

Agile contracting as a mechanism to improve performance in business environments

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Received: October 21th, 2024. Received in revised form: November 25th, 2024. Accepted: December 2nd, 2024.

Abstract

During the initial phase of the Industry 5.0 revolution, agile methodologies have become crucial in companies, especially for projects that aim to establish a competitive advantage in this new era. The purpose of this research is to evaluate how flexibility in contractual clauses impacts the performance of agile projects, particularly in the context of Industry 5.0. Using a quantitative, exploratory, descriptive and cross-sectional approach; where, inclusion criteria were applied that considered only professionals with certifications in agile methodologies and proven experience in project management in public and private sectors. The final sample (100 participants) was selected from a universe of 1,000, ensuring representativeness by sector and management role. The analysis revealed that 82% of respondents believe that contractual flexibility significantly improves the achievement of project objectives, with the main factors being: 1) adaptability (72%); 2) flexibility (82%); 3) continuous learning (84%); speed (87%), teamwork (81%); and customer focus (87%) contribute to flexibility and collaboration among project participants contribute significantly to effectively meeting contractual conditions. In addition, the findings underscore the importance of rapidly improving the knowledge, skills and experience of staff in agile environments. The study advocates external support to accelerate the acquisition of contextual expertise, mitigate risks and foster a culture of innovation in organizations.

Keywords: project management; agility; contractual flexibility; business innovation; continuous improvement.

La contratación ágil como mecanismo para mejorar el rendimiento en entornos empresariales

Resumen

Durante la fase inicial de la revolución de la Industria 5.0, las metodologías ágiles se han vuelto cruciales en las empresas, especialmente para los proyectos que pretenden establecer una ventaja competitiva en esta nueva era. El propósito de esta investigación es evaluar cómo la flexibilidad en cláusulas contractuales impacta el rendimiento de proyectos ágiles, particularmente en el contexto de la Industria 5.0. Empleando un enfoque cuantitativo, exploratorio, descriptivo y transversal; en donde, se aplicaron criterios de inclusión que consideraron únicamente a profesionales con certificaciones en metodologías ágiles y experiencia comprobada en gestión de proyectos en sectores público y privado. La muestra final (100 participantes) fue seleccionada de un universo de 1,000, asegurando representatividad por sector y rol gerencial. El análisis reveló que el 82% de los encuestados considera que la flexibilidad contractual mejora significativamente el cumplimiento de los objetivos del proyecto, siendo los principales factores: 1) adaptabilidad (72%); 2) flexibilidad (82%); 3) aprendizaje continuo (84%); velocidad (87%), trabajo en equipo (81%); y enfoque al cliente (87%) contribuyen con la flexibilidad y la colaboración entre los participantes en los proyectos contribuyen significativamente a cumplir eficazmente las condiciones contractuales. Además, las conclusiones subrayan la importancia de mejorar rápidamente los conocimientos, las habilidades y la experiencia del personal en entornos ágiles. El estudio aboga por el apoyo externo para agilizar la adquisición de experiencia contextual, mitigar los riesgos y fomentar una cultura de la innovación en las organizaciones.

Palabras clave: gestión de proyectos; agilidad; flexibilidad contractual; innovación empresarial; mejora continua.

1 Introduction

In the digital era, technology has significantly altered our daily activities and the way we interact with the world. This

transformation extends to the development of products, goods, and services through projects. According to van Rooij [1], the term 'project management' has replaced 'project administration', emphasizing the efficiency of interacting

How to cite: Silva-Atencio, G., and López-Valerio, C., Agile contracting as a mechanism to improve performance in business environments. DYNA, 92(236), pp. 9-16, Febrero, 2025.

processes and the critical role of resource management. Effective resource management ensures that projects adhere to predefined time, cost, and scope constraints. Although procurement management encompasses equipment, supplies, materials, solutions, services, and labor, offering a comprehensive scope for organizations, project managers often lack sufficient authority to manage contracts effectively due to the organizational hierarchy. This responsibility typically falls to roles experienced in the legal aspects of contract management. Companies usually define roles with the requisite authority to handle contracts, delineate their limits, and outline the procedures for managing terms and conditions per established rules. Contracts serve as formal mechanisms for agreements between involved parties [2]. Turner and Simister [3] note that while contracts have become a reliable and effective means to facilitate transactions, their implementation poses challenges, particularly in dynamic environments.

