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ŻANETA PIETRZAK

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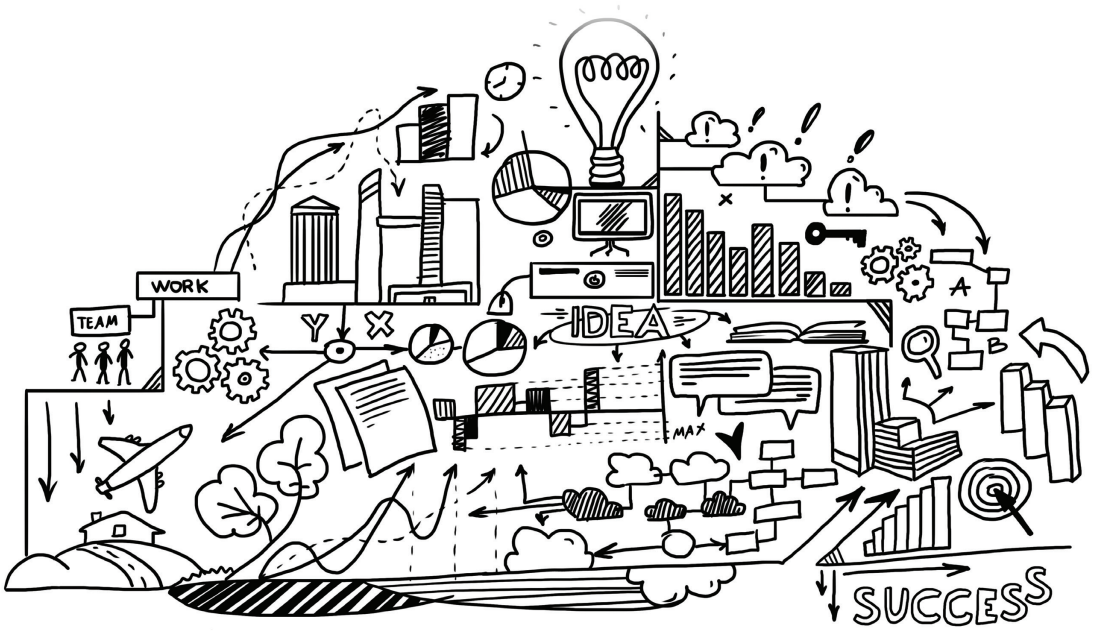

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Contents

To my parents
and Robert

Introduction

Operational budgeting is one of the most commonly used methods of management accounting today. Studies conducted around the world show that for the vast majority of medium-sized and large companies, budgeting is a basic tool of control. Research confirms that the implementation of budgeting is independent of the type of business, size of the enterprise, and country of origin (Libby, Lindsay, 2010; Uyar, Bilgin, 2011; Østergren, Stensaker, 2011). Similar observations have been made in Polish organizations. Studies have revealed that the diffusion of budgeting in Poland has significantly increased over the last 30 years. In 1989, the percentage of companies that implemented budgeting was 43.3%, in 1998, it had increased to 76.8% (Radek, Schwarz, 2000), while in 1999, it was already 80% (Szychta, 2001). In a survey conducted in 2012 (Wnuk-Pel, 2012), the percentage of Polish companies using budgeting had already reached 98.4%.

Budgeting facilitates the coordination and evaluation of activities, helps to motivate and assess employee performance, and supports internal control within the organization (Angelakis, Theriou, Floropoulos, 2010; Al Farouk, McLellan, 2011; Yalcin, 2012). To conclude, budgeting is an important element of a company's management process, and thus it constitutes a particularly vital area of scientific research.

Traditional budgeting bears some limitations that, to some extent, interfere with the management function. Much criticism in terms of budgeting was present in the literature at the beginning of the 21st century, with critical opinions relating to the numerous disadvantages of this concept (Neely, Bourne, Adams, 2003; Libby, Lindsay, 2010; Jensen, 2011). Advocates of alternative tools claim that this method is too time-consuming and expensive, while the use of the budgeting system for motivational purposes is also negated (e.g., Dugdale, Lyne, 2006; Libby, Lindsay, 2007; Jensen, 2011). Opponents of traditional budgeting opt for a replacement with alternative solutions. They suggest: a) completely abandoning the budgeting process and implementing a rolling forecast with the wider use of financial and non-financial indicators – Beyond Budgeting (BB), or b) modifying the budgeting process, e.g., by implementing Activity-Based Budgeting (ABB).

Thus, two opposing observations can be distinguished in the subject literature: wide dissemination of operational budgeting on the one hand, and severe criticism

of its use on the other. In this context, the issue of assessing the use of budgeting in organizations deserves special attention – this subject poses a significant challenge for the scientific community.

Assessing the successful implementation or subsequent functioning of management accounting tools, including, in particular, operational budgeting, is difficult to define, and it can be understood subjectively, depending on the individual preferences of the assessor, as well as the time of analysis. To a large extent, success is an abstract concept whose measurement becomes ambiguous and can only be made if all the dimensions of its assessment are properly specified (Diallo, Thuillier, 2004). Nevertheless, according to Prabhakar (2008), the only issue that researchers interested in the area of success agree on is the fact that there is a dispute about how success can be defined, measured, and evaluated. As a result, commonly accepted, objective, and universal tools used for measuring the success of the budgeting system, for example, have yet not been developed. Success can only be indirectly examined by means of numerous criteria (measures) and their interrelationships and links. While analyzing the literature, a research gap was identified, i.e., there is a lack of an unambiguous and universal way to assess the use of operational budgeting in manufacturing enterprises in Poland, along with the identification of factors that shape and condition it. This study is an attempt to fill this gap.

The use of operational budgeting was assessed in broader terms than just from the perspective of its use for management purposes. Operational budgeting was analyzed both using technical and behavioral aspects and by means of its impact on the current and future functioning of the organization. This issue is particularly important. Researchers strongly recommend using an evaluation system to improve effectiveness and increase the level of system success (Mendoza, Pérez, Grimán, 2006; Nah, Delgado, 2006; Uwizeyemungu, Raymond, 2010; Ruivo, Oliveira, Neto, 2012; Mamić Sačer, Oluić, 2013).

The assessment of budgeting was formulated based on several factors that, according to the literature, condition it. In addition, it should be taken into account that apart from defining specific factors, it is also necessary to present how to measure them. It is also important to present the determinants that will directly affect the assessment and determine the relationships and links between them so that in the future, operational budgeting can be shaped through appropriate management in order to improve how it is evaluated. These arguments justify the choice of the research area, and they also constitute a basis for determining the research problem. It was formulated in the form of a question: "What **factors** determine the assessment of the use/success of operational budgeting and how can one **measure** and subsequently **assess the use/success** of operational budgeting in Polish companies?".

The above research question is related to the **main research objective** and **specific objectives** of the research. The main objective is to **measure and evaluate the use/success of operational budgeting** in Polish companies and to **identify and measure the determinants of success**, based on the suggested model.

In order to achieve the main research objective, the following **specific objectives** were formulated:

1) to determine the role of operational budgeting in the process of managing a company;
2) to determine the variables that influence how the use/success of operational budgeting is assessed, to present factors that determine individual variables, and to identify the relationships and links between them;
3) to develop a model that helps to measure and evaluate the use/success of operational budgeting.

In order to achieve the main objective and specific objectives, the following main hypothesis was formulated: The **quality of operational budgeting** and the **information** it generates positively affect the success of this system, in particular the **use** of operational budgeting and the level of employee **satisfaction** that determine the **benefits** for individual users and the company.

Based on the literature review (which involved mainly foreign publications), the following research hypotheses were formulated, which were verified utilizing an empirical study on operational budgeting systems in Polish companies:

H1: The quality of the system positively affects the quality of information it generates.
H2: The quality of the system has a positive impact on the assessment of the use/success of operational budgeting.
H3: The quality of the information has a positive impact on the assessment of the use/success of operational budgeting.

During the study, the following **research methods** were applied: a literature review, including Polish and foreign literature, and an empirical study, using a standardized questionnaire.

In terms of the **literature review**, national and foreign publications were included, both regarding theoretical works and analyzing empirical research. The literature review concerned management accounting and methods of management accounting, in particular, operational budgeting, its application, and possible methods of assessment. By analyzing and synthesizing the work of other authors, and generalizing their inquiries, such an extensive literature review created the basis for my own conclusions and, while preparing the empirical study, made it possible to formulate research hypotheses.

In order to verify the research hypotheses and to achieve the main objective, **questionnaire research** was conducted, which aimed to analyze the system

of operational budgeting in the context of measuring and evaluating success. The empirical study aimed to analyze the factors that determine the assessment of the use/success of operational budgeting and the relationship between these factors, which was supposed to allow the development of a tool to measure and evaluate the use of budgeting in companies.

This monograph is divided into an introduction, four chapters – three theoretical chapters and an empirical one – and a conclusion.

The **first chapter** is divided into three main areas that are designed to characterize operational budgeting as a method of management accounting that supports organizational management. Operational budgeting has been presented in many dimensions, e.g., as a method, a tool, or a process, as well as in a more complex approach, as a system. This approach made it possible to carry out a holistic and multi-faceted analysis of this phenomenon without narrowing budgeting to only one perspective. Thus, its multidimensional importance for enterprise management has been emphasized in relation to its role, functions, and goals. In light of traditional budgeting criticism, a critical approach to it and alternative concepts are also presented. The two subsections present directions of empirical research in the area of operational budgeting in Poland and internationally.

The **second chapter** is theoretical and presents a suggested model for assessing the use of operational budgeting. It is based on the DeLone and McLean information system success model (DeLone, McLean, 1992), which was developed to verify the impact of various factors on assessing the success of an information system. The chapter characterizes the theoretical foundations of the new, proposed model, the primary assumptions in the context of the initial model, as well as issues related to defining variables distinguished in the model, such as system quality, information quality, system use, user satisfaction, individual impact, and organizational impact. A method to define and measure each of the variables was determined (and applied in the process of questionnaire construction – Appendix, and the relationships between individual variables that mapped the research hypotheses are described. The final part of the chapter summarizes the process of preparing and conducting the empirical study, which aimed to develop this model.

Chapters three and four present the results of the empirical research. The third chapter is devoted to the general characteristics of the respondents' companies in three dimensions, i.e., a) the respondent, b) the company he/she works for, and c) the operational budgeting system used in the surveyed organization. The rest of the chapter presents how to measure each of the analyzed variables that make up the assessment of operational budgeting in the organization: system use, user satisfaction, individual impact, and organizational impact. In terms of detailed indexes and the index of assessment of operational budgeting use, the basic

statistics were analyzed, which enabled more in-depth interpretation. The fourth chapter includes the analysis of two determinants that, according to the research hypotheses, should determine success: system quality and the quality of information generated by this system. The last part presents the developed model for assessing operational budgeting use.

The conclusion includes a summary with final assumptions regarding the literature review and the empirical research, as well as the limitations of the results. This section also recommends possible directions for further research and analyses.

The paper presents the results of the literature and empirical research, which were conducted over several years. The study resulted in articles and papers that were presented at national and international conferences. Partial results of the study were presented at the Asia-Pacific Management Accounting Association (APMAA) conference in Tokyo (Japan) in November 2018.

This publication is a result of cooperation with Professor Tomasz Wnuk-Pel. I would like to express my sincere thanks to him for his contribution and commitment, as this study would not have been possible without his participation and support. The Professor's comments and guidelines in terms of the concept and the study itself, and more importantly, his faith in me, allowed me to prepare this study.

1. Operational budgeting in theory and practice

Operational budgeting is one of the most widely used methods of management accounting today. It is often analyzed in the literature and investigated in numerous empirical studies (Ekholm, Wallin, 2000; Abdel-Kader, Luther, 2006; Dugdale, Lyne, 2006; Sivabalan et al., 2009; Braun, Tietz, Harrison, 2010; Libby, Lindsay, 2010; Uyar, 2010; Uyar, Bilgin, 2011; Østergren, Stensaker, 2011). "In market economy conditions, planning and controlling an enterprise's activity on the basis of budgets is a necessity and one of the basic elements of proper management" (Sobańska, Czarnecki, Wnuk-Pel, 2009, p. 284). Achim stresses that rigorous planning "[…] of any economic activity is an essential element for the success of those activities. Without planning, the activity of any economic entity would detach from the surrounding reality […] the capacity for the provision and planning of any activities in market economy conditions assures the survival and development of these activities" (Achim, 2009, p. 33).

1.1. Operational budget and budgeting in a company's management system

The term "budgeting" is inseparable from the word "budget." The term "budget" derives from the Latin word "bulga," which describes a sack or bag used to collect income (Sondel, 2009, p. 115). The word exists in many languages, for example, English – budget, or French – bougette.[1] Over time, however, the meaning of the word changed, shifting from the area of public finances to the private sector and the economic conditions of enterprises. For a better understanding, selected definitions of the word "budget" in a microeconomic perspective of an enterprise system are presented in Table 1.1.

1 J.J. Glynn, J. Perrin, and M.P. Murphy (2003, p. 383) state that the word "budget" derives directly from the French term "bougette," meaning a small leather case, which since 1733, or even earlier, was used by the British Treasury Minister who would bring plans of public finances to Parliament in it.

Table 1.1. Definition of a budget in management accounting

Source	Definition
Fremgen, 1973, p. 32	"[…] a comprehensive and co-ordinated plan expressed in financial terms for the operations and resources of an enterprise and for some specific period in the future."
Drury, 1996, p. 28	"[…] a financial plan for implementing decisions taken by the management."
Szychta, 2000, p. 340	"[…] a numerical expression of an action plan used to coordinate the intentions of the enterprise."
Brown, Howard, 2002, p. 321	"[…] a predetermined statement of management policy during a given period which provides a standard for comparison with result actually achieved."
Proctor, Burton, Pierce, 2006, p. 139	"[…] a predictive business model expressed quantitatively for a given period."
Wnuk-Pel [in:] Sobańska, Czarnecki, Wnuk-Pel, 2009, p. 287	"[…] financial expression of planned activities in the coming period; the budget is a plan to use specific resources to achieve short-term objectives."
Jaruga, Kabalski, Szychta, 2010, p. 796	"[…] quantitative expression of a business entity's action plan for the application and coordination of planning assumptions and intentions."
Świderska, 2010, p. 459	"[…] an expression of an enterprise's action plan, presents the method of allocating resources in a quantitative and/or qualitative form."
Nowak, 2011, p. 268	"[…] a plan to allocate resources to individual responsibility centers in a given budgetary period with an appropriate scope of responsibility."
Horngren, Datar, Rajan, 2012, p. 375	"[…] quantitative expression of a proposed plan of action by management for a specified period and an aid to coordinating what needs to be done to implement that plan."
Lambe, 2012, p. 244	"[…] a comprehensive and coordinated plan which is packaged by the management of an organization, and expressed in financial terms for the operations and resources of an enterprise for some specific period in the future."
Garrison, Noreen, Brewer, 2014, p. 483	"[…] a quantitative plan for acquiring and using resources over a specified period of time."
Drury, 2015, p. 416	"[…] a financial plan for implementing decisions taken by the management."

Source: own elaboration.

According to the definitions cited in the Table 1.1, a budget can be defined as an expression of planned activities (Szychta, 2000; Sobańska, Czarnecki, Wnuk-Pel, 2009; Jaruga, Kabalski, Szychta, 2010; Świderska, 2010; Nowak, 2011; Horngren, Datar, Rajan, 2012) or a definition of their future implementation (Drury, 1996; Pandey, 2002; Lambe, 2012; Garrison, Noreen, Brewer, 2014). Foreign researchers also emphasize that it should be comprehensive and coordinated (Fremgen, 1973; Lambe, 2012) and additionally it should determine the acquisition of necessary

resources together with their subsequent allocation (Fremgen, 1973; Sobańska, Czarnecki, Wnuk-Pel, 2009; Świderska, 2010; Nowak, 2011; Lambe, 2012; Garrison, Noreen, Brewer, 2014). Meanwhile, Miller, Wooldridge, and Garvin (2001), Bonner (2008), Bierman (2010), and Drake and Fabozzi (2010) clearly emphasize that budgeting should specify both the financial sources and their subsequent use.

The definitions also determine a budget as a statement of management policy (Brown, Howard, 2002) as well as a predictive business model (Proctor, Burton, Pierce, 2006). A budget can be both qualitative (Fremgen, 1973; Sobańska, Czarnecki, Wnuk-Pel, 2009; Świderska, 2010; Nowak, 2011; Lambe, 2012) and quantitative (Fremgen, 1973; Jaruga, Kabalski, Szychta, 2010; Świderska, 2010; Nowak, 2011; Horngren, Datar, Rajan, 2012). However, it always refers to a specific future period (Brown, Howard, 2002; Proctor, Burton, Pierce, 2006; Sobańska, Czarnecki, Wnuk-Pel, 2009; Nowak, 2011; Lambe, 2012; Horngren, Datar, Rajan, 2012; Garrison, Noreen, Brewer, 2014).

Some of the cited researchers emphasize budget goals, e.g., the coordination of plans (Szychta, 2000; Jaruga, Kabalski, Szychta, 2010; Horngren, Datar, Rajan, 2012) and achieving company goals (Sobańska, Czarnecki, Wnuk-Pel, 2009). Budgets are created for individual responsibility centers, taking into account their scope of responsibility (Nowak, 2011), and they then provide the basis for subsequent comparisons with the actual performance (Brown, Howard, 2002). This understanding of a budget is in line with the definition developed by the British Chartered Institute of Management Accountants: "A quantitative expression of a plan for a defined period of time. It may include planned sales volumes and revenues, resource quantities, costs and expenses, assets, liabilities and cash flows" (Chartered Institute of Management Accountants, 2014). Although this definition undoubtedly shows the practical nature of the institution that developed it, it definitely characterizes a great amount of detail.

Budgeting is yet another analyzed concept. Selected examples of its definition in the area of management accounting are presented in Table 1.2.

Table 1.2. Definition of budgeting in management accounting

Source	Definition
Nowak, 2000, p. 413	"[…] a process of formalizing plans and translating quantitative narratives into a quantitative written format, using a monetary unit as a measure."
Glynn, Perrin, Murphy, 2003, p. 382	"[…] a formal system for forecasting, planning, monitoring, and controlling the use of resources in an enterprise."
Drury, 2015, p. 30	"[…] an important tool for forecasting and controlling activities and allocation of the entity's resources in order to achieve its objectives and assumptions."

Table 1.2 (continued)

Source	Definition
Szychta, 2008, p. 407	"[…] involves preparing and applying an annual global budget of the enterprise and budgets of responsibility centers responsible for costs and results."
Chartered Institute of Management Accountants, 2014	"[…] budgeting is a process of expressing anticipated costs and resources for planned activities for a defined period of time."
Jaruga, Kabalski, Szychta, 2010, p. 796	"[…] a set of various activities carried out in accordance with the principles and methods appropriate for this process; budgets are its outcome."
Nowak, 2011, p. 267	"[…] a process which distributes master plans of a business entity among its internal organizational units."
Bocharov, 2013, p. 21	"[…] the system which integrates the results of planning processes, accounting, control, and analysis of cost indicators of company activity."
Gupta, Singh, 2018, p. 22	"[…] a process of preparing plans for the company's future activities to achieve its objectives."

Source: own elaboration.

The above definitions seem more diverse than those observed regarding "budget." The emphasis is put on its various aspects. Researchers have numerous ideas on how to identify budgeting, and thus its role in the enterprise, which in turn creates a relatively large space for its interpretation. Budgeting is most often referred to as a "process" (Nowak, 2000; Chartered Institute of Management Accountants, 2014; Jaruga, Kabalski, Szychta, 2010; Nowak, 2011; Gupta, Singh, 2018), "tool" (Drury, 2004), or a set of various activities, principles and methods (Jaruga, Kabalski, Szychta, 2010). Only by presenting budgeting from different perspectives (as a method, tool, process, or in a more complex approach as a system) is it possible to fully understand the phenomenon, without narrowing it to only one approach. This approach additionally emphasizes the multidimensional importance of operational budgeting for business management regarding its role, functions, and goals.

Budgeting may be presented as:[2]

1) a method: "a consciously applied procedure aimed at achieving an intended objective";
2) a tool or instrument: "something used for some purpose," "a means used to implement something";
3) a process: "a series of successive changes that are related";
4) a system: "a set of things with a structure and that work as a logically ordered whole," "a set of principles or procedures according to which something is done; an organized scheme."

2 Definitions come from *Słownik języka polskiego PWN*.

Defining budgeting as a "**method**" means that it is a way of proceeding that leads to solving a given problem and achieving a defined goal. In this approach, budgeting should involve specific and repeatable stages. Nowak supports this assumption, stating that "budgeting is a method of management aimed at improving the efficiency of using resources. During budgeting, rules for planning a company's activities and resources, which the enterprise has for the implementation of its tasks, are laid down" (Nita, Nowak, 2010, pp. 33–34). A study by Jaruga, Kabalski, and Szychta extends and details this definition. The study claims that budgeting is not just a method; it is "a set of various activities carried out by means of some principles and methods" (Jaruga, Kabalski, Szychta, 2010, p. 796). The most commonly used methods of budgeting include (Drury, 2015):

1) depending on the starting point of the budget:
   - incremental budgeting – the budget starts from the previous period and adds or subtracts an incremental amount to cover any future changes;
   - zero-base budgeting – the budget estimates individual components with the assumption that they are being implemented for the first time;
2) depending on the level of involvement of junior managers:
   - a top-down budget – the budget is prepared by senior management with little involvement of junior managers;
   - a bottom-up budget – the budget is prepared by managers of all levels.

The approaches depend largely on the leadership style and nature of an organization (Bratton, Gold, 2007; Sagie, Koslowsky 2007; Redman, Wilkinson, 2009; Boxall, Purcell, 2011) and, thus, they have a different impact on organizational formation. Top-down budgeting supports autocratic leadership styles – top management shapes the budget, and lower-level employees are only responsible for its implementation. Morris, Bakan, and Wood (2006), Boon et al. (2007), Shah (2007), Bierman (2010), and Boxall and Purcell (2011) address this approach and point out that it reduces decision-making time. Unlike bottom-up budgeting, which supports democratic leadership styles, lower-level managers have more influence on the decisions (Robinson, 2007; Bonner, 2008). Such budgeting means that managers are closer to budgets and have more detailed knowledge of how to prepare them. They are more willing to accept them, and budgets become a motivation tool (Braun, Tietz, Harrison, 2010).

Budgeting can also be described as "an important **tool** for forecasting and controlling activities within an organization and for allocating the entity's resources so as to achieve its objectives and goals" (Drury, 1996, p. 370). Its significance is also emphasized by Nita, who describes it as "the most important instrument of management accounting that facilitates the achievement of an enterprise's objectives" (Nita, 2014, p. 98), while Olafusi, as cited in Isaac, Lawal, and Okoli, sums

it up as "plan in formal terms and helps to realize the firm's expectation. It is a comprehensive plan in the sense that all activities and operations are considered when it is being prepared" (Isaac, Lawal, Okoli, 2015, p. 5).

The definition of budgeting that is seen as a method or a tool focuses on its use to achieve planned objectives. Achim claimed that the overall objective of the budget is "to keep control of the activity done in the company by providing a roadmap for future activities and to set a series of goals to be achieved and the means by which to achieve those goals" (Achim, 2009, p. 339). Budgeting aims to "help managers to draw plans and adjust them to changing conditions as well as communicate and coordinate activities which should be performed in the entire organization" (Horngren, Datar, Rajan, 2012, p. 227). The efficient management of a company depends on the implementation of objectives and used resources. Managers may use budgets for different purposes: a) to control income and expenditure, b) to establish priorities and set targets in numerical terms, c) to provide direction and co-ordination, so that business objectives can be turned into practical reality, d) to assign responsibilities to budget holders (managers) and allocate resources, e) to communicate targets from management to employees, f) to motivate staff, g) to improve efficiency, and h) to monitor performance.

Some researchers, for example, Dobija, perceive budgeting as a **process** of "formulating ventures that take place in the enterprise under the existing accounting system" (Dobija, 1997, p. 284), or in a broader perspective as "a set of various activities carried out in accordance with principles and methods appropriate for this process leading to budget preparation and its use for the purpose of company control" (Jaruga, Nowak, Szychta, 2001, pp. 684–685), which can be done by "preparing, approving, implementing, and controlling the budget" (Szczypa, 2008, p. 125).

The initial stage of budgeting is particularly important. It can be described as "a process of preparing plans for the company's future activities to achieve its objectives" (Gupta, Singh, 2018, p. 22), or "a process that distributes a business entity's master plans among its internal organizational units" (Nowak, 2011, p. 12) or, as Batty claimed, "the whole process of preparing budgets is called budgeting" (Batty, 1963, p. 27). The following elements of budgeting can be distinguished (Nita, Nowak, 2010, p. 34):

1) formulating and implementing corporate strategy;
2) distinguishing an organization's targets;
3) planning long-term results;
4) planning short-term results, taking individual responsibility centers into account;
5) systematically and periodically verifying task implementation;
6) appropriate procedures.

These elements constitute the stages of a budgeting process in an organization (Drury, 2015). The process starts with mapping out and implementing an organization's strategy, budgeting procedures, and describing the changes in the business environment. During the course of the work, the budgeting objectives are formulated, based on which, individual budgets for different responsibility centers are drawn up. Next, there are negotiations, and as a result of the negotiations, the final and coherent version of the company's budget is accepted.

The concept of a "**system**" is the most extensive one in relation to budgeting. Glynn, Perrin, and Murphy were the first to use the term in relation to budgeting, claiming that it "is every formalized system of forecasting, planning, monitoring and control of resources used in a company" (Glynn, Perrin, Murphy, 2003, p. 382), also perceives budgeting as a system, describing it as "an integral element of the management system called controlling" (Szychta, 2001, pp. 658–659). Nita and Nowak (2010, pp. 53–68) present yet another comprehensive study on budgeting as a system. They claim that budgeting is "a process of formalizing plans and translating quantitative narratives into a quantitative written format by means of a monetary unit as a measure. Budgeting, as a projection activity, should aim at optimizing the attributes of an open system according to its sustainability and development criteria. Budgets are a result of budgeting, and they essentially reflect the future condition of open system attributes, including fundamental attributes" (Nita, Nowak, 2010, p. 58). In the context of information, budgeting was presented as a system that "integrates the results of planning, accounting, control and analysis of cost indicators" (Bocharov, 2013, p. 21). The approach to budgeting as a system involves functions that it should perform in an organization. Drury (2015, p. 372) specified six functions of traditional budgets:

1) refining a company's long term plans;
2) coordinating the different departments and helping to improve the relationships between them;
3) communicating ideas and expectations from top management to all other employees;
4) motivating managers to achieve challenging targets and goals;
5) controlling the business activities using variance analysis to determine areas that require attention;
6) evaluating the performance of managers in relation to achieving targets.

