

The Project and Risk Management Challenges of Start-ups

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Abstract: Start-up companies are essential to maintaining innovation in an economy. However, the high failure ratio of start-ups indicates that market, financial, and other risks require serious attention. As start-ups mostly evolved at the end of the 20th Century or the beginning of the 21st Century, the history of project and risk management practices for them has a shorter history. Overall, 90% of start-ups fail, 10% within the first year, and 70% within two and five years after foundation; therefore, understanding the underlying factors and how proper project and risk management can reduce the likelihood of failure, is worthwhile. This paper reviews the history of start-ups and the typical causes of failure based on a literature review. Finding the appropriate way and tools for risk management, a new approach is introduced. Considering start-ups as projects, a much more mature methodology is available for solving the problems. As a result of the diversity resulting from industry and other specificities, a two-level approach is suggested, including a risk-oriented management framework model and an additional flexible toolset.

Keywords: start-up; project management; risk management

1 Introduction

Due to the result of the latest technical improvements of the last century, there have been numerous innovations across the globe regarding new product and service developments. As start-up companies have a remarkable contribution to innovation processes regardless of the industry, the research interest is increasing in the field [1]. Start-up companies can generate relevant economic and social impact, but they

usually take higher risks to achieve success than other companies. Therefore, start-ups can be investigated as entities with a goal to generate profit as well as incubators of innovation, regardless of business outcome [2]. The competing goals of creating profit and maintaining a high level of creation must be achieved simultaneously. Global policy initiatives have emerged to fulfill this goal in the past few years to support the environment of new companies with local regulations and reduce the risks over the life cycle. Policymakers have also acknowledged the importance of start-ups in the economy, especially after the global recovery from the effects of the COVID-19 pandemic [3].

The highest number of start-ups are operating in the technological sector, especially in the Fintech industry (total 35.9%) [4]. The United States had the highest number of start-ups registered at the end of 2021 (70641), which is way above the second, India (12440) [5]. Despite the high number of start-ups, their success rate is relatively low. A study based on the analysis of 80 start-ups in March of 2021 found that only 10% of start-ups will make it through their first year. The most frequent reason for failure is the lack of product-market fit or market need (34%), and the second is the lack of funds (29%). Even if they survive the first year, only 40% of the companies will become profitable. There was no significant difference found between industries; the highest failure rate is within IT (63%), the lowest is within finance, insurance, and real estate (42%), and manufacturing represents the average (51%). Notably, about half of the start-up owners expect an acquisition by a larger corporation [6]. Regarding the invested amount of money, the most spectacularly growing start-up sectors are healthcare (41.2 billion USD), transportation (25.5 billion USD), and financial services (24.6 billion USD) [7].

Santisteban *et al.* [8] emphasize that the success of a start-up is influenced by applied project management and risk management strategies. A broad range of project management methods evolved in the 20th Century, mainly in parallel with the development of computer technologies [9] and continue to advance as organizations recognize the importance of conscious project management. However, these project management methods and frameworks were designed for large companies with a mature management system, and the question arises whether the practices are also applicable to start-ups or might require different approaches.

Risks are usually considered obstacles with a wide range of probabilities to achieve success. Due to worldwide globalization, several possibilities emerged for organizations, but in parallel, the number of risks to handle increased too [10]. The most effective approach to risk management usually considers economic aspects, as the main target of private companies is to achieve targeted profitability, which catalyzes the development of project risk management principles [11]. It later considers their applicability for start-ups [12].

2 History of Start-ups and their Research

A Stanford University professor and entrepreneur, Steve Blank, defined a start-up as a “temporary organization that aims to pursue a repeatable and scalable business model” [13]. The definition is quite similar to that of small and medium-sized enterprises (SMEs), but there is a relevant difference between them in the innovative approach. Start-ups are highly innovative companies and have become increasingly popular since technological inventions make innovation procedures easier and faster in basically every industry.

This kind of entrepreneurship can be considered a business model that can adapt to the rapidly changing environment with constant re-iteration to reach the target and create value. Also, the level of competition is significant between start-ups since the economic race is obviously increasing in line with the number of actors within an industry. Digitization, the internet with simple and quick access to knowledge, and global supply chain improvements all support the birth of new start-ups worldwide.

