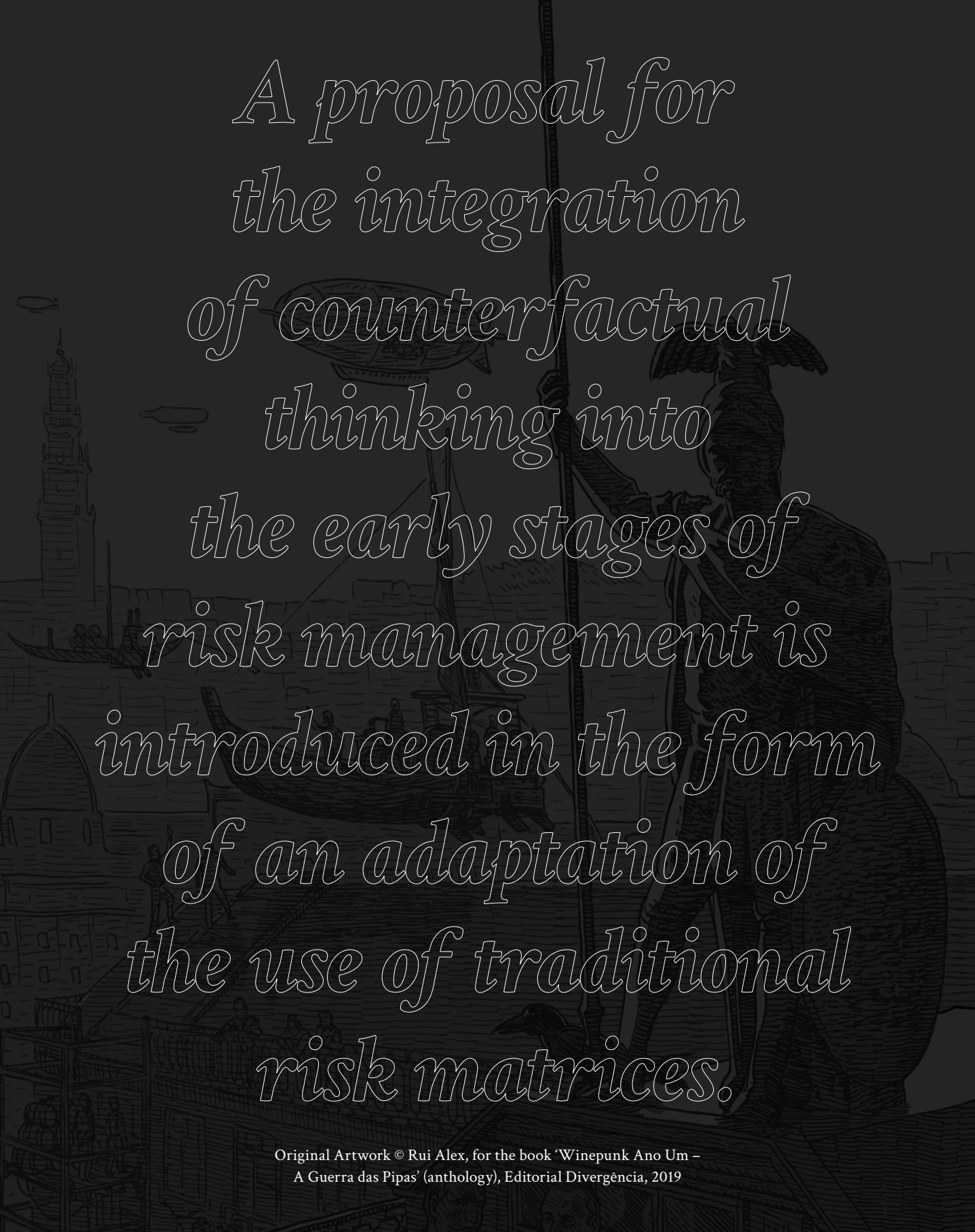

A proposal for the integration of counterfactual thinking into the early stages of risk management is introduced in the form of an adaptation of the use of traditional risk matrices.

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Alternate history for risk assessment in project management

HYPOTHESIS HISTORIA PERIODICAL

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Abstract. Interest in alternate history has become more prevalent, which has led to the study of its potential uses in different settings, business and management being one of them. This article presents an overview of the points of convergence between alternate history and risk identification and assessment in the context of project management. A proposal for the integration of counterfactual thinking into the early stages of risk management is introduced in the form of an adaptation of the use of traditional risk matrices. Future perspectives and limitations are also included, as the proposal is meant to complement and not substitute other risk management practices, tools, and techniques.