There are numerous studies on the role and importance of budgeting in companies. It has been shown that budgets are one of the most frequently used tools for planning and control in enterprises both in developed and developing countries (Chenhall, Langfield-Smith, 1998; Joshi, 2001; Ahmad, Sulaiman, Alwi, 2003;

Dugdale, Lyne, 2006; De With, Dijkman, 2008; Angelakis, Theriou, Floropoulos, 2010; Al Farouk, McLellan, 2011; Sleihat, Al-Nimer, Almahamid, 2012; Yalcin, 2012).

Joshi (2001) showed that there are three main reasons why companies implement budgets: performance evaluation, support for control, and planning. Budgeting prevents information asymmetry between senior and lower-level managers, it improves employee attitudes, motivates managers, and results in the better commitment of lower-level managers (Joshi, Com, 1997; Chenhall, Langfield-Smith, 1998; De With, Dijkman, 2008; Oak, Schmidgall, 2009; Angelakis, Theriou, Floropoulos, 2010; Al Farouk, McLellan, 2011; Yalcin, 2012). Budgets are also used to coordinate the activities of individual, distinguished centers of responsibility to ensure their cooperation and the achievement of specific targets (Chenhall, Langfield-Smith, 1998; Angelakis, Theriou, Floropoulos, 2010; Al Farouk, McLellan, 2011; Yalcin, 2012). To a lesser extent, budgets are used for long-term planning and linking them to the company's strategy (Sleihat, Al-Nimer, Almahamid, 2012).

1.2. Directions of empirical research in operational budgeting around the world

1.2.1. The degree of operational budgeting diffusion

"The relationship between budgeting and other aspects of management accounting and the widespread implementation of operational budgeting in organizations in different countries prove that budgeting was one of the most widely and most commonly studied phenomena of management accounting" (Szychta, 2008, p. 408). These studies mainly investigated the extent of its diffusion (Table 1.3) and its use in enterprises (Ekholm, Wallin, 2000; Abdel-Kader, Luther, 2006; Dugdale, Lyne, 2006; Sivabalan et al., 2009; Uyar, 2009; Braun, Tietz, Harrison, 2010; Libby, Lindsay, 2010; Uyar, Bilgin, 2011; Østergren, Stensaker, 2011).

Table 1.3. Research on the diffusion of operational budgeting

Author	Year	Country	Degree of diffusion (%)
Hope, Fraser	1997	EU countries	99
Chenhall, Langfield-Smith	1998	Australia	98
Wijewardena, De Zoysa	1999	Australia, Japan	97
Joshi	2001	India	98
Hyvönen	2005	Finland	100

Author	Year	Country	Degree of diffusion (%)
Dugdale, Lyne	2006	Great Britain	98
Abdel-Kader, Luther	2006	Great Britain	97
Angelakis, Theriou, Floropoulos	2010	Greece	94
Yalcin	2012	Turkey	94
Pavlatos, Kostakis	2015	Greece	97
Shcherbina, Tamulevičienė	2016	Ukraine	91

Source: own elaboration.

Research conducted in the mid-twentieth century showed that 90% of American companies used budgeting (Sord, Welsch, 1958; Umapathy, 1987), and it was and still is dominant in the practice of many enterprises in various countries. The use of this technique is close to 100 percent in the United Kingdom (Abdel-Kader, Luther, 2006; Dugdale, Lyne, 2006), while in other countries, the results are also relatively high, exceeding 94% of respondents (see Table 1.3).

Research has attempted to analyze in more detail the use of specific budgeting techniques, including flexible budgets, incremental budgets, or zero-base budgets. Ahmad, Sulaiman, and Alwi (2003) observed that the use of flexible budgets in Malaysia is higher than in the United Kingdom and New Zealand. Relatively lower results were observed in other countries (Pierce, O'Dea, 1998; Abdel-Kader, Luther, 2006). Abdel-Kader and Luther (2006) reported a 16% increase in the use of flexible budgeting in the UK, while Joshi (2001) showed it was used in only 5% of companies in India. Hansen and Van der Stede (2004) presented results in terms of incremental budgeting. They showed that 23% of US companies used zero-base budgeting.

1.2.2. The role and function of operational budgeting

Sivabalan et al. (2009) analyzed the reasons behind the implementation of operational budgeting. They found that the reasons are various and diverse, and the existing criticism is primarily addressed at results assessment. The most important reason indicated by enterprises was the function of planning and control; the aspect of performance evaluation was less important. These results are confirmed in previous studies, and although budgets at the organizational level serve different purposes and functions, most researchers (Amey, 1979; Ezzamel, 1987; Bremser, 1988; Douglas, 1994; De With, Dijkman, 2008; Libby, Lindsay, 2010; Sleihat, Al-Nimer, Almahamid, 2012; Samuelsson et al., 2016) agree that enterprises attach the greatest importance to two fundamental roles of budgets:

1) planning and
2) control.

1.2.2.1. Planning by means of operational budgeting – research

A review of the subject literature (Nowak, Nita, 2007; De With, Dijkman, 2008; Sleihat, Al-Nimer, Almahamid, 2012; Samuelsson et al., 2016) indicates a wide use of budgeting for the purpose of planning. For instance, Samuelsson et al. (2016) stated that planning is the basic function of budgeting that involves the identification and efficient use of required resources. Umapathy (1987) conducted a study among medium-sized and large companies in the United States, which revealed that implementing budgets for the purpose of planning and coordination had a positive impact on the financial results of these organizations. Libby and Lindsay (2010) conducted a study of North American companies. They analyzed the criticism of budgeting and identified new trends in budgetary practices. They found that almost all respondents used budgets for planning purposes and did not want to make any changes in this area.

Based on structural equation modeling, De Baerdemaeker and Bruggeman (2015) aimed to identify the impact of participatory strategic planning on budgetary gaps. One of their observations was that budgeting is used extensively in strategic planning. Arnold and Artz (2015) analyzed budget goals from the perspective of the difficulty in achieving them and how their flexibility (i.e., the possibility of making adjustments) can shape the financial results of companies. They found that more ambitious goals correlate with an increase in financial results, pointing out that the use of budget assumptions by leaders, primarily for making decisions, could mitigate the effects of the changeability of objectives that had been set during the period under analysis. Arnold and Artz's studies also confirm the use of budgets for planning purposes.

Arnold and Gillenkirch (2015) conducted an experimental study to examine the specifics of a budget negotiation process when there is a conflict between using the budget for planning purposes (ambitious goals) and assessing results (lower difficulty). Meanwhile, Amans, Mazars-Chapelon, and Villesèque-Dubus (2015) analyzed the use of budgets in two non-profit organizations in the areas of planning, control, coordination, and evaluation. Their study highlights the inherent use of budgets for planning. Similarly, Davila, Foster, and Jia (2014) surveyed a sample of 66 international companies to examine the relationship between management system implementation (financial and strategic planning, financial assessment and sales targets) and company value. They proved that budgets were considered crucial and were adopted by almost all organizations. It should be stressed that Davila, Foster, and Jia emphasized the use of budgets primarily for financial planning and evaluating (controlling) a business activity.

Samuelsson et al. (2016) observed that budget-based planning had a positive impact on the performance of small and medium-sized enterprises.

Kung, Huang, and Cheng (2013) surveyed Taiwanese manufacturing companies to examine the relationship between two aspects of budgeting (focusing on the budget and budget-based planning) and organizational performance. Their model showed a statistically significant correlation between planning (initial or flexible budget) and organizational performance. They also specified budget details and the extent to which management used budgets to pass on targets to lower levels of management. Arnold and Artz (2015), in a similar way, measured the degree of budget flexibility, the level of difficulty of the budgetary objectives, and a degree of use of budgets for planning, coordination, and allocating resources.

Libby and Lindsay (2010) measured the time spent on preparing budgets, their degree of detail, and the extent of changes introduced to the budget. Davila, Foster, and Jia (2014) identified the level of formalization in the budgeting process and the types of plans being developed. Umapathy (1987) investigated the extent to which managers used budgets for planning and coordination, the time horizon of plans, the time spent on preparing budgets, the difficulty of the goals, the level of formality and detail of the budget and budgeting process, the level of participation and the extent to which leaders used flexible and rolling budgets. Like Arnold and Artz (2015), Umapathy demonstrated whether organizations prepare separate budgets for different purposes, including planning and control. In a questionnaire about budgets in small companies, the National Federation of Independent Business (Dennis, 2007) specified the type, frequency, time, and level of detail of drawn up budgets. The NFIB survey also measured the sources of information on budget preparation, the level of budget flexibility, and its complexity.

1.2.2.2. The function of control by means of operational budgeting – research

Research conducted in the European Union shows that for 99% of medium-sized and large companies, regardless of type, size of activity, or country of residence, budgeting is an element of the activity control system (Simons, 1994; Hope, Fraser, 1997; Angelakis, Theriou, Floropoulos, 2010; Al Farouk, McLellan, 2011; Sleihat, Al-Nimer, Almahamid, 2012; Yalcin, 2012; Grabner, Moers, 2013; Kung, Huang, Cheng, 2013; Amans, Mazars-Chapelon, Villesèque-Dubus, 2015; Samuelsson et al., 2016). Bedford and Malmi (2015) described how companies implement diagnostic and interactive mechanisms of control through budgets and performance management systems. However, like Simons (1994), Bedford did not investigate how managers used budgets for control. Li, Ye, and Law (2013) identified budgets as the main instrument of control, adding that the types and intensity of control evolve over time; however, they did not provide detailed information on how managers use budgets for control.

In relation to the control aspects of budgeting, Puxty and Lyall (1989) stated that most British industrial companies used both standard costing and traditional budgeting. Similarly, Guilding, Lamminmaki, and Drury (1998) proved that standard costing is still popular, and most respondents do not intend to abandon it. Their analysis of the budgeting process and the use of standard costing in New Zealand and Great Britain showed a high degree of consistency. De Zoysa and Herath (2007), who conducted a study in Japan, found that standard costing is still used by a large number of companies in both developing and developed countries, which is in line with Guilding, Lamminmaki, and Drury (1998). Research suggests that the significance of standard costing has not decreased significantly despite the profound technological changes taking place in companies. Sulaiman, Ahmad, and Alwi (2005) found that most companies in Malaysia still use standard costing. Therefore, Malaysian companies maintained that the basic principles of standard costing and budgeting remained correct.

1.2.2.3. Performing other functions by means of operational budgeting – research

Further analysis of the literature (Chenhall, Langfield-Smith, 1998; De With, Dijkman, 2008; Angelakis, Theriou, Floropoulos, 2010; Al Farouk, McLellan, 2011; Yalcin, 2012) indicates that the importance of budgeting is much more than just planning and control:

1) budgeting promotes the coordination and evaluation of activities;
2) it helps to motivate employees and evaluate their performance.

Budgets are used to coordinate the activities of individual, separate responsibility centers to ensure that they cooperate and achieve specific objectives (Chenhall, Smith, 1998; Angelakis, Theriou, Floropoulos, 2010; Al Farouk, McLellan, 2011; Yalcin, 2012). Another purpose of operational budgeting is staff motivation (Chenhall, Smith, 1998; De With, Dijkman, 2008; Angelakis, Theriou, Floropoulos, 2010; Al Farouk, McLellan, 2011; Yalcin, 2012) and better allocation of resources (De With, Dijkman, 2008). Budgeting is also used to assess performance, communicate targets, and formulate strategies (Hansen, Van der Stede, 2004; Sulaiman, Ahmad, Alwi, 2005; Fruitticher et al., 2005), although Sleihat, Al-Nimer, and Almahamid (2012) point out that budgets are less frequently used for long-term planning and are less coupled with the company's strategy. Another aspect of using budgeting is timely problem recognition (Joshi, Al-Mudhaki, Bremser, 2003). Budgeting is described as an integral part of a management system that aims to provide criteria for result assessment, and it makes it possible to reward managers and other staff (Fruitticher et al., 2005). Thus, budgeting is related to cost accounting, assessment of responsibility, performance measurement, and the reward system.

Tanase (2013) understood that leadership styles in organizations affect the budgeting process. A person who lacks communication skills will probably prepare a top-down budget without involving staff from lower levels, which may result in a poor quality budget and strained relationships with staff. Meanwhile, Kyj and Parker (2008) observed that managers who respect and understand the intentions and activities included in a budget would also be empathetic towards those who are responsible for implementing the budget. Furthermore, Brown and Cregan observed that "involvement in decision-making means that employees and employers have different but reasonable vested interests" (Brown, Cregan, 2008, p. 680). It means that although employees and employers look at their responsibilities from different perspectives, both groups want to succeed at their level, which translates into the success of an entire organization.

1.2.3. Criticism of traditional operational budgeting and alternative approaches

Criticism of the traditional approach is another significant trend in the empirical research (Jensen, 2011; Kaplan, Norton, 2001; Hansen, Otley, Van der Stede, 2003; Hope, Fraser, 2003; Neely, Bourne, Adams, 2003; Wu, Boateng, Drury, 2007; Libby, Lindsay, 2010). In the mid-twentieth century, there were already voices that expressed doubt about the adjustment of budgeting to the changing business environment (Argyris, 1952; Barrett, Fraser, 1977; Hofstede, 2012). Some authors believe that budgeting problems result from the way it is used (Horngren, Datar, Rajan, 2012), while others argue that the budgeting process itself is essentially flawed (Hope, Fraser, 2003). For some researchers, budgeting is:

1) "an unnecessary evil" (Wijewardena, De Zoysa, 1999, p. 50);
2) "a thing of the past" (Gurton, 1999, p. 61);
3) "the accounting department's toy" (Ekholm, Wallin, 2000, p. 519);
4) "broken" (Jones, 2008, p. 123).

The most common accusations towards the system of budgeting include (Neely, Sutcliff, Heyns, 2001, pp. 1–2):

1) the process of budget consolidation is time-consuming and costly (Schmidt, 1992; Ahmad, Sulaiman, Alwi, 2003; Gary, 2003; De Waal, 2005; Libby, Lindsay, 2010);
2) budgets constrain reaction and flexibility in terms of changes in the business environment (De Waal, 2005; Libby, Lindsay, 2007);
3) budgets are not related to the company's strategy, and they sometimes contradict it (Uyar, Bilgin, 2011);

4) budgets do not create added value for the organization, especially in comparison to the time devoted to their preparation (Hansen, Otley, Van der Stede, 2003; Merchant, Van der Stede, 2003; Neely, Bourne, Adams, 2003);
5) budgets focus only on short-term cost reduction (Hansen, Otley, Van der Stede, 2003; Merchant, Van der Stede, 2003; Libby, Lindsay, 2010);
6) budgets are developed and updated infrequently, usually annually (Neely, Bourne, Adams, 2003; De Waal, 2005; Libby, Lindsay, 2007; Drury, 2015);
7) budgets are based on unsupported assumptions and guesswork (Prendergast, 2000);
8) budgets strengthen vertical command and control (King, Clarkson, Wallace, 2010; Jensen, 2011; Drury, 2015);
9) budgets do not reflect the emerging network structures that organizations are adopting (Ekholm, Wallin, 2000; Predergast, 2000; Ahmad, Sulaiman, Alwi, 2003; Jensen, 2011);
10) budgets encourage manipulation especially during the negotiations (Gary, 2003; Hansen, Otley, Van der Stede, 2003; De Waal, 2005; Libby, Lindsay, 2010; Jensen, 2011);
11) budgets reinforce departmental barriers rather than encourage knowledge sharing (Jensen, 2011);
12) budgets make people feel undervalued (Gary, 2003; King, Clarkson, Wallace, 2010; Jensen, 2011).

Initial criticism of traditional budgeting relates to the problem of it being time-consuming and costly to prepare. In this case, budgeting is criticized as a tool that, over time, becomes useless and does not add value. Another inadequacy of budgeting relates to the organization and its structure – budgets do not reflect changes or emerging new structures, and they constrain decentralized decision-making. The last group of weaknesses of budgeting concentrates on the motivational aspects that should characterize the process. However, according to the respondents of the questionnaire used in this survey, budgets are often full of false assumptions and may cause behavior that is opposite to what was intended.

As stated, budgets are most often criticized for being time-consuming (Schmidt, 1992; Ahmad, Sulaiman, Alwi, 2003; Gary, 2003; Neely, Bourne, Adams, 2003; Libby, Lindsay 2010; Radu, 2011). In the budgeting process, it is necessary to make numerous assumptions (Prendergast, 2000), which takes much time (Libby, Lindsay, 2010). It is estimated that the budgeting process consumes up to 20% of the total time spent on managing an organization (Neely, Bourne, Adams, 2003). As a result, huge costs are incurred in the process (Ahmad, Sulaiman, Alwi, 2003), which even exceed the benefits (Hansen, Otley, Van der Stede, 2003; Merchant, Van der Stede, 2003; Libby, Lindsay, 2010). In other words, budgets create little value compared

to the time and costs required to prepare them (Hansen, Otley, Van der Stede, 2003; Merchant, Van der Stede, 2003; Neely, Bourne, Adams, 2003).

Empirical studies show that the full budgeting cycle in enterprises was about 72 days (an average of 10.3 weeks) (Libby, Lindsay, 2007). In addition, American managers who were involved in the operational budgeting process spent two to three weeks preparing part of a budget for a subsidiary. According to De Waal (2005), Dutch companies spend, on average, between two and a half and four months preparing an annual budget, which was confirmed by Radu (2011), who claims that the average time devoted to preparing budgets varies, taking up to four months, on average. Specifically, 31% of organizations spend three to four months preparing their budgets, while in 40% of companies, this process takes one to two months. Only 28% of respondents did not support the idea that operational budgeting is time-consuming and costly, which means that the remaining percentage of respondents agreed with this accusation (Libby, Lindsay, 2007).

In 2012 Ding and Jia (2012) conducted a study in the field of operational budgeting processes in Luxembourg. Almost half of the financial executives they surveyed admitted that the budgeting process in their organizations took longer than two months (more than 3% of the companies needed more than three months to prepare a master budget). The most time-consuming aspect was gathering the necessary information and the subsequent data consolidation (59% of respondents said that it took a lot of time and effort, and 12% said it took a huge amount of time and effort). The most mechanical elements of a budgeting process that do not create value for the company (this confirms another weakness raised by the opponents of the traditional approach) also seemed problematic in terms of time and effort put into the process. Revising budgets and analyzing collected information was another resource-consuming activity listed by the respondents (68% and 67%, respectively). An average enterprise with a turnover of several billion dollars allocates annually as much as 25,000 man-days to consolidate detailed budgets into one budget for the entire organization. In some organizations, the budgeting process lasts up to six months, with managers spending up to 20% of their work time on it (Gary, 2003).

In addition, 64% of respondents (Libby, Lindsay, 2007) noticed that budgets do not detect problems quickly enough, while 49% stated that budgets become out of date too quickly, meaning that their usefulness is relatively low. It is probably caused by the lack of budget updates during the year (this situation occurs in almost half of the surveyed organizations).

Traditional budgeting is also criticized for the fact that staff performance evaluation is too closely linked to the implementation of budgetary targets. In the United States, as much as 97% of managers' bonuses depend on their results, measured

in relation to approved budgets (Gary, 2003). Thus, they may become a demotivating factor for employees. Managers of individual responsibility centers may try to create specific safety margins by increasing the funds allocated to them for the implementation of tasks planned in the next period, assuming that the board will grant them lower funds than they proposed.

On the other hand, budgeted tasks may have a lower level of tension, and goals may be easier to achieve, so a future bonus is easier to get. According to Jensen (2011), the biggest weakness of the budgeting process is the fact that it is strongly correlated with the remuneration system.

In relation to the human aspect, the budgeting process requires a huge amount of time from managers, and they are forced to spend time on endless negotiations (as each employee wants to achieve their own goals, the budgeting process cannot be perceived as objective). To some extent, it may encourage employees to inflate results and activities that are not consistent with the company's objectives (King, Clarkson, Wallace, 2010). The result is changing business decision-making into an "elaborate exercise in gaming" (Jensen, 2011, p. 96). As a result, the organization's value does not increase; on the contrary, in the long run, this can cause problems with implementing long-term strategic goals.

The research also shows that budgets lack flexibility. They are too rigid, as the budgeting process is usually prepared and updated annually (Drury, 2015), which may be insufficient (Neely, Bourne, Adams, 2003). As a consequence, the lack of flexibility may mean that the budget becomes outdated quickly, and its value decreases (Hope, Fraser, 2003; Neely, Bourne, Adams, 2003; Libby, Lindsay, 2010). According to King, Clarkson, and Wallace (2010), budgeting can also hinder day-to-day operations and excessively stress short-term cost control.

Budgeting, like any tool, is subject to the constant evolution which accompanies changes in the economy. Companies may use budgets unchanged or adjust them to the changing conditions of their business and internal orientation of the organization. As a result of discussion and criticism of operational budgeting, the following alternative approaches emerged: "better budgeting" and "beyond budgeting." Better budgeting focuses on improving the budgeting process and solving problems related to traditional budgeting. It includes five techniques (Goode, Malik, 2011) that can be used to overcome some of the limitations of traditional methods (Neely, Bourne, Adams, 2003), including:

1) activity-based budgeting – ABB: it includes planning through activities that add value;
2) zero-base budgeting: it forces managers to justify budgets every year, which prevents dysfunctional behavior and some budgetary limitations;

3) value-based technique: it encourages people to concentrate on creating wealth for shareholders and links activities to the strategy;
4) profit-based methods: they take into account both short and long term perspectives, ensuring sufficient resources, and thus liquidity;
5) rolling budgets: they allow budgets to be created more frequently, thus increasing the accuracy of forecasts.

The main problem associated with the new techniques is that they may require more financial resources and more time, which may cause even greater dissatisfaction with the implemented processes (Morrow, Connolly, 1991; Kaplan, 1994; Wilhelmi, Kleiner, 1995; Cooper, Slagmulder, 2000; Hansen, Otley, Van der Stede, 2003; Higgins, 2005; De With, Dijkman, 2008; Lin, Yahalom, 2009; Hansen, 2011; Wnuk-Pel, 2012). Some of them also introduce radical changes in the management process, focusing on problems related to measuring performance in traditional budgeting (Hope, Fraser, 2001; Shah, 2007; Rubin, 2010).

1.2.4. The future approach of companies to operational budgeting

Despite criticism of the traditional approach to budgeting, studies clearly show that organizations in the future will modify and adapt budgeting to current management problems (Finland 85.7%, Sweden 87.8%) (Ekholm, Wallin, 2000; 2011). According to De With and Dijkman (2008), in the Netherlands, 70.7% of respondents expressed satisfaction with the current budgeting process, 2.4% were more than satisfied, and only 17.1% remained neutral. Libby and Lindsay (2007) found that for almost 50% of IMA members, budgets are necessary, and, according to their study, the functioning of companies without budgeting would be disrupted. Czech organizations expressed a similar opinion – only a small number (11.3%) of companies did not use budgets. What is more, the surveyed organizations did not plan to give up budgeting (only 2.55% indicated such a possibility) (Popesko, Dokulil, Hrabec, 2017).

Pilkington and Crowther (2007) found that most often, large companies employing over 1,000 people are interested in alternative concepts such as Activity Based Budgeting and Beyond Budgeting. Smaller companies tend to maintain traditional systems, which is probably due to their size, style of management, and the possibility to train staff in new concepts. De Waal (2005) suggests thoroughly analyzing a company before implementing an alternative concept to make sure that employees feel dissatisfaction with the current systems. This study raises the question of whether implementing Beyond Budgeting principles, for example, is justified. In addition, examining staff's attitudes prior to the implementation means greater involvement of employees in the decision-making process and other internal

business processes taking place in the organization. However, Chartered Institute of Management Accountants (2008) believes that the lack of a budget in an organization can generate various types of problems: the lack of a basis for planning, coordinating, and controlling activities may result in a loss of orientation for future goals. Finally, a drastic change in culture can trigger employee disappointment, and a decentralized structure may prove impractical for some organizations.

Although alternative concepts are of public interest are mentioned in most modern management accounting textbooks, a study by Libby and Lindsay (2010) conducted among North American companies found that the traditional use of budgets for control purposes will not soon be eliminated. As well, most firms planned to improve their budgeting systems, not abandon them.

There are not many organizations that would radically change their budgeting process, and there are several reasons for this (Neely, Bourne, Adams, 2003; De Waal, 2005). The costs of change can be high because it usually requires hiring external consultants. In addition, it needs a lot of the time and effort from the staff and investment in systems that can be used in the newly implemented budgeting method. Banham (2000) points out that for large organizations, the cost of change can amount to USD 40 million. At the same time, it is difficult to estimate the benefits of such a change, and that is why companies are reluctant to undertake such large investments without being certain of their profitability (De Waal, Hermkens-Janssen, Van De Ven, 2011). The process of change is often complicated, and organizations lack knowledge of how to effectively implement an alternative solution in relation to the traditional budgeting (De Waal, Hermkens-Janssen, Van De Ven, 2011).

1.3. Directions of empirical research on operational budgeting in Poland

The research on operational budgeting conducted in Poland concentrates on the same areas as foreign studies, but their number and scope are incomparably smaller. The research that has been carried out so far mainly focused on the use of budgets (its role and functions) as well as analyzing the budgeting process itself (Gierusz, Kujawski, Kujawski, 1996; Radek, Schwarz, 2000; Sobańska, Wnuk-Pel, 2000; Szychta, 2001; 2008; Wnuk-Pel, 2012).

A survey of Polish companies in 1998 (Radek, Schwarz, 2000) showed that budgeting was implemented by over three-quarters of the surveyed enterprises (76.8%). Over time, the number of companies that did not implement this tool decreased by almost half – in the previous survey carried out in 1989, the percentage of firms

with a budgeting system accounted for 43.3%. Between 1998 and 1999, Szychta (2001) analyzed 60 companies located in central and southern Poland. Forty-eight firms (which constituted 80% of the respondents) responded positively to the question about the use of an annual budget. Annual budgets mainly were not drawn up by small and medium-sized retail and service companies.

Studies conducted in recent years (e.g., Wnuk-Pel, 2012) showed that the percentage of Polish companies that had implemented budgeting had increased significantly. 98.4% created annual budgets. They mostly focused on non-manufacturing activities (60.7%), and the average number of employees was 101–1000 people (53.7%). However, it should be noted that Polish companies show less satisfaction with the implemented operational budgeting systems, and they are more likely to change them in the future (Szychta, 2008; Wnuk-Pel, 2012).

