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Churn risk identification as an important aspect of marketing controlling – the case of a German start-up company

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Abstract

Aim/purpose – The purpose of this paper is to understand possible methods of identifying churn risk in small and medium-sized start-up companies.

Design/methodology/approach – This paper describes the case study of a German IT start-up company and its churn risk identification approach. All presented insights are based on the company's internal documentation. Additionally, the author conducted online surveys addressing 50 client teams asking them to assess the occurrence probability of the most common risk. The surveys have been conducted every month (August–November 2017) with 16 middle and upper managers.

Findings – Based on the research findings, it has been found out that consideration of customer opinions and estimations is very important to prevent the potential churn and strengthen marketing controlling systems. When a company aims to start tracking potential risks, it is recommendable to focus on small steps and continue adding additional risk factors that need to be tracked.

Research implications/limitations – This case study shows that a customized churn risk identification system does not have to be very advanced or sophisticated. The most important aspect of an effective churn risk identification system is its ability to be fully implemented, controlled, and corrected in case of any methodological issues or inconsistencies. However, the core key performance indicators should not be assessed based on the internal input, as self-evaluation approach tends to be very error-prone and subjective.

Originality/value/contribution – The research confirms that it is important to introduce risk identification as a holistic process, focusing not only on defining potential risks, but also estimating which risk factors are the most important ones from the strategic point of

view. Introducing churn risk KPIs and tracking them on a regular basis contributes to transparency and creativity of strategic and tactical management, enabling managers to identify issues and address them in a proactive manner.

Keywords: churn risk, marketing controlling, risk identification, project management, client satisfaction.

JEL Classification: G32, M37.

1. Introduction

Nowadays, most companies focus on current financial results and ignore the possible cash flows that might emerge over a customer's life time. In fact, customers that have been served correctly, are more likely to generate increasingly more profits with every year they stay with a company. According to Reichheld and Sasser (1990) this pattern is true across different businesses – the longer a company keeps a customer, the more money it tends to make. Thus, many large companies have decided to implement enterprise-wide risk management systems in order to assess possible risk of losing their clients. Moreover, Falkner and Hiebl (2015) point out that discussion on enterprise risk management in small and medium-sized companies is somewhat fertile. However, most of the recommendations and best practices are not directly applicable in the context of start-up companies (Naude & Chiweshe, 2017).

Most service providers look for ways to measure client satisfaction at an early stage of client involvement. Many companies perceive measuring the risk of potential client churn as one of the most crucial challenges. This topic is especially important in the highly competitive IT industry, where retention of clients and client churn is likely to be very high. The main goal of this paper is to understand possible methods of measuring churn risk at small and medium-sized start-up companies that do not use highly developed risk identification systems. The author aims to find out which tools can be implemented in order to assess the possibility of losing a client long before it happens.

Additional research questions include:

1. Which areas of potential churn should be monitored and analyzed?
2. What kind of key performance indicators (KPI) should be measured in order to track churn risk?
3. Which indicators are more important – the industry-wide or the company-specific ones?

This research study describes the case of a German IT start-up company and its churn risk identification approach. All presented insights are based on the company's internal documentation, including contractual agreements, statements of work, assignment schedules, as well as internal systems measuring product quality and usage.

Additionally, the author conducted online surveys addressing 50 client teams asking them to assess the occurrence probability of the most common risk. The surveys have been conducted every month (August-November 2017) with 16 middle and upper managers. Furthermore, authors' team conducted additional Net Promoter Score surveys with all 50 clients of Company X.

Section 2 describes common approaches towards risk management and risk mitigation based on a short literature review. Section 3 focuses on research methodology and the general concept of churn risk tracking at company X. Additionally it illustrates all key performance indicators that have been implemented in the course of this study. Section 4 presents research findings and results, capturing all improvements and proactive measures that have been implemented based on the results of this research. Additionally, it summarizes the relevance of the findings to the existing knowledge in the field of churn risk identification, evaluates how the findings meet the aims of the study, and answer all research questions. Section 5 summarizes the research findings, describes the study limitations, and indicate further subjects to research.

2. Literature review

Williams & Heins (1989) describe risk identification as “the process by which a business systematically and continuously identifies property, liability and personnel exposures as soon as or before they emerge”. According to Miller (1992) and Brustbauer (2014), risk management may help to identify significant risks that could jeopardize the success of SME companies. In order to be able to introduce risk management measures, it is important to understand the basic risk management concepts, including:

1. Risk management framework that can be defined as “a set of components that provide the foundations and organizational arrangements for designing, implementing, monitoring, reviewing and continually improving risk management through the organization” (International Organisation for Standardization [ISO], 2009, p. 2).

