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Operationalizing Project Success Criteria through Control Degree

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Abstract: This study explores the control degree in success criteria operationalization. A literature review reveals that control degree relates to two patterns operationalizing success criteria: one directed to measurement and measure selection; the other directed to operationalization through the conceptualization of a relationship between a specific factor and project success. While in both patterns tight control emerges, nevertheless a difference arises which implies that the control degree in these operationalization patterns varies. In the first pattern, control tends to be generic. The second provides opportunities to tailor the control of project success, considering the specific project and its context. Furthermore, this study shows that it is essential to include control suitability for making success criteria operationalization effective, in the sense of supporting project management to achieve project success. The theoretical contribution of this study is to link the field of project success and management control, adding that success criteria operationalization concerns control degree, i.e., tight/loose control.

Keywords: Project success, success criteria, operationalization, control degree, measures selection, control mechanisms, tight control, loose control.

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1. Introduction

The interest in project success, not least due to the fact that many projects, even when well-managed, fail in both academia and industry (Albert et al., 2017; Lavagnon, 2009; Shenhar and Dvir, 2007). Research in this area is extensive, as the references in this article and in referenced articles testify. Named studies, and others (Collins and Baccarini, 2004; Moradi et al., 2020), highlight the importance of measuring and evaluating project success. Success criteria that refer to principles or standards used to determine or assess a project's success, are important to measuring and evaluating project success (Lavagnon, 2009).

Several studies (Kabirifar and Mojtahedi, 2019; Rodrigues et al., 2014) have investigated the operationalization of success criteria results in measure selection, which are seen as control mechanisms to assess project success. Operationalization becomes the link between control and project success. While much is known about success criteria operationalization, the control degree associated with this operationalization deserves more attention from researchers, which this study offers. The identifying research question is which control degree entails the operationalization of success criteria.

The purpose of this study is to analyze control degree in the operationalization of project success criteria. This study further contributes to examining the link between the area of project success and that of management control (Duarte et al., 2019; Liu et al., 2010). Knowledge of control degree operationalizing success criteria can contribute to the development of project management processes and increase project success rates in general, thus increasing the efficiency of processes and success criteria operationalization specifically, e.g. by selecting the most appropriate measures.

We conducted this study through a systematic literature review (Xiao and Watson, 2019), which provided the opportunity to descriptively examine the state of the literature relating to the purpose of the study. This generated insights into and guidance on the operational needs of practitioners. It also provided insight into research gaps that need exploration by researchers.

2. Theoretical Framework of Study

This section discusses main concepts and the theoretical framework of the study.

2.1 Control Degree – Tight or Loose Control

Control degree is essential in management control (Gregory et al., 2013). A definition of management control is "the attempt to increase the probability that employees will behave in ways that lead to the attainment of organizational goals" (Liu et al., 2010:222). Examples of such activities are controlling project scope, comparing actual performance to performance standards and establishing clear goals.

Control degree refers to controls used, which can involve tight or loose control. A definition of tight control is a "high degree of assurance that employees will behave in the organization's best interests" (Merchant and Van der Stede, 2017:139). We present tight-loose control as the two poles of a spectrum, while referring to levels of tightness and levels of looseness (Morris et al., 2006). We consider tight control to be formal and loose control informal (Morris et al., 2006).

Control degree implies that standardization, authority, autonomy, and decentralization affect the degree of coupling within the project and the organization to which the project belongs (Nogueira and Raz, 2014). Accordingly, tight control decisions create efficiency through the more systematic use of procedures and rules, while loose control gains by the opposite approach (Butler et al., 1998). Both tight and loose control are context-dependent: loose coupling occurs more in turbulent than in static environments (Nogueira and Raz, 2014). The degree of coupling can also be affected by governance arrangements being viewed as decentralization in terms of, e.g., agency theory, which refers to the problem of controlling agency (Bush, 2017).

