Defining Project Success, a System Thinking Approach

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HYVES Project Research

Abstract.

Although research is inconclusive, a consensus exists that project success is a subjective, multidimensional, time, context, and stakeholder-dependent construct. A definition of project success is a prerequisite to assessing the success rate of the parent organization and demonstrating the effectiveness of project management methods. This research uses a system thinking approach to develop a generic model of a project's achievement. It is shown that project success or failure can be viewed as the extreme values of system states, and complex system behavior can be visualized and evaluated using cause loop diagrams. The relevance of the model is demonstrated by corroborating five key findings from previous research on project success.

Keywords: Project success, iron triangle, system thinking.

1 Introduction

The research presented in this paper is part of a study to develop a project methodology framework designed to systematically evaluate project methods' effectiveness, efficiency, domain, and application. The project success assessment is the pivotal point in the project methodology cycle. Having a sound and justifiable definition of project success is the starting point for project capability development, organizational learning, and improvement of the overall project success rate of the parent organization.

A consensus exists that project success is a subjective, multidimensional, time, context, and stakeholder-dependent construct (Ika 2009, Frefer et al. 2018). The vital strength of system thinking is to provide a holistic view of complex behaviors and the underlying structures causing them; therefore, a system thinking approach is explored to develop a universal concept of project success. The practical application of the model is to establish measurable success criteria to demonstrate success, alternatively, timely identify projects heading for failure.

2 Approach

The overall purpose of this research is to define a generic concept of project success using a system thinking approach. The specific research questions are:

R1. What is the real-world entity being modeled
R2. Where to establish the system boundary
R3. What are the elements of the system
R4. What are the relevant system states
R5. Which are the primary archetypes.

The research is structured as follows:

1. Conduct a literature review
2. Develop the logical model
3. Select a literature sample
4. Develop the detailed model
5. Validate the model.

3 Result

3.1 Literature review

During the early years of project management, Gaddis (1959) defined the project work form as "an organization unit dedicated to the attainment of a goal—generally the successful completion of a developmental product on time, within budget, and in conformance with predetermined performance specifications" (p. 89). This early definition of project success, also known as the *iron triangle,* was gradually extended with other dimensions, such as the project efficiency, the impact on the customer, direct and business success, and preparing the organization for the future (Shenhar et al. 1997).

In the context of IT/IS projects, several other dimensions are valid; the profitability for the sponsor, owner, and contractors; whether the system meets operational, tactical, and strategical objectives; the system meets the inherent system objectives, passes the quality thresholds, and the project atmosphere and outcome (Wateridge, 1998). The Logical Framework Method defines project success according to a project's goals, purpose, output, and input. A differentiation is suggested between *project management success*— focussing on the project process and the successful accomplishment of cost, time, and quality objectives, and the correctness of the project management procedures. The second dimension of success, *product success*, deals with the product's effects on the organization (Bacarini, 1999).

A vertical dimension is added by Bannerman, who proposes a multilevel framework of performance criteria to enable the success assessment from multiple stakeholder perspectives after project close-down, being process success, project management success, deliverable success, business success, and strategic success (Bannerman, 2008). In a study on the public project managers' perspective on project success, the following dimensions emerge; the continuity of the client organization, the impact on the environment or sustainability, project-specific political or social factors, following the right processes, the corporate image, and a good working relationship with the contracting partners (Koops et al., 2015). The established notion of project success as a multidimensional and subjective evaluation brings about the practical challenge of determining project success.

Although strictly speaking separate questions, a fine line in the literature exists between the definition and measurement of success. As for measuring success, different schools of thought can be distinguished. In the *objectivist tradition*, it is assumed that a universal, objective set of success criteria exists in practice that can be measured using a scientific method in combination with quantitative techniques (Ika, 2009; Fitzgerald & Howcroft, 1998). The objectivist approach is mainly quantitative, involving exploratory or evaluative questions used in interviews and surveys combined with statistical data techniques. The findings convert into an unequivocal formula that is easy to apply (Ika, 2009).