2. Risk management process that can be described as “systematic application of management policies, procedures and practices to the activities of communicating, consulting, establishing the context, identifying, analysing, evaluating, treating, monitoring and reviewing risk” (ISO, 2009, p.2).

Giannakis and Louis (2011) differentiate between four phases of risk management process:

1. Risk identification that helps to detect the potential uncertain events or sources that can cause negative consequences.
2. Risk assessment describing selection of suitable corrective actions for the risk, assigning the probability of events occurrence. In this step, it can be decided whether the event is very unlikely, improbable, moderate, probable, or very probable.
3. Risk management, referring to the selection and implementation of the optimal corrective strategy for the risk identified.
4. Risk monitoring, describing the process of supervising the monitored system in order to measure the efficiency of corrective actions and detect potential risks that have not been identified in the previous steps.

According to Committee of Sponsoring Organizations of the Treadway Commission (2018), risky events can be caused by internal (human resources, infrastructure, process and technology used by a company) or external factors (political, environmental, social, or technological, aspects). In order to manage potential risk, the US Department of Defense (2015, pp. 38-39) proposes four strategies:

1. Risk acceptance – acknowledging that the risky event may occur. In this case, there is a need for continues monitoring to ensure that the accepted consequences do not change for the worse.
2. Risk avoidance – removing requirements or eliminating events that represent uncertainty and high risks; taking an alternative path.
3. Risk transfer – reallocating a risk from one entity to another, e.g., across two departments or between the main contractor and secondary contractors.
4. Risk mitigation – seeking to actively reduce the risk to an acceptable level.

One of the most important external factors that may cause a risky event for a SME is company’s reputation, which results from customer relationship management. Swift (2000) defined CRM as “a method of understanding the customer behavior through intense communication with them to improve the performance which is represented in attracting customers, keeping them and increasing their loyalty and profitability”. In his research Hill (Hill & Alexander,

2003, pp. 37-38) found out that a 5% increase in customers' loyalty can contribute to a 25% to 85% increase of the financial success of the company. Thus, loyalty is one of the most important factors preventing customer churn.

According to Berson, Smith and Thearling (2000), 'customer churn' is a term used to describe the customer movement from one provider to another, and 'churn management' indicates an operator's process to retain profitable customers. In this paper, customer churn will be defined as the event of losing clients, whereas churn management will refer to implementing preventive measures in order to minimize the risk of losing the most profitable clients. The issue of customer attrition is especially important within the IT startup industry, where competition and risk of losing prosperous clients and projects are very high. Marcelino-Sádaba, Pérez-Ezcurdia, Echeverría Lazcano, & Villanueva (2014) conducted a case study involving 72 Spanish SMEs and found out that strategic project risks may jeopardize the entire project or even the survival of the SME.

This conclusion is crucial for the IT industry, as most of potential risks occurring in this industry are associated with projects and the way in which they are being managed. According to Ward (1999), a typical project risk management process consists of nine phases:

1. Define – obtain a clear, shared understanding of the project.
2. Focus – obtain a clear, share understanding of the risk management process.
3. Identify – obtain a clear, common understanding of threats and opportunities.
4. Structure – test simplifying assumptions, provide more complex structure (if necessary).
5. Ownership – clarify allocations of ownership and management responsibility.
6. Estimate – understand which risks and responses are important.
7. Evaluate – diagnose important difficulties and examine implications of different responses.
8. Plan – produce a project base plan and associated risk management plans.
9. Manage – monitor and control progress, develop plans on an on-going basis.

Most start-up companies implement this process to some extent. Even though some steps are very straight-forward (e.g., define, focus, and identify) others are more challenging (ownership, estimate, evaluate, plan, and manage). Moreover, according to Marcelino-Sádaba et al.(2014) many small and medium sized enterprises do not have enough resources and financial means to invest in highly sophisticated risk management systems. Additionally, this method does not take into account the fact that not all aspects of potential client churn can be measured with quantitative methods. Currently, one of the most frequently used

customer perception metrics is customer satisfaction. Gupta and Zeithaml (2006) point out that this is mainly due to the fact that it is “generic and can be universally gauged for all products and services”. Even though this parameter is not very precise and easy to compare across companies or industries, many enterprises decide to measure customer satisfaction score as it does not require complex mathematical analysis and can be measured in multiple ways.