Control degree can be depicted through first, the amount of control measured in terms of the number of control mechanisms used simultaneously and their frequency - e.g., monthly or weekly - and second, the intensity of control, e.g., the level of scrutiny to which the project is exposed in terms of questioning details and challenging results (Gregory et al., 2013). Control degree can vary, depending on factors such as environmental forces, predictability, managers' attitudes towards control, hierarchical levels, different groups in organizations and clarity of tasks (Chenhall, 2003). Tight control might involve frequent overviewing (Merchant and Van der Stede, 2017).

There are a wide range of formal and informal control mechanisms to quantify control amount (Morris et al., 2006). Formal controls involve, e.g., organizational structure, reward systems, budgeting, and operating procedures. Informal control involves, e.g., leadership style, culture, values, and norms. Other classifications overlap rather than being mutually exclusive. One such approach distinguishes between more organic mechanisms, such as clan control and personnel control, or more mechanistic procedures, such as operating procedures and results control (Chenhall, 2003).

Control mechanisms can also be divided into behavior control, which influences behavior and actions, and outcome control, which directs firms to evaluate the outcomes of behavior and actions; and the exercise of social control through values, norms, and such (Bonner et al., 2002). Self-control and cultural control also occur and are indeed forms of social control. Self-control focuses on self-monitoring and self-regulation, emphasizing an individual's own actions in reference to perceived organizational goals. Cultural control comprises interaction, beliefs, attitudes, values, and norms that influence behavior within an organization. Outcome control often directs organizations to performance measurement, usually using financial measures subdivided into accounting-based and market-based performance measures, and nonfinancial performance measures that include customer, learning, and internal processes performance measures (Herschung et al., 2018). Different control mechanisms can exist at different organizational levels, either individually or with others (Malmi and Brown, 2008).

When organizations rely on a number of control mechanisms and adapt them to each other, the intensity of control increases (Gregory et al., 2013; Merchant and Stede, 2017). The intensity of control, as opposed to the amount and frequency of control, which are mainly quantitatively oriented, focuses on the level of exposure to control of a project or organization (Gregory et al., 2013).

2.2 Project Success and Success Criteria

There is a diversity of views on how best to perceive and define project success (Lavagnon, 2009). Investigating how different studies treat project success, two lines diverge. One relates project success to performance, mainly in terms of time, cost, and quality (Agarwall and Rathold, 2006). The other line relates to how different stakeholders perceive project success (Agarwall and Rathold, 2006). External stakeholders in a project organization perceive the basis of project success as target cost and time, while project scope influences internal stakeholders' perceptions of project success. This difference of view also applies among categories of both external stakeholders, such as customers and users, and internal stakeholders, such as project managers, project owners, and developers (Davis, 2017; Jiang et al., 2017).

The two lines above relate to the distinction between project management success and project success made when defining project success (Jugdev et al., 2013; Lavagnon, 2009). A model (Shenhar and Dvir, 2007) suggests the dimensions of project success, judged over different timescales: project efficiency (end of project), team satisfaction (end of project), impact on the customer (months following the project), business success (years following the project), and, preparing for the future (years following the project). This model addresses to another distinction made involving the link between project success and the point of assessment – short- and long-term success (Albert et al., 2017; Scoleze Ferrer et al., 2020). When we relate project management success to the assessment of project implementation, considering deadlines and budgets, this constitutes short-time success. If we relate project success to the assessment of the effects of project results and to benefits realization, this constitutes long-term success. It should be noted that project management success does not necessarily mean project

success and vice versa, nor does short-term success automatically mean long-term success, or vice versa.

Project success concerns success measures (Bonner et al., 2002; Park, 2019). In this endeavor, success factors facilitate the achievement of success, while success criteria are used to measure success (Collins and Baccarini, 2004; Moradi et al., 2020). Success criteria can be hard, meaning measurable and tangible – i.e., in terms of time, cost, quality and economic success - or soft – i.e., as top management commitment or participation by and satisfaction of different stakeholders (Albert et al., 2017; Himme, 2012). The perception of project success can vary during the project life cycle. Accordingly, the criteria for measuring success changes during the different phases of a project's life cycle (Gemünden et al., 2005; Moradi et al., 2020). Thus, the timing of measurement when measuring and evaluating project success is crucial.