An alternative avenue for measuring project success is the *subjectivist approach*, founded on the notion that project success and failure are social phenomena that are subjectively and intersubjectively constructed by stakeholders (Alderman & Ivory, 2011; Ika, 2009; Packendorff, 1995). The subjectivist approach focuses on sense-making and interpretation based on in-depth, longitudinal case studies addressing the interpersonal dynamics and social context to understand better how various stakeholders perceive project success. A perspective-based framework for determining project success suggests that evaluation is an emergent, multidimensional, context situated, and subjective process (McLeod & Doolin, 2012).

A separate track in research investigates the relationship between project success and other management disciplines, such as program, portfolio, strategic, risk, and Benefits Realization Management (BRM). BRM focuses on developing projects that deliver the most relevant benefits for the organization. Research indicates that mature BRM practices strengthen project governance and are strongly associated with creating value for the business dimension (Serra & Kunc, 2014). Project success may depend on the right choice regarding the *project design parameters*, such as the method, organization, resources, tools, and techniques.

Research suggests that hybrid and agile approaches significantly increase stakeholder success in favor of traditional methods while meeting the same budget, time, scope, and quality demands. *Hybrid methods* prove to be equally effective as fully agile approaches (Gemino et al., 2021). Another research topic involves the study of factors that are deemed to be critical

for project success. Numerous *Critical Success Factor* (CSF) lists and frameworks have been proposed, differentiated per moderating factors, such as the project domain, parent organizational structure, stakeholder group, and project stage. Cook-Davies divides the success factor question into:

1. What factors are critical to project management success
2. What factors are critical to an individual project
3. What factors are critical to the project success rate (Cooke-Davies 2002).

The long and rich history of research on project success has given rise to *literature summary studies*, synthesizing content, and evaluation of the various research methods used. A retrospective look at project success in forty years of the literature conducted by Jugdev & Müller shows how the perspective on project success has changed from success definitions related to the implementation phase to appreciations of success that span the entire project life cycle, potentially including the product life cycle. The history of project success can be divided into four periods:

1. *Implementation and handover focus* (the 1960s-1980s)
2. *Development of CSF lists* (the 1980s-1990s)
3. *Development of CSF frameworks* (the 1990s-2000)
4. *Strategic project management* (21st Century), (Jugdev & Müller, 2005).

A comprehensive literature review conducted by Ika of the main findings in thirty articles published between 1986 and 2004 in the Project Management Journal and the International Journal of Project Management affirms that results are inconclusive; however, a consensus exists that success is an ambiguous, inclusive, and multidimensional concept whose definition is bound to a specific context. A recent literature review confirms that the main findings from Ika in 2009 remain valid, except for a rise in attention to the sustainability dimension (Frefer et al., 2018).

3.2 Logical model development

The logical model is defined based on insights gained from the literature review. A *project* is a temporary organization, generally speaking, a means to an end that ceases to exist at some point. Therefore, the real-world object modeled is not the project as a temporary work form but rather the *project's achievement (R1).* In that context, project success or failure can be regarded as *system states* varying over time due to *success driving factors* influencing the *success variables* and the *success criteria.*

The project's *intrinsic success* is an evaluation of the project's achievements in the context of the assignment stated in the *business case* and *scope statement*. Projects are the vehicles of

change, and the impact of these changes can reach far beyond the limits of the initially envisaged purpose or imagination of the initiators. Over time, the complete picture of the extent, scale, and severity of expected and unexpected effects will emerge. The project achievement beyond the assignment is evaluated using *extrinsic success criteria*. Parent organizations must operationalize the criteria' value tailored to the assignment's characteristics and the project operating environment.