Keywords: Alternate History, Risk Identification, Risk Assessment, Risk Matrix, Project Management.

1. Introduction

"What if" thinking is becoming more prevalent in different types of settings due to the fact that alternate history tends to bloom in uncertain and volatile times where change is the only constant. When dealing with unexpected or sudden contingencies, people become more aware of how a specific situation can change a whole sequence of events [1] and disrupt life as we know it.

As a result of this increased complexity and uncertainty, risk is everywhere, but so is risk management. Risk management offers an integrative framework for understanding many parts of the human experience because "risk is recognized and accepted as inevitable and unavoidable in every field of human endeavor, so there is a matching drive to address risk as far as possible" [2]. This has led to the widespread use of risk management as a consolidated way to identify, understand, and respond to risk in multiple areas and sectors, from business to public policy.

Traditionally, risk has had a negative connotation, which has led to an over-emphasis on the potential effects of risk as harmful and unwelcome [3]. Under this perspective, unmanaged risk is considered dangerous because unforeseen outcomes can jeopardize the fulfillment of goals. Nevertheless, some uncertainties could have positive effects if they occurred. "These uncertainties have the same characteristics as threat risks (i.e., they arise from the effect of uncertainty on achievement of objectives)" [3], but their consequences would be beneficial and welcome and should be treated as opportunities.

In this context, effective risk management is essential for both mitigating potential negative impacts and taking full advantage of opportunities, yet, in many industries, it does not work as it should [3]. "Potential threats that should have been spotted and tackled turn into avoidable problems, and opportunities to create additional value or minimize waste and rework are missed" [2]. In order to manage uncertainty proactively, the success factors that are currently missing in risk management need to be addressed [2], and this can involve incorporating novel methodologies to facilitate certain parts of the process.

Alternate histories could prove to be useful as they help "understand the forces that can influence the future by rethinking the past and its consequences" [1], which is the basis of risk assessment and management: gaining insights into what could happen in the future by analyzing and modeling past data to create simulations of the short- or long-term future. The goal is to impose structure on the world, limit variation, and explain residual uncertainty in situations where control is hard to achieve [2]. This article presents convergence points between risk management and alternate history to propose a way of incorporating them both into the early stages of identification and assessment of risks.

2. Background

2.1 Introduction to alternate history in business settings

Alternate histories are a form of fiction writing that emerges from what would be considered a shift from an established narrative timeline to a what-if scenario that stems from a point of divergence from the original or real timeline [4]. They represent "hypothetical scenarios that could happen alternatively to the considered timeline" [5]. Alternate histories challenge the past, the present, and the future through unrealized possibilities, providing an intriguing window into the ways in which people understand events that have occurred and how they think about what could have been different [6].

Alternate history relies heavily on cause-and-effect principles, as the best kind of alternate history is the one more closely based on plausible causal

relationships [7]. Therefore, the nature of alternate history can be closely linked to decision-making processes, planning, change management, and multiple other business strategies [8–11] where thinking about consequences is crucial.

Alternate history methodologies provide a framework that allows to generate counterfactual narratives by mixing historical thinking, causality, and creativity [6]. Alternate history has been deemed as inherently "presentist" because, although it focuses on changes in the past, its primary concern is the outcomes they would have in the present [12], it helps think about where things would be now if something had been different then.

In the realm of alternate history, various terms such as "uchronias," "alternative histories," "allohistories," "parahistories," "speculative or hypothetical histories," and "counterfactuals" are often used interchangeably; nevertheless, nuances and complexities with each term can lead to differences between them [13–15]. For instance, "uchronia" is often considered the rewriting of history as it might have been, sometimes referred to as "alternate history" or "counterfactual history" [16]. However, some authors view uchronia as a broader category encompassing the construction of past, present, and future alternate chronotopes, within which alternate history is a more limited subcategory [14]. Terminological differentiation is used to enforce normative evaluation in this domain. For example, a distinction between uchronias and alternate histories has been made based on how meticulously authors depict historical divergence [13].

Similarly, the terms "alternate" and "alternative" are seemingly interchangeable, but "alternate history" is preferred over "alternative history" due to the latter's association with histories from non-standard perspectives [14]. "Counterfactual" is another favored term for exploring the consequences of imagined historical divergences in terms of historiography [14]. A counterfactual represents what did not occur by creating alternative outcomes to actual facts. It involves generating a nonfactual or alternative antecedent and then producing a consequent contrary to reality [17]. Counterfactuals are also known as "subjunctive conditionals" and have been widely used by historiographers to identify significant connections and turning points, particularly in cliometrics and economic history [14].