Start-ups are often linked with the rise of Silicon Valley, where most of the innovative technology, mainly semiconductor manufacturing, companies concentrated in this area in the 1970s. After this, a huge “boom” started in the 1990s with the development of Internet companies, which is considered the second phase of start-up history. Later, the technological improvements provided a base for other industries to get leverage from the latest developments. Nowadays, start-ups are among several technologies and are a worldwide trend, and no longer exclusively in the United States.

The first definition of the modern start-up was published by Forbes [14] in 1976, and afterward, in Business Week [15], the term start-up company was defined. In the 1980s, Van de Ven [16] analyzed the management framework of start-ups, followed by Dean [17] to discover the project management aspects of start-ups. Recently, a detailed classification of different start-up types was collected by Krishnan et al. [12] in 2020.

Finkelstein [18] targeted the general risks related to start-ups. Chang [19] in 2004 and Konecsny [20] in 2018 explained the applicability of one of the most frequently used risk management methods, venture capital financing, to mitigate the financial risks of start-ups. A similar approach was followed by Midler [21] in 2008; he investigated the importance of continuous learning. Blank and Dorf [13], Trimi et al. [22], Erzurumlu et al. [23], and Picken [24] all investigated the role of business models in start-ups. Several authors analyzed the risk management practices of start-ups like Erzurumlu et al. [23], Jaroslaw [25], and Halmosi [26]. Mantilla [27] and Santisteban et al. [8] called attention to the difficulties and success factors of start-ups.

Start-ups differ from other companies that use traditional business planning strategies [13] because their future predictions cannot be made based on past experience since a comprehensive operations database is not available [28].

Therefore, a key point to running a successful start-up business is managing knowledge to build lessons learned into the next loop of strategic planning and initiate a quickly adaptable system for fast changes. They improve through continuous changes and building a business model, for the actual situation [24] [29-31]. Teece stated that the success of an organization is highly dependent on its ability to adapt the business model dynamically [32].

All these contributing factors to the high failure rate of start-ups [19] [33] can be considered risks, and some of these can be traced back to internal managerial issues. Trimi and Berbegal-Mirabent [22] highlight that a major cause of start-up failure is the lack of a structured process to understand their markets better and validate theories in the early stages of the company. Learning about the related risks and explaining their reasons is critical to increasing the success rate. This article aims to map the frequent risks of start-ups to better understand current obstacles and explore options for implementing project management practices to mitigate risks effectively.

3 Risks of Start-ups

The literature on corporate risk management is broad. Competing information is available regarding the definition of risks, risk management, and its relation to project management [34]. Studies on risk management emerged in the 1980s, along with the appreciation of business strategies and project management. The motivation for developing risk management was that many projects were completed late, over budget, or did not perform as expected. A database from the 1980s showed that “many projects met their time-target – the average slippage was 17% – but there was a clear over-run-on cost – the average over-spend was 88%”. Williams gave a detailed bibliography of the topic [35].

According to Giardino *et al.* [33], about cutting-edge technologies, just one failed project can destroy the start-up’s future. Case studies show how inconsistent management strategy and execution lead to failure [36]. It is important to understand the importance of a fast and effective learning procedure, especially regarding the market, which requires information. The study reveals “inconsistency between the strategy of understanding and testing the problem/solution fit and the behavioral execution of pursuing the product/market fit.” Early recognition and solution of problems lead to higher chances of start-up success. The analyzed, failed start-ups, showed a reluctant behavior to reflect customer needs appropriately [33].

Based on empirical investigation among young companies in their formative age (2-8 years old, across 10 EU countries and 18 sectors), some similarities can be seen in the risk management of these companies. Financial risks can be managed with the support of formal and informal networks. Market risks are usually not well

manageable by these companies. Firms in knowledge-intensive sectors (high-tech manufacturing) and companies with more formally educated leaders apply risk management more consciously. Technology and financial risks are positively related to internal risk mitigation and networking. Operational risk is positively related to internal risk mitigation but negatively to networking. Market risk is exactly the opposite of operational risk. The education of founders and new product introduction are positively related to all aspects of risk mitigation. Short life cycles are strongly related to market risk mitigation strategies across all sectors. Networking and technology risk management show a correlation in low-tech sectors. At the same time, it was found that the founders' previous employment was unrelated to risk mitigation activities [37].