In summary, project success criteria consist of two components (Albert et al., 2017; Collins and Baccarini, 2004). First, project management success criteria focus on efficiency in project work, execution, monitoring and project control. Important criteria include meeting times, and cost and quality objectives (Dasari et al., 2015; Lech, 2013). Second, product success criteria relate to value deliverables to the users of the project outcome, leading to long-term influence. Important criteria are customer satisfaction with the functionality of project results and project owner's satisfaction that the project result meets strategic objectives and delivers the intended benefits (Jiang et al., 2017). There is a time order between these components: product success has a higher priority than project management success, although, at the same time, project management success influences product success (Ernst, 2002).

2.3 Control Degree Operationalizing Success Criteria

Success criteria becomes understandable and practically measurable through operationalization (Klahm et al., 2014). This can be done by developing a construct - e.g., a framework - which guides the operationalization of success criteria, allowing for the measurement of project success and the selection of measures. One way to operationalize is by following an incremental approach, for example starting with several measures in order to decide in subsequent iterations which measures are to be chosen (Ram et al., 2019). Measures of success and when they should be measured can be deciding either only by project management or by various key stakeholders such as the project sponsor, project owner and customer.

Assessing and evaluating project success is a matter of control, which can vary depending on factors such organizational and project management maturity levels, project environment and managerial aims. Table 1 illustrates operationalization of project success criteria through project control - tight as loose control. Investigation of control degree requires the consideration of success criteria operationalization in terms of the amount of control mechanisms (number as frequency) and the intensity of control. Research in the area (Olawale and Sun, 2015; Detzen et al., 2017) confirms that control influences project success. Project control refers to "the application of processes to measure project performance against the project plan, to enable variances to be identified and corrected, so that project objectives are achieved" (Olawale and Sun, 2015:623). Project control must accurately record data, e. g. project scope and changes of requirements, to effectively measure and evaluate project progress. At the same time, it should be noted that the degree of control can have negative consequences, e.g., preventing the kind of innovation many organizations want to achieve.

3. Methodology

The systematic literature review carried out here, is based on a system characterized by the use of explicit and rigorous criteria to identify, evaluate and synthesize all the literature on a chosen topic (Macheridis and Paulsson, 2021; Xiao and Watson, 2019).

We used LUBsearch, a search engine with access to approximately 200 databases (including Scopus and Web of Science) and just over 78,000 journals, to locate relevant scientific articles, supplementing this with Google searches. We repeated the database searches at various times and recorded the names of published researchers in this field. The first criteria employed for accepting an article was whether the inclusion criteria involved the research question. Second, we checked whether the literature search directed us to peer-reviewed articles published in academic journals, as these types of publications are recognized as having a quality stamp, since peer review legitimizes papers as suitable for publication. In addition, a requirement for publication in scientific journals is that the authors declare that the research involved no ethical conflicts. A further criterion is invariably that researchers write articles in English, as were the majority of articles on the named databases.

The date range of publication was also a criterion to limit the literature search, which delimited the time period to 2000-2020. This period is similar to those in other studies, e.g., Lavagnon (2009) that used sources from 1986 to 2004. During this time, the number of studies in the field has increased.

We chose three keywords to begin the search, namely "project", "success criteria" and "control degree", in titles and as "search words". To increase the number of references "control degree" was replaced with the keyword "control" and the search was repeated. By adding "peer reviewed", "academic journals", "articles in English" and using the built-in function in all LUBsearch actions that "Exact duplicates are removed from the results", this process identified a total of 380 references. This list was printed. We sorted articles by publication year using a built-in function in the university database, LUBsearch. Altogether, we took published articles from more than 40 journals.

We screened each article to decide whether to include it for data extraction and analysis. We assessed the research problem and purpose, methodology and conclusions, as well as the structure and disposition of the article. This step specified that the level of analysis was that the project presented required success criteria operationalization.