These kinds of narratives each include an account of what might have happened as a consequence of some hypothetical alteration in history [18], often captured by the expression "what if" [15]. The question "What if...?" has been a timeless way to establish causal connections and draw moral conclusions while interpreting the past. Various attempts have been made to classify different types of "what ifs" based on how history was altered. One interesting distinction includes nexus stories, occurring at the moment of the break; true alternate histories, occurring after the break, sometimes much later; and parallel worlds stories, suggesting that all potential events occurred without a definitive break [13].

Despite the diversity in terms and classifications, all these concepts and definitions share a common goal – to perceive the future as a challenge to explore alternative approaches to history and to expand the understanding of the intricate relationship between the past and the present [19]. In this article, alternate histories and counterfactual thinking are used to describe this process as a means of identifying and better assessing risks in project management.

There seems to be an emerging cultural fascination with the implications of "counterfactualism" and alternative possibilities [20], which means that there is no better time to explore alternative possibilities for the use of alternate history as a thought experiment that can bring forth more creative ways of thinking and doing. Building alternate histories can help learning and changing processes,

as "imagining the possibilities of what could have been helps broaden the horizons regarding what could be" [8], by creating a way of looking at reality from different angles and dimensions [21].

2.2 Risks in project management

"A risk is any uncertainty that, if it occurs, would have an effect on the achievement of one or more objectives." [3]. In this sense, organizations generally view risks as uncertain events or conditions that, if materialized, may affect the accomplishment of established goals. In project management, those risks are usually identified and assessed in terms of their probability of occurrence and potential impact on the objectives [22] through qualitative or quantitative risk matrices (see table 1).

Table 1. Example of Risk matrix

Risk level		**Probability of occurrence**		
		High	*Medium*	*Low*
Anticipated impact	*High*			
	Medium			
	Low			

Source: *Developed by the authors based on information from de Sousa & Morais (2014) [23].*

Although it is recommended to consider both the negative and positive effects of risks [24], in practice, most organizations focus on the adverse effects far more, as they are viewed as the ones that can cost time and money. This results in risk management practices being primarily focused on the prevention and reduction of damage, harm, and loss [24].

Unfortunately, despite evidence that risk management is highly influential in terms of project success [25], research has found that it is the lowest-scoring project management technique when it comes to effective deployment and use [3]. This suggests that although risk management is recognized as an essential part of project management, it is not being prioritized or implemented effectively.

"To be fully effective, risk management must be closely integrated into the overall project management process. It must not be seen as optional or applied sporadically only on particular projects" [3]. Risk management must therefore be built into organizations and project life cycles. "Risk management is an endeavor that begins with requirements formulation and assessment, and also includes the planning and conducting of a technical risk response phase if needed" [26]. For this purpose, the risk management discipline is based on four sequential and cyclical processes: identification of possible threats and opportunities, assessment of identified risks in terms of probability of occurrence and associated impact, response planning in terms of preventive and reactive actions, and implementation and monitoring of the planned responses [24].

3. Material and methods

A literature review was conducted to identify the core concepts surrounding risk management that intersect with alternate history methodologies. The methodology for the literature review included an online search for articles, books, and research materials on the subjects of risk assessment and management in the context of project management, as well as alternate history.

Over 60 research articles, book chapters, and reports were reviewed, and considering the scope

of this article, around 40 were selected as sources of information. Additionally, information from the Project Management Body of Knowledge by the Project Management Institute was analyzed to provide the appropriate background for risk management in the project management context. The sources were selected because they helped identify several points of convergence between risk management methodologies and alternate history that allowed to propose an integrated approach for risk management that uses alternative pasts to identify risks, prioritize them, and brainstorm ideas for response strategies.

4. Results: Using alternate history methodologies in risk assessment and management

"There is clearly nothing wrong with risk management in principle" [3]. The process is generally well-defined, and there are proven tools and techniques to support it, but still, there seems to be an issue in the implementation. According to Hillson and Simon, the problem arises not from a lack of understanding with regard to the "why, what, who, or when" of risk management but from confusion over the "how to" [3]. This has led to several authors exploring the possibility of implementing new methods that help clarify the ways in which organizations can identify, assess, and better manage the risks for their projects.