3. Research methodology

The following case study focuses on needs of a medium-sized German start-up company and its churn risk identification strategies. Company X is a fast-growing, multinational company with a strong focus on consulting services. It has 50 clients and its core business goal is to provide its customers with highly efficient marketing information systems. X’s customer base includes many global brands from FMCG/CPG, healthcare, retail, high-tech, finance and communications sectors.

Within the last two years, the company faced multiple issues related to clients’ reorganization and relationship with clients’ key stakeholders. The respective consulting teams have built very strong relationship with their clients, but when the clients decided to re-organize their internal structures, many of them lost their main sponsors advocating cooperation with company X. Moreover, some clients expressed their dissatisfaction with services of X. However, the company did not have enough resources to investigate the root causes of dissatisfaction. Furthermore, projects that have been launched faced the issue of decreasing usage and lack of growth strategies. Some clients have not kept their systems up-to-date and their users lost interest in X’s platform, assuming that its content is usually outdated. In order to better understand all issues and track the risk of possible client churn, X decided to start from basic risk identification concepts and implemented an approach focusing on three risk assessment aspects – customer satisfaction, system adoption, and product performance/stability. It has been estimated that the respective Professional Service teams who have close relationship with their clients should be able to rate client satisfaction in different areas and dimensions. Thus, 50 client teams consisting of directors and main points of contact have been asked to answer 10 questions about their accounts’ health. The teams had 1 week to fill in the online survey and submit their results to the research teams (Table 1).

Table 1. Complexity index: KPIs

KPI	Self-assessment question	Possible answers
General Client Satisfaction	How satisfied is the client in general?	1 (extremely unlikely) – 7 (extremely likely)
Client Reorganization Risk	How likely is your client to churn due to reorganization / loss of key client sponsor?	1 (extremely unlikely) – 7 (extremely likely)
Client Relationship Risk	How likely is your client to churn due to insufficient client relationship?	1 (extremely unlikely) – 7 (extremely likely)
Launch Postponement Risk	How likely is your client to churn due to ongoing launch postponement?	1 (extremely unlikely) – 7 (extremely likely)
Competitive Risk	How likely is your client to churn due to competing software initiatives?	1 (extremely unlikely) – 7 (extremely likely)
Growth Strategy	Do you have any usage growth strategy planned that does not require upsell?	Yes/No
Upsell Strategy	Have you planned any upsell?	Yes/No
Risk associated with Content Quality	How likely is your client to churn due to insufficient content quality?	1 (extremely unlikely) – 7 (extremely likely)
Product Delivery Risk	How likely is your client to churn due to failed (product) delivery?	1 (extremely unlikely) – 7 (extremely likely)
Product Stability Risk	How likely is your client to churn due to product instability?	1 (extremely unlikely) – 7 (extremely likely)

Source: Author's own elaboration.

The most crucial questions asked in the survey were the ones about general client satisfaction, risk of client reorganization, client relationship, and product stability. These risks are crucial for understanding the general health of the respective account. If there is a company reorganization in place, the client is more likely to lack the strategic clarity, have competing priorities, and face difficulties articulating the future state, which might be very challenging for its potential/existing suppliers. The client relationship factor refers to clients' loyalty, which results in a repetitive purchase of products and services, as well as recommending products or services to other potential clients.

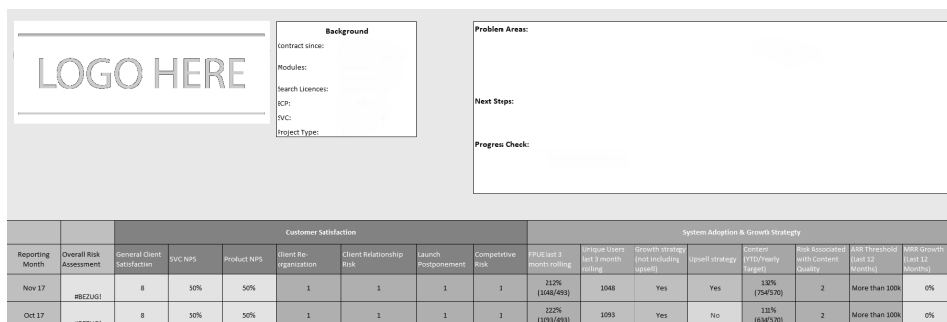
Moreover, for all the newly launched or launching clients, X estimated risks of both launch postponement and delayed product delivery. This is especially important, as X's management needs to know how and when to allocate its workforce. Additionally, the whole work of development team and other technical departments is clearly defined by the deadlines included in the contractual agreements. The risk of launch postponement captures both possible issues – the risk of launch postponement caused by client's decision and the product delivery postponement caused by X's inability to deliver on time. For all clients and projects that have been launched, the respective teams answered questions about their growth and upsell strategies, and estimated the content quality.