Table 1. Control degree operationalizing success criteria

Operationalizing project success criteria through control degree	
Loose control toward project success	Tight control toward project success
Success criteria operationalizes choosing limited number of control mechanisms used with limited frequency and intensity. • Autonomy and decentralization • Less systematic use of procedures and rules	Success criteria operationalizes choosing large number of control mechanisms used often and with high intensity • Standardization and centralization • Systematic use of procedures and rules

For each reference we included the title, the author and information about the publishing journal, publication year and subject in the printed list. After reviewing the list and the classifications, we concluded with a final selection of 86 articles, including not only references from the university database, LUBsearch, but also from other search engines. Because of space limitations, we shortened the reference list for this article substantially.

Selected articles were compiled in a four-column matrix. The first column contains author details, publication year and article title. The second column involves the studied project type, the method used, and the data collected. The third column outlines definitions of project success and the success criteria, and even success factors found in the study. These three columns are the basis for the presentation of "The spectrum of control degree operationalizing success criteria".

The fourth column in the compilation notes how success criteria operationalized to become measurable in the study in order to find a relation between control degree and how success criteria operationalizes. Analysis distinguished two patterns: one directed to measurement and measure selection, the other directed to operationalization through conceptualization. We collected articles classified in the first category in one matrix and articles classified in the other category in another matrix, using the two compilations as the basis for presentations in "Control degree and operationalization patterns of success criteria".

We went further, deepening the analysis by adding two columns to the respective compilation: one that noted comments regarding selected measures - e.g., whether selected measures were identified as output or social control mechanisms - the other noting comments regarding control degree in operationalizing success criteria, e.g., whether the control degree could be described as tight or loose. We used these two compilations as the basis for the presentation of "Control degree operationalizing success criteria".

4. Results

4.1 Spectrum of Control Degree Operationalizing Success Criteria

The literature review showed that the investigation of control degree in success criteria operationalization is a challenge because of the diversity of the studies in the area.

First, the studies involved a range of national contexts, such as Australia, Canada, and the UK (Jugdev et al., 2013), Germany (Himme, 2012), Iran (Kabirifar and Mojtahedi, 2019), Portugal (Rodrigues et al., 2014) and South Korea (Park, 2009).

Second, these were mainly studies of construction projects (Collins and Baccarini, 2004), software / IT projects (Eng et al., 2012; Lech, 2013) and NPD (New Product Development) projects (Bonner et al., 2002). It also includes studies of projects in the industrial automation segment (Scoleze Ferrer et al., 2020) and the aerospace and defense sectors (Rodríguez-Segura et al., 2016), to name a few.

Third, the chosen studies have different perspectives, namely those of organizations (Lech, 2003); and various project stakeholders, such as owners, project managers, clients, users, and community and project teams (Jiang et al., 2017; Park, 2009).

Fourth, studies also employed different methodological approaches, namely quantitative, based on questionnaire responses (Kabirifar and Mojtahedi, 2019), qualitative, based on document review, project analysis and interviews (Eng et al., 2012; Davis, 2017), and literature studies (Ernst, 2002). Some studies combined different approaches, such as interviews and surveys (Mahaney and Lederer, 2006).

Fifth, the studies have different theoretical starting points, including Contingency theory, expressed in aspects such as project type, national context and project characteristics (see references above); Stakeholder theory, expressed through individuals such as developers, project managers and users (Wang et al., 2006); Principal-agent theory; and Stewardship theory, focusing on governance relationships between stakeholders as principals and agents (Gemünden et al., 2005).

In short, when investigating control degree in success criteria operationalization, one must take into account the diversity of the studies in the field. Investigating control degree operationalizing success criteria, the literature review reveals two patterns of success criteria operationalization related to control. Accordingly, this study investigates the control degree of identifying operationalization patterns across a wide range of projects rather than individual cases.

4.2 Control Degree and Operationalization Patterns of Success Criteria

This section presents the operationalization patterns of success criteria that are related to control degree.

