), integration ($\beta = 0.115$; $p = 0.305$), and participation and addressee orientation ($\beta = 0.149$; $p = 0.146$) were not affected by digital transformation (see Figure 2). Accordingly, only hypothesis H6 was accepted, and H5, H7 and H8 were rejected.

The next step in assessing the structural model was to interpret the coefficient of determination, R^2 . According to R^2 , 54.1% of the endogenous construct of management accounting success was explained by the constructs of improved budgeting and digital transformation in budgeting (Hair et al., 2017). The four elements of improved budgeting explained 56.5% of digital transformation in budgeting. Finally, the forecasting capability Q^2 was determined using blindfolding (Hair et al., 2020). Both the construct of management accounting success and the construct of digital transformation in budgeting exceeded the threshold of 0 (Geisser, 1974). Q^2 values of 0.405 and 0.354 were calculated for the constructs of digital transformation in budgeting and management accounting success, respectively. Both values are greater than 0.25, indicating medium predictive relevance of the model (Hair et al., 2020).

Figure 1. Structural model results

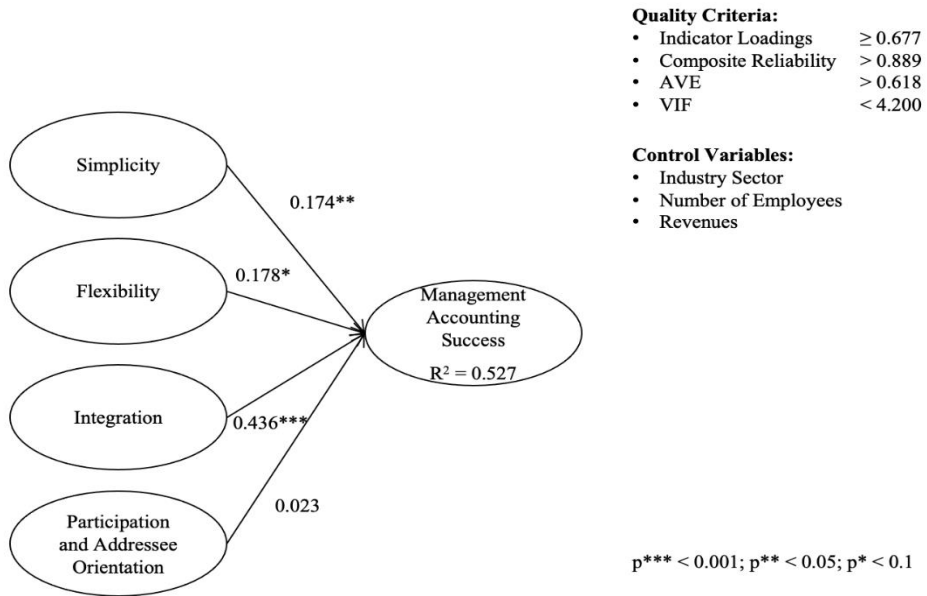
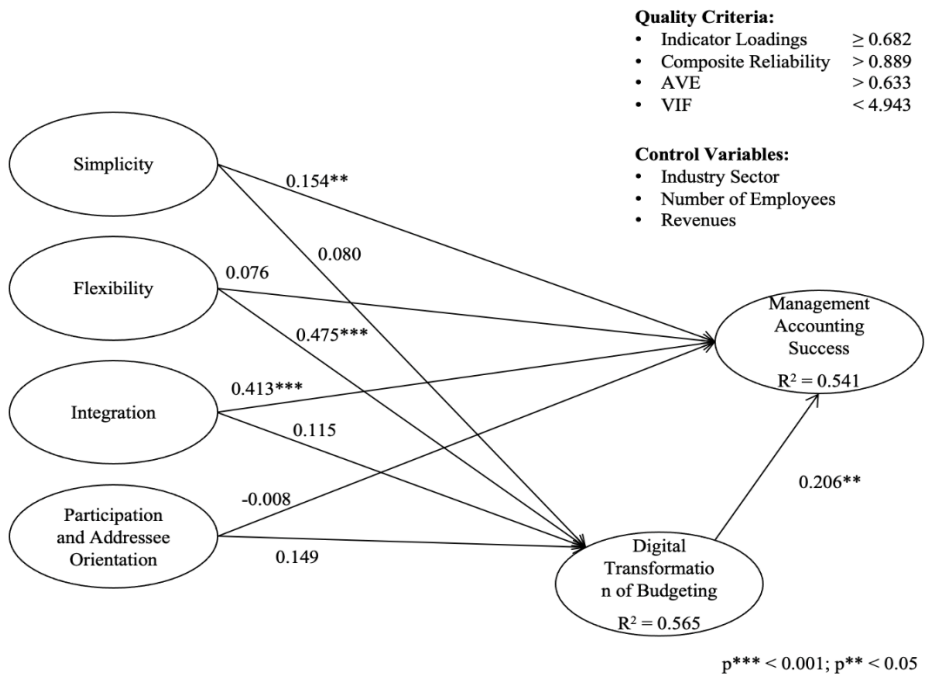