In terms of content quality, it is very important to understand whether users are providing the right and up-to-date content to the system, as it dramatically influences the general usage of the system, which is one of the most important factors for every Software as a Service (SaaS) company.

Furthermore, the Net Promoter Score (NPS) has been used as an additional way of measuring client satisfaction. However, clients of X have been asked two NPS questions – “How likely are you to recommend your Service Team to a friend or colleague?”, referring to the Service NPS, and an additional product-related question – “How likely are you to recommend your X installation to a friend or colleague?”, which was supposed to measure the general product NPS. This distinction seems to be more effective and insightful. According to Reichheld (2003), the ‘would recommend’ question proves to be the most effective in determining loyalty and predicting growth in number of customers.

A positive NPS does not guarantee growth, but financial growth cannot be achieved without it. In order to track the actual financial growth, the company decided to measure Annual Recurring Revenue (ARR) as well as Monthly Recurring Revenue (MRR) that indicate the recurring revenue over a specific period of time. In terms of financial evaluation, all deals that were below €100,000 and had a negative MRR growth have been considered as these at strong risk. Additionally, the monthly and quarterly usage targets have been based on the number of heavy and light licenses sold to the client. If the monthly usage was below 70% of the target, the client has been defined as a high-risk account. If usage accounted for 70-90% of the target, the account has been considered to be at low risk. If usage was higher than 90%, the respective client installation was likely to be very efficient and satisfying user needs. All key performance indicators have been summarized on one dashboard and provided to both the management and the respective Professional Service teams (Figure 1).

Figure 1. Management dashboard



Source: Author’s own elaboration.

The dashboard was shared with all stakeholder on a monthly basis and up-loaded to X's internal system. The teams responsible for clients from the same industry had the possibility to compare their clients' results with each other.

4. Research findings and discussion

Since churn risk reporting has been introduced at Company X, the number of clients who required management support has decreased from 9 to 6. Moreover, the number of clients that did not have any major churn risk issues increased from 8 to 10. The comparison of the initial results and the results measured after four months after introduction of the tracking system has been presented in the table below (Table 2).

Table 2. Survey results (1.08.2017-1.11.2017)

KPI/Reporting Date	1.08.2017	1.11.2017
General Client Satisfaction	7.93	8.16
SVC NPS	0.89	0.69
Product NPS	n/a	0.46
Client Re-organization	2.30	2.00
Client Relationship Risk	2.01	2.13
Launch Postponement	1.30	1.35
Competitive Risk	1.87	1.98
FPUE (last 3 months)	159.41%	162.93%
Growth Strategy	n/a	33
Upsell strategy	n/a	25
Content	66.56%	119.23%
Risk Associated with Content Quality	1.77	1.92
ARR Threshold (more than 100,000)	28	31
Product Delivery	1.85	1.73
Product Stability	1.68	1.56

Source: Author's own elaboration.

According to Table 2, the initial general client satisfaction among all clients accounted for 7.93. In November, this KPI value rose by 0.23. Thus, the company has managed to reach its main goal and slightly increased its client satisfaction. The average SVC NPS in August reached 0.89. In November, the average number declined by 0.2.

At the same time, the company started measuring product NPS in order to differentiate between client satisfaction associated with its products and their perception of respective Professional Service teams. It can be said that the dis-

proportion between service NPS and product NPS was relatively high – the average product NPS score accounted for 0.46. The slight decrease in clients' satisfaction with company's service can be explained by an increasing number of clients and some staffing issues that the company went through during these 4 months.

Most of the teams needed to reduce the amount of time they were spending on consulting their existing clients and focus on preparation for new projects.