4.2.1 Operationalization directed to measurement and measures

A group of studies (Dasari et al., 2015; Griffith, 2006) direct us primarily to measures identification and ranking. The first step is to identify and rank success criteria considering project success and success factors, then in the next step to select related measures. A study (Rodríguez-

Segura et al., 2016) illustrates this process in analyzing the different criteria to measure and assess the success of large projects in the aerospace and defense sectors. The findings show that the customer, the company, and the time taken to obtain success are the important success criteria. Measuring the schedule's goal and budgetary goal involves applying measures to project efficiency. Meeting functional requirements, fulfilling customer needs, solving customer problems, and satisfying the customer are some of the measures used to assess customer impact. Commercial success and capturing a large market are measures of business success. Establishing new markets, developing new product lines, and developing new technology are measures of effective preparation for the future.

The identification and ranking of success criteria is not just a matter of proven experience, e.g., project managers have experience in which success criteria are appropriate in a certain project type and context. The literature review shows that, first, the choices made in the study affect the choice of success criteria, e.g., the terms used to define project success and choice of studied project type; and second, the selection of success criteria can be structured and systematic.

4.2.2 Operationalization based on conceptualization

In some studies, conceptualization of a certain relationship guides operationalization. This is expressed in the title and, for the purpose of the article, where the study is published, e.g., the relationship between formal control, team adaptability and project success (Detzen et al., 2017); relationship clan control and project success (Eng et al., 2012); and the influence of management control and user-IS personnel interaction on project performance (Wang et al., 2006).

The focus on which relationship to study is followed by the choice of a research model (Liu et al., 2010) - a hypothesis (Rodrigues et al., 2014) or a conceptual framework (Himme, 2013) - that conceptualizes the relationship between success criteria and project success. This construct can be limited either to the relationship between two components, one of which is project success, or between more components, of which project success is one. The next step is to operationalize the conceptualization components, and measures selection follows.

An example to illustrate operationalization based on conceptualization of a relationship between two components, one of which is project success, is a study (Mahaney and Lederer, 2006) that investigated the statement that a lack of intrinsic and extrinsic rewards for developers may be a cause of project failure. Project success operationalizes in terms of client satisfaction, perceived quality, and the implementation process. Intrinsic rewards operationalize through pride, a sense of contribution to organization, and public praise. Extrinsic rewards operationalize through flexible work schedules, financial bonuses, opportunity to work at home, having private office space, etc.

An example to illustrate operationalization based on conceptualization that includes several components, of which one is project success, is a study (Gemünden et al., 2005) that investigate how innovativeness influences the relationship autonomy-project success. The components of this conceptualization operationalizes to specify dimensions of autonomy - structural, resource and social - and dimensions of innovativeness - market, technology, organizational and environmental. Project success operationalizes in terms of time, cost and quality. The measures selection follows, to assess respective dimensions, e.g., variables for measuring the structural dimension include organizational separation and reporting level and variables for measuring the market dimension to create new customer benefits and improve a firm's market position.

4.3 Control Degree Operationalizing Success Criteria

This section discusses control degree in respective success criteria operationalization patterns.

4.3.1 Control degree when operationalization directs to measurement and measures

Selection of control mechanisms to operationalize success criteria refers to output control, often addressing the project triangle - time, cost and quality - (Dasari et al., 2015; Griffith, 2006; Park, 2009). These measures emphasize the functional role of success criteria, e.g., measures to follow up the project's progress in relation to the project's schedule. These measures are most frequent in projects with specified project scope, such as construction projects (Bower et al., 2002). Other studies show (Davis, 2017) that the choice of control mechanisms depends on the type of stakeholders, e.g., customer benefits, to which the study directs attention. Control mechanisms related to project triangles and to stakeholders create opportunities to perform control for both project management success and product success (Jugdev et al., 2013), as well as short-term and long-term project success (Scoleze Ferrer et al., 2020).

The number of control mechanisms manifested in this operationalization pattern indicates tight control (Morris et al., 2006). Mixing control mechanisms related to the project triangle and to stakeholders gives opportunities to manage external pressures as stakeholders' requirements and internal dynamics as relationships within the project team (Gregory et al., 2013). Selected control mechanisms create possible ways of influencing the degree of coupling within the project, to the organization to which the project belongs, and to the environment (Nogueira and Raz, 2014).