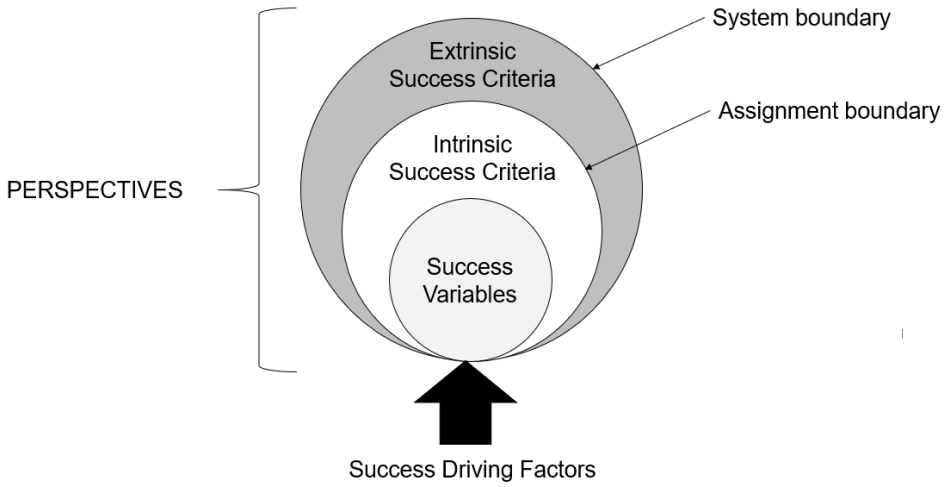

Figure 1. The logical model and system boundary (R2).

3.3 Article selection

The literature on the topic of project success can broadly be divided into articles related to:

1. The definition of project success
2. Measuring project success
3. The relationship between success and other management disciplines
4. Critical success factors
5. Summary literature reviews.

The literature sample was selected based on the following criteria:

- To represent all research categories
- To cover at least three decades of research until the present
- To contain contributions from leading authors.

3.4 Detailed model development

The fourth step involves an analysis of the literature sample for success-related concepts to extract input for the elements of the model. Success-related terminology is marked, and its meaning is determined based on the author's definition, alternatively derived from the context. Next, the textual elements are mapped to the model based on one of the following mechanisms:

- *Instantiation,* the textual concept is an occurrence of an element of the model; for example, a project manager is an instantiation of the stakeholder element
- *Differentiation;* the textual concept could potentially refer to multiple elements; for example, 'project goals' could pertain to benefits, demands, KPIs, or results
- *Component*, the textual concept is a part of a sub-assembly; for example, specification, requirement, and property are components of the result
- *Generalization*, a textual concept, refers to an element of the model in a broader sense; for example, a critical success factor framework builds on success driving factors
- *Unresolved*, no logical mapping appears to be feasible.

The system model is developed using an incremental and iterative approach per article, where the elements are adapted to achieve the best possible fit. After each model change, a regression mapping is conducted to ensure consistency with previous papers.

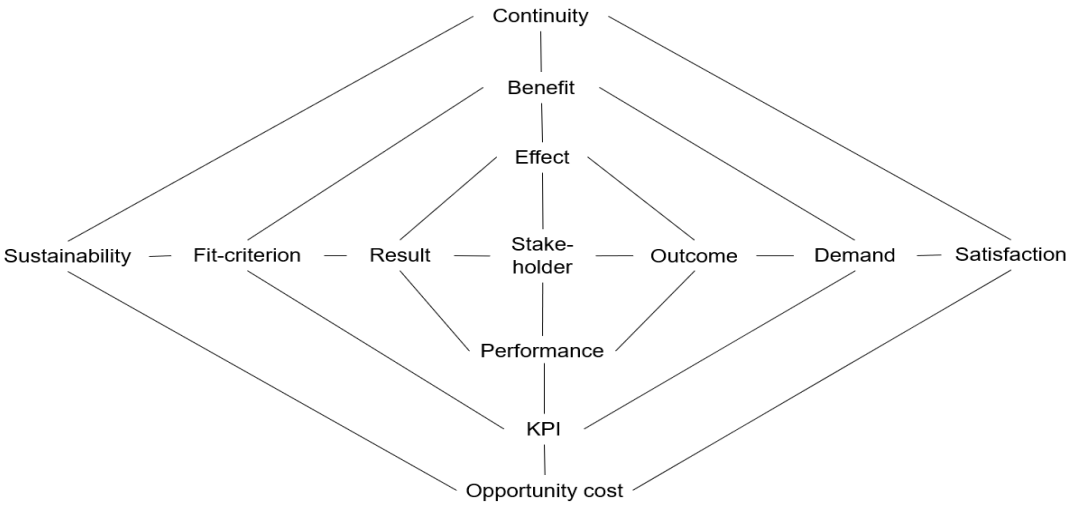

Figure 2. The diamond of success; system structure with main elements (R3).

