

Midocean University
Management College
Specialization of risk management



The impact of using gamification elements to reduce supply chain risks.

An applied study on the Saudi Electricity Company in Jeddah

**Research submitted as a requirement for the master's degree in
risk management.**

Preparing students

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Abstract in Arabic :

أثر استخدام عناصر التلعيب للحد من مخاطر سلاسل الامداد
دراسة تطبيقية على الشركة السعودية للكهرباء بمدينة جدة

المستخلص:

تهدف الدراسة إلى التعرف على مدى أثر استخدام عناصر التلعيب في تقليل مخاطر إدارة سلاسل الامداد لدى الشركة السعودية للكهرباء – في القطاع الغربي بمدينة جدة.

الكلمات المفتاحية: التلعيب - إدارة سلاسل الامداد - إدارة المخاطر – إدارة مخاطر سلاسل الامداد.

Abstract in English:

The impact of using gamification elements to reduce supply chain risks,

An applied study on the Saudi Electricity Company in Jeddah

Abstract:

The study aims to identify the extent of the impact of using gamification elements in reducing the risks of supply chain management at the Saudi Electricity Company - in the western sector of Jeddah.

Keywords: Gamification - Supply Chain Management - Risk Management- Supply Chain Risk Management.

The impact of using gamification elements to reduce supply chain risks,

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introduction:

Among the most important contemporary and modern concepts that have received great attention from educational institutions of all kinds, especially in recent times, is the “concept of gamification.” The reason for this is to facilitate the process of training and motivating employees by using and adopting gamification elements that include collecting points and badges, forming teams, challenges, and levels that must be achieved. Employees must master it, as it contains more comprehensive activities that stimulate a sense of competition and interaction.

The researchers wanted to link the elements of gamification to supply chain risk management and measure their impact to train and motivate employees in modern ways.

Problem of the Study:

All companies and institutions in both the private and governmental sectors, including the Saudi Electricity Company, face the challenges of the increasing demand for electricity services. The provision of this service affected by supply chains and management of those risks. Risk management in the Saudi Electricity Company seeks to address supply chain risks and improve the response to them for both known and unknown risks (which predicted before it happened). The most important basics of risk management that it is not possible to predict all the supply chain risks facing companies due to their different sizes and activities, but we can benefit from the turmoil that all countries of the world have faced during previous years in order to ensure the safety and efficiency of current and future supply chains. We can mention the most important risks faced by the Saudi Electricity Company, including (political unrest, natural disasters and climate change, human risks, shortage of raw materials, the economy and inflation).

According to this perspective, the research problem revolved around raising the main question of this study, which is:

What is the impact of using gamification strategies and tools to reduce supply chain risks for the Saudi Electricity Company?

During this study, we will address some of the sub-questions of this study:

- To what extent do Saudi Electricity Company leaders perceive supply chain risks?
- What is gamification mean?
- What is supply chain management mean?
- What is risk management?
- What is supply chain risk management mean?

Objectives of the study:

This study aims to provide a theoretical framework for managing supply chain risks facing the Saudi Electricity Company and to obtain recommendations and proposals that will contribute to reducing supply chain risk management in the Saudi Electricity Company - Distribution Engineering Department - Western Sector and then circulating them to the rest of the company's sectors in the Kingdom of Saudi Arabia .

Which the Electricity Company is able to use and demonstrate, as it is a useful instrument for deterring supply chain risks. Through the project, we also hope to demonstrate how gamification might help the Saudi Electricity Company handle its supply chain risk challenge.

The importance of studying:

The scientific importance of the study stems from reducing the risks of supply chains for the Saudi Electricity Company, which is a basic pillar of economic growth. In addition, the study expected to provide important data and results that can contribute to providing scientific and practical evidence about the impact of applying gamification strategies and tools in reducing supply chain risks to the Saudi Electricity Company. Which represents the main nerve in achieving economic and social development and sustainability, and therefore it is necessary to consider the factors influencing and affected by it.