Moreover, PMW [4], Tatikonda and Rosenthal [5], Mirza and Ehsan [6] in their reports, highlight that execution remains a major challenge. Frequent environmental changes, driven by uncertainty, complicate the management and adherence to established contractual terms. However, Treadgold and Reynolds [7] argue that adopting an agile approach could satisfy project deliverables more effectively, as it allows for flexible task development among stakeholders, considering established contractual constraints. Dal Mas, et al. [8], Thorup and Jensen [9], Franklin [10] suggest that contracts should foster communication between stakeholders to ensure obligations are met and focus on business value to enhance collaboration and performance.

Implementing an agile contract within an organization presents significant challenges. Lindsjorn and Moustafa [11] found that agility in contracts requires flexibility in scope, necessitating trust with the client. Ekasari, Raharjo and Prasetyo [12] identified coordination, autonomous team management, team maturity disparities, and distributed teams as major challenges within agile contracts, all falling under collaboration and communication. Baxter, et al. [13] argue that an effective agile contract demands commitment and a unified team culture to adapt to environmental changes. Nuottila, Aaltonen and Kujala [14] noted the difficulty in adopting and effectively implementing agile principles, calling for a paradigm shift in organizations to embrace transparency, inspection, and adaptation. This study aims to contribute to the state of the art by examining whether agile contracts can enhance project deliverable performance through the flexibility of contractual conditions, thereby adding value to business objectives.

2 Literature review

In the realm of procurement management within a project, the acquisition of products, goods, and services are contemplated, according to the needs that a project may have throughout its life cycle [15], being contracts the tools that allow regulating the terms and conditions to manage procurement, maximizing the operational-financial performance and mitigating the associated risks during the performance [16]. Iben and Laryea [17] identify that in

project management there are the following types of contracts: 1) typical contracts, associated with works concession, service concession, services, and supply; 2) mixed contracts, which combine in their object different services of typical contracts; and 3) special administrative contracts, whose purpose is the general interest. Rejeb, et al. [18] state that depending on the legal regime, a distinction must be made between contracts subject to harmonized regulation and contracts under administrative or private law.

Turner and Simister [3] identified that the selection of contract type, within the procurement process, is related to the uncertainty in the project outcomes and its delivery process; if the uncertainty, then the risk is low, and fixed-price contracts are best; but if the uncertainty increases, then the risk increases and the contracts should be changed to a variable model. Jarzębowski and Weichbroth [19] identified that in turbulent environments, customers demand the fulfillment of critical requirements with higher-than-expected performance to obtain accelerated results and ensure the success of the strategy early.

Baldi, et al. [20] identified that in a procurement process for a project, the following procedures should be considered: 1) Request for information to gather market information from a set of selected suppliers; 2) Request for proposal, used in the case of a complex scope, where the buyer is looking for the supplier to provide a solution; and 3) Request for quotation, used when price is the main deciding factor and the proposed solution is readily available. Frederico [21] mentions that the processes to be considered in procurement management should ensure the identification, validation, and confirmation of the terms and conditions of the project scope between the interested parties (buyer and seller).

Conversely, Ng and Navaretnam [22] identified that procurement has typically focused on purchases per se, examining issues such as outcomes and implementation challenges; but incorporating the agile mindset in the process expands the knowledge base of the company, obtaining reductions in inertia and improving its viability for future products, goods, and services, which over time will be reflected in continuous process improvement, giving room for the definition of an agile contract. Jay [23] mentions that to successfully achieve strategic goals it is necessary to identify specific situations, then establish a prioritization process, and an action plan and assign roles with their responsibilities; to ensure efficient and effective decision-making for the organization.