Project achievement is regarded as an *open system*, subject to outside events, trends, and forces resulting from interactions with other systems, which may include, however, is not limited to: the nature and culture of the parent organization, contractors, and partners, the characteristics of the project assignment, the project environment, and the chosen project method, tactical approach, tools, and techniques. *Succes driving factors* can be differentiated according to *awareness*, whether the team is conscious about their existence or not, and *nature*, whether these factors are controllable or uncontrollable. A *stakeholder* is any organization, group, or individual affected by a project, positively or negatively, knowing or unknowing. The *project result* is the sum of the domain deliverables that lead to a new or improved version of a product, service, or capability.

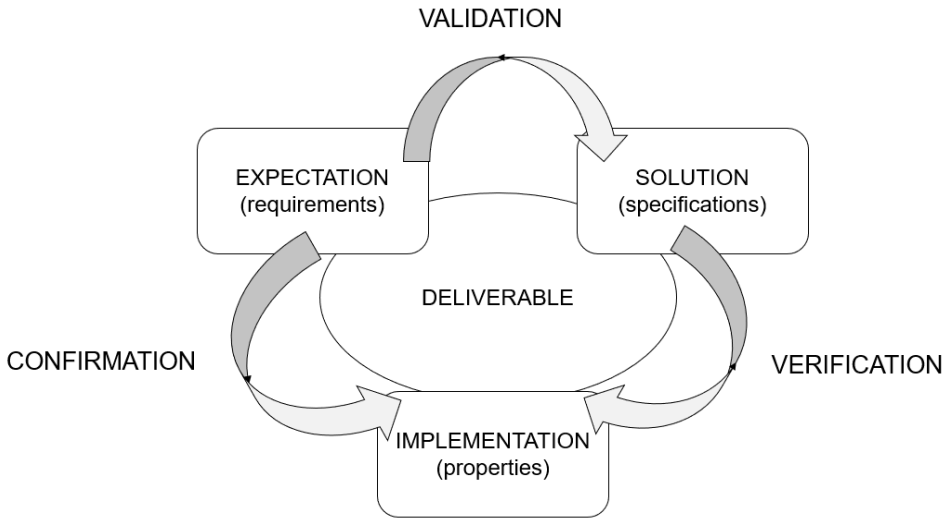

Figure 3. The project result sub-assembly.

The project result can be broken down into:

1. The *expected* result is defined by the *requirements* describing the needs
2. The *specifications* of the designed solution represent the *intended* result
3. The *properties* of the implementation characterize the *accomplished* result.

Requirements can be divided into explicit, implicit, functional, and non-functional types. *Validation* involves ensuring that the specifications of the solution match the requirements. *Verification* ensures that the implementation properties meet or exceed the specifications, also called 'build as designed.' *Confirmation* assesses whether the properties satisfy the needs as stated in the requirements. A project result can induce various *effects* in the organization, and the stronger the causal relationship, the more significant the impact.

A *project driver* is a threat, a problem, an opportunity, or a change in conditions that puts the project on the agenda. The intended effects address the project drivers adequately in a well-thought-out project, while the positive effects outweigh the adverse effects. *Project performance* is a snapshot of the team's e*ffectiveness* and eff*iciency*. Effectiveness always comes first; e.g., there can be no project efficiency without effectiveness. In addition to *hard dimensions* like productivity, the performance includes *human factors*, such as teamwork, problem-solving, piloting uncertainty, and learning ability.

The *project outcome* is the cumulative result of the project performance. The project's *intrinsic success* involves the evaluation of the project's achievements within the limits of the assignment, as stated in the business case and scope statement. Although validation and verification are essential, acceptance of the result ultimately depends on confirmation. A *fit criterion* describes the pre-agreed method, conditions, and acceptance criteria used to determine whether the properties of the accomplished result fit the requirements of the expected result and adequately address the project drivers.

Role	Stake A	Stake B	Stake C
PM	x		x
PO		x	
Regulator	x		
Supplier		x	x
User			x
Perception			
Effect 1	Pos	Neg	Pos
Effect 2	Pos	Neg	Pos
Effect 3	Pos	Neg	Neutral
Effect 4	Pos	Pos	Neutral
Effect 5	?	N	?
Value	**∑ > 0**	**∑ < 0**	**∑ > 0**

Figure 4. The benefits realization matrix.