Table 1
Summary of start-up risk categories

Source	Risk or reason of failure categorized
Giardino et al. [33]	Lack of Problem/Solution fit
Giardino et al. [33]	Neglected Learning Process
Janaji et al. [38]	Lack of fund
Cantamessa et al. [36]	Business model (e.g., no/wrong business model, product/market)
Cantamessa et al. [36]	Product (e.g., not feasible, bad quality)
Cantamessa et al. [36]	Environment (e.g., competitors, lack of funds)
Cantamessa et al. [36]	Customer/user (e.g., few customers)
Cantamessa et al. [36]	Organization (e.g., wrong leadership, wrong scaling)
Kim et al. [39]	Commercialization
Pisoni et al. [40]	Human capital
Pisoni et al. [40]	Financial resources
Pisoni et al. [40]	Strategic/managerial decisions
Pisoni et al. [40]	Product/service-related aspects
Pisoni et al. [40]	Contextual/environmental-related aspects

There are multiple approaches to categorizing the most common risks of start-ups (Table 1). The SHELL model (Figure 1) developed by Cantamessa et al. [36] in 2018 is a robust framework to provide a structural method to analyze possible risks of start-ups. The conclusion was that the top three reasons for start-up failures are “No/Wrong Business Model” (35%), “Lack of business development” (28%), and “Run out of cash” (21%).

A Brazilian study in 2017 regarding risk management behavior aimed to analyze similarities in the risk management of companies through correlation analysis. The main finding was that there is no unique way; the start-ups look at different ways of risk management. Their approach to risk management does not depend on the operation time and amount of investment, but a start-up with a more developed strategic framework has a better risk management process.

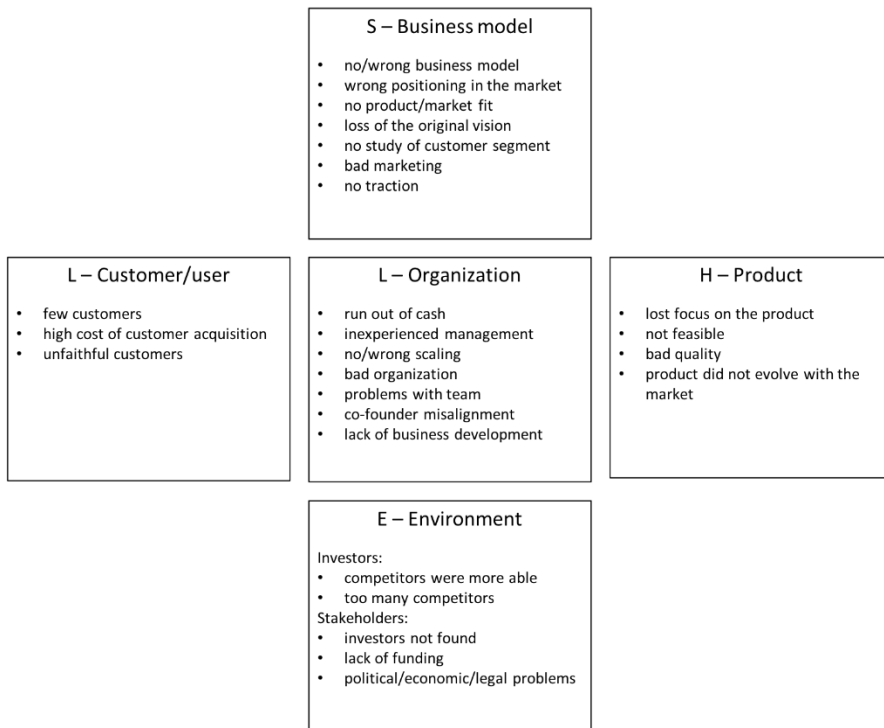


Figure 1

SHELL model based on [36]

Notably, managers who participated in the survey were interested in improving their risk management practices. The available risk management methodologies were too extensive and robust for the usage of start-ups, which clearly asks for the development of targeted and simplified methods in line with the start-up characteristics. The recommendation of the author is the ISO 31000 procedure (Figure 2), which is a simple and easy-to-implement procedure for start-ups. Besides, some start-ups followed the methodologies of Lean Start-up [41] or SCRUM [42]. These methodologies offer an incorporated toolset for risk management along the iteration cycles. The appreciation of the agile approach to project management emphasizes customer involvement at all project stages, including an improved feedback system. It could indicate that the analyzed companies tried to behave as companies in their stable enterprise phase, not in their initial phase [43].