Detailed analysis of budgeting in organizations in Poland is mainly conducted in doctoral dissertations. To the best of the author's knowledge[3] to date, twenty-six doctoral dissertations and one habilitation dissertation have been written in Poland in the field of budgeting (Kufel, *Koszty przepływu materiałów w przedsiębiorstwach przemysłowych. Problemy budżetowania, ewidencji i kontroli* in 1990). Doctoral dissertations mainly focused on companies with a specific activity, e.g., Bucior – *Zadanie budżetowe w systemie rachunkowości jednostek samorządu terytorialnego* (local government), Drobiazgiewicz – *Wdrożenie koncepcji modelu budżetowania w Poczcie Polskiej* (Polish Post) or Komorowski – *Budżetowanie jako metoda zarządzania na przykładzie polskich stoczni* (shipyards), Modrzejewski – *Budżetowanie w controllingu operacyjnym firmy pośrednictwa kredytowego* (a loan broker), or Juralewicz – *Budżetowanie w przedsiębiorstwach pasażerskiego transportu samochodowego* (passenger road transport).

The study mentioned earlier by Radek and Schwarz (2000) showed that budgeting was used by approximately three-quarters of respondents. Fixed budgets dominated; they were used by 42.7% of the surveyed companies, with partial budgets constituting the basis of the budgeting process. Subsequently, sales budgets (69.5%) and production budgets (59.8%) were drawn up from them, as well as the planned profit and loss account (64.6%). In the study by Szychta (2001) mentioned earlier, 80% of firms claimed that they use an annual budget for an entire company. The majority – 79.2% – did not prepare a full set of partial budgets, but only two or three, e.g., a sales plan, production plan, or a pro forma financial statement. According to the results, 45.8% of entities that use budgeting applied the incremental method; zero-base budgeting was declared by as much as 28.3% of all respondents.

3 Polish Science – Information Processing Institute – SYNABA, 29.08.2018.

In a more recent study (Wnuk-Pel, 2012), the percentage of Polish companies with implemented budgeting systems was much higher (98.4%). The incremental method dominated, with 81.5% of respondents declaring that they use it, while zero-base budgeting diffusion was much lower, although still relatively high (44%). The most frequently prepared budgets included sales (92.2%), a planned income statement (76.3%), general and administrative costs (70%), and direct costs (66.5%).

In another study, Wnuk-Pel and Christauskas (2018) gave a detailed presentation of operational budgeting practices in Poland and Lithuania, the results indicate that operational budgeting is still widely used. Furthermore, the research shows that budgeting greatly supports strategy implementation as well as planning, communication, coordination, evaluation of activities, managerial motivation, evaluation of achievements, resource allocation and expenditure authorization. General satisfaction with operational budgeting of top management, middle management and financial/accounting/controlling staff is moderate. The study revealed some differences between countries, for example: the frequency of distinguishing between controllable and uncontrollable costs, popularity of zero-base budgeting, level of difficulty in achieving budgetary targets, detail of budgeting and control systems, use of flexible budgeting and the impact of management accounting specialists on the final budget. A study conducted by Szychta (2008) showed that 30% of respondents indicated a need for changes in order to adapt budgeting to the needs of the organization. It is confirmed by the results of a study by Wnuk-Pel (2012), who measured the degree of satisfaction with the existing budgeting systems in Polish companies. 46.8% of respondents described their satisfaction with the current budgeting system as above average. 12.6% expressed dissatisfaction with the current system.

2. A model for assessing the implementation of operational budgeting

Operational budgeting analyzed as an information system seems to express its principles and implementation in an organization in the most comprehensive way. Assessing its implementation should take into account its complex and multidimensional nature, as well as the different perspectives of various stakeholders:

1. The people responsible for preparing and implementing the budgeting, as well as the technical aspects – "Does it work according to the assumed specifications?", "Are its features and characteristics satisfactory?".
2. The people responsible for generating information who are involved in the regular system operation – "Does the system facilitate my work; does it make me want to develop its functional aspect?", "Does it increase my job satisfaction?".
3. The executives who, on the basis of the obtained information, make decisions that ensure the future functioning of the company – "Does the system increase the value of the company? Or is it used as intended?".

2.1. The DeLone and McLean model of information systems success

The DeLone and McLean model of information systems success (DeLone, McLean, 1992) was adopted as a starting point for the model designed to assess the implementation of operational budgeting. The DeLone and McLean model is one of the most versatile models found in the literature (Brown, 2008). Since its development, it has been subjected to theoretical and empirical evaluation in many studies, and its usefulness has been verified in various sectors.

The DeLone and McLean model is a holistic model that assumes that the success of an organization's information system is defined by the positive impact

it has on the entire organization. This impact is a consequence of the positive, individual influence of the information system on individual users. The impact of the system on employees, according to the authors, depends on the actual use of the system in everyday work, which was characterized in the model by two factors: the quality of the system itself and the quality of the information it contained. The model was presented in a work published in 1992 and subsequently revised and updated in a paper issued in 2003. Since its publication, the model of information system success has become the basis for further scientific research (in 2003, i.e., ten years later, there were approximately 300 studies – DeLone, McLean, 2004), and to this day it is one of the most frequently used bases for analysis.

When developing their model for measuring an information system's success, DeLone and McLean relied on two foundations: a) information theory, by Shannon and Weaver (1949), and the problems that occur during the transmission of information, and b) the works of Mason (1978) in the field of efficiency and the significance of information. DeLone and McLean assumed that the problem of measuring an information system's success boils down to answering a question about the assessment of information value that is a product of this system. In reference to Shannon, Weaver, and Mason's research, DeLone and McLean assigned variables describing the model (Figure 2.1).

<table>
<tr><td>Shannon, Weaver</td><td>Technical level</td><td>Semantic level</td><td colspan="4">Level of effectiveness</td></tr>
<tr><td rowspan="2">Mason</td><td>Production</td><td>Product</td><td>Recipient</td><td colspan="2">Influence on the recipient</td><td>Influence on the system</td></tr>
<tr><td colspan="6">→</td></tr>
<tr><td>DeLone, McLean</td><td>System Quality</td><td>Information Quality</td><td>System use</td><td>User satisfaction</td><td>Individual benefits</td><td>Organizational benefits</td></tr>
</table>

Figure 2.1. Theoretical foundations of the DeLone and McLean model of success

Source: adapted from DeLone, McLean, 1992, p. 62.

DeLone and McLean claimed that the technical level of the IS system can be determined by the accuracy and effectiveness of the processing system (the process of producing information by the system). The semantic level defines the quality of information (the product of this system) in terms of its content and meaning. The last level of effectiveness should reflect the impact of information on the recipient (impact on an individual user's behavior and then the functioning of the entire organization).

Based on a review of the literature (180 works published between 1981 and 1987 that investigated various factors that condition an information system's success), DeLone and McLean distinguished six variables: a) system quality, b) information quality, c) use, d) user satisfaction, e) individual impact, and f) organizational impact.

However, these variables were not defined unambiguously (neither the concept nor the method of measurement). Based on other researchers' work, they presented only some of the possible ways of defining them (most often by means of features that should characterize them) and methods of measuring them:

1) system quality – desirable features of an information system: easy to use, flexible, reliable and easy to learn, as well as systematic functions: intuitive, sophisticated, flexible, and response time;
2) information quality – desirable features of information as an output product of the system, e.g., accurate, transparent, concise, complete, timely, and usable;
3) use – the extent and manner in which staff and clients use the information system, e.g., the frequency of use, the nature of its use, its purposefulness, or the scope of its application;
4) user satisfaction – user satisfaction regarding the system itself as well as information generated by the system;
5) individual impact – the degree to which the information system impacts individual users;
6) organizational impact – the degree to which the information system impacts the entire organization.

DeLone and McLean claimed that the distinguished variables depend on each other and that the relationships between them determine the assessment of success. The interrelationships between individual variables are presented in Figure 2.2.

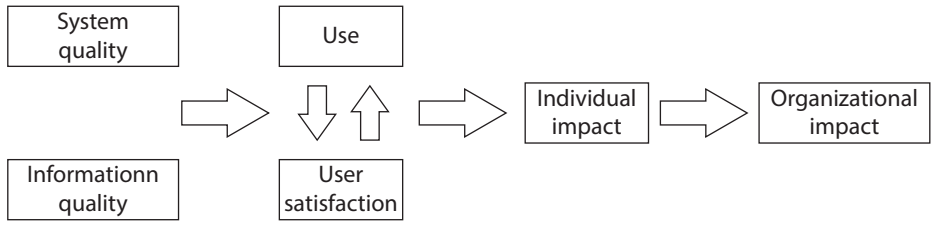

Figure 2.2. DeLone and McLean's initial model of information system success

Source: DeLone, McLean, 1992, p. 87.

The relationships between individual variables can be described in the following way:

1) system quality and information quality, independently (each of them) and jointly, influence the usage of an information system and user satisfaction;
2) the use of the system may impact the degree of user satisfaction;
3) the use of the system and user satisfaction directly influence the impact on an individual user;
4) the individual impact should influence the organizational impact variable (the operation of an entire organization).

It should be noted, however, that DeLone and McLean (1992) did not verify the above relationships in an empirical study, they relied only on research carried out by scientists in previous years. In subsequent years, this model has become the basis for empirical research conducted from the moment of its origin up to the present day (including Goodhue, Thompson, 1995; Pitt, Watson, Kavan, 1995; Taylor, Todd, 1995; Wang, Strong, 1996; Igbaria, Chidambaram, 1997; Agarwal, Prasad, 1999; Karahanna, Straub, 1999; Liu, Arnett, 2000; Hong, Kim, 2002; McKinney, Yoon, Zahedi, 2002; Rai, Lang, Welker, 2002; Mashhour, 2008; Vannirajan, Manimaran, 2009; Andoh-Baidoo et al., 2010; Zhu, Lin, 2010; Khayun, Ractham, Firpo, 2012; Olatokun, Owoeye, 2012; Aburas, Raihan, Hamid, 2013; Bossen, Jensen, Udsen, 2013; Koo, Wati, Chung, 2013; Okechi, Kepeghom, 2013; Romi, 2013; Manchanda, Mukherjee, 2014; Ramdan, Azizan, Saadan, 2014). Researchers used the assumptions contained in the DeLone and McLean model, but they also suggested a number of modifications (Pitt, Watson, Kavan, 1995; Seddon, Kiew, 1996; Seddon, 1997). The most important and well-known are the following suggestions by:

1) Pitt, Watson, and Kavan (1995), who emphasized the need to complete the model with a quality of information system service;
2) Seddon and Kiew (1996), who defined the significance of information system utility;
3) Seddon (1997), who emphasized the need to break down the factor into four more (expectations, consequences, perceived usefulness, and benefits for society).

DeLone and McLean (2004) conducted yet another literature study in 2002,[4] which aimed to verify if the model had been confirmed in research and whether it facilitated the understanding and measurement of information system success. These studies confirmed or denied proposed dependencies, and they presented a critical analysis and possible directions of model modification. Despite an impressive number of publications that used the assumptions formulated in the model, only a few empirically verified it (Seddon, Kiew, 1996; Rai, Lang, Welker, 2002). The vast majority of these studies tested only selected relationships between

4 285 reviewed articles published in scientific journals or conference materials, which were published before mid-2002.

the identified variables (Goodhue, Thompson, 1995; Etezadi-Amoli, Farhoomand, 1996; Jurison, 1996; Igbaria, Chidambaram, 1997; Guimaraes, Igbaria, 1998; Teo, Wong, 1998) or they tested models that were modified to some extent (Teng, Calhoun, 1996; Igbaria, Chidambaram, 1997; Gelderman, 1998; Yoon, Guimaraes, Clevenson, 1998; Yuthas, Young, 1998; Torkzadeh, Doll, 1999; Weill, Vitale, 1999; Wixom, Watson, 2001). As a result, DeLone and McLean developed an updated version of the model (Figure 2.3).

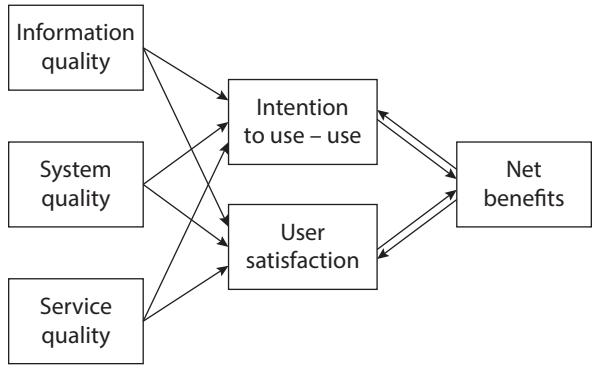

Figure 2.3. DeLone and McLean's updated model of information system success

Source: DeLone, McLean, 2004, p. 9.

The updated model shows that the quality of the system, the quality of the information it contains, and the quality of its service is the basis of information systems success. These factors directly affect both the level of the actual use of the system by users and their satisfaction. The updated version of the model:

1) adds an additional variable that describes service quality;
2) extends the system use variable with the intention to use it in the future;
3) combines variables that characterize the impact on an individual user and the entire organization into one: net benefits.

In subsequent years, many publications have been published that address the measurement of individual factors indicated in the model and analyze the relationships between them. One of the more comprehensive articles includes other suggestions from the authors of the model themselves (Petter, DeLone, McLean, 2013), but the following publications should also be mentioned: Sedera, Gable, and Chan (2004), Bokhari (2005) or Sabherwal, Jeyaraj, and Chowa (2006). Examples of selected studies broken down into types of information systems are presented in Table 2.1.

Researchers related to the model emphasize that the key goal of their research is still the desire to identify areas requiring further analysis. They also stress that research related to information system success is not completed, and there

is no final consensus in the literature as to what factors condition this success (Petter, DeLone, McLean, 2008; 2013). In 2007, DeLone and McLean (Petter, DeLone, McLean, 2008) conducted another analysis of the research related to the relationships included in the model (based on 180 publications in which the model was a basis for the conducted analysis). This study presented examples that confirm their previous conclusions, but it did not lead to another update of the model.

Table 2.1. Examples of studies which verified the assumptions of the model post-2000

Type of information system	Publication
Data warehouse	Wixom, Watson, 2001; Shin, 2003; Nelson, Todd, Wixom, 2005; Wixom, Todd, 2005
E-commerce	Molla, Licker, 2001; DeLone, McLean, 2004; Wang, 2008; Lai, 2016
Enterprise management system, decision support system	Gable, Sedera, Chan, 2003; Bharati, Chaudhury, 2004; Sedera, Gable, 2004; Elbeltagi, Hegazy, Grierson, 2005; Iivari, 2005; Qian, Bock, 2005; Lin, Lee, 2006; Sedera, 2006; Tam, Oliveira, 2016; Ojo, 2017
Government systems	Wang, Liao, 2007; Gable, Sedera, Chan, 2008; Tona, Carlsson, Eom, 2012
Health information system	Seng, Yusof, 2006; Bossen, Jensen, Udsen, 2013
Internal communication system	Hussein, Karim, Selamat, 2007; Masrek, 2007; Trkman, 2010; Urbach, Smolnik, Riempp, 2010
Knowledge management system, educational system	Jennex, Olfman, 2003; Clay, Dennis, Ko, 2005; Kulkarni, Ravindran, Freeze, 2006; Lin, 2007; Halawi, McCarthy, Aronson, 2008; Velasquez, Durcikova, Sabherwal, 2009; Dadmand, 2014; Chen, Chengalur-Smith, 2015; Cheok, Wong, 2015; Tajuddin, 2015
Banking system	Vannirajan, Manimaran, 2009; Andoh-Baidoo et al., 2010; Zhu et al., 2010; Aburas, Raihan, Hamid, 2013; Koo, Wati, Chung, 2013; Okechi, Kepeghom, 2013; Manchanda, Mukherjee, 2014; Tam, Oliveira, 2016
On-line communication system	Lin, Lee, 2006; Hsu, Yen, Chung, 2015
Archiving and security system	Paré et al., 2005; Mardiana, Tjakraatmadja, Aprianingsih, 2015; Astuti, Abdillah, 2017
Internet system (shopping, web pages)	Schaupp, Fan, Belanger, 2006; Al-Debei, Jalal, Al-Lozi, 2013; Zhou, 2013; Hsu, Yen, Chung, 2015; Yoon, Kim, 2015; Al-Shargabi, Sabri, 2016
Accounting system	Ismail, 2009; Daoud, Triki, 2013
Other (questionnaire carried out in different types of enterprises)	Roldán, Leal, 2003; Kulkarni, Ravindran, Freeze, 2006; Wu, Wang, 2006

Source: own elaboration.

2.2. A model for assessing the implementation of operational budgeting

2.2.1. Preliminary assumptions

DeLone and McLean's model of information systems success is the basis for a model that enables the use of operational budgeting in an enterprise to be measured and assessed. The developed model is based on the original DeLone and McLean model because subsequent modifications do not apply to the specifics of operational budgeting in an enterprise. In particular, it was found that:

1) variables that determine individual and organizational benefits will not be unified – leaving them in the form of two separate indexes does not disturb the concept and seems to be more transparent and intuitive for respondents;
2) there is no need to add a service quality variable to the model because operational budgeting is an internal process in an enterprise and it is not subjected to external evaluation and verification (IT system support, which is a tool for implementing the budgeting process can be an outsourced service; however, these activities are not carried out systematically and constantly).

The DeLone and McLean model became the basis of the model because an operational budgeting system is part of an enterprise's comprehensive information system. What is more, it is a widely known and used tool of management accounting (Armitage, Webb, Glynn, 2016; Otley, 2016; Quattrone, 2016).

Operational budgeting is based on two main pillars: a) people and b) the tools that are available to them. It should be borne in mind that today, the development of IT systems has a significant impact on operational budgeting. The systems are used not only to generate statements and reports but also for current decision-making needs in the enterprise (Gullkvist, 2013). In addition, IT systems allow repeated use of collected information without compromising its timeliness and usefulness (Czernicki, Jeziorski, 2008). They also allow a simulation of various activities and their analysis, which in turn improves planning and management of processes performed in the enterprise (Cywka, 2006).

The assessment of the use of operational budgeting in accordance with the suggested model is based on four aspects, i.e. the use of the system, user satisfaction and its impact on both individual employees and the entire enterprise. The factors conditioning its achievement include the quality of the system (this variable characterizes both operational budgeting process and the IT system used during budgeting) and the quality of generated information. In addition, it was assumed

that the quality of the system and the quality of information are closely related, i.e. the improvement of the system quality should influence the increase in the quality of information, which is a product of operational budgeting. The diagram of the suggested model is presented in Figure 2.4.

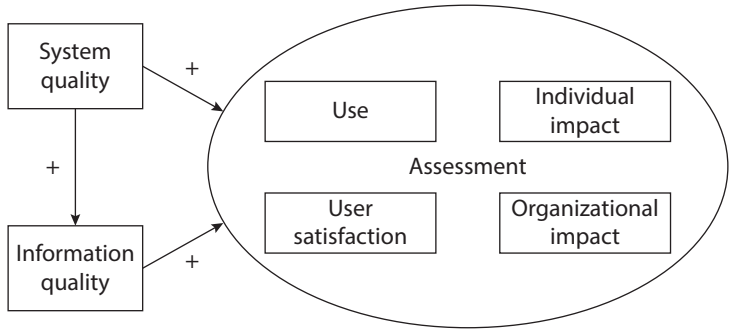

Figure 2.4. Model of assessment of the implementation of operational budgeting

Source: own elaboration.

The dependencies presented in the diagram (illustrated by means of using arrows) are consistent with the hypotheses that will be discussed later in this chapter. The definitions of the variables and how to measure them will be described in the next section.

2.2.2. Defining and measuring the variables

On the basis of the literature review, for each of the distinguished variables, the following were adopted:

1) the definition: most often it was defined by the features that should characterize a given variable, and
2) the method of measurement, which was subsequently used while constructing the research tool – a questionnaire (Appendix).

Each of the individual variables is presented in the further part of the chapter.

2.2.2.1. System Quality

The quality of a system is interpreted using a set of features that should characterize a given system; the variable consists of two aspects that describe:

1) IT system quality (a tool that allows a user to process input into output information utilizing procedures and models);
2) operational budgeting quality (a process that involves designing, creating, approving, and implementing a budget, and its subsequent control).

However, for the purpose of further analysis, the data will be analyzed jointly. This decision stems from the fact that it is difficult to separate these two aspects due to their strong linkage. In other words, today, it is very difficult for users of operating budgeting systems to imagine budgeting without IT tools. The basic features that describe the quality of the system usually involve:

1) flexibility (Sedera, Gable, 2004; Iivari, 2005; Zhang, Dawes, Sarkis, 2005; Ifinedo, Nahar, 2007; Gable, Sedera, Chan, 2008; Prybutok et al., 2008; Teo, Srivastava, Jiang, 2008; Wang, Liao, 2007; Petter, McLean, 2009; Petter, DeLone, McLean, 2013; Yeh, Xu, 2013);
2) availability (McKinney, Yoon, Zahedi, 2002; Gable, Sedera, Chan, 2003; Petter, McLean, 2009);
3) reliability (Gable, Sedera, Chan, 2003; Applegate et al., 2006; Petter, McLean, 2009; Zaied, 2012);
4) efficiency (Gable, Sedera, Chan, 2003; Zaied, 2012);
5) response time (Skok, Kophamel, Richardson, 2001; Iivari, 2005; Wixom, Todd, 2005; Zhang, Dawes, Sarkis, 2005; Au, Ngai, Cheng, 2008; Laudon, 2012; Petter, DeLone, McLean, 2013);
6) ease of use (McKinney, Yoon, Zahedi, 2002; Gable, Sedera, Chan, 2003; Sedera, Gable, 2004; Ifinedo, Nahar, 2007; Gable, Sedera, Chan, 2008; Wang, Liao, 2007; Zaied, 2012);
7) integration (Sačer, 2006; Norman, Yasin, 2007; Morley, Parker, 2009).

In order to define the quality of operational budgeting, the respondents were asked to determine to what extent the budgeting information system is: a) transparent and user-friendly, b) easy to use, c) flexible, and whether it requires: d) little expenses, and e) time expenditure (a seven-point Likert scale was applied for these five questions, where 1 meant Completely disagree and 7 – Completely agree with a given statement).

In terms of budgeting in companies, the respondents answered three questions: a) "Is the budgeting process based on a budgeting instruction?", b) "Is it divided into stages with different people assigned to them, who are responsible for them?", and c) "Is the budgeting procedure transparent and comprehensible?" (yes and no answers were possible). On this basis, an index that reflects the quality of operational budgeting was built (detailed information on constructing the index is presented in the next chapter).

2.2.2.2. Information quality

The quality of the system is closely related to the quality of the generated information. Qualitative features of information are attributes that should be met by information in the management decision-making process. The issue of the qualitative

characteristics of information for decision-making needs has been widely discussed in the literature since the beginning of the 1970s. It mainly relates to publications in the field of information systems and accounting. A list of the most frequently mentioned qualitative features of information is presented in Table 2.2.

Table 2.2. Qualitative characteristics of information

Author	Year	Information attributes
Sterling	1970	Relevant, reliable, objective or subjective, detailed
Greenball	1971	Relevant, expensive, objective
Feltham	1972	Relevant, reliable, useful, informational, timeliness, cost/benefit relation, different scales of information for different purposes
Motil	1972	Representative, unique, reasonable, valid, reliable, useful, relevant, cost/benefit relation
Kolman	1973	Relevant, useful, correct, usable, experiential, profitable
Mock	1976	Behavioral limitations: transparency (simple, quality, comparability, compliant with user's concept); value of information – relevant, cost/benefit relation, decision context (influence on decisions – relevance)
Kisielnicki	1978	Minimal characteristics (available, up-to-date, comparable, reliable, information loss), optimization characteristics (reliable, reproducible, flexible, efficient, cost, response time, detailed, stable, active, priority, confidential, easy to use, secure)
Kiziukiewicz	1994	Relevant, useful, complete, up-to-date, available, reliable, profitable
Sopińska	1999	Relevant, up-to-date, complete, accurate
Shin	2003	Timeliness, accurate, useful, relevant
Stefanowicz	2004	Relevance, up-to-date, communicativeness, univocal, complete, flexible, reliable
Karmańska	2006	Useful for decision-making, usable, "just in time" reporting
Halawi, McCarthy, Aronson	2008	Timeliness, transparent, accurate, relevant
Zimmermann	2009	Relevant, up-to-date, available, useful, profitable
Jiabalvo	2010	Relevant, predictive, up-to-date, available, profitable
Dull, Gelinas, Wheeler	2012	Timeliness, accuracy, and completeness
Porter, Norton	2012	Relevant, timeliness, complete, neutral, error-free
Romney et al.	2012	Accurate, up-to-date, complete, relevant
Turyna	2012	Attributes of individual data (accuracy, form, frequency, relevance, scope, original, unique, up-to-date, time horizon) Attributes of sets of information (relevance, completeness, up-to-date)

Source: own elaboration.

As a result of the review of the studies presented in Table 2.2, in order to define the quality of information generated by the system of operational budgeting, the respondents of the study were asked to determine to what extent this information is: a) easily accessible and available, b) accurate, precise, and

relevant, c) credible and reliable, d) up-to-date and "delivered on time," as well as e) understandable and accessible to the recipient (a seven-point Likert scale was applied for these five questions, where 1 meant Completely disagree and 7 – Completely agree with a given statement). On this basis, an index that reflects the quality of information generated by the system of operational budgeting was built (detailed information on constructing the index is presented in the next chapter).

2.2.2.3. System use

Another variable showing the use of operational budgeting defines its usefulness for the purpose of management. In research into operational budgeting, researchers try to determine its impact on the functioning of an enterprise by distinct management functions, treating operational budgeting as a tool that enables the company to be managed. Selected studies on operational budgeting by management function are presented in Table 2.3.