A *benefits realization matrix* provides an overview of stakeholders, stakes, effects, and value. Depending on the stakeholder, an effect can be evaluated as positive, negative, or neutral. A positive value exists when the favorable effects outweigh the adverse effects. A *benefit* is a positive value perceived from a stakeholder perspective. *Demands* govern the activities deployed to create the deliverables that make up the project result. Demands stipulate mandatory adherence to ethics, laws, regulations, company policies, processes, routines, industry standards, budget at completion, deadlines, material, and resource use.

Key Performance Indicators (KPIs) are qualitative and quantitative criteria or metrics used to gauge the performance of the project team, enabling forecasting of the outcome during execution. A KPI has a target value, and an actual value, and a KPI can be leading or lagging in nature. The project's *extrinsic success* involves the evaluation of the project's achievements beyond the limits of the assignment. *Continuity* refers to the ability of the parent organization to effectively and efficiently deliver products, services, or capabilities that are in demand by society over time. *Opportunity cost* relates to the loss of other alternatives when a specific project is chosen in place of others. The cost-benefit ratio must be compared with other project proposals, considering their relative urgency and importance, as resources are scarce.

Satisfaction is a stakeholder-specific, subjective, and time-dependent notion. Examples of possible satisfaction scenarios are:

1. The positive effects outweigh the adverse effects and are worth both the cost and the opportunity costs
2. Although at a higher expense than initially anticipated, the positive effects outweigh the adverse effects canceling out the opportunity cost
3. The positive effects outweigh the adverse effects, yet they may not be worth the opportunity cost
4. The adverse effects outweigh the positive effects.

The interests of the environment are covered by the *sustainability* criterion related to pollution, climate change, biodiversity, and in general, the ability for future generations to inhabit our planet and thrive.

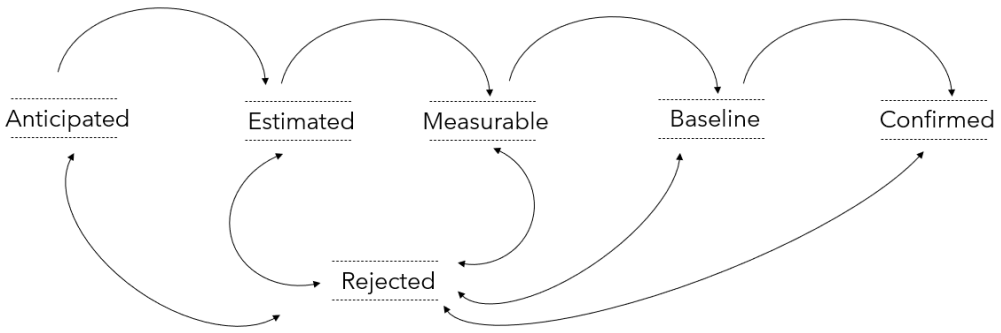

Figure 5. Example of a system state diagram (R4).

Project success or failure can be viewed as the extreme values of *system states* resulting from the dynamics between the success driving factors, the variables, and the criteria. Project success is *anticipated* and *estimated* during the inception and initial planning stages. Once a

platform is in place, project success becomes *measurable*. A baseline of the as-is situation is a prerequisite to provide proof of improvement, which eventually may lead to *confirmation* of success, alternatively *rejection*. Note the dynamic nature of both the success driving factors, variables, and criteria: a change in one element can lead to adjustments in all others. The question of success can be raised from a specific context, such as the strategic, organizational change, historical, socio-political, uncertainty, cultural, and methodological *perspective.*

System *archetypes* are behavior patterns that indicate a specific underlying system structure. The better we understand the underlying structure, the better we can foresee the system's future behavior and envisage the effects of correcting actions. Example archetypes of success are (R5):

1. *Weak causality:* there exists a limited causal relationship between the project result and the intended effects
2. *Tolerance critical*: full benefit achievement depends on strict adherence to the fit criteria and demands
3. *Cascading benefits*: despite failed time and cost demands, achieving the aim unlocks unprecedented revenue
4. *Zero-sum game*: value creation for one stakeholder goes at the direct expense of another stakeholder
5. *Rigged for failure*: the commitment to the project is non-existent, is motivated by an empty political gesture, or is riddled by fraud or corruption
6. *Precursor ops*: underlying obstacles must first be resolved before the primary driver can be addressed
7. *Force majeure*: An extraordinary event or condition beyond the control of the project determines the flow of events and ultimate achievement.