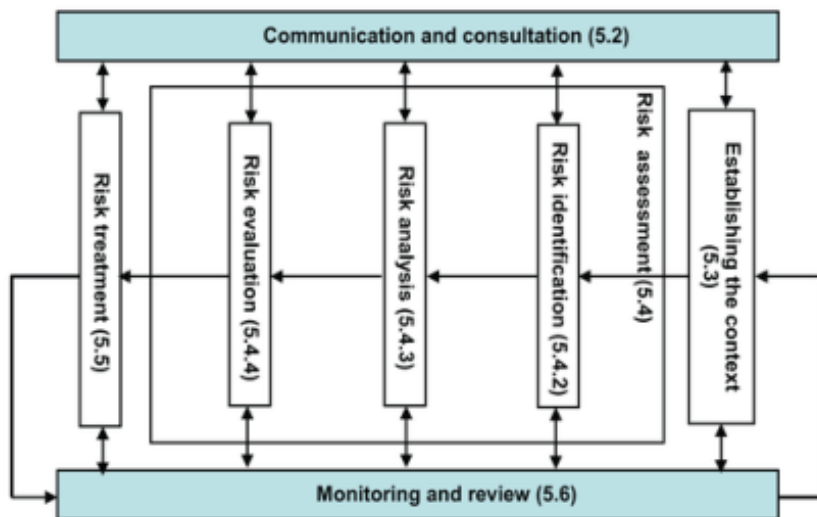


Figure 2

ISO 31000 risk management process [43]

Also, an exciting approach was introduced by Sanz-Prieto et al. [44] in 2021 called the Technical Due Diligence methodology. Due diligence is defined as a process that involves identifying and evaluating risks within a framework, including investments originated by commercialization activities, essentially the purchase and sale of companies, business units, and actions related to merger and corporate absorption mechanisms. Due diligence means rigorously investigating the possible operational risks and reducing them to the bare minimum expression. The methodology intends to perform a technical inspection of an asset, product, service, or process, including start-up ecosystems. The process is divided into phases (Kick-off call, Documentation review, Follow-up, and Report). The applicability of the method is restricted to start-up acquisition; therefore, it is a particular case among the available methods [44].

Filippetto et al. [45] offer a mathematical model developed among software development companies. Risk modeling requires analyzing historical data, then creating an algorithm to establish a tool for future risk prediction. They compose a computational model to reduce the probability of project failure based on the prediction of risks by using historical data (Figure 3). Since the method uses historical data, it is not applicable for starting companies, but accepting it as a framework, continuous data collection may support a quick introduction. Moreover, data management coordinated by an incubator organization may allow access to relevant information to a local or industrial community to boost the development of start-ups. The study considered 17 completed projects and considered 70% of their data to initiate a learning system to generate recommendations for future projects.

Additional 153 other projects from different companies were used as context histories. After the calculation by the algorithm, a comparison was made with an expert judgment regarding the predicted risks. The result showed a 73% acceptance rate by professionals and 83% accuracy compared to old projects. The model and study outline a possible future research field in risk management, as the development of artificial intelligence and big data could significantly support risk prediction models with a high amount of available data. Of course, historical data can only be obtained from the industry in the case of a new start-up, but the learning procedure can be more effective with this method [45].

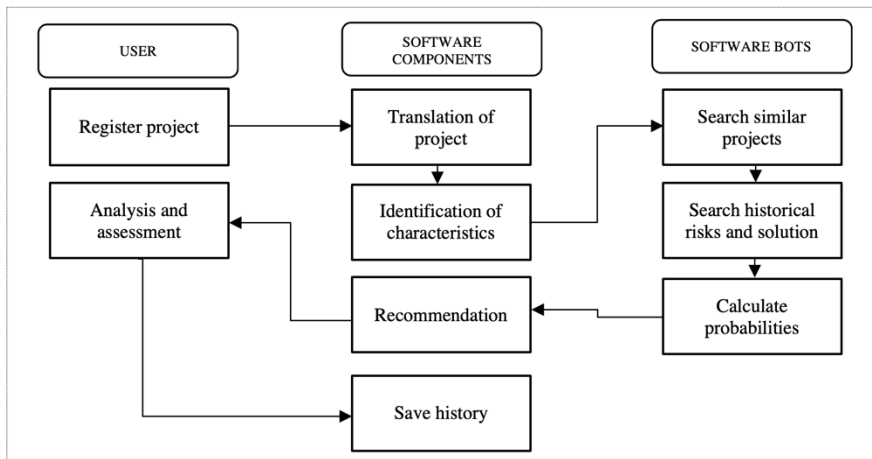


Figure 3

Risk recommendation flow in a project, based on Filippetto [45]