In the past decade, some authors have researched the benefits and shortcomings of different risk management approaches in real-life contexts [27, 28], exposing some of the issues of current risk management practices. These research exercises have highlighted problems like inadequate documentation, little knowledge reuse, and a lack of tools to automate, report, monitor, and support decision-making [24].

In this article, particular attention is paid to issues in the risk identification and assessment processes, in which the likelihood of occurrence and potential impact are used to determine risk levels. Oftentimes, the risk assessment process is solely based on interviews and brainstorming sessions with stakeholders or experts on the matter [24]. Other times, the assessment process proves to be difficult for organizations that do not have the resources to carry it out using complex software, and they have to use a risk assessment matrix like the one presented earlier (see table 1).

One of the primary problems when trying to fill out a risk assessment matrix is knowing where to begin and how to acquire the data or information needed for its completion, putting project managers' soft skills to the test. Sometimes, it is hard to classify the probability of occurrence of a risk or determine with exactitude the impact it would have. In this sense, many project management practitioners rely on historical information to come up with estimates. This is where alternate history could come into play and help overcome some of the obstacles project managers face when working with risk matrices.

Similarly to alternate history, risk management is highly concerned with the past and trying to establish connections from it to the present and future. In every project, the Project Management Information System (PMIS) should play an important role [29]. Among other things, it includes logs of previously executed projects, the issues that were encountered, changes that were made to the original plans, and other useful information [30]. This allows teams to "learn from events reported in the past, aiming to help in the design of better workflows for future execution" [24].

Historical information is beneficial not only to learn from the past as it was but to explore alternative events and outcomes that can lead to a deeper understanding of risks, particularly in organizations that manage multiple projects in the

same realm. Risk matrices in particular, although they present limitations, are considered useful for risk assessments. In fact, it is encouraged to use them in conjunction with other tools and techniques such as probability training, expert insights, counterfactuals, and hypothetical considerations [22], which is partly what is being analyzed in this article: the possibility of incorporating counterfactuals and hypothetical thinking, in the form of alternate histories, into risk management tools such as risk matrices.

Interestingly enough, there are already methods that play on the idea of alternate history in the context of risk assessment by changing past events. "One approach is to use a form of counterfactual analysis called retrospective simulation. Retrospective methods aim to analyze errors and prevent their recurrence" [31]. The process involves looking at the output from simulation runs retrospectively to generate only optimal answers [32].

Retrospective simulation involves modeling historical events and then introducing changes to see how they might have affected the outcome in a similar way to how alternate histories are built. By making use of retrospective data for the development of prospective scenarios, the efficiency of analysis might be increased [31]. This kind of information can be used to identify critical decision points and factors that contributed to the alternate history outcome and inform risk management strategies that address those factors. Through this methodology, risks identified within the scope of previous projects can be analyzed to find incidents that precede risk events and provide a reliable indication of an event occurrence prior to it actually happening [33].

Implementing alternate histories into risk management can help solve "deterministic optimization problems with respect to an observed sample path as if the outcomes of all uncertainties were known in advance" [32]. Once a sample path (actual past) is determined, it may be possible to reconsider various decisions and design factors (point of divergence) [32] and estimate possible outcomes (alternate histories).

For example, retrospective simulation could be used to evaluate the impact of a different decision made in the past on a current risk management strategy. By simulating how the past decision might have affected the outcome, stakeholders can better understand the potential consequences of different decision-making approaches and inform their risk management strategies accordingly. "Correct decisions are easy after the fact, but hindsight is not possible in the real world. However, for some important decisions, 20/20 hindsight is possible in a simulated environment" [32].

Going back to the issues presented with regard to the use of risk matrices for risk assessment, these types of exercises with simulated pasts or alternate histories can help project managers gain an understanding of issues and their consequences in order to build more reliable or complete risk matrices for future projects. Of course, every project is different, but there are always lessons to be learned. Alternate history can be used to either turn risks from previous projects into actual issues that were faced in an alternate past and understand how to deal with them, or it can be implemented to modify the magnitude or timeframe of problems from the past to adjust them to the current project's characteristics and better assess them as present risks.

For example, when transforming issues from the past to fit a present project's characteristics, an adaptation of a risk matrix can be used (see table 2). Instead of using the probability of occurrence and anticipated impact, frequency or prevalence and influence can be used to assess the severity of the alternate past adjusting for the current project.