A *Cause Loop Diagram* (CLD) can visualize complex system behavior and define system archetypes. Consider a tolerance-critical solar panel installation project for a house affected by two driving factors. Due to a roof angle that does not match the average height of the sun, the power production is less than expected. Failing the fit criterion negatively affects the result-effect-benefit relation (see figure 2). In addition, an unforeseen need to reinforce the roof to take the additional weight increases the planned cost, adversely affecting the outcome-demand-benefit relation.

Both factors increase the payback time, effectively reducing the free power period benefit. The lower power output combined with the higher budget at completion underscores the lost opportunity cost of a wind turbine installation. Limited benefits combined with an opportunity loss culminate in poor satisfaction, although the sustainability criterion is satisfied.

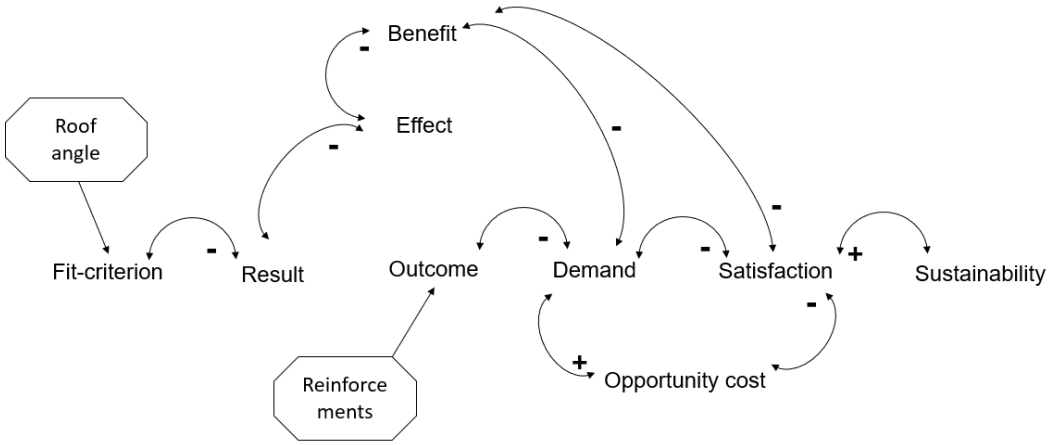

Figure 6. A cause loop diagram of a critical tolerance project.

3.5 Validation

The following model validation criteria emerged from the literature review:

V1. The iron triangle method alone provides insufficient and inaccurate substantiation for project success (Atkinson, 1999; Ika, 2009; Wateridge, 1998), failing to include all individual or collective stakeholder expectations (Atkinson, 1999; Baccarini, 1999; Bannerman, 2008; de Wit, 1988; Jugdev & Müller, 2005; Wateridge, 1998)

V2. A project failing the iron triangle assessment may be considered successful, and vice versa (Baccarini, 1999; de Wit, 1988; Ika, 2009)

V3. Project success entails more than project management success (Baccarini, 1999; Cooke-Davies, 2002; Ika, 2009; Jugdev & Müller, 2005)

V4. Project success is not an absolute black and white concept, and there are degrees of success (de Wit, 1988; Wateridge, 1998; Baccarini, 1999)

V5. The project achievement assessment is a social construct created through subjective processes of sense-making using context- and perspective-dependent criteria that are potentially variable over time

(McLeod et al., 2012).

(V1) Although the iron triangle appears to be an unequivocal method, the result element is inconsistently defined in literature as the project delivered to scope, requirement, specification, or quality. The word *scope* is a ubiquitous concept in project management but with a differentiated meaning. Depending on the context, the scope can refer to the project's activities, demands, requirements, specifications, deliverables, effects, or benefits. Delivered to the *requirement* is an unsatisfactory criterion for several reasons:

- The interpretation of a requirement is likely to vary across the stakeholder communities
- Implicit expectations may not be acknowledged
- It is the agreed-upon fit-criterion rather than the requirement that drives acceptance.