However, the use of approaches, methodologies, and standards is considered best practice in project management, with traditional approaches (waterfall) and agile methods being the most widely used today, alongside hybrid models that facilitate the transition from traditional to agile models [24].

Cutting-edge technologies have given way to new business models that could only have originated in the digital era. As a result, companies are transforming and will have to adapt to this new reality [25]. Today, many organizations face both an opportunity and challenge to innovate with products, processes, or technologies in a changing and disruptive environment. This approach to business agility has created an opportunity for organizations to be adaptable

through the approach of business agility, which has led to the creation of competitive advantage over the short, medium, and long terms [26,27].

Business agility is a relatively new paradigm that is presented as a solution to maintaining competitive advantage in times of uncertainty and turbulence in the business environment [28]. An agile mindset is defined by Ozkan and Gök [29] as possessing a quick, resourceful, and adaptive character. Thus, agile organizations are quick to respond, resourceful, and able to adapt to their environment [30].

Speed refers to the rate at which an organization can respond to customer requests, market dynamics, and emerging technological options; this includes the time to perceive relevant events, the time to interpret what is happening and assess the consequences for the organization, the time to explore options and decide what actions to take, and the time to implement appropriate responses [31]. Resources refer to the capabilities available in the organization, including people, technology, processes, and knowledge. Resources can be both tangible and intangible and provide the basis for doing business and for instantiating change [32,33]. Adaptability refers to the organization's ability to respond to changing demands, threats, or opportunities. This requires learning capability, as well as flexible processes and products that can be reconfigured without large additional costs [31,34].

Agility is about economies of scope rather than economies of scale [34]. While lean operations are often associated with efficient use of resources, agile operations are related to responding effectively to a changing environment while remaining productive [35]. The idea is to serve increasingly smaller market niches and individual customers without the high cost traditionally associated with customization [36]. Agile organizations are not only able to successfully implement change; they are agile and able to respond quickly and elegantly to both expected and unexpected events in their environment [35].

The concept of agility emerged from lean and flexible manufacturing [34,37], and has been rapidly adopted by organizations producing software in the form of agile systems development [38,39]. Therefore, for the use of these empiric methods within procurement processes to be fast and effective, organizations must consider customer needs, budget, technology, and data-driven business intelligence to improve performance, reduce cost, and minimize risk in a changing environment [40].

Additionally, AlOmar, et al. [41] state that for the success of an agile contract, flexibility must be established in the contract clauses to promote collaboration between stakeholders and the project team, generating a cadence between strategy and execution, through agility. While, Shams, et al. [42], Gupta, Agrawal and Ryan [43], Vermeulen and Barkema [44] agree that the contract structure should consider at least the following variables: 1) time and materials; 2) fixed price per sprint; 3) fixed cost per story point; and 4) fixed price based on results.

Gupta, Agrawal and Ryan [43] emphasize that, in the time and materials domains, a relationship between the stakeholders and the team must be flexible to promote continuous improvement in the process through the

principles of communication, transparency, and trust of those involved. In the fixed price per sprint scenario, the relationship of trust between stakeholders predominates, delegating to the team executing the contract the responsibility for the quality and volume of deliverables for each sprint [42].

On their side, Vermeulen and Barkema [44] highlight in the fixed cost per story point scenario, that the remuneration is directly proportional to the complexity of the work provided, being suitable for projects with a mutual understanding among those involved of the value to be obtained; but it is important to take into consideration the mechanism to be used for pricing based on the scope of the service offered. Finally, outcome-based fixed pricing is characterized by the provider to achieve the agreed outcome [42-44].