Scientific importance of the study:

- Highlighting of gamification and its impact on supply chain risks
- Contributing to determining the nature of direct impacts
- Contributing to bridging the research gap in the field of supply chain risks at the Saudi Electricity Company and related research centers
- Contributing to the formation of a cycle of continuous scientific research
- Contributing to technology transfer by publishing the findings of previous studies regarding the research topic

The practical importance of the study:

- Trying to draw attention (management and employees of the Saudi Electricity Company) to the importance of gamification in reducing supply chain risks.
- Providing a scientific framework to the Saudi Electricity Company for the variables and dimensions of the study (gamification, supply chains, risk management, supply chain risk management) to help it develop the appropriate mechanism for its implementation.
- The study considered a modest contribution to supporting trends and policies aimed at reducing supply chain risks in the Saudi Electricity Company.

- Concluding recommendations and proposals that help reduce the risks of supply chains for the Saudi Electricity Company.

Study hypotheses:

We relied on what mentioned in the study problem that shows there is a gap between the use of gamification elements and the risks of supply chains that affect the business of the Saudi Electricity Company and the needs and desires of consumers.

Gamification elements contribute to reducing the risks of supply chains for the Saudi Electricity Company. Gamification elements can considered independent hypotheses:

- Finding the relationship between the uses of the gamification element the **leaderboard** in order to reduce the risks of supply chain management.
- Finding the relationship between the uses of the gamification element the **levels** in order to reduce the risks of supply chain management.
- Finding the relationship between the uses of the gamification element **points** to reduce the risks of supply chain management.
- Finding the relationship between the uses of the gamification element of **teams (groups)** in order to reduce the risks of supply chain management.
- Finding the relationship between the uses of gamification achievement in order to reduce the risks of supply chain management.
- Finding the relationship between the uses of gamification **avatars** to reduce the risks of supply chain management.
- Finding the relationship between the use of gamification **badges or tags** in order to reduce the risks of supply chain management.

Study model:

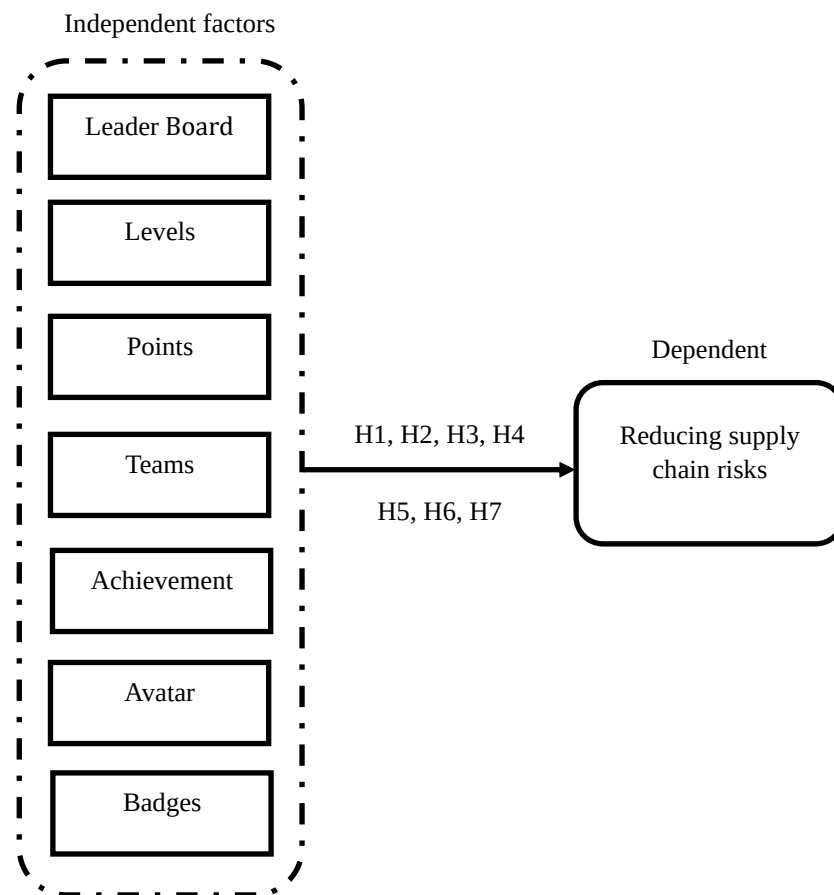


Figure (1) Study model: The independent variable will be reducing supply chain risks, and the dependent variables will be gamification elements.

