Risks analysis on digital platforms adoption to elevate SME businesses in developing country

To cite this article: Debrina Puspita Andriani et al 2020 J. Phys.: Conf. Ser. 1569 022096

View the article online for updates and enhancements.
Risks analysis on digital platforms adoption to elevate SME businesses in developing country

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Abstract. Industry 4.0 is a term for the digital revolution in industrial area appearing from a comprehensive and computerized network. Digital platforms can be an impressive and beneficial media for industry to get closer with the customers. While many big companies have attempted to figure on the potential and risks of digitalization along have introduced an innovation process for their business models, small and medium enterprises (SMEs) have not utilized this optimally. Currently SMEs are known as the bedrock of most economies, especially in developing countries. The aim of this study was to optimize the digital platform that had been developed as SME business media through risk analysis for the sustainability constructing. The SWOT analysis and failure mode and effect analysis (FMEA) approach were used to assess the identified and analysed risks before determining the appropriate mitigation plan. The study expected SMEs to fulfil the challenges and opportunities from Industry 4.0 for elevating national economic stability.

Keywords: digital platform, FMEA, industry 4.0, risk analysis, SME

1. Introduction
The industry revolution 4.0 makes digitizing all aspects of life, particularly related to innovation [1]. The development of the manufacturing sector with a digital platform becomes important as the latest technological advances and the passage of the era of Industry 4.0 [2]. Developing countries are one of the biggest and potential markets for the growth and development of digital platform or better known as electronic commerce (e-commerce) [3]. Indonesia as a developing country was taken as a case study in this study. With a population of over 250 million inhabitants and Internet penetration has reached as much as 90.5 million, these opportunities need to be utilized and adopted by the perpetrators of small and medium enterprises (SMEs) [4].

According to the OECD, SMEs contribute to the GDP of developing countries by contributing 60% of income and alleviating 70% of unemployment [5]. SME development through digital platform or e-commerce expected to be utilized and followed as part of promotion [6]. Technological readiness in promotion and marketing is essential in adopting e-commerce [7].

SME marketing in Indonesia is still largely managed by traditional methods where the touch of information technology is not yet optimal [8, 9]. Based on preliminary study, the e-Smart program for SME that was launched still has matters that are complained of by SMEs, which one was the unavailability of a special platform for SMEs [10]. However, it was undeniable amount of data held by SMEs across the country was also a challenge to manage in order to be utilized optimally [11].
As a continuation of previous study conducted on digital platform design specifically for SMEs, this study conducted a risk assessment on the use of digital platforms to support the future sustainability of the SME business [12]. Although the use of digital platforms is expected to increase SME business, some studies indicated the opposite [13, 14]. Therefore, a study of risks on digital platforms was important to be conducted.

Risk is the likelihood of an impact on the target, thus requiring management. Risk management is a set of comprehensive procedures to optimally manage and control the risks [15]. The stages of risk management include identification, measurement, and mitigation. Some methods commonly used in a risk assessment are operational management index (ORMI), failure mode and effect analysis (FMEA), root cause analysis (RCA), fault tree analysis (FTA), etc. [16].

In this study, the risks of the digital platform adoption in SME assessed using FMEA. FMEA has already widely used to identify potential failure of a process to assess the risk [17]. Moreover, international standards also recommended FMEA as one of the risk analysis techniques [18]. By using FMEA, it is known that risk analysis has the highest risk score based on risk priority number (RPN). The risk mitigation is intended to reduce the likelihood due to the negative impact of risk [19].

2. Research Method
The utilization of digital platforms categorized into strengths, weaknesses, opportunities, and threats through SWOT analysis. SWOT analysis is an important business strategy planning for SME businesses and become most widely used strategic tool by all organizations surveyed [20]. In this study, based on SWOT analysis, the system of the digital platform was evaluated and identified risks.