Ward [45] aimed to clarify the meaning of risk management and especially consider it rather a project uncertainty management than a management of purely “bad events”. It seems the risk is usually considered an event that can negatively affect the project; however, approaching it as uncertainty could provide a better perspective, including opportunity management. The author argues that current risk management methodologies are not fulfilling their potential, as the perspective should also focus on opportunities beyond threats. Moreover, the event-based approach should be improved, as it can result in a lack of attention to several areas, like variability because of different knowledge levels or the basis of estimates. It is recommended to rename Project Risk Management to Project Uncertainty Management to move the focus toward the new approach. The author recommends applying this management approach earlier in the project life cycle [46].

SMEs (small and medium-sized enterprises) have some similarities with start-ups; in some cases, they cannot be easily separated. In 2014, Brustbauer analyzed the risk management practices of SMEs based on a questionnaire. He suggests that companies should apply a passive (defensive strategy) or active (offensive strategy)

risk management method. The chosen method should be based mainly on company size, sector affiliation, and ownership structure. Risk management is a significant issue for SMEs, mainly because of the lack of resources for this activity, and about two-thirds of the analyzed companies have a passive risk management approach. Also, larger companies have a greater affinity for implementing risk management strategies. The author interprets that applying risk management increases competitiveness and success. A key factor for effective risk management is the awareness of the company regarding possible risks. If a company is not ready to define the risk in itself and its surroundings, it is not possible to create an effective action plan for risk mitigation [47].

It is essential to emphasize the development of start-up policies, which can also be considered a risk reduction approach for start-ups. As governments recognized the appreciation of start-ups in social and economic aspects, they started to create policies to support the growth of start-ups and secure their economic environment to increase the probability of their success. However, Mason [48] also raises the question of “huge internal inequalities” based on Silicon Valley studies, which could be reconsidered in further studies.

4 Project Management Considerations for Risk Mitigation

Some start-up companies try to apply traditional project management methods [49], but these might not be suitable for start-ups. The maturity of the management, the immature structure, and the level of accumulated experience require a different approach. On the one hand, risks are not selective according to maturity, financial, market, and operational issues; these are the same for start-ups and other companies. On the other hand, a less developed organization is also a source of risk. Considering start-ups as projects can open new opportunities to build a toolset that supports risk mitigation, among other purposes.

Mantilla [27] performed qualitative research on how different start-ups implement project management methodologies. According to Santisteban and Mauricio [50], 21% of start-ups last more than five years. The study revealed that 40% of companies used Agile methods (like Kanban, Lean Start-up, Trello), 30% used traditional methods (e.g., WBS, PERT, and GANTT), and 30% only planned to use any project management methodology in the future. Four out of ten start-ups used Microsoft or Google Office products, and five used online products supporting project management and communication (Asana, Jira, or Trello). The author assumed traditional PM methods are harder to implement in start-ups, and these companies naturally tend towards agile methods. [27].

One of the first articles dealing with start-up project management is related to Dean (1986). He shows the “principal results obtained by applying the project management approach to strategic planning and operations management of innovative start-up firms’ key activities” [17]. The approach implements entrepreneurship as a systematic principle and suggests considering innovation as one of the systematic principles. During the birth of a start-up company, several activities should be performed in an uncertain environment and with limited resources. He concluded that “without a centralized, cohesive, and logical systems approach, the entire start-up operation can quickly become a hopeless tangle of unrelated jobs” [17]. The study found that the lack of a generally effective business and project management plan and arbitrary decision-making, based on feelings and intuition rather than strategic planning leads to unpredictable outcomes. It is worth considering a start-up company as a project since the toolset applied (task definition, precedence relations, durations, milestones, throughput time planning) is common. Project management tools supply relevant initial point tools because the body of knowledge about them is extensive, including case studies and covering concepts or standards. These can moderate the risk of missing experience at start-ups. Dean proposed a basic project management approach for an innovative start-up, as summarized in Figure 4.