Study methodology:

In the theoretical part of the research, we relied on the descriptive approach and the analytical approach by referring to books, scientific journals, and publications from some relevant authorities (the Saudi Electricity Company), which dealt with the concepts and elements included in the study. The literature of many scientific articles and previous studies also reviewed in order to describe Search variables.

As for the applied part, it also depends on the analytical statistical approach, by using a random sample in distributing the study questionnaire. After collecting the data, the statistical analysis program (SPSS) will used to analyze the available data and test the study hypotheses.

The limits of the study:

Spatial boundaries: Kingdom of Saudi Arabia, Makkah Al-Mukarramah Governorate.

Time limits: 2023 AD

Human Limits: Employees of the Saudi Electricity Company - Distribution Engineering Department - in Jeddah.

Previous studies:

1. Study of Dennis Arias-Chávez, and others, “Gamification as a Resource in Education. A Bibliometric Analysis in Times of Pandemic”, Journal of Pharmaceutical Negative Results, Volume 13, Special Issue 3, 2022.

This study aimed to identify the role of gamification as a source of education during periods of disasters. Researchers from Spain conducted an original bibliometric study by selecting the most important scientific databases with a sample of 754 documents from Wos and 1443 from Scopus. Researchers have found during the period from 2020 to 2022, which was characterized by the Corona Covid 19 pandemic, a noticeable growth in scientific production due to the use of gamification and its ability to motivate students in virtual classrooms, and expected growth is expected in the coming years.

2. Study of Alba Fiuza-Fernandez and others “the knowledge about gamification of degree in primary education students”, PLOS ONE, March 29, 2022.

This study aimed to understand the impact of gamification in the primary education stage for students. The study conducted in Spain, and the researchers selected a sample of 164 students from the fourth and final year of science colleges for the primary stage to test the effectiveness of using gamification in education. Through this study, teachers’ knowledge about gamification measured, and therefore teachers must meet the requirements of Modern education, as the current generation is very familiar with the culture of gaming. It also showed that there is a significant shortage in gamification education resources, and 70% of the participants were unable to apply the gamification method in the classroom due to a lack of experience. There is also a willingness to teach, but there are no facilities. Inside schools.

3. Study by Andreas A Bouzakis, “The effects that gamification has on employee’s motivation, engagement, loyalty levels”, Aristotle University, Thessaloniki, 28/03/2021.

This study aimed to determine the ability of gamification technology to motivate employees and understand how gamification can be used to improve employee loyalty and retention and how gamification can increase employee engagement levels. The researcher selected a sample of 140 to 200 people from the city of Thessaloniki in Greece to test and analyze the statistical relationship between gamification and levels of participation, motivation, and loyalty. The researcher found that employees of companies that use gamification have a high level of motivation and engagement and are more loyal. It showed that women may be slightly more motivated than men and that women tend to understand

the relationship between work and pleasure and employees can be positively motivated through material rewards.

4. Article of Manzano-Leon, A, and others, “Between Level Up and Game Over: A Systematic Literature Review of Gamification in Education”, Sustainability, Publisher’s Note: MDPI, 19 February 2021.

This study aimed to understand the impact of education with the strategy and elements of gamification by reviewing the literature that previously published in research databases, from 750 articles, 198 articles selected. This study conducted at the University of Almería in Spain. Researchers have found that applying educational strategies using gamification is beneficial at various stages of education, from schools to universities, on a large scale, and has shown improvement in students’ motivation, engagement, and level of academic achievement. The relationship is direct: the more the various gamification elements used (points, badges, classifications, and narratives) are motivating for students, the more its impact will be reflected on entire societies and on our daily lives. This study also attempts to develop a fun education strategy to improve the quality of study through use of learning games more efficiently.

5. Study of Ana Isabel Polo-Pena, and others,” Influence of gamification on perceived self-efficacy: gender and age moderator effect”, International Journal of Sports Marketing and Sponsorship, 27 July 2020.

This study aimed to understand the impact of the factors that facilitate the adoption and use of games and their impact on user behavior, in addition to the impact of this between male and female genders. The study conducted in Spain, and the researchers took samples in two ways. The first method was through 30 offices, including 20 countries, and 40 million samples obtained. The second method was by telephone from a Spanish population, and 300,000 samples were obtained to test the effectiveness of using gamification on users, and through this The study measured the effect of using gamification on users’ behavior and perceived self-efficacy between genders.