Table 2.3. Selected studies on operational budgeting by management function

Planning	Hansen, Otley, Van der Stede, 2003; Hansen, Van der Stede, 2004; Abdel-Kader, Luther, 2006; De With, Dijkman, 2008; Sivabalan et al., 2009; Becker, Messner, Schäffer, 2010; Sleihat, Al-Nimer, Almahamid, 2012
Organizing	Epstein, Manzoni, 2002; Angelakis, Theriou, Floropoulos, 2010; Al Farouk, McLellan, 2011; Yalcin, 2012; Otley, 2016
Leading, commanding	Epstein, Manzoni, 2002; Hansen, Otley, Van der Stede, 2003; Hansen, Van der Stede, 2004; Anthony, Govindarajan, Dearden, 2007; De With, Dijkman, 2008; Sivabalan et al., 2009; Becker, Messner, Schäffer, 2010
Coordinating	Epstein, Manzoni, 2002; Abdel-Kader, Luther, 2006; Angelakis, Theriou, Floropoulos, 2010; Al Farouk, McLellan, 2011; Yalcin, 2012
Controlling	Epstein, Manzoni, 2002; Abdel-Kader, Luther, 2006; De With, Dijkman, 2008; Angelakis, Theriou, Floropoulos, 2010; Al Farouk, McLellan, 2011; Sleihat, Al-Nimer, Almahamid, 2012; Yalcin, 2012

Source: own elaboration.

Based on a classic division of management functions and a review of the literature related to the use of operational budgeting in an enterprise management process (Table 2.3), the survey questionnaire distinguished the following functions of operational budgeting: a) business planning, b) communicating goals, c) coordinating activities, d) evaluating development directions, e) motivating managers, f) evaluating managers' work, g) rewarding managers, h) allocating resources, and i) authorizing expenses. The respondents were asked to specify to what extent they agree with the statement that operational budgeting in their company facilitates the performance of the above-mentioned functions. Answers were given

on a seven-point Likert scale (where 1 meant Completely disagree and 7 – Completely agree with a given statement). On this basis, an index that reflects the use of the operational budgeting was built (detailed information on constructing the index is presented in the next chapter).

2.2.2.4. User satisfaction

The next variable reflects the level of user satisfaction in terms of operational budgeting. Undoubtedly, it is the most subjective area of all. Satisfaction, including satisfaction in the workplace, is related to the ability to fulfill individual needs, goals, values, and beliefs (Bartkowiak, 2009). According to Chatzoglou et al. (2011), job satisfaction is defined as what an employee feels towards his or her job. Alam (2012) explained that job satisfaction is an employee's emotion towards their job and how they evaluate their job. In turn, Puvada and Gudivada (2012) defined job satisfaction as a set of emotional feelings of an employee towards their job and organization. Habib, Khurseed, and Idrees (2010) described job satisfaction as a positive feeling based on a person's job and experience. In other words, job satisfaction describes the personal feelings of employees towards their job. It is an individualized feeling. It consists of numerous elements that are conditioned by many factors that are evaluated differently by the respondents. Satisfaction can also be interpreted by areas from which it should result. Selected approaches are presented in Table 2.4.

Table 2.4. Areas of employee satisfaction assessment

Author	Components
Brilman, 2002	Salary, corporate image, relations between employees and managers, interest in work, development opportunities, employment security, use and appreciation of coworkers' abilities, nature of the work performed, scope of responsibility, promotion system
Vigg, Mathur, Holani, 2007	Social and economic benefits; relations with colleagues, subordinates, and superiors; authority to make decisions; achievements, social programs and organizational policy in the field of service security and working conditions
Andrałojć, Szambelańczyk, 2009	Economic factors (the result of remuneration), professional factors (type of tasks, frequency of their change, scope of activities requiring appropriate skills, degree of autonomy in the implementation of tasks, speed of receiving feedback on the results of work, physical working conditions), social factors (organizational culture, including the type of social relations in the organization)
Lipińska-Grobelny, Głowacka, 2009	Colleagues, supervisor, work content, working conditions, organization and management, development, remuneration
Boyce, Brown, Moore, 2010	Career and status of an individual as an employee, good health and well-being at work, personal development, relationships between work and personal life, mental and physical effort, interpersonal relations at work
Padala, 2010	Remuneration, incentives and promotion opportunity

Author	Components
Samartha, Begum, 2011	Personal factor, work environment, administrative bottlenecks, professional pressure, job insecurity, and mental burden
Baka, 2012	Salary, working conditions, relations with supervisors and colleagues, development opportunities, work content
Deshpande et al., 2012	Interpersonal relations between management and lower-level personnel, training and development, working conditions and the amount of remuneration
Shaikh, Bhutto, Maitlo, 2012	Nature of the job, colleagues, supervisor, salary, promotion opportunity
Nazeri, Babayof, Keshavarzi, 2017	Salary, promotion opportunity, supervisor, additional benefits, rewards, working conditions, colleagues, nature of work, communication

Source: own elaboration.

The variable in the suggested model is supposed to reflect satisfaction in areas such as: supervisor, recognition, colleagues, development, working conditions, and remuneration. The respondents were asked to specify their attitude towards: a) the content of their job, b) the type of tasks, c) the physical conditions of their employment, d) the possibility of promotion, e) the amount of remuneration, f) the organizational policy of the company, g) the ethical aspects of work, h) relations with colleagues, i) relations with superiors, j) fulfillment of personal needs and aspirations, and k) a general assessment including all aspects of work (answers to each of these aspects were given on a seven-point Likert scale, where 1 meant Completely disagree and 7 – Completely agree with a given statement). On this basis, an index that reflects users' satisfaction was built (detailed information on constructing the index is presented in the next chapter).

2.2.2.5. Individual and organizational benefits

The last two variables included in the model reflect the benefits of implementing operational budgeting. These benefits were divided into two categories: a) individual benefits, i.e., achieved by an individual user, and b) organizational benefits, i.e., benefits achieved at the level of an entire organization. Studies conducted in the European Union show that 99% of medium-sized and large companies, regardless of type and scale of operations, as well as country of origin, used budgeting as an essential element of controlling activities (Hope, Fraser, 1997). In addition, a review of the literature (De With, Dijkman, 2008; Angelakis, Theriou, Floropoulos, 2010; Al Farouk, McLellan, 2011; Yalcin, 2012) indicates that the importance of budgeting is much broader, as it: a) promotes the coordination and evaluation of activities, b) helps to motivate and evaluate employee performance, and c) supports organization's internal control system. However, operational budgeting is primarily used for planning (Hansen, Otley, Van der Stede, 2003; Hansen, Van

der Stede, 2004; De With, Dijkman, 2008; Sivabalan et al., 2009; Becker, Messner, Schäffer, 2010; Sleihat, Al-Nimer, Almahamid, 2012) and cost control (Angelakis, Theriou, Floropoulos, 2010; Al Farouk, McLellan, 2011; Sleihat, Al-Nimer, Almahamid, 2012; Yalcin, 2012).

Budgets are also used to coordinate the activities of individual, isolated responsibility centers in order to ensure their cooperation and that they implement specific goals (Epstein, Manzoni, 2002; Angelakis, Theriou, Floropoulos, 2010; Al Farouk, McLellan, 2011; Yalcin, 2012). The next aim of operational budgeting is to control activities and motivate employees (Epstein, Manzoni, 2002; De With, Dijkman, 2008; Angelakis, Theriou, Floropoulos, 2010; Al Farouk, McLellan, 2011; Yalcin, 2012), as well as better resource allocation (Hansen, Otley, Van der Stede, 2003; Hansen, Van der Stede, 2004; Anthony, Govindarajan, Dearden, 2007; De With, Dijkman, 2008; Sivabalan et al., 2009; Becker, Messner, Schäffer, 2010). To a lesser extent, operational budgeting is used for long-term planning and linking budgets to the organization's strategy (Merchant, Van der Stede, 2003; Becker, Messner, Schäffer, 2010; Frow, Marginson, Ogden, 2010; Sleihat, Al-Nimer, Almahamid, 2012).

Individual benefits include: a) improved work quality (Sedera, Gable, 2004; Gable, Sedera, Chan, 2008), b) increased control over task performance procedures, c) faster task implementation (Sedera, Gable, 2004; Gable, Sedera, Chan, 2008), d) improved productivity (Sedera, Gable, 2004; Gable, Sedera, Chan, 2008), e) the implementation of more tasks, f) the facilitation of task implementation (Sedera, Gable, 2004; Gable, Sedera, Chan, 2008), and g) increased motivation in terms of the tasks performed.

Organizational benefits include: a) improved decision-making quality (Almutairi, Subramanian, 2005), b) improved communication between departments (Sabherwal, 1999; Almutairi, Subramanian, 2005), c) emphasis put on relationships and links between departments (Almutairi, Subramanian, 2005), d) increased business innovation, e) reduced costs and waste (Sedera, Gable, 2004; Almutairi, Subramanian, 2005; Gable, Sedera, Chan, 2008), f) definition and focus on strategic goals, and g) increased control over day-to-day operations (Becker, Messner, Schäffer, 2010; Frow, Marginson, Ogden, 2010; Sleihat, Al-Nimer, Almahamid, 2012).

The respondents were asked to specify to what extent they agree with the statement that operational budgeting in their company generates a given individual or organizational benefit (each of the above). Answers were given on a seven-point Likert scale, where 1 meant Completely disagree and 7 – Completely agree with a given statement. On this basis, indexes were built that reflect benefits for users or for the entire company (detailed information on constructing the index is presented in the next chapter).

2.2.3. Relationships and links between variables

According to Susanto (2015), the main aim of management accounting systems, and therefore also of operational budgeting, is to process data from various sources into information required by different users to reduce risk when making decisions. Romney et al. (2012) have a similar opinion. They claim that an information system of accounting collects, saves, stores, and processes data to produce information. Heidmann, Schäffer, and Strahringer (2008) add that the quality of the system reflects its ability to generate high-quality information. Arens, Elder, and Mark (2008) argue that organizations should develop an information system to ensure that economic events are noticed on time and in a reasonable manner in order to produce high-quality information.

A high-quality system (i.e., one that is transparent and user-friendly, which applies modern technologies and, at the same time, is easy to use and flexible) should provide users with information that is easily comprehensible, thus enabling it to be used effectively. It should provide complete and accurate information that will be useful in terms of the users' daily tasks and relevant to management decision-making. The assumption that the quality of the system determines information quality has been confirmed by many studies, including those in the field of Internet and mobile services (Lin, 2007), ERP systems (Gorla, Somers, Wong, 2010; Ifinedo et al., 2010) and project management (PMIS) (Raymond, Bergerson, 2008). Studies by Gorla, Somers, and Wong (2010), conducted among Hong Kong managers associated with the Institute of Certified Public Accountants, and Yeh and Xu (2013), conducted based on responses from 128 respondents from 14 faculties of a public university, indicate in a statistically significant way that a poor quality system results in lower quality of output information, and vice versa, improved system performance increases the quality of information it generates. Montesdioca and Maçada (2015) also positively verified it among 176 users of information systems in Brazil.

These studies were also conducted in relation to accounting systems: Ponte and Pilar (2000), Salahi, Vahab, and Abdolkarim (2000), Sačer (2006), Arens, Elder, and Mark (2008), Heidmann, Schäffer, and Strahringer (2008), Sajadi, Dastgir, and Hashem Nejad (2008), Salahi, Keramati, and Didehkhani (2010), Nicolaou (2011), Dull, Gelinas, and Wheeler (2012), Laudon (2012) Pornpandejwittaya (2012), Romney et al. (2012), Yeh and Xu (2013) Susanto (2015), Susanto, Chang, and Ha (2016). Dull, Gelinas, and Wheeler (2012) stated that an accounting information system can be an important element of an organization's success since it facilitates daily operations and provides useful information for managing the organization. Thus, it can be concluded that it is not possible to obtain high-quality information from an accounting system without an appropriate quality accounting information system (Sačer, 2006; Susanto, 2015). Information systems used in accounting can effectively

improve financial statements (Salahi, Vahab, Abdolkarim, 2000; Pornpandejwittaya, 2012) and accelerate transaction processing (Sajadi, Dastgir, Hashem Nejad, 2008). Ponte and Pilar (2000) claim that the quality of an accounting information system is the basis for supporting the creation of high-quality information used in the decision-making process. The above arguments suggest that the high quality of the system leads to high-quality information; on this basis, Hypothesis 1 was formulated:

H1: The quality of the system positively affects the quality of the information it generates.

Variables such as system quality and information quality are factors that determine the success of the system, which was presented using three aspects: a) system use, b) user satisfaction, and c) benefits (individual and organizational). Tables 2.5 and 2.6 present empirical studies that verify the impact of these variables (system quality – Table 2.5, information quality – Table 2.6) on the specified elements that define the assessment (success) of operational budgeting. The measurement will make it possible to assess the use of operational budgeting.

Table 2.5. Empirical studies that verify the impact of the "system quality" variable on the elements of information system success

		Studies whose results have shown...	
		Correlation	Lack of correlation
Impact of "system quality" on...	system use	Igbaria, Chidambaram, 1997; Hwang, Windsor, Pryor, 2000; Morris, Venkatesh, 2000; Venkatesh, Davis, 2000; Hong, Kim, 2002; Rai, Lang, Welker, 2002; Iivari, 2005; Hsieh, Wang, 2007; Halawi, McCarthy, Aronson, 2008; Tona, Carlsson, Eom, 2012	Markus, Keil, 1994; Subramanian, 1994; Straub, Limayem, Karahanna-Evaristo, 1995; Gefen, Keil, 1998; Lucas Jr., Spitler, 1999; McGill, Hobbs, 2003
	user satisfaction	Seddon, Kiew, 1996; Bharati, 2002; Devaraj, Fan, Kohli, 2002; Gelderman, 2002; Rai, Lang, Welker, 2002; McGill, Hobbs, 2003; Almutairi, Subramanian, 2005; Iivari, 2005; McGill, Klobas, 2005; Wixom, Todd, 2005; Wu, Wang, 2006; Hsieh, Wang, 2007; Leclercq, 2007; Halawi, McCarthy, Aronson, 2008; Tona, Carlsson, Eom, 2012	
	benefits	Seddon, Kiew, 1996; Gefen, Keil, 1998; Agarwal, Prasad, 1999; Lucas Jr., Spitler, 1999; Morris, Venkatesh, 2000; Venkatesh, Davis, 2000; Devaraj, Fan, Kohli, 2002; Rai, Lang, Welker, 2002; Bharati, Chaudhury, 2004; Wixom, Todd, 2005; Hsieh, Wang, 2007; Klein, 2007	Subramanian, 1994; Goodhue, Thompson, 1995; Chau, Hu, 2002; McGill, Klobas, 2005; Kulkarni, Ravindran, Freeze, 2006; Wu, Wang, 2006

Source: own elaboration.

Table 2.6. Empirical studies that verify the impact of the "information quality" variable on the elements of information system success

		Studies whose results have shown...	
		Correlation	Lack of correlation
Impact of "information quality" on...	system use	Rai, Lang, Welker, 2002; Kositanurit, Ngwenyama, Osei-Bryson, 2006; Halawi, McCarthy, Aronson, 2008	Goodhue, Thompson, 1995; McGill, Hobbs, 2003; Iivari, 2005
	user satisfaction	Seddon, Kiew, 1996; Bharati, 2002; Palmer, 2002; Rai, Lang, Welker, 2002; McGill, Hobbs, 2003; Bharati, Chaudhury, 2004; Almutairi, Subramanian, 2005; Iivari, 2005; Wixom, Todd, 2005; Kulkarni, Ravindran, Freeze, 2006; Wu, Wang, 2006; Leclercq, 2007; Halawi, McCarthy, Aronson, 2008; Caniëls, Bakens, 2012; Tona, Carlsson, Eom, 2012	Marble, 2003
	benefits	Gatian, 1994; Seddon, Kiew, 1996; D'Ambra, Rice, 2001; Rai, Lang, Welker, 2002; Bharati, Chaudhury, 2004; Kositanurit, Ngwenyama, Osei-Bryson, 2006; Wu, Wang, 2006	Hong, Kim, 2002; Kulkarni, Ravindran, Freeze, 2006

Source: own elaboration.

The "system quality" and "information quality" variables have a direct impact on the assessment of operational budgeting, i.e., improving their quality affects the success of operational budgeting in an enterprise and thus the high assessment of this tool. The above-mentioned studies show that each of the independent variables influences three factors that determine success, i.e.:

1) the use of operational budgeting,
2) the satisfaction of users of the system and
3) the benefits it generates.

We can then assume that they will also characterize the success based on these variables.

Nelson, Todd, and Wixom (2005) conducted a comprehensive study on the expected success of information system implementation, identifying several factors that determine both the quality of information and the quality of the system itself. Their analysis presents data accuracy as an inherent property of the information system that significantly increases the perception of system quality. Their study also describes completeness of information as a feature strongly related to success.

Ittner (2008) found very different relationships between independent variables related to performance measurement practices and two dependent variables: system success and company performance. They claim that previous studies on accounting

have shown that the perception of system success is influenced by various organizational and technical characteristics, making it an inappropriate indicator of a company's actual performance.

The information system can be perceived as technically advanced, facilitating communication, or reducing the need to manually reconcile data from various sources. None of these features, however, automatically translates into increasing a company's ability to identify and achieve its goals (such as return on capital employed, market share, or any other goals considered strategically important for the organization). Chapman and Kihn (2009) measured system success by analyzing whether the system (both budgeting and supporting information system) was considered profitable (i.e., the benefits exceeded the expenses), and it was indicated as an appropriate tool for managing the company. The results revealed a direct relationship between the level of information system integration and success. What is more, the authors argued that the approach to budgeting translates into company performance. Based on the studies mentioned above, further hypotheses were formulated:

H2: The quality of the system has a positive impact on the assessment of the use/success of operational budgeting.

H3: The quality of information has a positive impact on the assessment of the use/success of operational budgeting.

Hypotheses H2 and H3 cannot be supported by direct research, because it was not conducted in this form (i.e., success was not identified as an index that consisted of particular variables). The research only identified the relationship between all the individual variables, but not between groups of variables (Figure 2.5).

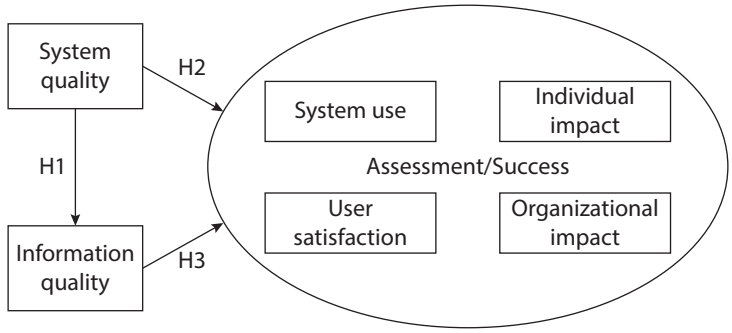

Figure 2.5. A model of operational budgeting success with research hypotheses

Source: own elaboration.

Importantly, the study will not verify the relationship between system quality and information quality and the variables defined as system components (system

use, user satisfaction, benefits). These variables are intended to assess the implementation and characterize the success of operational budgeting. They also determine the impact of the variables (system use, user satisfaction, benefits) on how it is measured and subsequently evaluated.

2.3. Design of the empirical research

Previous studies related to operational budgeting in Poland were most often conducted in the form of surveys, and they focused on the degree of its diffusion and use, as well as general characteristics of the system. In-depth analyses were conducted mostly in doctoral dissertations,[5] which most often focused on a specific type of activity of a particular organization, i.e., Polish Post: Drobiazgiewicz, a shipyard: Komorowski, a hospital: Kujawska, Cygańska and Kludacz-Alessandri, or a university: Ossowski.

Studies indicate a very high percentage of companies that use operational budgeting as one of the tools that enable company management. To some extent, these studies make it possible to characterize operational budgeting and observe trends in the foreign literature on the subject, i.e., its criticism and the need for an in-depth analysis that would improve current systems. This study fits into that trend, and the results are presented in the next chapter.

The survey employed a questionnaire that aimed to analyze the factors that characterize the use and success of operational budgeting, and the factors that condition it. The questionnaire was also intended to measure and evaluate the use of operational budgeting. By verifying the research hypotheses, an attempt was made to determine the impact of particular variables on assessing the implementation of this tool.

Regarding the stages of research into management accounting (Ryan, Scapens, Theobald, 2002), six stages were distinguished in this study:

1) defining the research hypotheses;
2) selecting research methods and objects;
3) designing the study;
4) ensuring the credibility and reliability of the study;
5) collecting the data;
6) evaluating and analyzing the data.

These stages are characterized in more detail below.

5 Data from http://nauka-polska.pl (accessed: 29.08.2018).

Stage 1. Defining the research hypotheses

The questionnaire was related to measuring and assessing operational budgeting. It aimed to verify the following research hypotheses:

H1: H1: The quality of the system positively affects the quality of the information it generates.
H2: The quality of the system has a positive impact on the assessment of the use/success of operational budgeting.
H3: The quality of the information has a positive impact on the assessment of the use/success of operational budgeting.

Stage 2. Selecting the research methods and objects

In 2016, a pilot study was carried out to verify the developed tool and make any necessary corrections. Based on a small sample of approximately 20 respondents, the questionnaire was revised and subsequently distributed in the survey the following year. The questionnaires were distributed through two distribution channels, i.e., via the Internet and in person. The respondents included post-graduate students attending classes in 2017/2018 as well as students of previous editions and participants of various types of specialist workshops in cost accounting and management accounting. As a result of distributing the survey in this way, the sample is not representative.

Stage 3. Designing the study

A questionnaire consisting of four parts was used to analyze how the use of operational budgeting in Polish enterprises is assessed. The goal of the first three parts was to characterize:

1) the person completing the questionnaire;
2) the company where the employee was employed;
3) the functioning of the operational budgeting system in the enterprise.

The last part was designed to identify variables that make it possible to measure the success of operational budgeting and the variables that condition it.

The first part of the questionnaire aimed to present the general characteristics of the respondent. It contained six questions that covered such aspects as: a) gender, b) age, c) education, d) their role in the enterprise with regard to operational budgeting, e) time in the profession, and f) an assessment of their IT knowledge regarding the tools used for budgeting.

The second part of the questionnaire characterized the companies and consisted of eight questions about the specifics of their operations. These questions covered issues such as: a) type of activity, b) origin of equity, c) number of employees, d) amount of revenue in the year preceding the survey (2016), e) time

on the market, as well as the f) age, g) education, and h) work experience of the financial director.

The third part of the questionnaire aimed to present the operational budgeting of the organizations, and it consisted of ten questions. These questions included, in particular, characteristics of the IT system as a tool that allows a user to process input into output information utilizing procedures and models. The respondents were also asked to answer questions about the system of operational budgeting, i.e., the process of designing, creating, approving, and implementing the budget, as well as its subsequent control – these questions related to, among others, the workload incurred in the budgeting process, budgeting methods, characteristics of budgetary targets, and also the extent of the respondents' involvement in the operational budgeting process and how they influence it.

The last part of the questionnaire is devoted to areas that should make it possible to identify dependent and independent variables. Except for the first question, where the answer was defined as "yes" or "no", the respondents were asked to rate their answers on a seven-point scale, where 1 meant Completely disagree and 7 – Completely agree with a given statement. This part consisted of six questions, which referred to:

1) the use of operational budgeting (two questions);
2) the information generated by the system of operational budgeting (one question);
3) the respondent's benefits from the system of operational budgeting (one question);
4) the organization's benefits from the system of operational budgeting (one question);
5) the respondent's satisfaction (one question).

The selection of individual variables was carried out in accordance with the purpose of the study. Additionally, it was conducted in such a way that made it possible to reliably analyze operational budgeting success and, subsequently, determine the factors that condition it.

Stage 4. Ensuring the credibility and reliability of the study

When preparing and carrying out the survey, every effort was made to guarantee structural credibility, internal and external credibility, as well as the reliability of the survey:

1) structural credibility – the research was preceded by a literature review, both in the field of operational budgeting as well as methods of measuring and assessing success; the suggested model is based on theoretical and empirical foundations, both in terms of defining the variables and the relationships

between them; an attempt was also made to ensure structural credibility by presenting and discussing the author's proposals during scientific meetings of the Department of Accounting at the Faculty of Management of the University of Lodz;

2) internal credibility – when distributing the surveys, it was ensured that the respondents had knowledge of the analyzed phenomenon and that operational budgeting was used in their enterprises; in addition, the questionnaire contained a question about the functioning of operational budgeting, which aimed to eliminate companies that do not implement it; the questionnaire also included comments intended to dispel any of the respondents' doubts; a study designed in such a way makes it possible to observe cause-effect relationships based on the collected data;
3) external credibility – the results of the study were compared with the results of studies carried out by other researchers, both in Poland and internationally; as the sample was unrepresentative, this is important, since these results cannot be statistically generalized to all enterprises in the analyzed population;
4) reliability – before conducting the test, appropriate procedures and methods for documenting the test results were determined, including rules for collecting questionnaires, describing them, entering data into the system, and creating a database.

All the actions mentioned above aimed to ensure a sufficiently high quality of research.

Stage 5. Data collection

The study into the use of operational budgeting in Polish companies involved 852 respondents (questionnaires distributed via the Internet: 212, in person: 640). Of the 256 completed questionnaires that were returned, 210 of them were qualified for further analysis. In further verification of the collected material, the following questionnaires were rejected:

1) incomplete – there were 74 questions in the entire questionnaire (including bullet points), and an 80% threshold was adopted, i.e., only those questionnaires were taken into consideration in which respondents answered 60 or more questions; 38 questionnaires were rejected at this stage;
2) completed by respondents from the same company – there were eight doubled questionnaires.

The percentage of correctly completed surveys that were further analyzed was 24.65%. There was a relatively high return rate of surveys results from those that were distributed in person – 27.81% (the return rate of questionnaires distributed

via the Internet is lower, out of 212 questionnaires sent in this form, answers were obtained from 32 respondents –15.09%).

Stage 6. Data evaluation and analysis

The analysis and evaluation of the documentation collected in the form of the questionnaires was the final stage of the study. The collected research material was verified for cross-compliance. The verification for internal consistency of the questionnaires included making sure that if a respondent indicated "it is not related to the budgeting process" in one question, then in another one he/she did not write "participation in the budgeting process is very large."

3. Dimensions of operational budgeting assessment in the light of the questionnaire research

3.1. General characteristics of the respondents and their companies

3.1.1. General characteristics of the respondents

The respondents and the manufacturing companies they worked for were characterized on the basis of information collected by means of questionnaires. The respondents were divided according to six criteria: age, sex, university education in business/economics, their role in the company, as well as the length of their professional career and the level of IT knowledge in relation to the tools used for budgeting. The description of the organizations was based on the origin of capital, the number of employees, annual turnover for the year preceding the study, and the time of the company's operation. In addition, data regarding the Chief Financial Officer of each organization was obtained, i.e., their age, education, and length of professional career in their current position.

Women dominated among the respondents. There were 140 females (67%) from the total number of 210 respondents; men constituted 33%. The respondents differed in terms of age. More than half of the respondents were under 40 (107 people, i.e., 51.2%), of whom 30.1% (63 people) were under 30 years old. The least numerous group was employees over 50 (11 people, 5.26%). The division of the population according to the age criterion in individual groups is presented in Figure 3.1.