Table 2. Adapted risk matrix for use with alternate history

Severity		Frequency or prevalence				
		Very rare	*Rare*	*Occasional*	*Prevalent*	*Very prevalent*
Influence	*Incidental*					
	Minor					
	Moderate					
	Major					
	Severe					

Source: *Developed by the authors with information from de Sousa & Morais (2014) [23], NASA (2009) [34], and Thomas, Bratvold, and Bickel (2014) [35].*

"A matrix should be designed to be appropriate for the circumstances, so it may be difficult to have a common system applying across a range of circumstances relevant to an organization" [36]. Depending on the project and the organization's needs, matrices can shift in size and complexity, ranging from 2x2 to 5x5 in most cases. There can also be matrices that do not have the same rows as columns. The frequency or prevalence can be assessed by establishing specific criteria for each category and determining how often the issue occurred in the past to better assess how prevalent it could be in the current project.

In terms of the influence, table 3 can be used as a reference to determine the area of the project impacted by the problem and the effect it had. An integral approximation must be made, for which different types of consequences need to be considered. Consequence should be measured as a deviation from the project's scope, cost, and schedule baselines [26, 37]. Criteria for the rankings must be adapted to the context of each project, organizational risk appetite, and stakeholder priorities, but, in general terms, the following are widely used.

Table 3. Input table for adapted risk matrix

Influence	Incidental	Minor	Moderate	Major	Severe
Effect on the scope	*No impact on success criteria*	*Minor impact on full success criteria*	*Moderate impact to full success criteria.*	*Minimum success criteria are achievable with margins*	*Minimum success criteria are not achievable*
Effect on the cost	*<2% increase over budget*	*Between 2% and 5% increase over budget but can be handled with reserves*	*Between 5% and 7% increase over budget and cannot be handled with reserves*	*Between 7% and 10% increase over budget*	*>10% increase over budget*
Effect on the schedule	*Negligible schedule impact*	*Minor impact on schedule milestones; no impact on the critical path*	*Impact to schedule milestones; moderate impact on the critical path*	*Major impact on schedule milestones; major impact on the critical path*	*Cannot meet schedule and program milestones*

Source: *Developed by the authors as an adaptation from NASA (2009) [34] and Thomas, Bratvold, and Bickel (2014) [35].*

In terms of using alternate history, if the past issue affected the cost and the schedule, for example, data can be adapted, creating an alternate past with information available in the present, like the project budget and timeframe. The table would then reflect the alternate history of a project's problems which can then be used to think about what the potential impact of a risk would be in the present and future.

A similar method has been used by an organization in Mexico that was working on creating an anti-corruption policy. Data on diverse corrupt practices were analyzed to determine how frequent they were and, therefore, how prevalent they could be in the future, also taking into account the severity of the problems in the past in terms of social and economic costs and damage to the public trust [38]. Corruption risks were categorized accordingly in order to set public policy priorities; problems that seemed to be getting worse with time and had high social, economic, and public opinion costs were addressed first, while the ones that had been stagnant were set to be intervened second, and issues that had gotten better with time but were still present were undertaken last.

It is important to state that for this methodology to work, projects would have to be similar in their area of application (sector or industry), have comparable objectives, or deal with the same stakeholders (including team members and providers), as some of the same complications might keep coming up if not properly addressed. For example, building alternate histories for issues experienced in a construction project with the purpose of identifying and assessing risks in a public policy project may not be compatible. However, using historical information from an e-store app development project to build counterfactuals to assess potential risks in a new purchasing app might prove to be useful.

It is about using available information on previous projects and adapting it to the context and characteristics of the current one; therefore, the more similar the projects are, the easier it is to establish those connections and build more plausible alternative histories that can lead to a better interpretation of both the probability and potential impact of risks, because they have already happened in the counterfactual past.

The idea is that when facing the challenge of using a risk matrix, project managers can ask "What if a past project looked like a current one?" "How would it have been affected by the issues encountered?" but also "What if we knew then what we know now." Answering these questions can lead to better risk assessments and strategies to overcome them or harness opportunities that would otherwise be overlooked.

Another approach to using alternate history in risk management is to test the resilience of risk management strategies under different conditions. By modeling hypothetical scenarios based on alternate historical events, project managers and stakeholders can identify potential weaknesses in their risk management strategies and develop more appropriate contingency plans to address them. This is similar to the idea of using alternate history in scenario planning [8].