Figure 2. Structural model results with mediation



6. Discussion

The budgeting process and improved budgeting approaches continue to attract research interest (Arnold & Artz, 2019; Kenno, Lau, & Sainty, 2018; Liyanage & Gooneratn, 2021; Sitepu et al., 2020). Earlier research mainly criticised companies' budgeting practices (Hansen, 2011; Hope & Fraser, 1997; Neely et al., 2003), whereas more recent studies have focused on the reasons for implementing budgeting in times of crisis (Becker et al., 2016), on increasing budgeting flexibility (Oyadomari et al., 2018), or on changing budgeting by using digital technologies (Bergmann et al., 2020). Although the concepts of Beyond Budgeting and Better Budgeting (Hope & Fraser, 2003; McNally, 2002) have been touted as solutions to the shortcomings of traditional budgeting, little is known about their practical application, and many organisations still use traditional approaches (Popesko et al., 2015).

We found that simplicity, flexibility, and integration are elements of improved budgeting that are positively related to management accounting success, whereas participation in the budgeting process and addressee-oriented preparation of information are not. Furthermore, our results partially support the claim that modern digital technologies improve management accounting success. However, this study shows that the use of digital technologies alone is not sufficient to increase management accounting success. Rather, management accounting success is dictated by the way in which budgeting is structured in the organisation.

6.1 Theoretical Implications

Our study contributes to the literature by identifying criteria for successful budgeting in organisations. Previous studies have only analysed the Beyond and Better Budgeting approaches in terms of the budgeting process, criticisms of traditional budgeting (Libby & Lindsay, 2010; Neely et al., 2003; Østergren & Stensaker, 2011; Yakhou & Sulzen, 2010) or other departments within the organisation (Hansen, 2011). Our study broadens this perspective by showing that modifying traditional budgeting can increase the success of overall management accounting. From a theoretical perspective, the three elements of simplicity, flexibility and integration should be considered important complements to Beyond and Better Budgeting.

A simple budgeting process can be executed quickly without going through too many planning loops (De Waal et al., 2011; Libby & Lindsay, 2010). Lean processes, a limited number of control-relevant contents and input variables, and an appropriate level of detail (Østergren & Stensaker, 2011; Sivabalan et al., 2009) are relatively independent of digital transformation. By contrast, the availability of a large amount of data amplifies the effect of digital transformation on budgeting flexibility (Bhimani & Willcocks, 2014). Scenarios can be run more effectively, and information can be provided faster, with higher quality and more detail (Palermo, 2018). Optimised budgeting is especially beneficial in crisis situations (Becker et al., 2016). For example, various scenario and sensitivity analyses can be used to develop action plans, increase the scope of action, and determine which external influences the company reacts to particularly strongly (Bourmistrov & Kaarbøe, 2013; Henttu-Aho, 2016; Palermo, 2018). Data availability also makes rolling forecasts more precise. By automating processes, forecasts can be made more frequently and incorporate external sources of information (Oyadomari et al., 2018). Within management control systems, budgeting is increasingly viewed as an instrument for implementing strategic goals by increasing flexibility (Frow, Marginson & Ogden, 2010).