Among the women, 49.6% were between 31 and 40 years old (69 respondents); the second largest group was the youngest, under 31 (45 people, 32.4%). Both groups, i.e., females under 40 years old, constituted 82% of the total. A similar division was observed for the men – the group under 30 years old: 24.6%, and 31–40

years old: 55.1%, which in total constitutes 79.7%. This allows us to conclude that the structure of both groups is similar, despite the difference in numbers.

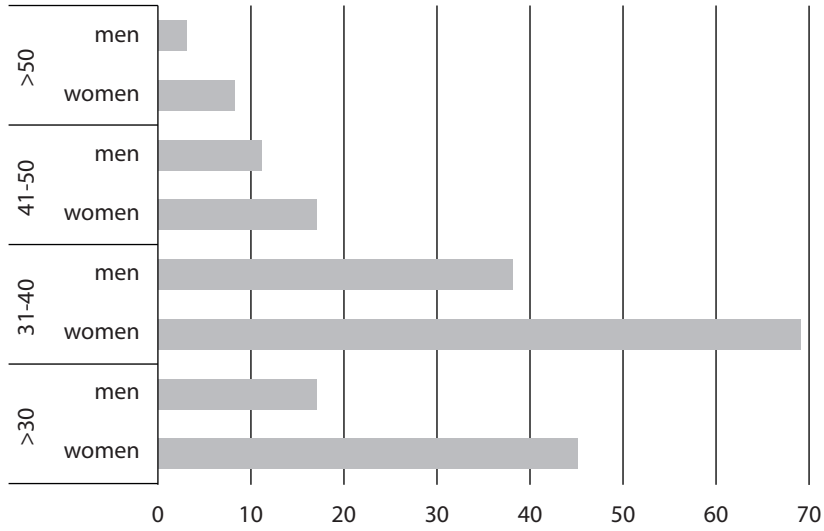

Figure 3.1. Age structure of respondents

Source: own elaboration.

The respondents' education in the field of business/economics was also verified. They were divided into four groups: lack of education in this field, bachelor's degree, master's degree, and higher than a master's degree. More than three-quarters of the respondents had a master's degree (161 people, which constituted 78.54%), while the other groups were much smaller and of similar sizes. Both those with a bachelor's degree or higher than a master's degree had 12 people (each group is 5.85%), while only 20 people did not declare any university degree in this field.

The respondents were asked to specify their role in the enterprise concerning operational budgeting, by defining it as: a) a controller, analyst, accountant, i.e., a person mainly involved in generating information in the budgeting system, or b) a manager, supervisor, i.e., they use information from the budgeting system. In order to eliminate people unrelated to budgeting, the respondents could mark the following option: "I have no connection with the budgeting process" – this answer was given by 12 people (6.78% of the analyzed questionnaires). Those who mainly deal with preparing information constituted the vast majority of the population – 142 respondents (80.23%) compared to 23 (13%) respondents who stated that their work was mostly related to the analysis and further use of the budgeting information. A more detailed breakdown of individual groups related to operational budgeting in Polish enterprises is presented in Table 3.1.

Table 3.1. Characteristics of respondents who generate information and use information from the budgeting system

		Generate information	Use information
Sex	Female	101 (71.63%)	13 (56.52%)
	Male	40 (28.37%)	10 (43.48%)
Age	< 30	53 (37.59%)	4 (17.39%)
	31–40	68 (48.23%)	9 (39.13%)
	41–50	15 (10.64%)	5 (21.74%)
	> 50	5 (3.54%)	5 (21.74%)
Degree in business/economics	Less than bachelor's	12 (8.70%)	6 (27.27%)
	Bachelor's	8 (5.80%)	1 (4.54%)
	Master's	112 (81.16%)	13 (59.09%)
	Higher than master's	6 (4.34%)	2 (9.1%)

Source: own elaboration.

Women (71.63%) were mostly involved in the preparation of information. This figure is higher than for the group of people who use the information generated by the system (56.52%). The age range in both analyzed groups was also different. The first group (data preparation) mostly consists of people under 40 (85.82% in total), while the group of managers and supervisors was dominated by people aged 31–50 (82.61% in total; however, 43.48% are people over 40). The educational profile is also relatively different – most respondents who prepare information had master's degrees in business/economics (81.16% of people who prepare information). The group of managers and supervisors is more diverse – 59.09% declare they had a master's degree compared to 27.27% of respondents who answered "no education." However, it should be noted that the questionnaire included a question only about education in the field of business/economics, not about education in general, which may explain the high percentage of this answer in the analyzed group.

The division according to the length of career was relatively similar. People who had worked 5–10 years (71 people, i.e., 34.13%) constituted the most numerous group, the next groups included, respectively: 10–15 years (55 people – 26.44%) and more than 15 years (42 people – 20.19%). The remaining 40 people had worked for less than five years. The average rating of respondents in terms of their IT

knowledge in relation to the tools used for budgeting was 4.67,[6] (the average rating for people who prepare information was 4.86 compared to 4.22 for those who use the information).

3.1.2. General characteristics of the companies

Only people who worked for manufacturing companies (210 firms) participated in the study. 82 companies were characterized only by domestic capital (39.23%), while companies with foreign capital constituted – 127 (60.77%). The respondents were also asked to specify the number of employees and the amount of turnover for the year preceding the survey (2016) – Tables 3.2 and 3.3, respectively. The results allow us to state that large organizations prevailed, both in terms of employment and turnover.

Table 3.2. Employment in the surveyed companies

	Number	%	Cumulative number	%
< 10	1	0.48	1	0.48
11–50	12	5.77	13	6.25
51–250	65	31.25	78	37.50
251–1.000	72	34.62	150	72.12
> 1,000	58	27.88	208	100.00
In total	208	100.00		

Source: own elaboration.

More than half of the respondents (62.50%) classified their enterprise as employing more than 251 employees. Specifically, 72 firms (34.62%) employed between 251 and 1,000 people, and 58 enterprises (27.88%) had over 1,000 employees. Smaller companies employing fewer than 50 people were relatively uncommon – 6.25%, of which only 0.48% had the lowest employment, i.e., fewer than ten people.

With reference to the criterion of annual turnover, 132 enterprises (out of the 177 who provided answers to this question) generated revenues higher than €41 million per year (74.58%). Companies with a turnover of €41–200 million PLN (66 enterprises) constituted the most numerous group among the respondents. The largest organizations, with a turnover higher than €800 million, constituted 20.90%, while those with revenues of €201–800 million were 16.39%. Smaller firms, with a turnover below €40 million, represented 25.42% of the total (45 companies, of which 13 were the smallest organizations, declaring revenues below €8 million).

6 The respondents provided answers on a seven-point Likert scale, where 1 meant very low, and 7 very high.

Table 3.3. Sales turnover in the surveyed companies

	Number	%	Cumulative number	%
< €8 million	13	7.34	13	7.34
€8–40 million	32	18.08	45	25.42
€41–200 million	66	37.29	111	62.71
€201–800 million	29	16.39	140	79.10
> €800 million	37	20.90	177	100.00
In total	177	100.00		

Source: own elaboration.

The vast majority of the companies (83.81%) had been operating on the market for more than ten years (176 companies out of 210). The number of enterprises in the remaining groups declines as their time of operation decreases, i.e., 22 companies had functioned for between 6 and 10 years (10.48%), 11 between 1 and 5 (5.24%), and only one had started its activity in the year of the survey.

The second set of questions aimed to characterize the CFO in the companies. The respondents were asked about the CFO's age, university education in business/economics, and the length of career in the current position in the current company. Most respondents (59.28%) stated that the age of CFO was between 40 and 50 (115 people); there were 38 people (19.59%) under 40, 41 people over 50, and only nine over 60 (4.64% of the total). The CFO's education was most often defined as a master's degree (145 people, 82.37%), compared to 24 people with a degree higher than master's (13.64%) and seven with a degree lower than a master's (four people did not have any economics or business education, and three people had obtained a bachelor's degree). The time in the current position in the current company was relatively diverse; 37.44% of the CFOs had held the position for 1–5 years (73 people), 46 for 6–10 years (23.59%), and 27.18% (53 people) indicated more than ten years. The last and least numerous group was CFOs who had worked less than a year – 23 people, i.e., 11.79%.

3.1.3. Characteristics of operational budgeting

In the vast majority of the companies – 125 – operational budgeting had functioned for more than four years (68.53%), including 72 companies that had implemented the system more than ten years before the survey was carried out (36.55%). Only 28 respondents (12.18%) claimed that it had started to be used in the year of the study (i.e., for less than a year). The most common IT tool applied for budgeting included a spreadsheet or database (e.g., Excel or Access) – 67.31% of the respondents declared that they use it. The group of companies using a ready-made

and parameterized budgeting module in Enterprise Resource Planning (ERP) was relatively smaller – it included 21.63%. The remaining companies used parameterized, dedicated software for budgeting – 5.77%, or a specially developed IT program – 5.29%.

The respondents also determined to what extent they agree that the budgeting system is transparent and user-friendly, easy to use, flexible, and requires little costs and time. Answers were marked on a seven-point Likert scale, where 1 meant "strongly disagree" and 7 meant "strongly agree". The characteristics of the information systems are presented in Figure 3.2.

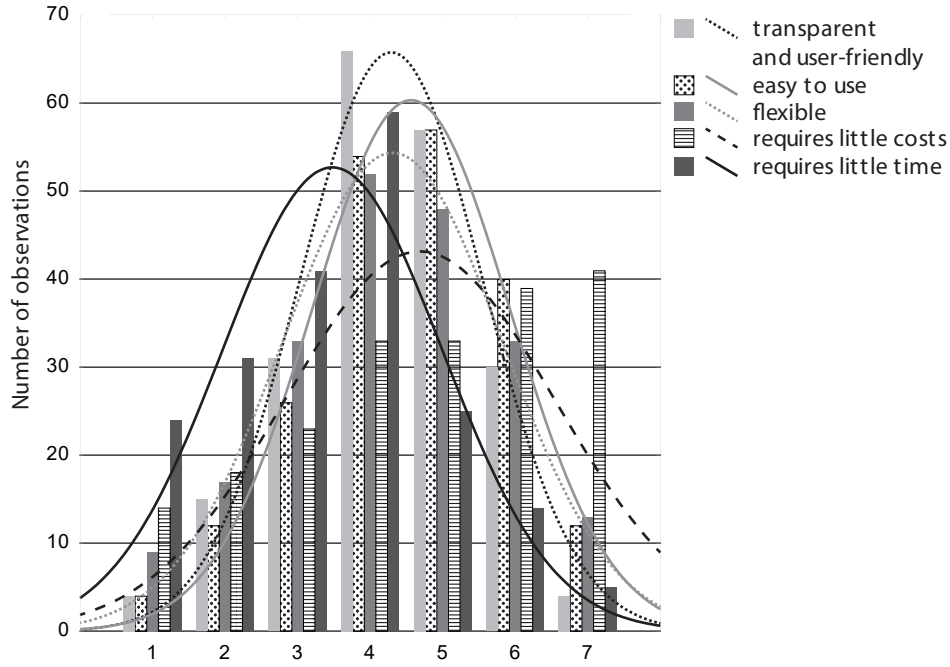

Figure 3.2. Characteristics of the IT systems of the surveyed companies

Source: own elaboration.

The results allowed us to determine that a dedicated IT system for operational budgeting required little expenditure (average rating: 4.66), it was considered relatively easy to use (4.54), while in terms of transparency and user-friendliness, as well as its flexibility, the ratings were at an average level (approximately 4, 4.27, and 4.28 respectively). The lowest level of agreement referred to saving time (3.46). Due to the variety of IT tools used by the companies, the analysis of features that characterize them was also carried out in a cross-section of individual, distinguished groups. The results are presented in Figure 3.3.

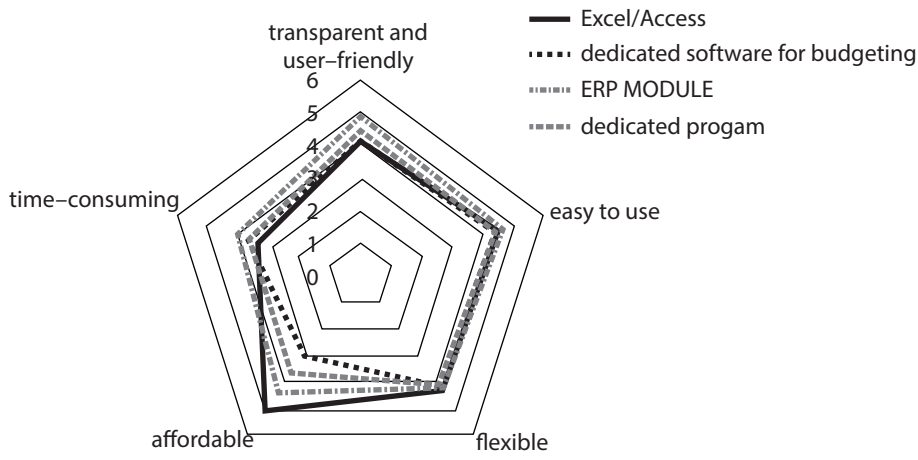

Figure 3.3. Characteristics of the IT tools

Source: own elaboration.

Ready-made and parameterized specialist software for budgeting was the most user-friendly and transparent option. It had an average rating of 4.91 in comparison to the lower results obtained for the budgeting module in the ERP – 4.51. A specially developed IT program received significantly lower ratings – 4.18, as did spreadsheets or databases (e.g., Excel, Access) – 4.17. However, spreadsheets and databases were rated the highest in terms of flexibility (4.38) and affordability (5.1). Unfortunately, this tool proved to be the most time-consuming (3.35). Specialized budgeting software (4.00) was the best in terms of the time consumption criterion, and it also required relatively low expenditure (4.36); however, this was done at the expense of its flexibility (4.18) – the lowest flexibility of all was ascribed to the ERP module. The highest costs (3.00) were incurred in terms of a specially developed IT program, which the respondents additionally rated as time-consuming (3.67). However, the remaining aspects were characterized at a relatively satisfactory level compared to others (with ratings between 4.18 and 4.45).

Great diversity was evident in relation to the number of people dealing with the system of budgeting: 34.83% of companies (70) had a single employee, and the budgeting system was only one of their duties, or it was their main task (3.48%), while others had two or three employees (33.83%) or four or more employees (27.86%). The surveyed enterprises most often applied incremental budgeting – 122 companies, i.e., 85.92%. The remaining methods were declared as follows:

1) zero-base budgeting – 52 companies (47.27%);
2) bottom-up budgeting – 73 companies (64.04%);
3) top-down budgeting – 72 companies (63.16%).

The study makes it possible to determine that 57.22% of enterprises rely on budgeting instructions, 82.18% divided the budgeting process into stages with the assignment of people responsible for their implementation, and 65.46% described the budgeting procedure as transparent and understandable. On a seven-point Likert scale, the respondents were also asked to determine the degree of difficulty in achieving budgetary targets, their participation in the budgeting process, and their impact on the budgeting system.

Table 3.4. Budgetary targets, respondents' participation in budgeting, and their impact on budgeting

	Budgetary targets		Participation in budgeting		Impact on budgeting	
Rating	Number	Percentage	Number	Percentage	Number	Percentage
1	0	0.00	21	10.00	32	15.31
2	7	3.38	21	10.00	27	12.92
3	26	12.56	29	13.81	41	19.62
4	85	41.06	47	22.38	36	17.22
5	59	28.50	28	13.33	22	10.53
6	23	11.11	24	11.43	30	14.35
7	7	3.38	40	19.05	21	10.05
Mean		4.42		4.30		3.78

Seven-point scale: a) difficulty in achieving budgetary targets, where: 1 – very easy to achieve, […], 7 – very difficult to achieve; b) respondent's participation in budgeting, where: 1 – very little, […], 7 – very high; c) respondent's impact on budgeting, where: 1 – very little, […], 7 – very high.

Source: own elaboration.

The results (Table 3.4) show that both difficulty in achieving budgetary targets and the respondents' participation in the process of operational budgeting are at an average level (respectively 4.42 and 4.30), targets are neither too easy to achieve (none of the respondents described them as "very easy to achieve"), nor too difficult (only seven people, 3.38% described them as "very difficult to achieve"). The respondents' involvement in the budgeting process was diverse. The most numerous group proved to be those whose participation was described as average (a score of 4) – 47 people chose this answer (22.38%). 43.81% of respondents expressed greater involvement (answers above 5 – 92 people). The remaining group (33.81%) consisted of people who rated their impact as lower than average, i.e., answer 1 "very little" – 10%, 2 – 10%, and 3 – 13.81%. Lower results were obtained regarding the respondents' impact on the operational budgeting process in the company. The group with a higher than average impact (answer: 4) constituted only 34.93% and was lower by 12.92 percent than the group, which indicated a lower than average impact (answers 1, 2, and 3) – 47.85%.

The frequency of problems related to budgeting was at an average level of 4.14, where 1 means that problems are very rare, and 7 means they are very frequent. 36.23% of respondents described the frequency as higher than average (responses 5 and above), and 21.74% described it as relatively rare (below 3 on the scale). Nevertheless, 47.06% of the companies do not plan to introduce any changes in operational budgeting, while 51.96% plan to expand and adapt the system of budgeting to current needs. Only one of the surveyed companies intends to abandon the system of operational budgeting.

3.2. Dimensions of operational budgeting use

The assessment of the use – and therefore, the success – of operational budgeting was determined using four dimensions: a) the use of the system, b) user satisfaction, c) individual impact, and d) organizational impact. In order to describe each of the above dimensions, the respondents were asked to specify each of the components of a given parameter on a seven-point scale, where the numbers indicated the degree of agreement with the statement: 1 – meant I do not agree and 7 – I fully agree.

3.2.1. The use of operational budgeting

Operational budgeting is a tool that is used for a variety of reasons (see Table 3.5). Most respondents (71.15%) gave it a score between 5 and 7, with 63 people giving it a score of 6, and 36 a score of 7. Thus, the average score is 5.17, which is confirmed by the skewness coefficient below zero with a very high value of –0.7455 (strong skewness to the left).

The other ratings are also at relatively high levels (average ratings above 4), and the distribution of each of them is left-skewed (negative values of the skewness coefficient). This means that the test sample is dominated by higher-than-average results, which is also confirmed by high values of the median and mode. The lowest results, although still high, were obtained for the use of operational budgeting for managers' remuneration, which could indicate that budgeting determines the remuneration system to a lesser extent, and it is not the basis for employee evaluation. 34.48% of respondents described it as lower than 3, while 40.39% indicated more than 4, resulting in a platykurtic (flattened) variable distribution (negative and high kurtosis coefficient – 0.7792) meaning lesser concentration around the average (4.0246).

Correlations between the variables that illustrate the ways operational budgeting is used are presented in Table 3.6.

Table 3.5. The use of operational budgeting

The use of operational budgeting for:	Number	Mean	Median	Mode	Mode size	Standard deviation	Coefficient of variation	Skewness	Kurtosis
planning	208	5.173077	5	6	63	1.413819	27.33034	–0.745500	0.177726
communication	209	4.665072	5	4	51	1.507282	32.30994	–0.367608	–0.447691
coordination	207	4.811594	5	4	57	1.310251	27.23112	–0.417797	–0.017378
activity evaluation	208	4.581731	5	4	62	1.377196	30.05843	–0.289688	–0.070464
managers' motivation	208	4.346154	4.5	5	56	1.543378	35.51134	–0.340551	–0.425205
managers' evaluation	208	4.408654	5	5	50	1.535827	34.83665	–0.355185	–0.595668
managers' remuneration	203	4.024631	4	4	51	1.686987	41.91657	–0.145255	–0.779171
resource allocation	199	4.492462	5	5	62	1.392147	30.98851	–0.466477	0.113840
expenditure authorization	202	4.821782	5	5	55	1.482207	30.73981	–0.522750	–0.213792

Source: own elaboration.

Table 3.6. Correlation between the ways of using operational budgeting

The use of operational budgeting for:	Planning	Communi-cation	Coordina-tion	Activity evaluation	Managers' motivation	Managers' evaluation	Managers' remuneration	Resource allocation	Expenditure authorization
planning	1.000000	0.675819*	0.666570*	0.489269*	0.437459*	0.405625*	0.374923*	0.448902*	0.383564*
communication	0.675819*	1.000000	0.672006*	0.566039*	0.502186*	0.416362*	0.453960*	0.449869*	0.311249*
coordination	0.666570*	0.672006*	1.000000	0.620251*	0.457563*	0.437160*	0.381613*	0.519003*	0.507596*
activity evaluation	0.489269*	0.566039*	0.620251*	1.000000*	0.497961*	0.446971*	0.417001*	0.489740*	0.387723*
managers' motivation	0.437459*	0.502186*	0.457563*	0.497961*	1.000000	0.868587*	0.710325*	0.414218*	0.439483*
managers' evaluation	0.405625*	0.416362*	0.437160*	0.446971*	0.868587*	1.000000	0.723432*	0.380036*	0.402925*
managers' remuneration	0.374923*	0.453960*	0.381613*	0.417001*	0.710325*	0.723432*	1.000000	0.455148*	0.398756*
resource allocation	0.448902*	0.449869*	0.519003*	0.489740*	0.414218*	0.380036*	0.455148*	1.000000	0.537845*
expenditure authorization	0.383564*	0.311249*	0.507596*	0.387723*	0.439483*	0.402925*	0.398756*	0.537845*	1.000000

* Correlation coefficients are significant with p-value = 0.05, N = 190.

Source: own elaboration.

The scale to assess the use of operational budgeting proved to be reliable. Cronbach's alpha coefficient was 0.896391, and the average correlation coefficient between the scale items was 0.507048 (high and statistically significant correlations between individual items of the scale – Table 3.6). It can, therefore, be assumed that this construct is relatively homogeneous. On this basis, an index describing the degree of operational budgeting use (*USE*) was built (equation 1).

Equation 1. The "use of operational budgeting" index

$$USE = \frac{\sum_{i_{USE}=1}^{9} \left(i_{USE} \times o \right)}{63}$$

where:
USE – the use of operational budgeting index,
i_{USE} – defined aspect describing the use of operational budgeting,
o – evaluation of a given aspect (1–7 scale).

The index was obtained by adding up the results for each of the nine aspects, and then, to make it easier to analyze, the result was divided by 63 (the maximum value that could be obtained, i.e., 9 aspects * the seven-point scale to describe each of them). In this approach, the index fits the range from 0 to 1.

The average rating of the use of the system was 0.7179, and the skewness (–0.3567) below 0 indicates a left-skewed distribution, which means that there are more results above the average in the sample. Most respondents rated the system use higher than average. This distribution is also confirmed by comparing the mean value with the median. The relationship is confirmed: mean (0.7179) < median and mode are the same value (0.7302).

The Shapiro-Wilk test was carried out for the system use feature to verify the compliance of the distribution with the normal distribution. Figure 3.4 presents the histogram with the distribution of the system use (*USE*) variable.

The results ($W = 0.98$, $p = 0.0563$) do not allow us to reject the null hypothesis at the level of $\alpha = 0.05$ or state that the examined variable (*USE*) does not have a normal distribution. To verify the hypotheses about the insignificance of the differences between the medians of the system use variable, the Mann-Whitney *U* test, which does not require the groups to be equinumerous, of a normal distribution, or of homogeneous variance, was applied in two groups (distinguished by the origin of capital variable). The results are presented in Table 3.7.

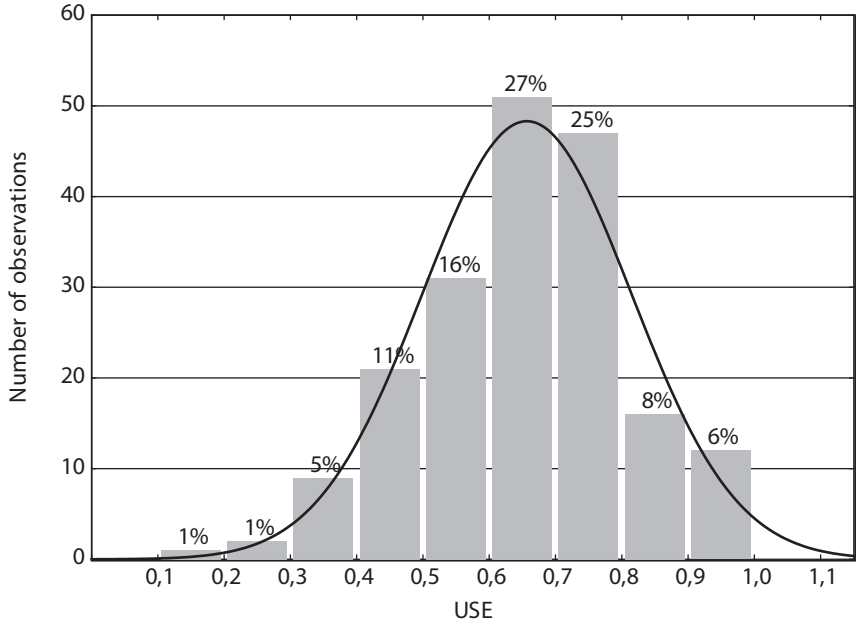

Figure 3.4. Histogram with the distribution of the system use (USE) variable

Source: own elaboration.

Table 3.7. Statistics of the Mann-Whitney *U* test for the *USE* index

	U value	*Z* value	*p*-value	Count of group 1	Count of group 2
Domestic capital	3700.000	1.561424	0.118425	114	75

* Statistics values and *p*-value are significant at the level of α = 0.05.

Source: own elaboration.

Based on the adopted level α = 0.05 and the z-statistic of the Mann-Whitney test without correction for continuity, as well as the accurate *U*-statistic, it can be assumed that there are no statistically significant differences between the use of operating budgeting and the origin of capital. To verify the hypothesis about the insignificance of differences between the medians of the studied variable in several groups, a test was used that was an extension of the *U*-Mann-Whitney test – the Kruskal-Wallis one-way analysis of variance, i.e., ANOVA Kruskal-Wallis on ranks. The groups were distinguished in terms of variables such as the number of employees (H (4, N = 188) = 9.120621, p = 0.0582), the value of revenues (H (4, N = 160) = 16.28344, p = 0.0027), the age of the CFO (H (3, N = 176) = 1.617991, p = 0.6553), the age of the enterprise (H (4, N = 190) = 2.236970, p = 0.6923) and the length of use of operational budgeting in the organization (H (3, N = 180) = 27.01579, p = 0.0000). The

obtained *p*-values show significant differences in the use of budgeting systems between the groups in terms of the value of revenues and the length of time operational budgeting had been used in the organization.