The risk of product delivery fell from 1.85 in August to 1.73 in November. This is related to the fact that most deadlines for implementation projects have been planned for the end of Q3 and most of them have been finished by September. However, the risk of product stability grew from 1.68 in August to 1.56 in November. This is very typical for innovative companies in the IT industry as they implement many improvements and enhancements within a very short period of time. X decided to address this issue by introducing stable code releases that have been tested by its QA team six weeks before rolling them out to X's clients. In August, the launch postponement risk accounted for 1.3 and increased to 1.35 in November. This change has been caused by unforeseeable changes on the client's side – some clients faced unplanned expenses and needed to postpone their launches until the next fiscal year. Although the average number of users of respective installations went up from 159.41% to 162.93% in November and most clients overachieved their content targets, the risk associated with content quality increased from 1.77 to 1.92. This is mostly due to the increasing number of market research studies being uploaded by researchers from around the globe that did not go through any quality checks. Furthermore, the competitive risk accounted for 1.87 in August and rose by 0.11 in November. This change seems to be self-explanatory, as X was one of the innovators that have entered the market a few years ago. In the course of time, many companies decided to implement similar solutions and developed competitive products. One of the biggest issues that the company faced by the end of Q2 was potential client re-organization. However, most of the re-organizations happened during Q3, which contributed to a slight decrease of re-organization risk (from 2.3 to 2.0). Over these 4 months, 33 teams developed a growth strategy, 25 of them decided to focus on upselling and closed the deals before the end of the year. Moreover, the number of clients that achieved ARR Threshold higher than 100K increased by 3.

From the moment the report has been introduced, the company managed to keep all its existing clients. During the four months of research work, X has lost only one Proof of Concept (PoC). In consequence, management team decided to

utilize the framework for all potential clients with any financial involvement, including all PoCs. Moreover, all accounts got more management support and exposure, independently from the account size and their importance within X's portfolio. Implementing quantitative parameters helped to make accounts comparable with each other, which contributed to increased transparency. Although the report itself was more important for the tactical management level, it helped to develop more precise and realistic roadmaps or project plans across all departments. Since the concept has been implemented, the general client satisfaction started increasing and the most crucial issues have been addressed in a very efficient and effective way. In order to drive system usage, many clients decided to nominate their internal experts in areas of users' interest and prepare customized newsletters about hot topics that affected their company or industry.

Additionally, the User Experience team conducted interviews with some clients to better understand their use cases and address crucial usability issues with the respective product managers. Furthermore, the company started organizing meetings between its core clients in order to discuss issues, brainstorm on possible solutions, and come up with clear vision for the future product roadmaps. By doing so, X started giving its external stakeholders the feeling that their opinion was important and that they could influence the future of X's products and services. X aimed to extend its offering to address all customers' needs by offering them new products at least once a year. Before implementing the monthly churn risk identification report, only the minority of clients had a sustainable development strategy.

5. Conclusions

5.1. Research contribution

Based on the research findings, it has been found that consideration of customer opinions and estimations is very important in order to prevent potential churn and strengthen marketing controlling systems. When a company aims to start tracking potential risks, it is recommendable to focus on small steps and continue adding other risk factors that need to be tracked.

Moreover, the research confirmed that it is important to introduce risk assessment as a holistic process, focusing not only on defining, identifying and structuring potential risks, but also on estimating which risk factors are the most important ones from the strategic point of view. Furthermore, once these crucial

risk factors are identified, it is crucial to evaluate implications of different responses and prepare risk management plans. Once the process is in place, it needs to be revisited on a regular basis in order to make sure that the current management framework is up-to-date and helps to fulfill company's needs. The most efficient strategy for preventing churn risk among start-up companies seems to be risk mitigation. Furthermore, this study showed that many synergies can result from clustering existing clients or projects and benchmarking them with each other. One of the side effects of introducing churn risk KPIs and tracking them on a regular basis is increased transparency and creativity of strategic and tactical management, enabling managers to identify issues and address them in a proactive manner.

5.2. Research implications

This case study showed that a customized churn risk identification system does not have to be very advanced or complex. Thus, it is very important to implement solutions that are tailored to the current company's situation. The most important aspect of an effective churn risk identification system is its ability to be fully implemented, controlled, and corrected in case of any methodological issues or inconsistencies.

The aspects and parameters that should be monitored need to be rooted in company's core strategic goals and aim to monitor the most important aspects of its activities and services. However, every company should aim to track multiple risks. The risk of churn can be caused by many aspects that are not directly associated with the service provider. It can be rooted in company's external environment, internal regulations or policies, as well as the competitive situation on the market. For any given IT company, it is recommendable to track customer satisfaction, product adoption and growth strategy, as well as product performance, as they seem to be the most important factors contributing to a potential risk of churn.