Even if an agreement exists that the result matches the requirements, the planned benefits may fail to emerge due to a weak causal relationship between the deliverables and the intended effects (weak causality archetype). Delivered to *specification* opens for a project failure scenario pointedly described by Burke (2015):

"—it is just what I asked for but not what I wanted." (p. 1)

As for *quality*, using the result sub-assembly (figure 3), the quality concept can be differentiated into verification, validation, and confirmation. Whether the result is delivered according to quality depends on who is asked. An architect would typically focus on the validation aspect of quality; a developer or contractor will concentrate on verification, while user quality is based on confirmation using a fit criterion.

In addition, the evaluation of the time and cost dimensions is not entirely unproblematic either. Agreement exists that time and cost can be objectively measured. However, the conclusion that going over time and budget results from inefficiency are based on the presumption that these demands were achievable. Project lead times and budgets can be set unrealistically low deliberately for various purposes, such as closing a sales deal, getting buy-in for political motives, or as a cynical attempt to extort the best effort out of the project team. An outcome over time and budget alone is not irrefutable proof of inefficiency.

(V2) It is observed that projects failing the iron triangle may deliver products that are considered successful and vice versa. This phenomenon is described in the literature as the difference between *project management success* and *product success* (De Wit, 1988). The first part of the explanation could be founded on the limitations and inaccuracy of the iron triangle method. The second reason could be a weak or absent causal relationship between the result and the intended effects. Without a robust causal connection, the expected benefits will fail to emerge independently whether the targets for the result, time, and cost are met.

The third reason is the extrinsic success evaluation; even if the project is completed successfully within the limits of the assignment, satisfying the extrinsic success criteria is not guaranteed. For example, a successful project selling company assets to create cash flow might later prove detrimental to its continuity. Alternatively, by default, the decision to select one project over another will create dissatisfaction with the proponents of competing projects mourning the opportunity cost. Finally, failure to meet time and budget demands in a cascading benefit archetype of a project becomes irrelevant.

(V3) Suppose we define the project management effort as equivalent to the control process. In that case, the primary requirement of the control process is to ensure that the creation process produces the proper results that meet the fit criteria. Once this objective is within reach, the second requirement is to optimize the time and resources used in the creation process by minimizing waste, such as gold plating, unnecessary waiting time, excessive energy, material usage, or pollution.

The efficiency of the project management process itself is the third priority, as every hour spent on control activities goes at the expense of the time available for creating the domain deliverables. Another requirement would be to present reliable status reports and future projections considering uncertainty to support the governance process. Finally, the control process must ensure personal growth, team development, and organizational learning. Achieving all these project management targets will help but cannot guarantee intrinsic or extrinsic success.

(V4) In the zero-sum archetype, where project failure means victory for the negative stakeholders, the project success assessment is likely to be of black and white nature. However, if we define complete success on all criteria as 'Yes' and complete failure as 'No,' given the four intrinsic and four extrinsic criteria, the theoretical number of possible combinations is $2^8 = 256$. This implies that in addition to black (N,N,N,N,N,N,N,N), and white (Y,Y,Y,Y,Y,Y,Y,Y), there exists 254 shades of grey.

(V5) The project achievement assessment is a social construct created through subjective processes of sense-making using context- and perspective-dependent criteria that are potentially variable over time. In general, the project success assessment will vary depending on:

- The observer's *location,* inside or outside the system boundary
- The *purpose* of the evaluation, within or beyond the limits of the assignment
- The *context*, whether evaluated from a specific stake or a perspective.

As a result, a stakeholder can reach a different conclusion using the same information depending on the vantage point. Also, success criteria may vary as stakeholders come and go during the project life cycle and new information emerges during project execution.

4 Discussion

The starting point for the methodology discussion is the general limits of modeling: any model represents 'a' version of the truth, not the truth. Also, all models are simplifications; their explanatory merits would be lost if they were equally complex as the real-life object they represent. A potential bias is the choice of systems thinking modeling over other paradigms such as process analysis, functional analysis, or capability thinking. Given the consensus that project success is perceived as a multidimensional subjective construct that varies over time, a system thinking approach would be a natural choice given its ability to visualize complex structures and behavior.

The selection and content of the articles used for analysis constitute another subjective factor, as the western world, IT domain, and private sector related subjects tend to dominate studies over the developing countries and public sector projects. A third factor potentially affecting the outcome is the sample size of the articles. The number of articles was planned as ten due to practical constraints of time and resources. Finally, the design of the mapping mechanisms and the mapping process itself will depend on the analyst's hand.