The concept of alternate histories is rooted in the belief that every historical situation holds numerous divergent possibilities that go beyond those that actually occurred. This perspective views the course of history as a waste of opportunities that could have been realized [13]. Through implementing counterfactual thinking into risk identification and assessment, those opportunities can be harnessed in the present and future by exploring what might have been, avoiding the negative outcomes, and building on the positive ones. In this sense, project managers can acquire or develop soft skills through this process, such as communication, decision-making, adaptability, resourcefulness, planning, and critical thinking.

5. Solutions and Recommendations

In order to manage risks effectively, they need to be meticulously assessed, a process that has traditionally involved relying on historical information and playing with facts, modeling, and simulation. This has been done through everything from relatively simple methods to building complex algorithms and programs. It is obvious that some methods are more reliable than others, particularly when it comes to the use of data and the quality of it. Nevertheless, there are areas in the risk management process that allow for change, adaptation, and innovation. Applying alternate history to risk management can help people think about things differently and come up with ideas that they may not have had otherwise, particularly improving the risk identification and prioritization process.

Although risk matrices are appealing, "they can create liability issues and give a false sense of security" [39]. Therefore, it is not recommended to use them to substitute other risk management tools and techniques. Instead, they can be used as a starting point to promote discussion and the flow of ideas, especially when implementing them alongside alternate history. Overall, the use of alternate history methodologies in risk assessment and management can provide valuable insights into the potential consequences of different decisions and strategies, and help stakeholders develop more effective approaches to managing and mitigating adverse risks and taking advantage of positive ones.

6. Future Perspectives

One of the main reasons why risk management is such a fascinating topic is precisely because it is constantly changing [2]. This allows for the innovation and improvement of different phases in the process. Risk identification is the first step, and, in theory, alternate history seems like a good place to start.

"It is probably true that the scope and influence of risk management will continue to expand, at least in the short term, as more areas of application are found for risk-based approaches" [2]; therefore, it is also highly likely that new and better tools and techniques will be available, especially with the continuous technological developments. Future research could build on the suggestions included in this article to implement them in an actual project and evaluate the benefits and shortcomings of using alternate history and counterfactuals to identify and assess risks in a practical way.

Additionally, incorporating the Bakhtinian Theory of Chronotope, developed by Mikhail Bakhtin, could help develop alternate history narratives in organizations. This theory explores the interconnectedness of time and space in literature. It suggests that literary works are shaped by specific chronotopes, which are configurations of time and space that influence the development of characters, events, and themes in a story [40].

In the context of alternate history, the Bakhtinian concept of chronotope can be applied by considering how altering specific historical events creates new time-space configurations, thereby influencing the narrative and the development of the actors involved, which could be thought of as characters in the story.

In this sense, alternate history narratives often rely on exploring the consequences of these altered chronotopes and organizations can employ these ideas to analyze potential scenarios and their implications. By altering key business decisions, market conditions, or technological advancements in past situations, they can use narrative exploration to anticipate various outcomes and plan accordingly.

Conclusion

It is time for a methodological re-assessment of the uses of thought experiments such as alternate history, "particularly in light of counterfactualism's

developmental relatedness to cultural, technological, and analytical modernity" [21]. In this sense, analyzing risks in the context of project management seems like a good opportunity to explore the possibilities of using alternate histories, as playing with the facts and mixing in historical information is not new when dealing with risks.

The potential of alternate history as a way to identify and prioritize risks lies in using counterfactuals to explore how changes in the past might have affected the outcome of a particular project and how those changes can inform risk management strategies in the present. Alternative pasts for a project can be inspired by real circumstances in the present to help simulate outcomes that could come to be. To give structure to this idea, the concept of retrospective simulation was introduced, as well as an adaptation proposal for risk matrices that integrate past and present information to create semi-imaginary project issues and estimate their consequences in order to help visualize contemporary risks. The ideas presented in this article can help start the conversation, promote debate, generate new ideas, and inspire project managers to identify project risks and assess them preliminarily.

Limitations include the fact that, although risk matrices can be practical and useful tools that contribute to consistency when prioritizing risks, they can also be subject to bias, inaccuracy, and other issues that can lead to "risks being overlooked, inappropriately assessed, or prematurely dismissed" [41]. Risk matrices "provide qualitative or semi-quantitative ordinal information, and not mathematically precise data" [31] and, when possible, should be used in conjunction with more accurate estimation, modeling, and simulation methods. Diverse teams can also promote better risk management practices by offering a range of perspectives and skills, improving performance, fostering healthy discussion within a group, leading to more robust deliberation processes, and challenging conformity [42].

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