Turetken, Stojanov and Trienekens [45] state that to achieve success in a contract, parties involved must share responsibilities to validate the uncertainties in the scope, time, cost, and quality of the product or services to be delivered. Hence, the customer must understand the requirements and obligations; and the supplier needs to validate the knowledge, experience, and expertise for the execution of the object of the contract. Additionally, Uludağ, et al. [46], state that, when establishing the clauses of a contract, these shared responsibilities should address: 1) Knowledge of the initial vision and route time; 2) Identification of the Minimum Viable Product (MVP) and the potential characteristics for its continuous improvement; 3) Criteria for prioritization of the initial backlog in planning; 4) Definition of the scope of the initial solution; 5) Roles and responsibilities of the service execution team; and 6) Establishment of the financial framework according to the contractual terms. AAnwar and Abdullah [47] mention that the basis of a contract should include the direction and expected results, being necessary for those involved to plan in detail each interaction in the tasks to be performed, to ensure active engagement and alignment throughout the execution of the iteration.

After each interaction, an evaluation of the performance obtained is carried out through the collection and analysis of metrics, allowing more accurate decision-making, to establish continuous improvement strategies, within a dynamic and iterative context [48]. Al-Saqqa, Sawalha and Abdelnabi [49] called this event the inspection and adaptation of the solution according to the contract, which is aimed at ensuring the success of the scope and according to the objectives. Noteboom, et al. [50] identified that, through an agile approach, flexibility is provided in the terms and conditions of service contracts; impacting boosting collaboration, self-management, motivation, and courage of work teams, allowing to redefine work priorities according to the context and customer requirements, without modifying the terms and conditions within the contract.

Kula, et al. [51] proposed a model to identify the critical factors for on-time delivery of products within an agile approach, where, as part of the contract scope, they established a fixed price for user stories, regardless of their size, then the stories are incorporated into the sprint for the definition of the initial investment and provide the customer

with the value of the feature versus the expense, as a tool for decision making, which allows customers to pay only for those features that provide value to the business. Nicoletti [52] identified that by adopting a scrum method as an operating model for a cross-functional contracting team, agility, and alignment were improved, which allowed companies to remain highly adaptable, since, by involving a multidisciplinary team, collaboration, self-management, and help among all collaborators were fostered, bring benefits for the whole team and improving performance and cost.

3 Research methodology

This research employed a quantitative methodology to examine causal relationships within a specific population, thereby enabling hypothesis validation [53]. It combined exploratory and descriptive approaches to discern the primary characteristics that drive continuous improvement in the procurement processes of products, goods, and services, utilizing a flexible contracting model [54]. Additionally, a cross-sectional approach was implemented to observe the phenomenon's behavior at a particular moment in time [55].

A sample of 1,000 project management professionals was selected, comprising individuals in managerial roles across both public and private sectors in Costa Rica during 2023. These professionals were actively leading projects using agile methodologies at the time of the study. From this group, 100 professionals responded accurately and successfully to the survey. The sample size was determined using a finite population model, facilitated by access to an open database of expert professionals, provided by CERTIPROF, LLC, a certified and internationally recognized entity in this field. Data collection was conducted via a closed survey, distributed by email to maximize efficiency in terms of time, cost, and ease of response. The survey included a 5-point Likert scale for responses, with some questions offering single or multiple-choice options to gather detailed data for the study and describe the sample accurately.

Following data analysis, the research tested the proposed hypothesis, which is stated as follows: "The adoption of agile methodologies enhances the performance of deliverables in project contracts for products, goods, and services, through the influence of flexibility in the contractual clauses."

The objective of the present study was to evaluate the degree of consensus among the experts surveyed. The hypothesis was evaluated using the correlation coefficient, a statistical measure that provides insights into the strength, degree, and direction of relationships between variables. In this case, a positive correlation indicates that two variables change in the same direction, with the coefficient ranging from 0 to 1, where 1 signifies the strongest possible association [56-58].

4 Results

Fig. 1 shows descriptive information on the distribution of the participant's experience in the field of agility.