A significant modeling decision was to perceive the project as a workforce and the project's achievement as two connected but separate systems. As a project is a temporary organization, it is the achievement itself that is under scrutiny. Other critical decisions in the logical design were to separate variables from criteria and discriminate between intrinsic and extrinsic criteria.

Eleven articles related to project success were analyzed and published between 1988 and 2021, spanning 33 years of research, with representative articles from leading authors covering all categories. The highest count of unique success-related terminology was 254 (Shenhar et al. 1997), and the lowest number was 53 (Koops et al. 2015). The average number of success-related concepts was 157, with a total number of unique words of 1348.

Although not a specific analysis item, the overall impression was that few authors provided definitions of key concepts. The reader is presumed to be familiar with the authors' wording, ranging from single words such as scope, input, outcome, goal, and objective, to more elaborate constructions such as 'critical discipline-specific in-project processes' (Bannerman, 2008).

Authors	Year	Concepts	Resolved	% R	% U	% I	% D	% C	% G
Pinto & Slevin	1988	114	112	98,25	1,75	61,40	20,18	8,77	7,89
Shenhar & Levy & Dvir	1997	263	260	98,86	1,14	67,30	7,22	12,93	11,41
Wateridge	1998	79	76	96,20	3,80	70,89	12,66	7,59	5,06
Baccarini	1999	187	179	95,72	4,28	54,55	16,58	16,58	8,02
Ika	2004	125	114	91,20	8,80	48,00	20,80	12,80	9,60
Bannerman	2008	254	245	96,46	3,54	45,28	20,47	22,05	8,66
McLeod & Doolin	2012	205	205	100,00	0,00	54,15	23,41	17,56	4,88
Serra & Kunc	2015	171	168	98,81	1,75	54,39	17,54	23,98	2,34
Serrador &Turner	2014	84	83	98,81	1,20	57,83	34,94	4,82	1,20
Koops et al	2014	53	53	100,00	0,00	71,70	15,09	11,32	1,89
Gemino & Reich & Serrador	2021	192	192	100,00	0,00	55,21	12,50	30,21	2,08

Table 1. Textual element mapping results.

The instantiation and component mapping types were valued over-generalization and differentiation during the detailed model development. The highest differentiation score was 34,9% (Serrador & Turner, 2014), and the lowest was 7,22% (Shenhar et al., 1997), although the latter had the highest unique word count of all articles. This observation led to an intriguing thought: if we assume the model to be accurate, then the differentiation percentage could be interpreted as an indicator of textual ambiguity. Since surveys and interviews are the main research methods, it could be interesting to see whether the respondents would score differently before and after a generic model of essential concepts was provided.

Three articles scored a full coverage from textual elements to the model; the average unresolved rate was 3,3%, with the highest rate of 8,8% Ika, 2009. This higher rate could be attributed to the fact that this is a summary paper covering a variety of findings, where the context definition is harder to establish. Although the opportunity cost element was not found in the sample literature, it is essential to explain a negative satisfaction value, although the project scores high on other success criteria. Lack of evidence for the opportunity element could be related to the article selection; possibly, articles focussing on project finance could substantiate this criterion.

5 Conclusions

The project as a work form and the project's achievement can be regarded as interconnected but separate systems. Project achievement is considered an open system, subject to success driving factors affecting the success variables. The success variables are evaluated using intrinsic and extrinsic criteria.

Within the limits of the assignment, project success or failure is determined by evaluating the variables against the intrinsic criteria: fit-criterion, demand, benefit, and KPI.

The project achievements beyond the assignment are appraised using extrinsic success criteria: continuity, sustainability, satisfaction, and opportunity cost.

Project success and failure can be regarded as the extreme values of system states. Depending on the observer's vantage point, it is possible to reach different conclusions regarding a project's achievement using similar information:

- Viewing from inside versus outside the system boundary
- Examining within versus beyond the limits of the assignment
- Assessing success or failure from a particular stake versus a perspective.

The opportunity cost element was not present in the research but deemed necessary to explain behavior where a project delivers the expected benefits, yet stakeholders are dissatisfied due to lost alternative project possibilities.

Acknowledgments

Nil

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