Risk analysis began with the identification of risk where the risks of the digital platform utilization that would be the input obtained from the prior analysis. The risks analysis was determined and analysed by failure mode effect analysis (FMEA). The FMEA results were used as input to determine the risk response or mitigation planning [21].

The risks were analysed by FMEA through the assessment of the criticality of the risk consequences (severity), the probability of the potential cause to ultimately occur (occurrence), and the level of difficulty or ease of risk control (detection). The scale of the severity, occurrence, and detection are showed in Table 1-3 [22].

### Table 1. Scale of Severity

| Level | Level of Impact       | Description                                                                 |
|-------|-----------------------|-----------------------------------------------------------------------------|
| 5     | Very high/ catastrophic | Create a threat to the organization and its stakeholders and high loss for the organization in financial sector and politics |
| 4     | High impact           | Create a threats for the function of organization and create a loss in financial sector and politics |
| 3     | Moderate/ medium      | Disrupt the administration program. Loss in financial sector and politics    |
| 2     | Low                   | A little loss in materials and have an impact to the stakeholders            |
| 1     | Very low/ insignificant| A little loss in materials and have no impacts to the stakeholders            |

### Table 2. Scale of Occurrence

| Level | Description | Frequency            |
|-------|-------------|----------------------|
| 5     | Very Often  | > 1 time in a week   |
| 4     | Often       | ≤ 1 time in a month  |
| 3     | Moderate    | > 1 time in a month  |
| 2     | Seldom      | ≤ 1 time in a year   |
| 1     | Rare        | > 1 time in a year   |

### Table 3. Scale of Detection

| Level | Description                  | Criteria                                                                 |
|-------|------------------------------|---------------------------------------------------------------------------|
| 5     | Almost uncertainty           | Failure cause/mode not detectable or analysed                              |
| 4     | Low                          | Failure cause/mode detected only sometimes                                |
| 3     | Moderate                     | Allows occasional occurrences of failure cause/mode                        |
| 2     | High                         | Allows rare occurrences of failure cause/mode                             |
| 1     | Almost certain               | The failure cause/mode cannot occur because prevented from the current system |
By multiplying the score level of severity occurrence, and detection score based on Eq. (1), the risk priority number (RPN) was generated [23]. These scores were obtained through observation, interviews, and questionnaires from 100 samples representing the digital platform users. The RPN showed the priority of the risks and was sorted from the highest score to the lowest score.

\[
RPN = S \times O \times D
\]  (1)
3. Results and Discussion
This phase based on the data that had been collected and divided into the SWOT analysis, risk identification, risk analysis, and risk response plan. The appropriate risk response or mitigation plan fulfilled the challenges and opportunities of SME businesses from Industry 4.0 for elevating local resources contribution.

3.1. SWOT analysis
A digital platform had many advantages and opportunities for the SMEs stakeholders. On the other hand, it also brought weaknesses and threats. SWOT analysis in this study was conducted through field and literature study [24]. There were seven strengths, three weaknesses, two opportunities, and eleven threats. The SWOT analysis of digital platform for SME business is shown in Table 4.

The strengths and the weaknesses were matters related to internal factors in the adoption of digital platforms for SMEs. Meanwhile, the opportunities and the threats were matters related to external factors. The weaknesses and the threats with a total of 14 points were used as risk events for further risk analysis [25].