Identifying and ranking success criteria has the advantage that the selection of control mechanisms is guided by its practical consequences, e.g., customer satisfaction is a measure that is agreed upon, and thus the choice of this measure has practical benefits. This pragmatism allows accountability because it facilitates the backdating of responsibility to individuals, e.g., using follow-up and reporting systems. The shortcoming is the risk of missing the importance of project conditions and context, e.g., a changed environment or power relationships between stakeholders.

4.3.2 Control degree when conceptualization is the basis of operationalization

The operationalization of success criteria based on conceptualization actualizes not only output control. Time, cost and quality, as well as customer-related control mechanisms, are important, even in this case. The conceptualization of relationships where factors such as incentive mechanisms (Bower et al., 2002); clan control (Eng et al., 2012), ethics (Scoleze Ferrer et al., 2020), national culture (Rodrigues et al., 2014), and trust (Jiang et al., 2017) are involved assumes that behavior and social control mechanisms can effectively assess project management success and project success.

Depending on conceptualization, the relationship uses different success measures (Malmi and Brown, 2008), such as hard, e.g., budget related, or soft, e.g., trust related (Himme, 2012), to influence the control degree during project implementation. This operationalization reflects formal aspects, such as reporting project activity outcomes, and informal aspects, such as culture and informal communication, which depend on the degree of centralization in particular organizations (Morris et al., 2016). In this manner, loose control becomes an application issue in control implementation.

Operationalizing the construct that conceptualizes a relationship means that different control mechanisms link to included components. Even in this operationalization pattern, the number and breath of selected measures indicate tight control. For example, a study (Liu et al. 2010) constructs a research model to conceptualize the relationships between the various components: management controls and users' contribution individually influence a team's task completion competency, which in turn influences project management performance. A selected indicator of management control is the extent to which "software development first-line managers sign off on their schedules and cost estimates"; a selected indicator of user contribution is "users are not an integral part of the development task"; a selected indicator of a team's general task completion competence is "an inability to work with undefined elements and uncertain objectives"; and a selected indicator of project management performance is the "ability to meet project goals".

In the given example, the number and width of selected control mechanisms support frequent control. The conceptualized relationship provides a basis for checking that control intensity performs is based on the correct elements, thereby increasing the opportunities to perform control of both project management success and project success (Lavagnon, 2009) as short-term and long-term project success (Albert et al., 2017). The same applies to opportunities to manage conflicting logic, depending on external pressures and internal dynamics (Gregory et al., 2013).

Operationalization based on conceptualization emphasizes the importance of the suitability of control and tests the relationships between components. In this way, the measurement of project success becomes appropriate and tailored. Tailored oriented operationalization generates better possibilities of exercising control, which becomes purpose oriented, as with operationalization. In accordance with what was stated earlier (2.3) tailored control can affect e.g. innovation and the willingness to take the initiative.

5. Discussion

5.1. Knoweledge Contributions and Further Research

This study contributes to a deeper understanding of the complexity of investigating control degree, linked to success criteria operationalization. It links control degree investigating success criteria operationalization to environmental factors, e.g., national contexts and maturity level of industry; to organizational aspects, e.g., hierarchy; to the project, e.g., project type; and to individuals, e.g., methodological and theoretical foundations. Another knowledge contribution of the study shows that the way to deal with control relates to patterns of success criteria operationalization. When operationalization directs to measurement and measures identification, ranking control tends to be generic. When operationalization employs conceptualization to achieve the stated goal, control becomes tailored and purpose oriented.

A theoretical contribution of this study involves both patterns adding the dimension of control degree to success criteria operationalization. Both operationalization patterns provide the opportunity to choose several control mechanisms: output, behavior and social control mechanisms. The mix of control mechanisms influences the range of possibilities for control of project management success and product success as control of short-term and long-term project success. Another theoretical contribution of this study is the issue of suitability of control in success criteria operationalization. Results from the analysis of operationalization based on conceptualization show the importance of being aware of what is specific in a project and in a project context that influences project success. Purposeful and tailored control is important, something that success criteria operationalization based on conceptualization provides, offering better opportunities for success.