6. Thesis Title and Preparer: Supply Chain Risk Management in Small and Medium-sized Enterprises, Adam Dandabo & Philip Kivelo.

This thesis Conducted at Karlstad University, in 2021. This master’s thesis delves into the implementation of supply chain risk management (SCRM) in small and medium-sized enterprises (SMEs). The COVID-19 pandemic underscored the criticality of SCRM in safeguarding business operations against disruptions. However, SMEs often face challenges in implementing SCRM due to limited resources, structured processes, and proactive tools. To address this gap, the thesis investigates key factors for successful SCRM implementation in SMEs through a mixed methods approach, combining semi-structured interviews and a survey. The findings provide valuable insights for SMEs to effectively manage supply chain risks and enhance their overall resilience.

7. Thesis Title and Preparer: Supply chain Risk Understanding and Facing the Main Risks on the Chain, Yan Coelho Albertin

This thesis is for a Bachelor's thesis Logistics Engineering degree at South Eastern Finland University of Applied Science, in 2017. This thesis aims to develop a proactive supply risk management (SRM) model for Company Alpha, an agrifood company in Sweden. The model addresses the perceived issues caused by lacking transparency in their upstream supply chain and specifically tailored for medium-sized agrifood companies. The model encompasses five key elements: risk identification, risk assessment, risk mitigation, risk monitoring, and risk organization. It includes a primary process performed annually, complemented by continuous elements throughout the year. The model also introduces enablers such as upstream supply chain mapping and Kraljic segmentation to enhance SRM and overall purchasing effectiveness.

8. Thesis Title and Preparer (Research note): Assessing and managing risks using the Supply Chain Risk Management Process (SCRMP), Rao Tummala & Tobias Schoenherr

This paper prepared in 2011 for Eastern Michigan University and Michigan State University. This Paper aims to develop a proactive supply risk management (SRM) model for Company Alpha, an agrifood company in Sweden. The model addresses the perceived issues caused by lacking transparency in their upstream supply chain and specifically tailored for medium-sized agrifood companies. The model encompasses five key elements: risk identification, risk assessment, risk mitigation, risk monitoring, and risk organization. It includes a primary process performed annually, complemented by continuous elements throughout the year. The model also introduces enablers such as upstream supply chain mapping and Kraljic segmentation to enhance SRM and overall purchasing effectiveness.

9. Thesis Title and Preparer (Development of a Proactive Supply Risk Management Model, Albin Melin & Jesper Ehlers, Page 2, 2021)

This thesis aims to develop a proactive supply risk management (SRM) model for Company Alpha, an agrifood company in Sweden. The model addresses the perceived issues caused by lacking transparency in their upstream supply chain and specifically tailored for medium-sized agrifood companies. The model encompasses five key elements: risk identification, risk assessment, risk mitigation, risk monitoring, and risk organization. It includes a primary process performed annually, complemented by continuous elements throughout the year. The model also introduces enablers such as upstream supply chain mapping and Kraljic segmentation to enhance SRM and overall purchasing effectiveness.

Comment on previous studies:

The researchers reviewed (9) nine Arab and foreign studies conducted between (2020-2022) AD, which were similar in their approach to gamification and supply chain risk management, in addition to their focus on using gamification strategies and elements in order to reduce supply chain risks. They also addressed the role of effective gamification in reducing risks. Through use of (strategies - gamification elements - developing laws and legislation).

The researchers used what mentioned in previous studies from various sources of data and information in order to form a theoretical background on the subject of the study and to define the concepts and terminology of the study. However, this study differed from because the spatial and temporal limits in terms of its application in the Kingdom of Saudi Arabia in the Makkah Al-Mukarramah Governorate and targeted employees of the Saudi Electricity Company in Jeddah city. It also aims to identify the role of gamification in reducing supply chain risks by linking the elements of gamification in this study and knowing its impact on reducing supply chain risks.

Study Structure:

We will cover the following four chapters in this study: The study's overall framework and earlier research covered in the first chapter. The theoretical foundations of gamification, supply chains, and supply chain risks covered in the second chapter. Field surveys and hypothesis analysis covered in the third chapter. Results and recommendations are included in the fourth chapter, which followed by a list of references and research publications.