The post-hoc analysis made it possible to conclude that there are significant differences in terms of revenues between enterprises generating revenues above €800 million (median: 0.7936) and those with revenues below €8 million (median: 0.6270) and in the category €41–200 million (median: 0.6984). These results make it possible to claim that, in terms of turnover, larger organizations assess the quality of operational budgeting higher than others. Statistically significant differences were observed between companies that had been using operational budgeting for more than ten years (median: 0.8095) and those in which it had been functioning for less than a year (median: 0.6190) and 1–3 years (median: 0.6667). A larger scale of use is evident in companies that had been using the process of budgeting for many years, and smaller by those that had implemented it recently and were still getting to know it and learning how to use its functions.

3.2.2. User satisfaction

User satisfaction is yet another dimension of operational budgeting use. The level of user satisfaction is conditioned by numerous factors. For the purpose of index determination, 11 aspects were selected (Table 3.8). The ratings for each of them were very high, exceeding 4 in all the cases. The areas in which the ratings are the highest (a mean above 5) include relations with colleagues (5.52), employment conditions (5.35), relations with superiors (5.33), the content of the work (5.16), and the type of tasks performed (5.14).

The other ratings are also at relatively high levels (average above 4), and the distribution of almost all of them is left-skewed (negative values of skewness). This means that the test sample is dominated by higher-than-average results, which is also confirmed by high median and mode values (the only exception is the organizational policy of the company, where the skewness index is positive, but its value is close to zero). The lowest results, although still high, were for the company's organizational policy (average: 4.08). This may be caused either by the small impact of organizational policy on the level of satisfaction (this area may not have any impact or only a small impact on employee satisfaction) or a lower level of satisfaction in this area.

To determine the reliability of the scale, correlations between individual factors were examined – the results are presented in Table 3.9 below.

Table 3.8. User satisfaction with operational budgeting

Satisfied with:	Number	Mean	Median	Mode	Mode size	Standard deviation	Coefficient of variation	Skewness	Kurtosis
content of work	206	5.160194	5	5	70	1.035265	20.0625	–0.13956	–0.3894
type of tasks performed	208	5.149038	5	6	65	1.095401	21.2739	–0.29965	–0.2119
physical employment conditions	209	5.349282	6	6	71	1.195951	22.3572	–0.66869	0.3798
opportunities for promotion	207	4.473430	5	4	55	1.470757	32.8776	–0.32178	–0.3121
amount of remuneration	208	4.471154	5	5	62	1.314775	29.4057	–0.26512	–0.4179
organizational policy of the company	209	4.081340	4	4	75	1.333044	32.66192	0.009619	–0.250011
ethical aspects of the work performed	208	4.932692	5	Multiple	57	1.360338	27.57801	–0.609576	0.181228
relations with colleagues	209	5.521531	6	6	75	1.205263	21.8284	–0.75798	0.2504
relations with superiors	209	5.334928	5	5	63	1.268242	23.7724	–0.72342	0.4862
fulfillment of personal needs and aspirations	207	4.748792	5	5	69	1.320005	27.7966	–0.55031	0.2347
overall assessment of job satisfaction	209	5.038278	5	5	93	1.023037	20.3053	–0.89316	2.7308

Source: own elaboration.

Table 3.9. Correlation between measures of satisfaction with operational budgeting

Satisfied with:	Content of work	Type of tasks performed	Physical employment conditions	Opportunities for promotion	Amount of remuneration	Organizational policy of the company	Ethical aspects of the work performed	Relations with colleagues	Relations with superiors	Fulfillment of personal needs and aspirations	Overall assessment of job satisfaction
content of work	1.000000	0.777009*	0.483884*	0.366356*	0.294091*	0.463363*	0.431556*	0.372605*	0.452253*	0.568704*	0.650262*
type of tasks performed	0.777009*	1.000000	0.389502*	0.346873*	0.288609*	0.392407*	0.320200*	0.295494*	0.341959*	0.486262*	0.573077*
physical employment conditions	0.483884*	0.389502*	1.000000	0.387091*	0.386299*	0.510201*	0.562073*	0.344721*	0.378345*	0.370980*	0.451868*
opportunities for promotion	0.366356*	0.346873*	0.387091*	1.000000	0.672413*	0,.622270*	0.357309*	0.158833*	0.318042*	0.559430*	0.557223*
amount of remuneration	0.294091*	0.288609*	0.386299*	0.672413*	1.000000	0.556276*	0.422645*	0.265409*	0.314608*	0.536071*	0.527898*
organizational policy of the company	0.463363*	0.392407*	0.510201*	0.622270*	0.556276*	1.000000	0.590090*	0.312256*	0.465549*	0.533181*	0.538796*
ethical aspects of the work performed	0.431556*	0.320200*	0.562073*	0.357309*	0.422645*	0.590090*	1.000000	0.514826*	0.479199*	0.451155*	0.438133*
relations with colleagues	0.372605*	0.295494*	0.344721*	0.158833*	0.265409*	0.312256*	0.514826*	1.000000	0.548328*	0.418897*	0.468715*
relations with superiors	0.452253*	0.341959*	0.378345*	0.318042*	0.314608*	0.465549*	0.479199*	0.548328*	1.000000	0.575719*	0.552628*
fulfillment of personal needs and aspirations	0.568704*	0.486262*	0.370980*	0.559430*	0.536071*	0.533181*	0.451155*	0.418897*	0.575719*	1.000000	0.692897*
overall assessment of job satisfaction	0.650262*	0.573077*	0.451868*	0.557223*	0.527898*	0.538796*	0.438133*	0.468715*	0.552628*	0.692897*	1.000000

* Correlation coefficients are significant with p-value = 0.05, N = 201.

Source: own elaboration.

The scale to assess the use of operational budgeting proved to be reliable. Cronbach's alpha coefficient was 0.899743, and the average correlation coefficient between the scale items was 0.466514 (high and statistically significant correlations between individual items of the scale – Table 3.9). It can, therefore, be assumed that this construct is relatively homogeneous. On this basis, an index describing the degree of user satisfaction (*SU*) was built (equation 2).

Equation 2. The "user satisfaction" index

$$SU = \frac{\sum_{i_{SU}=1}^{11} \left(i_{SU} \times o \right)}{77}$$

where:
SU – user satisfaction index,
i_{SU} – defined aspect describing user satisfaction,
o – evaluation of a given aspect (1–7 scale).

The index was obtained by adding up the results for each of the 11 aspects, and then, to make it easier to analyze, the result was divided by 77 (the maximum value that could be obtained, i.e., 11 aspects * the seven-point scale for each description). In this approach, the index fits the range from 0 to 1.

The average user satisfaction rating was 0.7032, and the skewness (–0.0237) below 0 indicates a left-skewed distribution, which means that there are more results above the average in the sample. However, it should be stressed that the coefficient value is very low. Most respondents gave a user satisfaction rating higher than average.

The Shapiro-Wilk test was carried out for the user satisfaction variable to verify the compliance of the distribution with the normal distribution. Figure 3.5 presents the histogram with the distribution of the user satisfaction (*SU*) variable.

The results (Shapiro-Wilk $W = 0.99159$, $p = 0.29739$) do not allow us to reject the null hypothesis at the level of $\alpha = 0.05$; thus, it cannot be concluded that the examined variable (*SU*) does not have a normal distribution. To verify the hypotheses about the insignificance of the differences between the medians of the user satisfaction variable, the Mann-Whitney *U* test was applied in two groups (distinguished using independent variables) – the results are presented in Table 3.10.

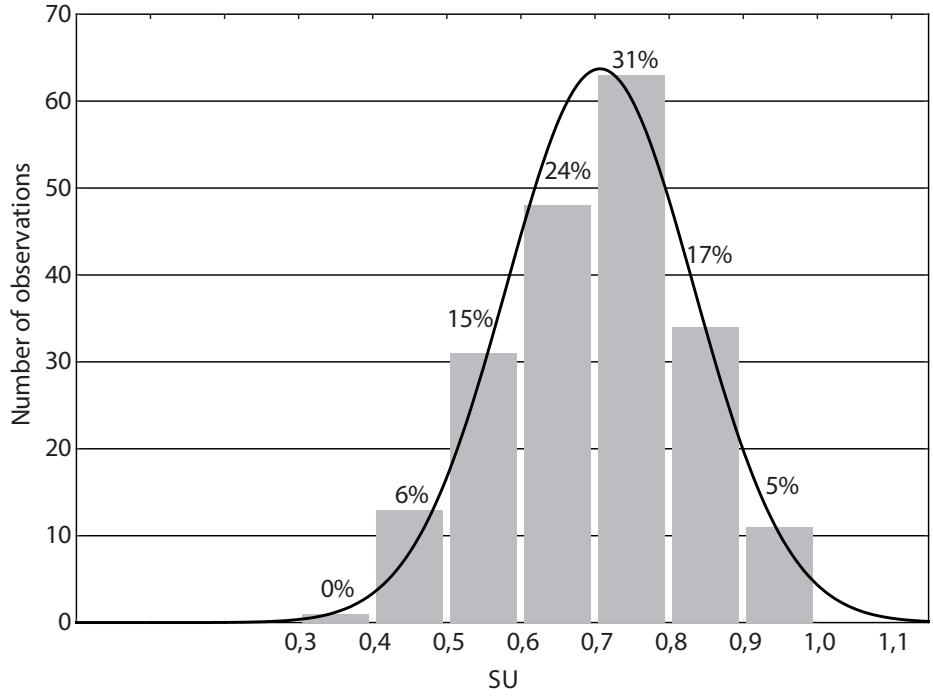

Figure 3.5. Histogram with the distribution of the user satisfaction (*SU*) variable

Source: own elaboration.

Table 3.10. Statistics of the Mann-Whitney *U* test for the *SU* index

	U value	*Z* value	*p*-value	Count of group 1	Count of group 2
Domestic capital	4586.500	0.384913	0.700302	120	79

* Statistics values and *p*-value are significant at the level of α = 0.05.

Source: own elaboration.

Based on the adopted level α = 0.05 and the *z*-statistic of the Mann-Whitney test without correction for continuity, as well as the accurate *U*-statistic, it can be assumed that there are no statistically significant differences between user satisfaction and the origin of capital.

To verify the hypothesis about the insignificance of differences between the medians of the studied variable in several groups, the ANOVA Kruskal-Wallis test on ranks was used. The groups were distinguished in terms of variables such as the number of employees (H (4, N = 199) = 1.379193, p = 0.8478), the value of revenues (H (4, N = 170) = 7.804961, p = 0.0990), the age of the CFO (H (3, N = 185) = 4.610631, p = 0.2026), the age of the enterprise (H (4, N = 201) = 2.899920, p = 0.5747), and

the length of time that operational budgeting had been used in the organization (H (3, N = 190) = 1.309295, p = 0.7269). The obtained p values show the lack of significant differences in the respondents' satisfaction between the groups in terms of the scope of employment, value of revenues, age of the CFO, age of the company, or time operational budgeting had been used for.

3.2.3. Individual impact

The impact on individual users and their work is yet another dimension of operational budgeting. In order to identify it, seven aspects were selected that may be affected by the implemented system of operational budgeting. Each aspect was rated highly, oscillating in most cases around 4. However, it should be emphasized that the results (Table 3.11) for this aspect are lower when compared to the two previous factors (i.e., system use and user satisfaction), which constitute the assessment of the use of operational budgeting in the company. The highest results (mean > 4) were recorded for the impact of operational budgeting on improving the quality of work and increasing control over performed tasks. Almost half of the respondents rated the following aspects higher than average, i.e., a score of 5–7: a) improving the quality of the work – 45.24%, b) increasing control – 50.95%.

Other ratings are also at relatively high levels (the average ratings are slightly below 4), and the distribution of each of them is left-skewed (negative values of skewness), which means that the test sample is dominated by higher-than-average results. This is also confirmed by high median and mode values. The lowest results, although it should be noted that they are still relatively high, were obtained for implementing a larger number of tasks (average: 3.85) and increasing motivation in terms of the implemented tasks (average 3.85). This may be because operational budgeting is not often used for employee remuneration (this dimension is included in the "System use" index). Only 39.05% of respondents defined the impact of budgeting on motivation between 5 and 7, although the percentage points decrease as the rating increases (5 – 23.38%, 6 – 11.43%, and 7 – 2.86%.).

To determine the reliability of the scale, correlations between individual factors were examined – the results are presented in Table 3.12.

Table 3.11. Impact of operational budgeting on individual users

The impact of the system:	Number	Mean	Median	Mode	Mode size	Standard deviation	Coefficient of variation	Skewness	Kurtosis
improves the quality work	207	4.183575	4	4	55	1.550171	37.05374	–0.373577	–0.438930
increases control over work-related procedures	204	4.235294	4	5	51	1.661956	39.24063	–0.418810	–0.631447
enables accomplishment of tasks more quickly	205	3.975610	4	4	51	1.613178	40.57687	–0.250166	–0.706615
increases productivity	206	3.956311	4	4	59	1.593595	40.27983	–0.263818	–0.635347
enables accomplishment of more tasks	205	3.814634	4	4	63	1.588803	41.65020	–0.180612	–0.614714
facilitates implementation of tasks	205	3.951220	4	4	63	1.592741	40.31012	–0.198773	–0.579153
increases motivation during performing tasks	205	3.848780	4	4	52	1.597044	41.49481	–0.245787	–0.701676

Source: own elaboration.

Table 3.12. Correlation between measures of individual impact

The impact of the system:	Improves the quality work	Increases control over work-related procedures	Enables accomplishment of tasks more quickly	Increases productivity	Enables accomplishment of more tasks	Facilitates implementation of tasks	Increases motivation during performing tasks
improves the quality work	1.000000	0.827953*	0.808404*	0.808646*	0.772521*	0.789162*	0.702946*
increases control over work-related procedures	0.827953*	1.000000	0.834183*	0.822349*	0.788254*	0.814008*	0.743494*
enables accomplishment of tasks more quickly	0.808404*	0.834183*	1.000000	0.894128*	0.897020*	0.894848*	0.772895*
increases productivity	0.808646*	0.822349*	0.894128*	1.000000	0.894113*	0.930167*	0.759334*
enables accomplishment of more tasks	0.772521*	0.788254*	0.897020*	0.894113*	1.000000	0.912265*	0.821709*
facilitates implementation of tasks	0.789162*	0.814008*	0.894848*	0.930167*	0.912265*	1.000000	0.779111*
increases motivation during performing tasks	0.702946*	0.743494*	0.772895*	0.759334*	0.821709*	0.779111*	1.000000

* Correlation coefficients are significant with a p-value = 0.05; N = 201.

Source: own elaboration.

The scale to assess individual impact turned out to be reliable. Cronbach's alpha coefficient was 0.969984, and the average correlation coefficient between the scale items was 0.832782 (high and statistically significant correlations between individual items of the scale – Table 3.12). It can, therefore, be assumed that this construct is relatively homogeneous. On this basis, an index describing the degree of operational budgeting impact on individual user satisfaction was built – individual impact (*II*) (equation 3).

Equation 3. The "individual impact" index

$$II = \frac{\sum_{i_{II}=1}^{7} \left(i_{II} \times o \right)}{49}$$

where:
II – individual impact index,
i_{II} – defined aspect describing individual impact,
o – evaluation of a given aspect (1–7 scale).

The index was obtained by adding up the results obtained for each of the seven aspects, and then, to make it easier to analyze, the result was divided by 49 (the maximum value that could be obtained, i.e., 7 aspects * a seven-point scale to describe each aspect). In this approach, the index fits the range from 0 to 1.

The average user satisfaction rating was 0.5719, and the skewness (–0.3845) below 0 indicates a left-skewed distribution, which means that there are more results above the average in the sample. Most respondents gave a higher than average rating for individual impact. The Shapiro-Wilk test was carried out for the individual impact variable to verify the compliance of the distribution with the normal distribution. Figure 3.6 presents the histogram with the distribution of the individual impact (*II*) variable.

The results (Shapiro-Wilk $W = 0.96580$, $p = 0.00008$) allow us to reject the null hypothesis at the level of $\alpha = 0.05$; thus, it can be concluded that the examined variable does not have a normal distribution. To verify the hypotheses about the insignificance of differences between the medians of the individual impact variable – the Mann-Whitney *U* test was applied in two groups (for the origin of capital variable) – the results are presented in Table 3.13.

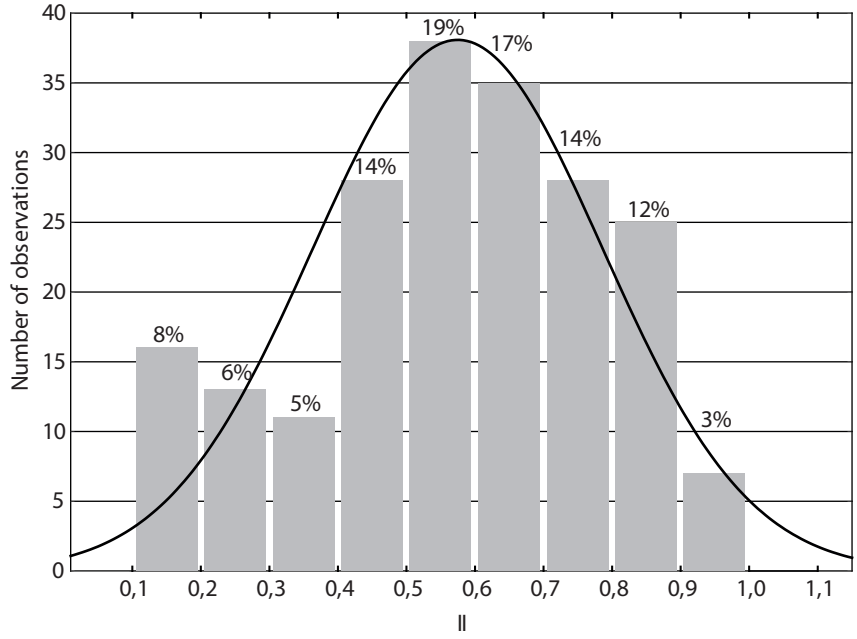

Figure 3.6. Histogram with the distribution of the individual impact (*II*) variable

Source: own elaboration.

Table 3.13. Statistics of the Mann-Whitney *U* test for the *II* index

	U value	*Z* value	*p*-value	Count of group 1	Count of group 2
Domestic capital	4689.500	0.175734	0.860503	119	80

* Statistics values and *p*-value are significant at the level of α = 0.05.

Source: own elaboration.

Based on the adopted level α = 0.05 and the z-statistic of the Mann-Whitney test without correction for continuity, as well as accurate *U*-statistic, it can be assumed that there are no statistically significant differences between individual impact and the origin of capital.

To verify the hypothesis about the insignificance of differences between the medians of the studied variable in several groups, the ANOVA Kruskal-Wallis test on ranks was used. The groups were distinguished in terms of variables such as the number of employees (H (4, N = 199) = 4.320146, p = 0.3644), the value of revenues (H (4, N = 172) = 3.474870, p = 0.4817), the age of the CFO (H (3, N = 185) = 0.7508434, p = 0.8612), the age of the enterprise (H (4, N = 201) = 2.523486, p = 0.6404) and the amount of time operational budgeting had been used in the organization (H (3, N = 188) = 2.932293, p = 0.4022). The resulting p-values show the lack of significant

differences of individual impact between the groups in terms of the scope of employment, value of revenues, age of the CFO, age of the company, or the length of time that operational budgeting had been used for.

3.2.4. Organizational impact

The impact on the entire organization is yet another dimension of operational budgeting. In order to identify it, seven aspects were selected that may be affected by the implemented system of operational budgeting. Each was rated highly, oscillating in most cases around 4. However, it should be emphasized that the results (Table 3.14) are lower when compared to the two previous factors (system use and user satisfaction), which constitute the assessment of operational budgeting use in the company. The highest result was recorded for the increase in control over current tasks (average 5.1). As many as 70.95% of respondents rated it in the range of 5–7. Fifty-seven people (27.14%) rated it 5, 63 people – 6 (30.0%), and the maximum response was indicated by 26 respondents (12.38%).

Other ratings are also at relatively high levels (average ratings are around 4), and the distribution of each of them is left-skewed (negative values of skewness), which means that the test sample is dominated by higher-than-average results, which is also confirmed by high median and mode values. However, there is one exception, i.e., the increase in the company's innovativeness, which has a right-skewed distribution (positive values of skewness). Additionally, it is the index with the lowest average rating (3.73). Nearly half (47.64%) of the respondents evaluated it in the range of 1–3, which is even more significant in the context of the much smaller percentage of people who rated between 5 and 7: 30%. The respondents do not associate operational budgeting with the innovativeness of the enterprise. In their opinion, it is definitely connected more with the traditional approach, i.e., control of current operations.

To determine the reliability of the scale, correlations between individual factors were examined – the results are presented in Table 3.15.

Table 3.14. Organizational impact of operational budgeting

Operational budgeting:	Number	Mean	Median	Mode	Mode value	Standard deviation	Coefficient of variance	Skewness	Kurtosis
improves the quality of decision making	209	4.837321	5	5	66	1.323727	27.36489	–0.663873	0.201386
improves communication between departments	207	4.043478	4	4	58	1.495314	36.98089	–0.250838	–0.471532
highlights relationships between departments	207	4.077295	4	4	58	1.514915	37.15491	–0.191353	–0.577940
increases the company's innovativeness	207	3.729469	4	3	56	1.373908	36.83924	0.112812	–0.439835
reduces costs and waste	206	4.451456	5	5	54	1.470050	33.02402	–0.368970	–0.380919
makes it possible to identify and focus on the strategy	207	4.608696	5	Multiple	48	1.443607	31.32355	–0.258459	–0.648936
increases control over current activity	207	5.096618	5	6	63	1.299865	25.50446	–0.569277	–0.087291

Source: own elaboration.

Table 3.15. Correlation between measures of operational budgeting on the organization

Operational budgeting:	Improves the quality of decision making	Improves communication between departments	Highlights relationships between departments	Increases company's innovativeness	Reduces costs and waste	Allows to identify and focus on the strategy	Increases control over current activity
improves the quality of decision making	1.000000	0.654125*	0.572286*	0.533771*	0.533807*	0.600409*	0.588732*
improves communication between departments	0.654125*	1.000000	0.778382*	0.619718*	0.500735*	0.456747*	0.442969*
highlights the relationships between departments	0.572286*	0.778382*	1.000000	0.600346*	0.475670*	0.422358*	0.427912*
increases the company's innovativeness	0.533771*	0.619718*	0.600346*	1.000000	0.576051*	0.601580*	0.432355*
reduces costs and waste	0.533807*	0.500735*	0.475670*	0.576051*	1.000000	0.663245*	0.693970*
makes it possible to identify and focus on the strategy	0.600409*	0.456747*	0.422358*	0.601580*	0.663245*	1.000000	0.651654*
increases control over current activity	0.588732*	0.442969*	0.427912*	0.432355*	0.693970*	0.651654*	1.000000

* Correlation coefficients are significant with the p-value = 0.05; N = 203.

Source: own elaboration.

The scale to assess organizational impact proved to be reliable. Cronbach's alpha coefficient was 0.899589, and the average correlation coefficient between the scale items was 0.571515 (high and statistically significant correlations between individual items of the scale – Table 3.15). It can, therefore, be assumed that this construct is relatively homogeneous. On this basis, an index describing the degree of operational budgeting impact on the entire organization was built – organizational impact (*OI*) (equation 4).

Equation 4. The "organizational impact" index

$$OI = \frac{\sum_{i_{OI}=1}^{7} \left(i_{OI} \times o \right)}{49},$$

where:
OI – organizational impact index,
i_{OI} – defined aspect describing organizational impact,
o – evaluation of a given aspect (1–7 scale).

The index was obtained by adding up the results for each of the seven aspects, and then, to make it easier to analyze, the result was divided by 49 (the maximum value that could be obtained, i.e., 7 aspects * a seven-point scale for each description). In this approach, the index fits the range from 0 to 1.

The average rating of organizational impact was 0.6274, and the skewness (–0.2365) below 0 indicates a left-skewed distribution, which means that there are more results above the average in the sample. Most respondents gave a higher than average rating for organizational impact.

The Shapiro-Wilk test was carried out for the organizational impact variable to verify the compliance of the distribution with the normal distribution. Figure 3.7 presents the histogram with the distribution of the *OI* variable.

The results (Shapiro-Wilk $W = 0.99098$, $p = 0.23780$) do not allow us to reject the null hypothesis at the level of $\alpha = 0.05$; thus, it cannot be concluded that organizational impact does not have a normal distribution. To verify the hypotheses about the insignificance of the differences between the medians of the organizational impact variable, the Mann-Whitney *U* test was applied in two groups (independent variables: domestic capital) – the results are presented in Table 3.16.

Based on the adopted level $\alpha = 0.05$ and the z-statistic of the Mann-Whitney test without correction for continuity, as well as the accurate *U*-statistic, it can be assumed that there are no statistically significant differences between organizational impact and the origin of capital.

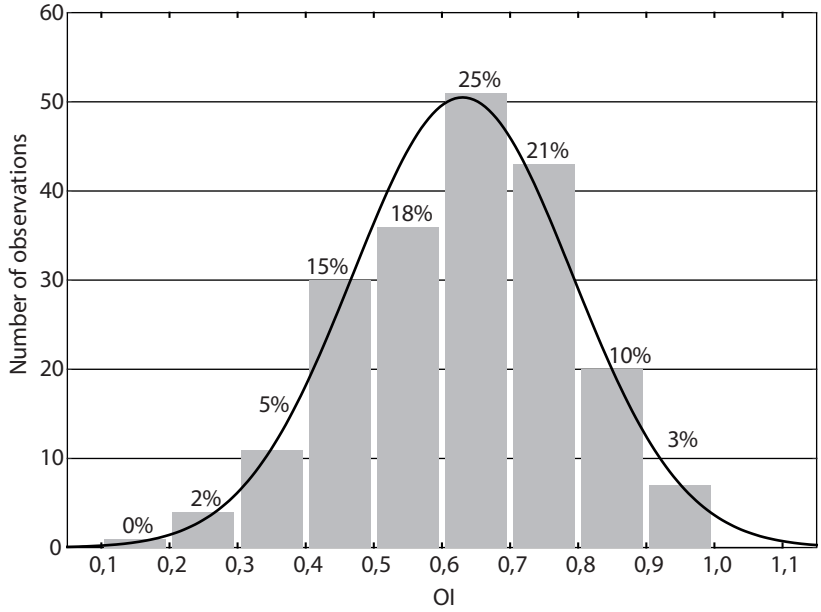

Figure 3.7. Histogram with the distribution of the organizational impact (*OI*) variable

Source: own elaboration.