Table 4. SWOT Analysis for Digital Platform Adoption in SMEs Business

| Strengths | Weaknesses | Opportunities | Threats |
|-----------|------------|---------------|---------|
| 1. The SMEs could get closer to consumers through Internet. | 1. Consumers not always could see the real product, so it was possible if the product was not as it's described. | 1. Indonesia's large population is an opportunity to markets that have never been touched. | 1. The SMEs used the customer’s data in the wrong way |
| 2. The scope of customers was not limited by the geographical location. | 2. There was waiting time for products ordered by consumers. | 2. The digital platform could be the way to increase business between the islands. | 2. Trouble while using the digital platform |
| 3. Got the opportunities for network expansion and cooperation. | 3. The market uncertainty. | 3. Decreasing the company’s competitiveness | 3. Decreasing the company’s competitiveness |
| 4. Reduced the operational cost | 4. The digital platform could be the way to increase business between the islands. | 4. The product was defect in shipping process | 4. The product was defect in shipping process |
| 5. Time efficiency because product searches and transactions could be done more quickly and accurately. | 5. Changes in government policies | 5. Changes in government policies | 5. Changes in government policies |
| 6. Consumers could obtain product information and transaction easily | 6. Error in banking system | 6. Error in banking system | 6. Error in banking system |
| 7. Flexible because the transaction process could be done everywhere. | 7. Error in supplier’s delivery service | 7. Error in supplier’s delivery service | 7. Error in supplier’s delivery service |

3.2. Risk Identification
The first step to analyse risk in digital platform was identification the risks. Risk identification was conducted through the SWOT analysis that based on observation and literature review. There were 14 risks obtained from the weaknesses and the threats where each was showed by code of R1-R3 and R4-R14, respectively. Risk identification from the digital platform is shown in Table 5.

Table 5. Risks Identification for Digital Platform Adoption in SMEs Business

| Code | Risk Event |
|------|------------|
| R1   | The products specification was different from its described |
| R2   | Waiting time for the products was too long |
| R3   | Market uncertainty |
| R4   | The SMEs used the customer’s data to the wrong way |
| R5   | Trouble while using the digital platform |
| R6   | Decreasing the company’s competitiveness |
| R7   | The products was defect in shipping process |
| R8   | Changes in government policies about the digital platform |
| R9   | Error in banking system |
| R10  | Error in supplier’s delivery service |
| R11  | Failure in operational system |
| R12  | The scams/fraud by the seller |
3.3. Risk Analysis
R1 was risk for products specification was different from its described. R1 occurred because the product was not described well. The impact of this failure was a decrease in consumer trust. The current control was a feature for photos and descriptions of products on the digital platform.

The score of severity (S), occurrence (O), and detection (D) were determined from the score as shown in Table 1-3. R1 given a severity (S) score of 5, very high, where the failure mode could create a threat to the organization and its stakeholders and high loss for the organization in financial sector and politics. The occurrence (O) score given on 4, often, where the event frequency was \( \leq 1 \) time in a month. Whereas for detection (D) score given on 2, high, where the digital platform allowed rare occurrences of failure cause/mode.

The risk priority determination was conducted by calculation of RPN (Eq. 1). After each risk had RPN, then RPN was sorted by the largest to the lowest score. The higher of RPN became the higher priority of handling the risk. RPN calculation showed the risk with the highest priority was R12, the scams/fraud by the seller, with RPN was 60. On the contrary, the risk with the lowest priority was R8, changes in government policies about the digital platform, with RPN was 4. A complete analysis and assessment of all risks is shown in Table 6.

### Table 6. FMEA Analysis for Digital Platform Adoption in SMEs Business

| Code | Failure Mode | Failure Effect | S   | O   | D   | RPN |
|------|--------------|----------------|-----|-----|-----|-----|
| R1   | The product was not described well | Decreasing customer’s trust | 5   | 4   | 2   | 40  |
| R2   | Bad customer service | Decreasing customer’s trust | 4   | 4   | 3   | 48  |
| R3   | Error from the forecasting | Over stock or running out the product | 3   | 2   | 1   | 6   |
| R4   | The SMEs did not have a loyalty to their customers | Lost customers | 5   | 2   | 2   | 20  |
| R5   | Signal troubles | Lost business opportunity | 4   | 4   | 2   | 32  |
| R6   | Database protection was weak | The leak of confidential data | 4   | 2   | 1   | 8   |
| R7   | The product did not handled well | The product was non-conformance | 4   | 4   | 3   | 48  |
| R8   | Economic, social, politics condition in the country | The digital platform and the seller must adapt with the new policies | 4   | 1   | 1   | 4   |
| R9   | Disruption in banking system | Transaction failed | 5   | 2   | 4   | 40  |
| R10  | The fault in delivery time calculation | Delay in production process | 4   | 3   | 2   | 24  |
| R11  | The lack of seller’s knowledge to use the digital platform | The system was not optimum | 4   | 2   | 1   | 8   |
| R12  | Lack of responsibility from the seller | Lost customer trust and decreasing the credibility | 5   | 3   | 4   | 60  |
| R13  | The fault in buyer’s address and phone number | The item is lost and the seller must replace the product | 5   | 2   | 2   | 20  |
| R14  | The marketing strategy was not optimum | Decreasing the revenue | 3   | 2   | 3   | 18  |