As illustrated in Fig. 1, the distribution of experience among the interviewees in agile project management is as follows: 48% possess over five years of experience, 31% have between two to five years, and 21% have less than two

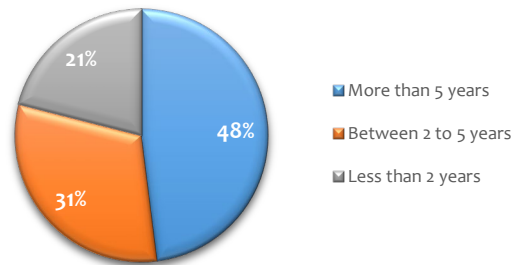


Figure 1. Distribution of experience in the field of participant agility
Source: Own Elaboration.

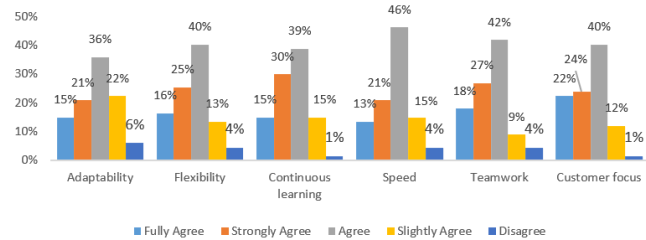


Figure 2. Perception of the contribution of agility as a mechanism for improving contract performance.
Source: Own Elaboration

years. This diversity in experience levels indicates that the sample adequately represents the knowledge and expertise relevant to the phenomenon being studied. Terzieva [59] highlights the importance of knowledge management in project environments, emphasizing that the practice of learning from both failures and successes plays a crucial role in capturing, sharing, and preserving knowledge over time. As depicted in Fig. 2, illustrates respondents' views on how agility contributes to enhancing the performance of the terms and conditions in contracts for products, goods, and services. Worley, Williams and Lawler III [60] pinpoint several factors that improve contract performance in an agile setting, including 1) Adaptability, 2) Flexibility, 3) Continuous Learning, 4) Speed, 5) Teamwork, and 6) Customer Focus.

Fig. 2 presents the respondents' perceptions on the effectiveness of agile methods in contract management, with the majority agreeing or strongly agreeing on several key aspects: 1) Adaptability: 72% of respondents report that agility enhances contract adaptability. 2) Flexibility: 82% believe that increased flexibility improves result delivery. 3) Continuous Learning: 84% acknowledge that continuous learning fosters improvements in contract management. 4) Speed: 87% confirm that agility accelerates delivery times. 5) Teamwork: 81% recognize that agile methods facilitate and enhance operational efficiency. 6) Customer Focus: 87% note that these methods increase visibility and transparency regarding customer requirements. Collectively, these responses underscore the consensus that agile methodologies significantly enhance contract performance.

Ng and Navaretnam [22], Algarni [56], Linders [61] concur that agile methods equip project teams with additional skills, capabilities, and tools essential for efficient contract management and ensuring the fulfillment of project objectives with anticipated value.

Furthermore, the research measured the degree of

Table 1.
Results of Spearman's correlations independent variables

Dependent Variable	Hypothesis Testing Model	Independent Variables
	Spearman's	Level of influence of the flexibility factor on the terms and conditions set forth in the contract clauses
Question The use of agile methods allows to improve the performance of deliverables in a project contract for products, goods and services.	Correlation Coefficient (Bilateral)	0,72
	Sig.	
	Sig.	0,3
	N	100

Source: Own Elaboration

consensus among the experts via the correlation coefficient to test the proposed hypothesis. Alzina [62] explains that correlation provides insights into the intensity, direction, and degree of relationship between variables. In this context, a positive correlation occurs when two variables change in the same direction; the strength of this relationship is indicated by a coefficient ranging from 0 to 1, with 1 denoting the strongest relationship. This analysis is characterized as non-parametric, suitable for testing hypotheses concerning quantitative data populations, particularly when the distribution is uncertain.

The study utilized Spearman's rank correlation to assess the connection between two variables. According to Kendall and Smith [63], this coefficient evaluates the degree of correlation across multiple variables. Table 1 encapsulates the most significant correlations, both negative and positive. Following Alzina [62] classification, these range from negligible to low. For analytical purposes, the research primarily focused on positive correlations, reflecting the core interests of the study and highlighting the significant relationships between dependent and independent variables.