We have pointed out certain difficulties found in the database, such as information on control intensity. To our knowledge, there are currently no studies relating the issue of tight-loose control of project success in general or success criteria operationalization more specifically, in order to determine whether assessing the degree of control, and whether and where this varies, influencing project success. This research gap is a challenge for further research.

We identified a research need related to the frequency and intensity of control during project implementation. The literature review illustrates a focus on the number of control mechanisms, while the issue of frequency and intensity are barely present, bringing difficulties in determining control degree. The investigation of frequency and intensity of control degree relating to success criteria operationalization deserves more attention from researchers.

5.2. Practical Recommendations

Project success measurement is central to assessing the project process and the outcomes of this process. In this manner, project management can take a passive role,

allowing others to evaluate them, or can be proactive, by requiring that those in such roles ensure that the benefits occur that deliverables can provide (see table 1).

As illustrated in Table 2 measures selection based on measurement and measures identification has a functional importance, as it addresses project management success and product success, not least to stakeholders, who have both expectations and requirements of a project. Project stakeholders, such as project sponsor, may need to consider conditions and variables to apply necessary controls in order to take ownership of project success. Selected measures facilitate comparisons between projects and are familiar to many stakeholders, offering advantages when discussing project success. It is mainly in the application of study results that in a project and in the individual organization arise opportunities for efficiency and improvements.

The results of this study show that appropriate control has to be decided at the start of a project and must be based on measures selection considering identified important success criteria. It is important to manage project control during project implementation. Therefore, it is appropriate that the project budget and the project's time activity planning provide opportunities for this to take place. The illustrations in Tables 1 and 2 provide guidance that at the same time as the project's control degree is generic and pragmatic, it is also appropriate and tailored in order to achieve the desired project success.

The focus on control in this paper highlights the need for a project control system and for controller involvement in project management settings. Project control systems and appropriate governance provide feedback to management that requires them to take appropriate efforts. Controller involvement must include not only a functional role focusing on management accounting information and controlling activities, such as planning and evaluating deviations in performance (e.g., delays), but also a cross-functional role to support management strategic and operational decision-making regarding, e.g., managing uncertainty and project risks, using both financial and non-financial information (Malagueño et al., 2021).

6. Conclusions

This article has analyzed studies on project success criteria operationalization. Overall, we found that the studies varied depending on aspects such project type, industry, national contexts and methodological approaches. Furthermore, the study object in the studies reported included cases studying a certain type of relationship such the impact of incentive mechanisms on project success.

A conclusion of this study is that operationalization of success criteria impact on control degree in a project. Table 2 shows the impact that identifying operationalization patterns - one directed to measurement and measure selection, the other directed to operationalization through conceptualization - has on the project's control degree. Furthermore, the conclusion of the study is that control relating to operationalization directed to measurement and measure selection becomes pragmatic, generic and emphasizes the functional role of success criteria. Selection of control mechanisms to operationalize success criteria refers to output control, often addressing time, cost and quality. Operationalization based on conceptualization - tailored and purpose oriented - emphasizing the importance of the suitability of control. Selected control mechanisms can be output oriented, such as behavior and socially oriented. Both operationalization patterns involve mixing various controls.

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Table 2. Project control and success criteria operationalization patterns

	Project control	
Operationalization pattern	Directed to measurement and measures selection	Based on conceptualization
Focus	Primarily projects with specified project scope	Specified relationship that impacts project success
Consideration to stakeholders	Involved stakeholders in measuring and assessing project success	Stakeholders embedded in the conceptualized relationship
Modes of control mechanisms	Often output control mechanisms	Rather mixed control mechanisms
Number of control mechanisms	A breadth of control mechanisms to take into account involving stakeholders	A breadth of selected control mechanisms to operationalize the conceptualized relationship
Control degree	The number and width of selected control mechanisms support frequent control indicating tight control	The number and width of selected control mechanisms support frequent control, indicating tight control
Characteristics	Generic and pragmatic Allows accountability	Appropriate, tailored and purpose-oriented Allows the suitability of control
Relation to project success dimension	Allows measurement and evaluations of as well project management success and project success as short-term and long-term success	Allows measurement and evaluations of project success to the extent allowed by the conceptualized relationship

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