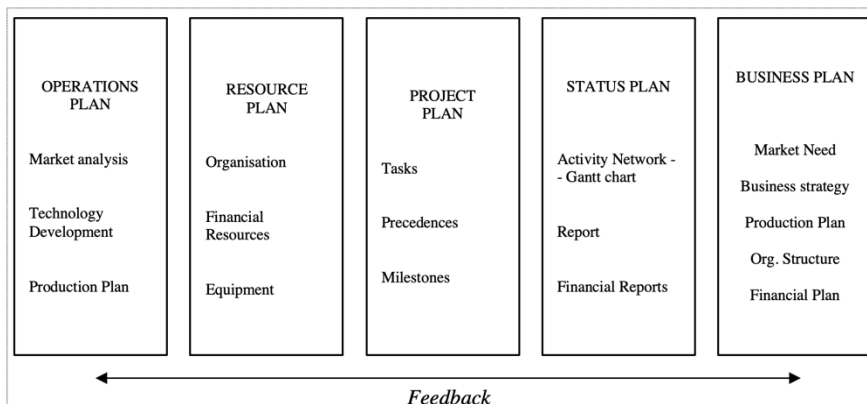


Figure 4

Project management approach to managing the innovative start-up firm (based on Dean) [17]

Midler and Silberzahn [21] present cases about the importance of learning through the product development process of start-ups. Learning efficiency was found to be a critical factor in this context. They analyzed three theoretical aspects, project management, organizational learning, and entrepreneurship. The study concluded that exploration and learning are key with these start-ups, as the cumulative learning method seems more successful [21]. Another study [51] analyzed how companies handle feature innovation on a strategic level. The ability of a company to successfully deploy feature innovations is a critical capability that allows car

manufacturers to be competitive in the market. The study investigated nine general car manufacturers and 26 feature innovation cases, showing a “clear trend towards the structure of autonomous “advanced engineering” units and processes responsible for exploring innovative features and transferring them to multiple products”. They found that automotive companies separated the product development process from the innovation development process by called “Advanced Engineering” departments. The study proves that the innovation implementation process has a “direct impact on the competencies and routines of the carmaker” and, therefore, it might be a major driver for dynamic capability [51].

The increasing attention paid to sustainability also offers lessons learned. Projects in this field face high-risk situations and require specialized know-how. A study [23] analyzed 207 clean technology projects in the US to compare how operation design affects risk and enhances project valuation. A positive correlation has been confirmed between deployment feasibility and project valuation.

Yudine [52] proposed a four-dimensional thinking methodology to develop start-up projects. The method contains three stages of development and five phases of milestones. The study does not provide evidence of the applicability of the proposed method based on empirical data.

- 1st stage: “Chaotic” thinking broadwise on a two-dimensional plane of interdisciplinary links
- 2nd stage: The thinking in the time-dimension
- 3rd stage: Thinking in the vertical direction
- 1st phase: Developing an idea for the startup-project
- 2nd phase: The Business-plan of the startup-project
- 3rd phase: The search for the financial resource
- 4th phase: The implementation of the project
- 5th phase: The assessment of the startup-project efficiency

The model proposes to simplify the business procedure for a new start-up as the informational overload can affect managerial judgment and, consequently, the efficiency of the company. Phases of the method have been detailed but kept to a simple level to make it “user-friendly”. The author recommends for future studies the implementation and effectiveness checks of the proposed method [52].

Conclusions

Start-ups are the beating heart of economic growth, through sustaining the dynamics of new products and novel solutions. The high failure ratio among start-ups is a call to address targeted actions. The fact that the failure ratio has been high for a long time indicates a lack of effectiveness in the proposed solutions, and a fundamentally new approach is needed to handle the risks. Handling a start-up as a project allows

may be an initial step. A start-up is not a project, but projects have a decisive role in their life cycle, project management tools may have a practical extension to their organizational support in the field of risk management.

Start-ups are not mature and not experienced organizations that can introduce complex management systems, covering project or risk management. Some try to use traditional models; others focus on agile practices, depending on the knowledge level and the industrial specifications. The high failure ratio also suggests that no common practice is available, and the case studies around lessons learned, are appreciated in finding unique solutions. The analysis of causes for failure, emphasize a misalignment between products or services and market demand, the incompetence to improve through quick iteration and the lack of structured business management processes.

A similar characteristic of a start-up and a project is embodied in project-based organizations. Implementing conscious risk management practices into their business management system is advised as part of the project management practices. The most frequent risks are related to financial, market and continuous learning implementation. Therefore, these items should be handled separately in the project phase planning activities. There are also global policies and standards initiated in the past few years for start-ups that can reduce risks.

Further research aims to explore industrial differences among start-ups and seeks common characteristics, if they exist. In line with an agile environment, developing a two-level method is recommended, including a principle-fold, risk management framework model and a flexible toolset, as a supplement.

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