In analyzing the dependent variable (agile method), the positive associations with the independent variables (factors as adaptability, flexibility, continuous learning, speed, teamwork, and customer focus) were interpreted. The p-values associated with the null hypothesis's test statistic were 0.6 and 0.8, respectively, indicating a significant correlation between the variables. Consequently, the hypothesis suggesting a strong interrelation can be confidently accepted.

The hypothesis testing corroborates the findings, demonstrating that implementing an agile approach—particularly through enhancing flexibility—can significantly improve contract performance. Gupta, Agrawal and Ryan [43] further assert that managing a project with an agile approach not only boosts performance but also fosters continuous improvement. This approach encourages a close connection between the project and the organization as a whole to consistently deliver value by incentivizing ongoing enhancements.

1 Discussion

Project management is associated with procurement, the latter establishes the policies to enter into a contract and the processes derived from these, being contracts the mechanisms used to establish the agreements between the parties involved and are also tools established to regulate the management between stakeholders [2,24]. On the other hand, agility has to do with economies of scope, which determines

the types of contracts that are required and how they should operate in the life cycle of projects [64].

The use of agile methods within procurement processes must be fast and effective, which is why the orientation towards the client and knowing their requirements specifically should focus on the efficient use of budget, technology, and information to improve the performance of the processes involved [65]. This also means that the clauses used in contracts should be flexible and adaptable to the needs of the environment.

In the construction of agile contracts, it is important to consider how the client's requirements adapt to the needs of the environment, the work team is flexible in its design and execution, and there is a focus on continuous improvement from the internal processes to its monitoring and control. There is also a team committed to the goals established and the products to be delivered.

All of the above factors give room for the agile approach requires that stakeholders be more involved in providing feedback on the deliverables in each interaction, prioritization of tasks, and the value that can be provided in the face of change, being the success of a project or service is ultimately determined by the level of continuous collaboration between the buyer and the seller. Therefore, the present study seeks to assess the level of perception at the enterprise level and determine whether agile contracts can generate this collaboration in an agile environment, through collaboration, flexibility, and adaptability of processes.

Tam, et al. [66] identified that the factors of teamwork capability and customer involvement can favor the deliverables in an agile project; Pacagnella Junior, Romeiro da Silva and Aquino Junior [67] identified that factors such as teamwork, flexibility in the organizational culture and project adoption capability are key to the success of a project. This evidences that the operational factors applied to the execution of a project are also applicable to contract management, giving a systemic scope within an empirical environment.

Finally, it highlights the need to streamline the processes of knowledge building and, the experiences of collaborators in agile environments to ensure their proper use and foster an appropriate relationship with the environment.

2 Conclusions

The study confirmed a positive impact of agility on the performance of contract terms and conditions throughout their lifecycle, establishing a causal relationship between

agility and contract performance in the creation of products, goods, and services. This influence adds significant value to the organization. The data revealed that respondents view flexibility and collaboration among project participants positively, which in turn positively affects the predefined objectives.

Participants concurred that agile methods equip project teams with additional skills, abilities, and tools for effective contract management, aiding in achieving set goals and objectives. There is a strong correlation between the expertise of agile project professionals and their understanding of agile contracts and their outcomes. Furthermore, from the perspective of the users, traditional project contract management has evolved into a process that is both more agile and efficient. It is essential to expedite user experiences in agile environments, enhancing their knowledge to effectively transform project contracting processes into overall management catalysts.

The practical implications of these findings advocate for a shift towards embracing business agility in the digital era, positioning it as a guide to ensure the success of individuals, companies, and society at large. The results offer a strategic roadmap for stakeholders to foster information-driven decision-making in an uncertain environment. From a theoretical perspective, the implications encourage academic research to further explore the relationship between process and procedure in business agility and the resilient role of stakeholders in the digital age. This ensures a diverse future research trajectory as the subject is contemporary, extensive, and multifaceted.

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