Table 3.16. Mann-Whitney *U* test for the *OI* index

	U value	*Z* value	*p*-value	Count of group 1	Count of group 2
Domestic capital	4298.500	1.477213	0.139620	121	81

* Statistics values and *p*-value are significant at the level α = 0.05.

Source: own elaboration.

To verify the hypothesis about the insignificance of differences between the medians of the variable, a test was used in several groups, the ANOVA Kruskal-Wallis test on ranks was used. The groups were distinguished in terms of variables such as the number of employees (H (4, N = 201) = 2.187326, p = 0.7014), the value of revenues (H (4, N = 171) = 3.216935, p = 0.5222), the age of the CFO (H (3, N = 187) = 3.012841, p = 0.3897), the age of the enterprise (H (4, N = 203) = 0.000000, p = 1.000), and the length of time that operational budgeting had been used in the organization (H (3, N = 190) = 7.446801, p = 0.0589). The resulting p-values show the lack of significant differences of organizational impact between the groups in terms of the scope of employment, value of revenues, age of the CFO, age of the company, or the amount of time operational budgeting had been used for.

4. Assessment of the use of operational budgeting and the factors that condition it in the light of the questionnaire research

4.1. Assessment of the use of operational budgeting

In order to determine the reliability of the measurement scale applied to assess the use of operational budgeting, correlations between individual factors, i.e., detailed indexes built in the previous stages, were examined – the results are presented in Table 4.1 below.

Table 4.1. Correlations between indexes determining the assessment of the use of operational budgeting

	System use (*USE*)	User satisfaction (*SU*)	Individual impact (*II*)	Organizational impact (*OI*)
System use	1.000000	0.338702*	0.325456*	0.692086*
User satisfaction	0.338702*	1.000000	0.199735*	0.489885*
Individual impact	0.325456*	0.199735*	1.000000	0.565824*
Organizational impact	0.692086*	0.489885*	0.565824*	1.000000

* Correlation coefficients are significant with p-value = 0.05; N = 172.

Source: own elaboration.

The assessment scale of the use of operational budgeting proved to be reliable. Cronbach's alpha coefficient was 0.742904, and the average correlation coefficient between scale items was 0.451837 (moderate and statistically significant

correlations between individual items of the scale – Table 4.1). It can, therefore, be assumed that this construct is relatively homogeneous. On this basis, an index describing the assessment of the use of operational budgeting was built (*ASS*) (equation 5).

Equation 5. The "assessment of the use of operational budgeting" index

$$ASS = 0.25USE + 0.25SU + 0.25II + 0.25OI$$

where:
ASS – assessment of the use of operational budgeting index,
USE – use of operational budgeting index,
SU – user satisfaction index,
II – individual impact index,
OI – organizational impact index.

The index was obtained by adding up the detailed indexes, each of which was given a weight of 0.25 – in this approach, the index is in the range from 0 to 1. The average assessment of use was 0.6510, and the skewness (–0.2103) below 0 indicates a left-skewed distribution, which means that there are more results above the average in the test sample. Most respondents gave a higher than average rating for the assessment of budgeting use. This distribution is also confirmed by comparing the mean value with the median. The relationship: average (0.6510) < median (0.6587) (multiple mode) is confirmed.

The Shapiro-Wilk test was carried for the assessment of the use of operational budgeting to verify compliance of the distribution with a normal distribution. Figure 4.1 presents the histogram with the distribution of the assessment of the use/success of operational budgeting (*ASS*) variable.

The results (Shapiro-Wilk $W = 0.9832$, $p = 0.0359$) allow us to reject the null hypothesis at the level of $\alpha = 0.05$; thus, it can be concluded that the examined feature has a normal distribution. To verify the hypotheses about the insignificance of differences between the medians of the variable assessing the use/success of operational budgeting (*ASS*), the Mann-Whitney *U* test was applied in two groups (isolated using an independent variable: origin of capital) – the results are presented in Table 4.2.

Based on the adopted level $\alpha = 0.05$ and the *z*-statistic of the Mann-Whitney test without correction for continuity, as well as the accurate *U*-statistic, it can be assumed that there are no statistically significant differences between the assessment of the use of operational budgeting (*ASS*) and the origin of capital.

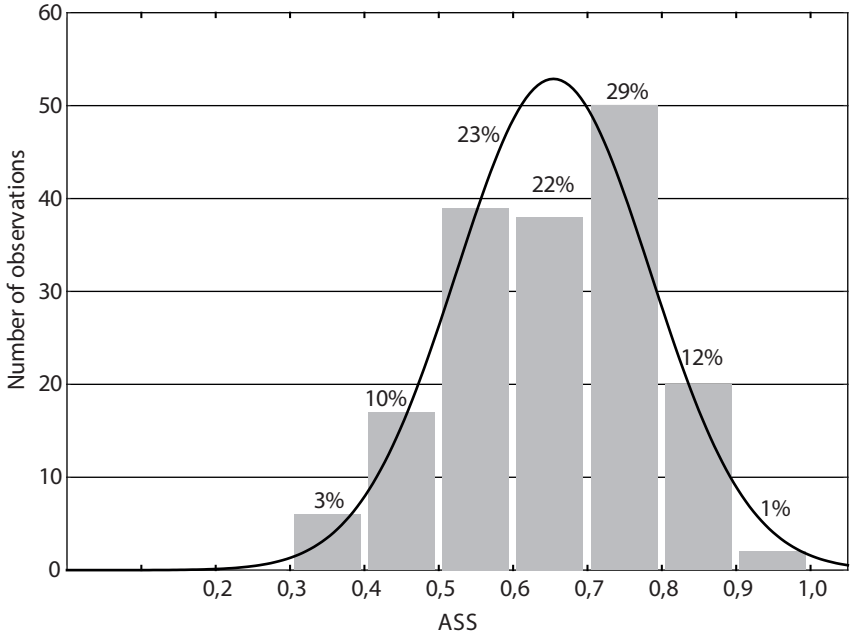

Figure 4.1. Histogram with the distribution of assessment of the use/success of operational budgeting (*ASS*) variable

Source: own elaboration.

Table 4.2. Statistics of the Mann-Whitney *U* test for the *ASS* index

	U value	*Z* value	*p*-value	Count of group 1	Count of group 2
Domestic capital	3133.500	1.358955	0.174162	102	70

* Statistics values and *p*-value are significant at the level of α = 0.05.

Source: own elaboration.

To verify the hypothesis about the insignificance of differences between medians of the studied variable, a test was used in several groups, the ANOVA Kruskal-Wallis test on ranks was used. The groups were distinguished in terms of variables such as the number of employees (H (4, N = 170) = 3.291415, p = 0.5103), the value of revenues (H (4, N = 148) = 4.668528, p = 0.3230), the age of the CFO (H (3, N = 158) = 0.0713444, p = 0.9950), the age of the enterprise (H (4, N = 172) = 0.000000, p = 1.000) and the length of time operational budgeting had been used in the organization (H (3, N = 164) = 8.513346, p = 0.0365). The resulting p-values show a lack of significant differences of the assessment of the use of the operational budgeting variable between the groups in terms of the scope of employment, value of revenues, age of the CFO, age of the company, or the amount of time operational budgeting had been used for.

4.2. Analysis of the determinants that condition the assessment of the use of operational budgeting

4.2.1. The quality of operational budgeting

The quality of the system was determined by the following features: a) the IT system and b) the organization of the operational budgeting system. When describing (a) the tool, the respondents were asked to specify each feature of the IT system on a seven-point scale, where 1 meant Completely disagree and 7 – Completely agree with a given statement. When describing (b) operational budgeting, the respondents had to characterize it by answering yes/no questions.

Table 4.3. Correlations between the qualitative features of the IT system used for budgeting

Feature of the IT system	Transparent and user-friendly	Easy to use	Flexible	Requires little expenditure	Requires little time investment
Transparent and user-friendly	1.000000	0.616225*	0.649345*	0.226486*	0.417175*
Easy to use		1.000000	0.481398*	0.263665*	0.406217*
Flexible			1.000000	0.252097*	0.309625*
Requires little expenditure				1.000000	0.195873*
Requires little time investment					1.000000

* Correlation coefficients are significant with p-value = 0.05; N = 196.

Source: own elaboration.

The scale of the assessment of the IT system used for operational budgeting proved to be reliable. Cronbach's alpha coefficient was 0.7306, and the average correlation coefficient between scale items was 0.3944 (detailed values of the correlation coefficients between individual scale items are shown in Table 4.3). The second component of the system quality index, i.e., the scale for assessing the quality of the budgeting process, proved to be a scale with a lower degree of reliability. Cronbach's alpha coefficient was 0.5125, and the average correlation coefficient between scale items was 0.2592. The lower alpha value might have been caused by fewer questions – budgeting process characteristics were based on only three questions. In addition, the interrelationships between individual items were also relatively

lower (Table 4.4, each question was aimed at a different aspect of the process); hence, it can be concluded that this construct may be relatively heterogeneous.

Table 4.4. Correlations between features of organizing a budgeting system

	Instruction	Stages	Procedure
Instruction	1.000000	0.173545*	0.335728*
Stages		1.000000	0.264637*
Procedure			1.000000

* Correlation coefficients are significant with p-value = 0.05000, N = 183.

Source: own elaboration.

Subsequently, an index describing the quality of the system in the respondents' companies was built (equation 6).

Equation 6. The "system quality" index

$$QSys = 0.5\frac{\sum_{i_{IT}=1}^{5}\left(i_{IT}\times o\right)}{35} + 0.5\frac{\sum_{i_{OS}=1}^{3} i_{OS}}{3}$$

where:
$QSys$ – system quality index,
i_{IT} – defined aspect describing the IT system,
o – assessment of a given aspect (1–7 scale),
i_{OS} – defined aspect describing the organization of the operational budgeting system (where yes – 1, no – 0).

The index was obtained by adding up two components: the part responsible for the IT system and the part concerning the organization of the operational budgeting system. The former was obtained by summing the ratings for each of the five features. Then, to make it easier to analyze, the result was divided by 35 (the maximum value that could be obtained, i.e., 5 features * a seven-point scale for each description). In this approach, the index fits the range from 0 to 1.

The second part of the index – describing the organization of operational budgeting – is based on three yes (1)/no (0) questions (for easier analysis, the result was divided by 3; thus, the value of this index element is 1). Each of the components of the index was assigned a weight of 0.5 so that after summation, the value of the system quality index fits the range from 0 to 1.

The average system quality rating was 0.6393, and the skewness coefficient (–0.5155) below 0 indicates a left-skewed distribution, which means that there are more results

above the average in the test sample. Most of the respondents gave a higher than average rating in terms of system quality. This distribution is also confirmed by comparing the mean value with the median and mode. The relationship is confirmed: mean (0.6393) < median (0.6476) < mode (0.8143). The variable has a more flattened distribution (less concentration) when compared to a normal distribution (negative value of kurtosis: –0.4105), which indicates a platykurtic distribution.

The Shapiro-Wilk test was carried out for the index to verify compliance of the distribution with a normal distribution. Figure 4.2 presents a histogram with the distribution of the newly created system quality (*QSys*) variable.

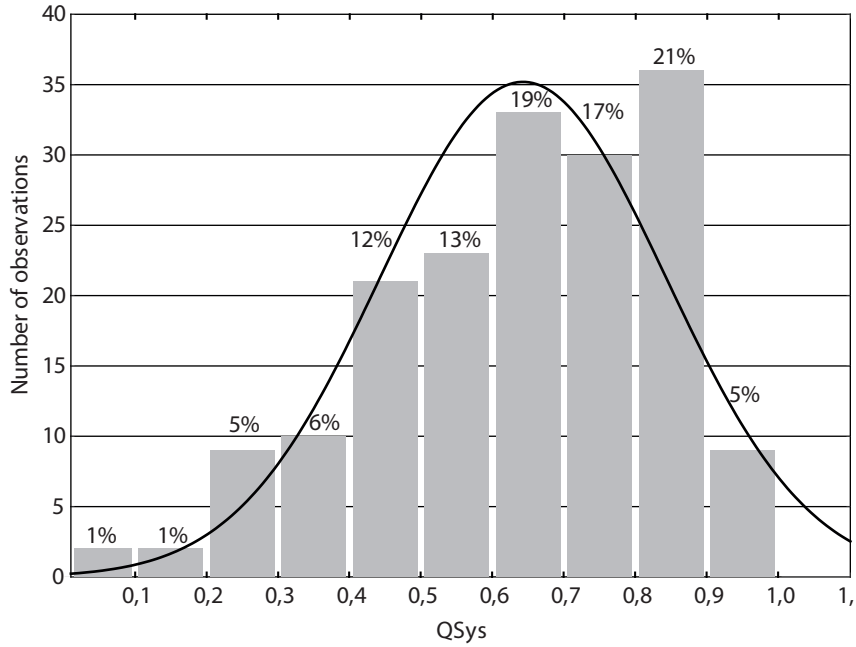

Figure 4.2. Histogram with the distribution of the system quality variable (*QSys*)

Source: own elaboration.

The results ($W = 0.96479$, $p = 0.00021$) allow us to reject the null hypothesis at the level of $\alpha = 0.05$; thus, it can be concluded that the examined feature does not have a normal distribution. To verify the hypotheses about the insignificance of differences between medians of the system quality variable, the Mann-Whitney *U* test was applied in two groups (isolated by means of independent variables) the Mann-Whitney U test was applied (it does not require the groups to be equinumerous, normal distribution or homogeneous variance are also not required) – the results are presented in table 4.5.

Table 4.5. Statistics of the Mann-Whitney *U* test for the *QSys* index

	U value	*Z* value	*p*-value	Count of group 1	Count of group 2
Domestic capital	3367.000	0.629350	0.529121	105	68

* Statistics values and *p*-value are significant at the level of α = 0.05.

Source: own elaboration.

Based on the adopted level of α = 0.05 and z-statistic of Mann-Whitney test, as well as based on an accurate *U*-statistic, it can be assumed that there are no statistically significant differences between system quality and the origin of capital. To verify the hypothesis about the insignificance of differences between medians of the studied variable, in several groups, the ANOVA Kruskal-Wallis test on ranks was used. The groups were distinguished in terms of variables such as the number of employees (H (4, N = 174) = 13.53404, p = 0.0089), the value of revenues (H (4, N = 151) = 11.95741, p = 0.0177), the age of the CFO (H (3, N = 160) = 1.914975, p = 0.5902), the age of the enterprise (H (4, N = 175) = 0.7633535, p = 0.9433) and the length of time operational budgeting had been used in the organization (H (3, N = 162) = 10.50071, p = 0.0148). The resulting p-values show significant differences in the assessment of system quality between the groups in terms of the scope of employment, value of revenues, and the amount of time operational budgeting had been used.

Post-hoc analysis showed that significant differences apply to companies employing 51–250 people (median: 0.6095) and companies with more than 1,000 employees (median: 0.7286). These results make it possible to state that larger organizations (both in terms of employment and turnover) are characterized by a higher assessment of the quality of the operational budgeting system. Statistically significant differences were noted between companies that had been using operational budgeting for more than ten years (median: 0.7167) and those in which it had been in use for less than a year (median: 0.5238). A higher system quality rating was given for companies in which the budgeting process has been used for years, and lower ratings were assigned by those whose companies had implemented it recently and were still learning how to use its functions.

4.2.2. The quality of information generated by an operational budgeting system

Information quality is determined by the features that the information should be characterized by. The respondents were asked to describe each feature in relation to the quality of information generated by operational budgeting on a seven-point scale, where 1 meant Completely disagree and 7 – Completely agree with a given

statement. The accuracy of the assessment tool (scale) was verified by means of reliability analysis. The correlation matrix (Table 4.6) indicates a strong correlation between individual qualitative features.

Table 4.6. Correlations between the qualitative features of information in the budgeting system

Information is:	Easily accessible and achievable	Accurate and precise	Credible and reliable	Up-to-date and "delivered on time"	Understandable and accessible for the user
easily accessible and achievable	1.000000	0.632899*	0.637231*	0.520799*	0.494857*
accurate and precise		1.000000	0.839069*	0.559055*	0.515811*
credible and reliable			1.000000	0.596936*	0.522051*
up-to-date and "delivered on time"				1.000000	0.652584*
understandable and accessible for the user					1.000000

* Correlation coefficients are significant with *p*-value = 0.05; *N* = 207.

Source: own elaboration.

The scale of the assessment of information quality proved to be reliable – the scale items measure the same construct (Cronbach's alpha coefficient was 0.8790, and the average correlation coefficient between the scale items was 0.6099). Subsequently, an index describing the quality of information in the respondents' companies was built – *QInfo* (equation 7).

Equation 7. The "information quality" index

$$QInfo = \frac{\sum_{i_{QInfo}=1}^{5} \left(i_{QInfo} \times o \right)}{35},$$

where:
QInfo – information quality index,
i_{QInfo} – defined aspect describing information quality,
o – assessment of a given aspect (1–7 scale).

The index was obtained by adding up the results of each of the five features, and then, to make it easier to analyze, the result was divided by 35 (the maximum value that could be obtained, i.e., 5 features * a seven-point scale for each description). In this approach, the index fits the range from 0 to 1.

The average information quality rating was 0.6449, and the skewness coefficient (–0.1326) below 0 indicates a left-skewed distribution, which means that there are more results above the average in the test sample, although the coefficient is relatively low. This distribution is also confirmed by comparing the mean value with the median. The relationship is confirmed: mean (0.6449) < median (0.6571). The variable has a more flattened distribution (less concentration) when compared to a normal distribution (negative value of kurtosis: –0.7208), which indicates a platykurtic distribution.

Enterprises that are financed entirely by domestic capital evaluate the quality of information lower (median: 0.6) than companies with foreign capital (median 0.7142). The analysis indicates that the assessment of information quality (illustrated by the mean and median) increases the longer it is used in the company:

1) less than a year: mean: 0.5405; median: 0.5143;
2) 1–3 years: 0.5992; 0.5714;
3) 4–10 years: 0.6403; 0.6286;
4) more than 10 years: 0.7020; 0.7429.

The Shapiro-Wilk test was carried out for the information quality feature to verify compliance of the distribution with a normal distribution. Figure 4.3 presents the histogram with the distribution of the information quality (*QInfo*) variable.

The results ($W = 0.98047$, $p = 0.00565$) allow us to reject the null hypothesis at the level of $\alpha = 0.05$; thus, it can be concluded that the examined feature does not have a normal distribution.

To verify the hypotheses about the insignificance of the differences between the medians of the information quality variable, the Mann-Whitney *U* test was applied in two groups (isolated by means of the domestic capital independent variable). The results are presented in Table 4.7

Based on the adopted level of $\alpha = 0.05$ and the *z*-statistic of the Mann-Whitney test, it can be assumed that there are statistically significant differences in the assessment of information quality between the groups, which were distinguished using the "origin of capital" variable.

Verification also involved more numerous groups, distinguished by the number of employees (H (4, $N = 205$) = 5.436980, $p = 0.2453$), the value of revenues (H (4, $N = 174$) = 3.354719, $p = 0.5003$), the age of the enterprise (H (4, $N = 207$) = 5.356657, $p = 0.2526$), and the amount of time that operational budgeting had been used in the organization (H (3, $N = 194$) = 22.02677, $p = 0.0001$). The resulting *p*-value = 0.0001 indicates a significant difference in the level of information quality assessment between the length of time operational budgeting had been used in the organization. It means that the longer the system had been used, the better the quality of information it generated.

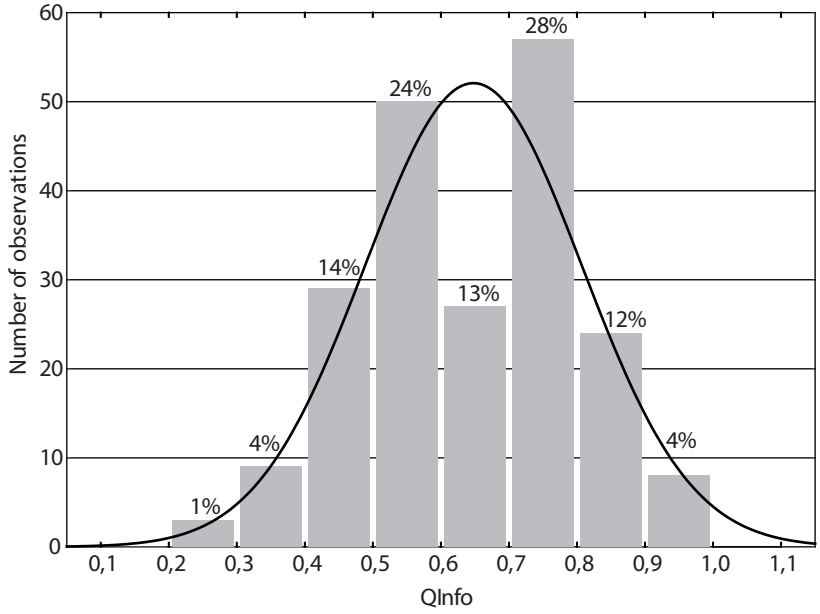

Figure 4.3. Histogram with the distribution of information quality variable (*QInfo*)

Source: own elaboration.

Table 4.7. Mann-Whitney *U* test for the *QInfo* index

	U value	*Z* value	*p*-value	Count of group 1	Count of group 2
Domestic capital	3857.500	2.847842*	0.004402	123	82

* Statistics values and *p*-value are significant at the level α = 0.05.

Source: own elaboration.

4.3. Verification of the model for assessing operational budgeting use

The study mainly aimed to examine the relationship between the assessment of operational budgeting use and the factors that determine the quality of both the system itself and the information it generates. This is especially important since company management depends on reliable and accurate information that should be available within an appropriate amount of time. Most of this information is generated by an information system, which includes the system of operational budgeting as one of its elements. The operational budgeting information system is, therefore, the basis for ensuring a satisfactory level of information quality, and both

of these factors determine the achievement of success by the company, although the interpretation of success is relative and ambiguous.

In this study, the assessment of the use of the operational budgeting system was defined by a number of elements, which, based on a review of the literature, included four aspects: the satisfaction of the people related to the system, how it is used, and the benefits achieved by both individual employees and the company as a whole. In order to develop a model to assess operational budgeting, the following hypotheses were formulated, which defined the relationships between the variables:

H1: The quality of the system positively affects the quality of the information it generates.
H2: The quality of the system has a positive impact on the assessment of the use/success of operational budgeting.
H3: The quality of the information has a positive impact on the assessment of the use/success of operational budgeting.

The hypotheses are verified in the following subsections.

H1: The quality of the system positively affects the quality of the information it generates

A correlation coefficient was used in the study. The analyzed dependence proved to be statistically significant ($p < 0.05$), allowing us to reject H0, i.e., the dependence of features is irrelevant, in favor of the alternative hypothesis, i.e., the dependence of features is significant. The correlation coefficient ($r = 0.4728$) indicates a moderately positive correlation. The results show that an increase in the quality of a budgeting system has a positive effect on the quality of information it generates. The dependence of the studied indexes is presented in Figure 4.4, where a scatter plot of the *QSys* and *QInfo* indexes is shown, along with additional analyses presenting basic statistics for each of the variables.

The results are confirmed by other studies (Ponte, Pilar, 2000; Sačer, 2006; Gorla, Somers Wong, 2010; Salahi, Abdipour, 2011; Dull, Gelinas, Wheeler, 2012; Yeh, Xu, 2013; Montesdioca, Maçada, 2015; Susanto, 2015; Fitrios, 2016; Kanakriyah, 2016; Uwaoma, Otti, 2016; Susanto, Meiryani, 2018).

Susanto and Meiryani (2018) confirmed that the quality of an information system has a significant impact on the quality of the information it generates. A coefficient value of 0.33 makes it possible to state that an increase in system quality by one standard deviation would lead to an increase in information quality by an average of 0.33, assuming that the other variables remain at their current level. The results of the study by Fitrios (2016) indicate that each increase in the quality of the information system by 1 point may result in an improvement in the quality

of information by 0.880. Moreover, the system quality variable explains as much as 66.20% of the variability of information quality. This allowed them to state that implementing an information system has a significant impact on the quality of generated information (at a significance level of 0.05).

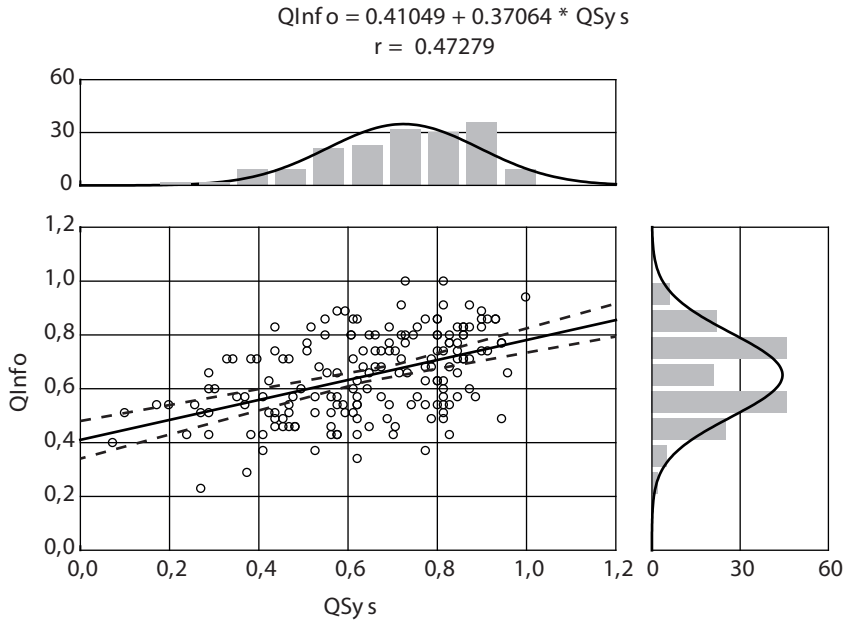

Figure 4.4. Dependence between system quality and the quality of information it generates

Source: own elaboration.

Further studies also confirm these conclusions. Kanakriyah (2016) obtained a high correlation coefficient between analyzed variables – 0.722 – which means that the accounting information system has a positive effect on the quality of information. Uwaoma and Otti (2016) stated that the correct use of an information system would certainly provide significant, valuable, and accurate information. It would also increase the efficiency of decision-making, as well as help in shaping future policy. In other words, automated information systems improve the quality of information (in terms of its relevance, reliability, comparability, understandability, and cohesion; the average rating was above 3.00 on a five-point scale).