5.3. Research limitations

Self-evaluation approach to track potential client churn tends to be very error-prone and subjective. Therefore, companies willing to implement their own churn risk identification systems should aim to collect the data directly from their clients and involve them into the evaluation phase. This can help to estab-

lish a better customer relationship and gain more insights about the actual clients' situation, which can contribute to an improved offering and product portfolio. If the relationship with the client is not close enough, the company will not be able to assess different risk areas and will be likely to estimate the risk to be lower than reality, which could contribute to false assumptions and overlooking some major account issues. Moreover, the same issue can happen if the company is lacking knowledge about changes of internal and external conditions of its clients. Thus, all questions that are related to customer and product satisfaction should address the client.

Additionally, as the observation period lasted four months, it is hard to predict whether the values would change within a longer period of time. It is possible that they could stagnate and influencing them by implementing preventing actions would not have much impact.

5.4. Future works

The potential subject to further research might be analyzing the optimal mix of qualitative and quantitative risk factors as well as the optimal frequency of churn risk management reporting. Additionally, it might be very insightful to analyze previous churns across one particular industry and determine the factors that contributed to them in order to prevent future churns.

References

- Berson, A., Smith, S., & Thearling, K. (2000). *Building data mining applications for CRM*. London: McGraw-Hill.
- Brustbauer, J. (2014). Enterprise risk management in SMEs: Towards a structural model. *International Small Business Journal*, 34(1), 70-85, doi: 10.1177/0266242614542853
- Committee of Sponsoring Organizations of the Treadway Commission. (2018). *Enterprise Risk Management – Integrated Framework*. Retrieved from <https://www.coso.org/Pages/erm-integratedframework.aspx>
- Department of Defense. (2017). *Risk, issue, and opportunity management guide for defense acquisition programs*. Washington, DC: Office of the Deputy Assistant Secretary of Defense for Systems Engineering. Retrieved from <https://www.acq.osd.mil/se/docs/2017-rio.pdf>

- Falkner, E. M., & Hiebl, M. R. W. (2015). Risk management in SMEs: A systematic review of available evidence. *The Journal of Risk Finance*, 16(2), 122-144. doi: 10.1108/JRF-06-2014-0079
- Giannakis, M., & Louis, M. (2011). A multi-agent based framework for supply chain risk management. *Journal of Purchasing and Supply Management*, 17(1), 23-31, doi: 10.1016/j.pursup.2010.05.001
- Gupta, S., & Zeithaml, V. (2006). Customer metrics and their impact on financial performance. *Marketing Science*, 25(6), 718-739, doi: 10.1287/mksc.1060.0221
- Hill, N., & Alexander, J. (2003). *Pomiar satysfakcji i lojalności klientów* [Measuring clients' satisfaction and loyalty]. Kraków: Oficyna Ekonomiczna.
- International Organisation for Standardization [ISO]. (2009). ISO 31000:2009, Risk Management – Principles and Guidelines. Geneva: Author.
- Marcelino-Sádaba, S., Pérez-Ezcurdia, A., Echeverría Lazcano, A. M., & Villanueva, P. (2014, February). Project risk management methodology for small firms. *International Journal of Project Management*, 32(2), 327-340, doi: 10.1016/j.ijproman.2013.05.009
- Miller, K. (1992, June). A framework for integrated risk management in international business. *Journal of International Business Studies*, 23(2), 311-331.
- Naude, M. J., & Chiweshe, N. (2017). A proposed operational risk management framework for small and medium enterprises. *South African Journal of Economic and Management Sciences*, 20(1), 1-10. doi: 10.4102/sajems.v20i1.1621
- Reichheld, F. (2003). The one number you need to grow. *Harvard Business Review*, 88(12), 46-54.
- Reichheld, F., & Sasser, W. E. (1990, September-October). Zero defections: Quality comes to services. *Harvard Business Review*, 68(5), 105-111.
- Swift, R. (2001). *Accelerating customer relationships*. Upper Saddle River, NJ: Prentice Hall.
- Ward, S. (1999). Requirements for an effective project risk management process. *Project Management Journal*, 30(3), 37-43. doi: 10.1177/875697289903000306
- Williams, C. A., Jr., & Heins, R. M. (1989). *Risk management and insurance* (6th ed.). New York, St. Louis, San Francisco: McGraw-Hill.

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