Compared with simplicity and flexibility, integration has a stronger impact on management accounting success. Accordingly, corporate strategy should be mapped in budgets to monitor short-term and long-term goals (Skærbæk & Tryggstad, 2010). It is equally important to link different processes, such as reporting and forecasting (De Waal et al., 2011; Frey, 2012), involve IT (Chapman & Kihn, 2009; Nelson et al., 2005); and integrate incentive systems. In contrast to our expectations, the relationship between integration and management accounting success is independent of digital transformation.

According to the results, neither the participation of budget managers in the budgeting process nor addressee-oriented preparation of information is important. This finding seems to contradict the literature, which has argued that budget participation is a success factor for organisational outcomes such as budget satisfaction (Hansen & Van der Stede, 2004) and motivation (Ihantola, 2010). However, the same stream of literature has also underlined that participation and addressee-orientation need to be targeted, i.e., the needs of appropriate recipients must be met (Frey, 2012). Future research should examine targeted participation more closely and try to resolve these inconclusive findings.

This study answers the call for additional research on the budgeting process in the context of digital transformation (Rikhardsson & Yigitbasioglu, 2018). Earlier research explored digital transformation in specific technologies, such as business analytics (Bergmann et al., 2020), or other management accounting processes, such as reporting (Al-Htaybat & von Alberti-Alhtaybat, 2017). By contrast, this study focuses on digital transformation in budgeting and shows that it positively impacts the success of a company's management accounting.

6.2 Managerial Implications

The results of this study challenge the claim that budgets hinder high performance in companies and should therefore be abolished (Hope & Fraser, 2003). Completely abolishing budgeting is not a viable alternative for the reasons previously stated (Frow et al., 2010). Management accountants should heed suggestions for improving simplicity, flexibility and integration and implement and monitor such improvements. Integration is particularly important for companies, as it can substantially improve the success of management accounting independent of digitalised budgeting. For companies that rely primarily on more flexible budgeting, additional investments in digitalised budgeting are advised since flexible budgeting is heavily dependent on the possibilities offered by digital transformation. However, before introducing digital technologies and new programs, the necessary prerequisites and expertise must be created to preempt conflicts and problems (Ferraris et al., 2019).

6.3 Limitations and Avenues for Future Research

While the results of our study provide important insights into how improved budgeting can increase the success of management accounting, some limitations should be considered. First, the sample was rather small, with 189 respondents from a single country. Future research should examine the effects of improved budgeting using larger samples from different country contexts. In addition, in many companies, digital transformation of the budgeting process is still in an early stage (Möller et al., 2020). Subsequent analyses may reveal different impacts of digital transformation on management accounting. Second, the survey data could contain biases, as the participants' answers were based on subjective perceptions. Therefore, the potential influence of the interpretations and views of the respondents on the results should be controlled. Third, external factors, e.g., leadership styles or organisational culture, may

influence the effects of improved budgeting (Østergren & Stensaker, 2011). Future research should consider a wider set of potential factors that may influence the success of management accounting. A final limitation is related to digital transformation. The questionnaire only asked for very general information about digital transformation in the company and budgeting. Future studies should integrate more factors and specific technologies that could have an impact on suggestions for improving budgeting.

7. Conclusion

In this study, approaches to improved budgeting were bundled into four elements, and the extent to which these elements affect the success of management accounting was examined. The ability of a digitalised budgeting process to support the relationship between improved budgeting and management accounting success was also analysed. The results show that moving to simple, flexible, and integrated budgeting significantly increases management accounting success and that digital transformation mediates the effect of flexibility.

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Appendix: Discriminant validity assessment

	1	2	3	4	5	6	7	8	9
1 Number of employees	1.000								
2 Participation and addressee-orientation	-0.034	0.817							
3 Digital transformation of budgeting	-0.079	0.637	0.879						
4 Simplicity	-0.139	0.536	0.540	0.806					
5 Flexibility	-0.126	0.744	0.735	0.657	0.827				
6 Industry sector	-0.067	-0.115	-0.068	0.028	-0.178	1.000			
7 Integration	-0.052	0.772	0.648	0.567	0.810	-0.148	0.795		
8 Management accounting-success	0.030	0.578	0.606	0.542	0.639	-0.010	0.690	0.843	
9 Revenues	-0.008	0.043	-0.004	-0.024	-0.067	0.206	0.033	0.056	1.000