Gorla, Somers, and Wong (2010) and Montesdioca and Maçada (2015) confirm that problems with the quality of the system result in lower quality of output information, and vice versa, and that improving its functioning increases the quality of the information it generates. Ampatzidis et al. (2016) found out that implementing an information system makes it easier for an organization to gain

access to comprehensive information that is useful in planning and controlling. It can, therefore, be concluded it is impossible to obtain high-quality information from the accounting system without an appropriate information system (Gelinas, Sutton, 2002; Sačer, 2006; Susanto, 2015), and that problems related to the information system are among the most important issues in the context of information quality (Yeh, Xu, 2013). Finally, Ponte and Pilar (2000) claim that system quality is the basis for creating high-quality information that is used in the process of decision-making.

H2: The quality of the system has a positive impact on the assessment of the use/success of operational budgeting

A correlation coefficient was used to verify the H2 hypothesis. The analyzed dependence was statistically significant ($p < 0.05$), allowing us to reject H0, i.e., the dependence of features is irrelevant, in favor of the alternative hypothesis, i.e., the dependence of features is significant. The correlation coefficient ($r = 0.5110$) indicates a moderately positive correlation. Thus, an increase in the quality of a budgeting system will have a positive impact on the assessment of the use of the operational budgeting system. The dependence of the studied indexes is presented in Figure 4.5 by means of a scatter plot, with additional analysis for each of the variables, *QSys* and *ASS*.

The results confirm those obtained in previous years by other researchers (Grande, Pérez, Muñoz, 2011; Qatanani, Hezabr, 2015; Esmeray, 2016; Medina-Quintero, Abrego-Almazán, Ortiz-Rodríguez, 2018). The quality of the system is related to a company's success, although it should be noted that this success was defined in various ways by different researchers.

Medina-Quintero, Abrego-Almazán, and Ortiz-Rodríguez (2018) observed positive and significant correlation coefficients for the "system quality" variable and a) user satisfaction (0.291) and b) system use (0.253). They claim that a user-friendly information system will not disappoint; it is fast and compatible with other systems used in the organization, which allows a reduction of costs, a better understanding of customer needs, a better selection of suppliers, and an improvement in performance. A study by Tona, Carlsson, and Eom (2012) showed that the quality of the system is a significant predictor of its use and user satisfaction. Gorla, Somers, and Wong (2010) positively verified the assumption that the quality of a system is positively related to the quality of the information and organizational impact. The results are similar to those obtained by Wang (2008) and Nunes et al. (2013) – both found a strong relationship between the quality of the system and the defined variables responsible for a company's success or which are components of its success.

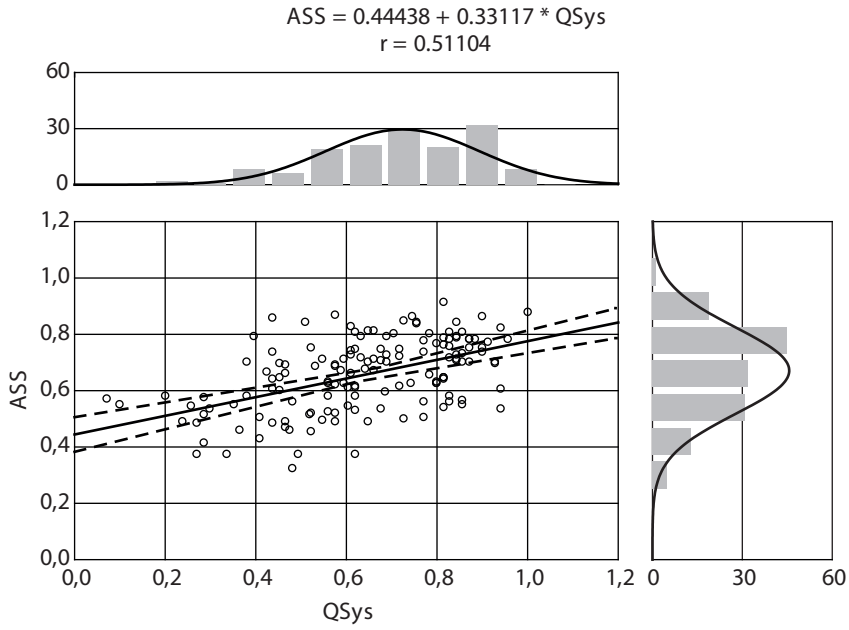

Figure 4.5. Dependence between system quality and the assessment of its use

Source: own elaboration.

Grande, Pérez, and Muñoz (2011) found a relationship between the use of information systems and the level of the obtained results. This thesis was confirmed by Esmeray (2016), who obtained the same positive result (and statistically significant relationship) for performance indicators. In addition, Esmeray (2016) determined a positive relationship between the use of the system and the development of a studied enterprise (defined by sales volume, number of clients, and turnover). The results published by Hamdan (2018) showed that an information system is the first factor that facilitates decision-making. In turn, Qatanani and Hezabr (2015) examined the role of information systems and their impact on improving a company's value, claiming that, in order to improve their business, companies should first improve basic elements of their information systems. The findings by Kanakriyah (2016) reveal an important role of the information system in increasing profitability, by reducing risk and uncertainty in the decision-making process in all aspects of the company's operation (rationalizing decision-making) and increasing user trust in the generated data.

H3: The quality of the information has a positive impact on the assessment of the use/success of operational budgeting

A correlation coefficient was used to verify the H3 hypothesis. The analyzed dependence proved to be statistically significant ($p < 0.05$), allowing us to reject H0, i.e., the dependence of features is irrelevant, in favor of the alternative hypothesis, i.e., the dependence of features is significant. The correlation coefficient ($r = 0.6147$) indicates a moderately positive correlation. This is the strongest dependency obtained. The increase in the quality of information generated in the system of operational budgeting will, therefore, have a positive impact on the assessment of the use of the implemented operational budgeting. This impact is definitely stronger than in the case of the previous variable (system quality). The relationship between the examined indexes is presented in Figure 4.6.

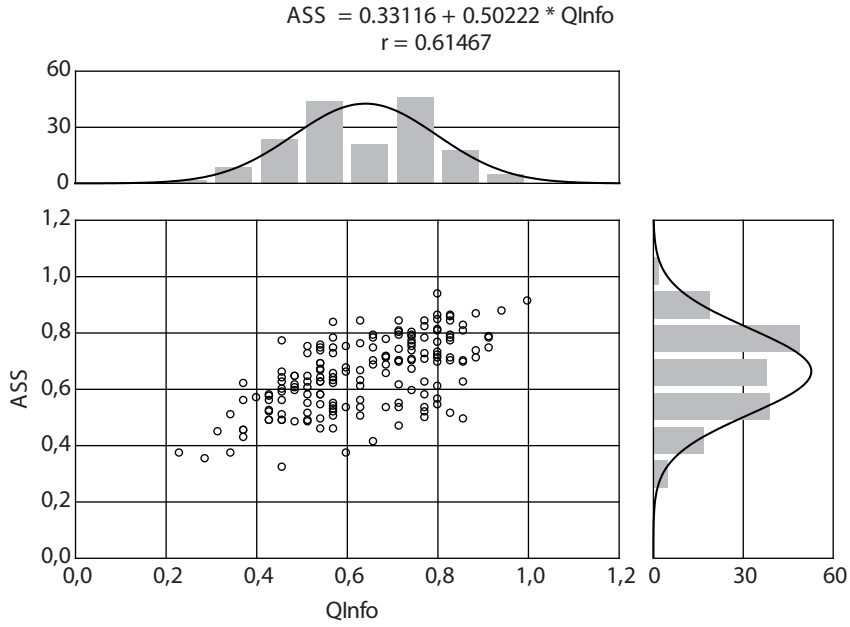

Figure 4.6. Dependence between information quality and the assessment of the use of budgeting

Source: own elaboration.

The quality of information is related to the possibility of an enterprise achieving a positive and high assessment of operational budgeting; however, it should be taken into consideration that this assessment can be defined in various ways. In the study, the positive assessment of budgeting was analyzed using a number of factors, such as user satisfaction, use of the system, or the benefits that it can

provide for employees and the company. The results obtained for individual factors confirm the results of studies conducted by other researchers (Bharati, 2002; Rai, Lang, Welker, 2002; McGill, Hobbs, 2003; Almutairi, Subramanian, 2005; Iivari, 2005; Wixom, Todd, 2005; Kulkarni, Ravindran, Freeze, 2006; Scheepers et al., 2006; Wu, Wang, 2006; Halawi, McCarthy, Aronson, 2008).

The relationship between information quality and user satisfaction is strongly supported in the literature (Bharati, 2002; Rai, Lang, Welker, 2002; McGill, Hobbs, 2003; Almutairi, Subramanian, 2005; Iivari, 2005; Wixom, Todd, 2005; Kulkarni, Ravindran, Freeze, 2006; Wu, Wang, 2006; Halawi, McCarthy, Aronson, 2008). A qualitative study on system success found that data quality and the level of satisfaction measured by user attitudes are directly related. Another case study quoted respondents' opinions suggesting a relationship between information quality (interpreted by its content, accuracy, timeliness, and format) and user satisfaction (Scheepers et al., 2006). Meanwhile, Tona, Carlsson, and Eom (2012) found that the quality of information is a strong predictor of user satisfaction; however, it has no significant impact on the use of the system.

There is moderate support in the literature for the positive impact of information quality on the use of the system and the generated benefits (individual and organizational). Gatian (1994) stated that the quality of information was related to decision-making efficiency. It was also found that the quality of information is related to the quality of work and time-saving (D'Ambra, Rice, 2001), and satisfaction with decision-making (Bharati, Chaudhury, 2004). The quality of information perceived by recipients was also significantly related to perceived usability (Seddon, Kiew, 1996; Rai, Lang, Welker, 2002; Wu, Wang, 2006). Kositanurit, Ngwenyama, and Osei-Bryson (2006) found a significant relationship between information quality and the work efficiency of ERP system users. However, in the context of a management system, information quality was not directly related to perceived usefulness (Kulkarni, Ravindran, Freeze, 2006).

The quality of information was significantly related to employees' perception of their work environment (i.e., its content, type of tasks performed, and level of employee curiosity and commitment) (Teo, Wong, 1998) as well as organizational or sales efficiency (Farhoomand, Drury, 1996). The respondents also stated that the quality of obtained data was directly related to a noticeable decrease in the time and effort devoted to making management decisions (Wixom, Watson, 2001). On the other hand, it was found that the quality of information has no significant impact on the organization in the context of its productivity, competitiveness, or improved management (Teo, Wong, 1998).

A model for the assessment of operational budgeting developed on the basis of the quantitative study allowed us to identify variables and the relationships between them, as presented in Figure 4.7.

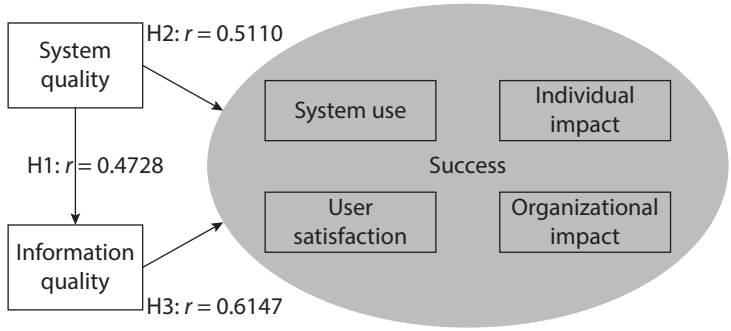

Figure 4.7. Model of operational budgeting success

Source: own elaboration.

The model of operational budgeting success consists of three variables: a) system quality, b) information quality, and c) the success of operational budgeting, and the relationships between them. The assessment of operational budgeting is based on four pillars that identify aspects which determine success, i.e.:

1) system use;
2) user satisfaction;
3) individual impact;
4) organizational impact.

The results of the study showed that the quality of generated information had a stronger impact on the assessment of operational budgeting (H3 hypothesis: 0.6147) compared to system quality (H2 hypothesis: 0.5110). A relationship of relatively similar strength is evident between the two variables that affect the assessment of operational budgeting: system quality and information quality (hypothesis H1: 0.4728). It allows us to claim that these variables have a moderately strong impact on the tested construct.

An alternative model to assess the use of operational budgeting was also examined. It omits the relationship between the system quality and information quality independent variables. The analysis was based on a simultaneous explanation of the assessment of the use of operational budgeting by both variables (*QSys* and *QInfo*) that determine the examined index (*ASS*). The regression analysis showed that the developed model is statistically significant as a whole (test results: $F(2.141) = 53.995$, $p < 0.0000$)). Detailed results of the regression analysis are presented in Table 4.8 and by means of equation 8.

Table 4.8. Results of the regression analysis for the alternative model to assess the use of operational budgeting

	b* coefficient	b* standard error	b coefficient	b standard error	*t*(141)	*p*
Intercept term			0.289289*	0.036332	7.962474	0.000000
J Sys	0.268774*	0.072294	0.171706*	0.046185	3.717790	0.000289
J Info	0.485646	0.072294*	0.398125*	0.059266	6.717652	0.000000

* Statistics values and *p*-value are significant at the level α = 0.05.

Source: own elaboration.

Equation 8. Regression equation of the alternative model to assess the use of operational budgeting

$$ASS = 0.269\,QSys + 0.486\,QInfo + 0.2893$$

where:
ASS – operational budgeting use index,
QSys – system quality of operation budgeting,
QInfo – information quality index.

Regression analysis was used to evaluate the impact of system quality and information quality on the assessment of operational budgeting use. Both independent variables accounted for a total of 42.57% of the variability of the analyzed assessment index ($R^2 = 0.4257$). Both factors showed a significant impact: system quality ($t = 3.7178$; $p < 0.05$) and information quality ($t = 6.7177$; $p < 0.05$). The directional coefficients allow us to state that increasing the value of either of the indexes will result in an increase in the assessment of the use of operational budgeting.

Conclusion

The study focused on the **research problem** presented in the form of a question: "What factors determine the assessment of the use/success of operational budgeting and how can one measure and subsequently assess the use/success of operational budgeting in Polish companies?".

When attempting to answer the research question, it was found that the factors that determine the assessment of use – and, thus, the success – of operational budgeting in Polish companies include the quality of the system and the quality of information it generates. It is possible to measure, and subsequently, assess the use of operational budgeting through a multidimensional analysis of four identified factors: a) system use (both the budgeting information system and the IT system, which is a tool applied in the budgeting process in the company), b) user satisfaction, c) individual benefits, and d) organizational benefits. These factors, and the relationships between them, constitute the basis of the developed model, whose construction allowed us to achieve the main research objective. This objective was achieved by means of specific individual objectives, thanks to a review of the literature and empirical research.

The literature review lay the groundwork for the achievement of the initial research objectives and established the basis for the empirical research. Their detailed proceedings are documented in Chapters 1 and 2.

Operational budgeting is one of the basic tools of management accounting information systems, which is confirmed by the scale of its use, both in foreign countries and in Poland. Despite criticism, this tool supports the process of business management. Its main functions include performance evaluation, support for control, and planning. In addition, it should be emphasized that budgeting prevents information asymmetry in the organization, improves employee attitudes and initiatives, motivates staff, and results in the better commitment of personnel in the organization's activities. Budgets are also used to coordinate the activities of individual centers of responsibility to ensure that they cooperate and achieve specific targets.

Measuring the use of management accounting methods is still an area of scientific discussion. In the subject literature, one cannot find an unambiguous attitude to how it is defined and measured. The suggested model for assessing operational budgeting use attempts to view the issue in a multifaceted way by defining success

from four perspectives (corresponding to the four indexes: system use, user satisfaction, individual impact, and organizational impact). A method to measure each of these aspects was developed, and the indexes became the basis for the assessment of the use/success of operational budgeting.

The model includes two variables that determine the assessment of the use of operational budgeting, i.e., system quality and the quality of information. Both parameters were defined by the qualitative features that should characterize them, and on this basis, indexes for the independent variables were determined.

Next, specific objectives were achieved by means of **empirical research**. The questionnaire research aimed to identify variables that were measures of operational budgeting use/success and variables that conditioned it. The questionnaires were distributed between April 2017 and April 2018 through two channels, i.e., via the Internet and in person. They were given to post-graduate students attending classes in 2017/2018 as well as students of previous editions, and participants of various types of specialized workshops in the field of cost accounting and management accounting. The study involved 842 respondents (questionnaires distributed via the Internet: 212, in person: 640). Two hundred and fifty-six completed questionnaires were returned, out of which 210 were qualified for further analysis.

Based on the collected data for all variables (dependent and independent), analysis by means of statistical tools was carried out (e.g., reliability analysis, basic descriptive statistics, normality test, the Mann-Whitney *U* test, and ANOVA Kruskal-Wallis on ranks). Detailed results of the study are presented and discussed in Chapter 4.

The use of operational budgeting was evaluated highly – the average rating of the respondents was 0.65 (the index included values in the range (0, 1)). In addition, most respondents gave a higher than average rating (skewness (–0.2103) below 0 indicates a left-skewed distribution). There were no statistically significant differences between the assessment of the use of operational budgeting and the type of business, nor the origin of capital, number of employees, value of revenues, age of the CFO, the age of the company.

Based on the data from the questionnaires, and using statistical methods (including linear regression analysis, correlation coefficient, and coefficient of determination, at the level of significance $\alpha = 0.05$), the following research hypotheses were positively verified:

1) the quality of the system positively affects the quality of the information it generates (H1);
2) the quality of the system has a positive impact on the assessment of the use/success of operational budgeting (H2);
3) the quality of the information has a positive impact on the assessment of the use/success of operational budgeting (H3).

The quality of the information generated had the strongest impact on the success of operational budgeting. That is also confirmed by the results of research conducted around the world.

An alternative model to assess the use of operational budgeting was also developed. In comparison to the main model, it ignores the impact of system quality on the quality of information it generates (this was possible due to the relatively weak relationship between the independent variables).

This study is comprehensive and presents a full picture of operational budgeting in the context of management support. It **contributes to the existing research** in the area of management accounting. The theoretical part familiarizes the reader with the traditional concept of operational budgeting, its criticism, and alternative approaches. The theoretical assumptions of the developed model, as well as the presentation of the model's foundations, were formulated on the basis of a literature review, which compiles and orders publications by domestic and foreign researchers. The empirical study is a **scientific contribution** in the area of management accounting. It creates the basis for further analysis and scientific discussions, both in terms of comparing achieved results with existing research, as well as continuing the study. The results and interpretations may also be **useful for practitioners**. They will be able to assess the system of operational budgeting, analyze identified variables, and thus understand relationships and conditions that allow for a more effective and valuable use of the budgeting system so that in the future, it generates benefits for users and contributes to the improvement of business management.

However, it should be borne in mind that the study has some **limitations**. Firstly, it was conducted on a sample that cannot be considered representative (the participants came from workshops, courses, and postgraduate studies in management accounting), which means that the results cannot be generalized to all manufacturing companies in Poland. Secondly, the study involved only specific factors based on empirical research; however, the universal set which defines variables was not analyzed, i.e., information quality, system quality, and an assessment of operational budgeting use.

The analysis of the results allows us to formulate conclusions regarding **future prospects and directions of research**. The quantitative studies designed and presented here may be continued in an unchanged form in a few years' time, ensuring the representativeness of the sample by generalizing the results. Additionally, repeating the survey would make it possible to observe possible trends in the use and assessment of operational budgeting. In addition, for the purpose of a more in-depth analysis of the problems discussed here, as well as a more detailed verification of the developed model, it would be interesting to conduct research in the form of a case study. It could significantly contribute to the observations made in the quantitative study.

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Appendix
Analysis of operational budgeting success

1. Respondent characteristics

1.1. Your sex:

Male	Female

1.2. Your age:

< 30 years	31–40 years	41–50 years	> 50 years

1.3. Your academic degree in business/economics:

Less than bachelor's degree	Bachelor's degree	Master's degree	Higher than master's degree

1.4. Your role in the company with regard to operational budgeting:

a) mainly generate information in the budgeting system (controller or similar position),
b) mainly use information from the budgeting system (manager),
c) no connection with the budgeting process.

1.5. Period of your professional career (regardless of the place of employment):

1–4 years	5–10 years	10–15 years	> 15 years

1.6. Assessment of your IT knowledge in relation to the tools used for budgeting in the company:

1 – very low	2	3	4	5	6	7 – very high

2. Company characteristics

2.1. Type of operation:

Manufacturing	Non-manufacturing

2.2. Origin of capital:

100% domestic	Share of foreign capital

2.3. Employees:

< 10	11–50	51–250	251–1000	> 1000

2.4. Annual turnover:

< €2 million	€2–10 million	€11–50 million	€50–200 million	> €200 million

2.5. Chief Financial Officer's age:

< 40 years	41–50 years	51–60 years	> 60 years

2.6. Chief Financial Officer's academic degree in business/economics:

Less than bachelor's degree	Bachelor's degree	Master's degree	Higher than master's degree

2.7. Time of Chief Financial Officer's professional career in current position (CFO) in current company:

< year	1–5 years	5–10 years	> 10 years

2.8. Time your company has functioned on the market:

< year	1–5 years	5–10 years	> 10 years

3. Operational budgeting system characteristics

3.1. Operational budgeting system is functioning in your company:

< year	1–3 years	4–10 years	> 10 years

IT SYSTEM (computer model of operational budgeting) – an IT tool that allows the user to process, by means of procedures and models, input information into the output information

3.2. The computer model of operational budgeting in your company operates in:

a) aspreadsheet or database (Excel, Access, etc.),
b) specially written computer program for the Company,
c) ready and parameterized specialized software for budgeting,
d) ready and parameterized budgeting module in the Integrated System (ERP).

3.3. To what extent do you agree with the statement that IT system of operational budgeting in your company is:

	1 – no	2	3	4 – 50%	5	6	7 – 100%
transparent and user-friendly?	1	2	3	4	5	6	7
easy to use?	1	2	3	4	5	6	7
flexible?	1	2	3	4	5	6	7
requires little expenditure?	1	2	3	4	5	6	7
requires little time investment?	1	2	3	4	5	6	7

OPERATIONAL BUDGETING – a process involving the design, creation, approval and implementation of the budget, as well as its subsequent control

3.4. Number of employees who on a regular basis maintain operational budgeting system in your company:

a) one, but this is only a part of his/her duties,
b) one, and this is his/her main task,
c) two or three,
d) four or more.

3.5. Method of operational budgeting used in your Company:

	0 – no	1 – yes
incremental method	0	1
zero-based budgeting	0	1
bottom-up budgeting	0	1
top-down budgeting	0	1

3.6. In your Company budgets are:

1 – very easy to achieve	2	3	4	5	6	7 – very difficult to achieve

3.7. Your participation in the operational budgeting process is:

1 – very low	2	3	4	5	6	7 – very high

3.8. Your influence on the operational budgeting system is:

1 – very low	2	3	4	5	6	7 – very high

3.9. In your opinion, problems in the functioning of the operational budgeting system are:

1 – very rare	2	3	4	5	6	7 – very common

3.10. Does your company plan to change the operational budgeting system in the near future?

a) no, we are not planning changes,
b) yes, we are planning to extend and adjust the operational budgeting system,
c) yes, we are going to abandon the operational budgeting system.

3.11. Do you agree with the statement that operational budgeting system in your company:

	0 – no	1 – yes
is based on the budgeting instruction?	0	1
is divided into stages with assigned persons who are responsible for their implementation?	0	1
the budgeting procedure is transparent and understandable?	0	1

3.12. To what extent do you agree with the statement that the operational budgeting system in your company is used for:

	1 – no	2	3	4 –50%	5	6	7 –100%
planning?	1	2	3	4	5	6	7
communication?	1	2	3	4	5	6	7
coordination?	1	2	3	4	5	6	7
activities evaluation?	1	2	3	4	5	6	7
managers' motivation?	1	2	3	4	5	6	7
managers' evaluation?	1	2	3	4	5	6	7
managers' remuneration?	1	2	3	4	5	6	7
resource allocation?	1	2	3	4	5	6	7
expenditure authorization?	1	2	3	4	5	6	7

3.13. To what extent do you agree with the statement that information generated by operational budgeting system in your company is:

	1 – no	2	3	4 –50%	5	6	7 –100%
easily accessible and achievable?	1	2	3	4	5	6	7
accurate and precise?	1	2	3	4	5	6	7
credible and reliable?	1	2	3	4	5	6	7
up-to-date and "delivered on time"?	1	2	3	4	5	6	7
understandable and affordable for the user?	1	2	3	4	5	6	7

3.14. To what extent do you agree with the statement that operational budgeting system in your company:

	1 – no	2	3	4 –50%	5	6	7 –100%
improves the quality of decision-making in the company?	1	2	3	4	5	6	7
improves communication between departments in the company?	1	2	3	4	5	6	7
highlights relationships between departments in the company?	1	2	3	4	5	6	7
increases company's innovativeness?	1	2	3	4	5	6	7
reduces costs and waste in the company?	1	2	3	4	5	6	7
makes it possible to identify and focus on the company strategy?	1	2	3	4	5	6	7
increases control over current activity of the company?	1	2	3	4	5	6	7

3.15. To what extent do you agree with the statement that operational budgeting system in your company:

	1 – no	2	3	4 –50%	5	6	7 –100%
improves the quality of your work?	1	2	3	4	5	6	7
increases control over your work-related procedures?	1	2	3	4	5	6	7
enables you to accomplish tasks more quickly?	1	2	3	4	5	6	7
increases productivity of your job?	1	2	3	4	5	6	7
enables you to accomplish more tasks?	1	2	3	4	5	6	7
facilitates implementation of your tasks	1	2	3	4	5	6	7
increases your motivation in performing tasks?	1	2	3	4	5	6	7

3.16. To what extent are you satisfied with:

	1 – no	2	3	4 –50%	5	6	7 –100%
content of your work	1	2	3	4	5	6	7
type of tasks performed	1	2	3	4	5	6	7
physical employment conditions	1	2	3	4	5	6	7
opportunities for promotion	1	2	3	4	5	6	7
amount of remuneration	1	2	3	4	5	6	7
organizational policy of the company	1	2	3	4	5	6	7
ethical aspects of the work performed	1	2	3	4	5	6	7
relations with colleagues	1	2	3	4	5	6	7
relations with superiors	1	2	3	4	5	6	7
fulfillment of your personal needs and aspirations	1	2	3	4	5	6	7
overall assessment of job satisfaction	1	2	3	4	5	6	7

Is the company that you work for listed on the Stock Exchange: .....

The name of the company you work for: .....

(only to eliminate surveys from the same company)

THANK YOU!

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