3.4. Risk Response Planning
Based on the analysis of the FMEA analysis, the priority risk for further analysis was fraud by the seller (R12). Furthermore, response planning to the priority risks considered the steps to deal with risks [26]. There are four methods of handling risks, i.e. risk avoidance, risk mitigation, risk transfer, and risk acceptance. In this study, risk mitigation was used as a step to reduce the impact that occurs.

The risk mitigation undertaken to reduce the impact of the highest risks, the scams/fraud by the seller, was changed the payment procedure. The current procedure was the buyer paid directly to the seller account. On the proposed procedure, the buyer should pay to the digital platform’s account and the system would make a validation to the payment. The seller would receive the money after the customer’s confirmed that they had received the product. The algorithm for the two conditions and the proposed design for the new payment procedure are shown in Figure 1 and 2, respectively.

4. Conclusions
At the risk identification stage, there were 14 risks from adopting digital platform for SMEs business. The highest or priority risk obtained through FMEA analysis was the risk of scams/fraud by the seller. The mitigation plan as risk response planning for the priority risk was to change the payment procedure. The current procedure was the buyer paid the bills directly to the buyer’s account, while the proposed procedure was the buyer will pay the bills to the digital platform’s account and the money will transfer to the seller’s account after the buyer will have been confirmed that had received the product. The future studies will be conducted a risk study not only on the adoption of digital platforms, but in the entire business process related to the digital platform with more parties involved.

Figure 1. The payment procedure algorithm: (a) Current algorithm, (b) Proposed algorithm.

Figure 2. The proposed design of payment.

Acknowledgement
The authors express gratitude to Institute of Research and Community Services and Statistical & Quality Engineering Laboratory, Universitas Brawijaya, Indonesia for their extraordinary support.
References

[1] Hamdani, J., & Wirawan, C. (2012). Open Innovation Implementation to Sustain Indonesian SMEs. Procedia Economics and Finance, 4, pp. 223 – 233.

[2] Broekhuizen, T. L. J, et.al. (2019). Digital platform openness: Drivers, dimensions and outcomes. Journal of Business Research, Article in Press.

[3] Gilaninia, S., et. al. (2011). Effective Factors on Adoption of E-Commerce in SME Cooperative. Interdisciplinary Journal Of Contemporary Research In Business, Vol. 3 (6), pp. 13 – 22.

[4] Sarosa, S. (2012). Adoption of social media networks by Indonesian SME: A case study. Procedia Economics and Finance, 4, pp. 244 – 254.

[5] OECD (Organisation For Economic Co-Operation And Development). (2004). Principles of Corporate Governance 2004. Principes de gouvernement d’entreprise de l’OCDE. http://www.oecd.org/corporate/ca/corporategovernanceprinciple.

[6] Savrul M., Incekara, A., & Sener, S. (2014). The Potential of E-commerce for SMEs in a Globalizing Business Environment. Procedia - Social and Behavioral Sciences, 150, pp. 35 – 45.

[7] Nugroho, M. A. (2015). Impact of Government Support and Competitor Pressure on the Readiness of SMEs in Indonesia in Adopting the Information Technology. Procedia Computer Science, 72, pp. 102 – 111.

[8] Maharani, W., & Gozali, A. A. (2015). Collaborative Social Network Analysis and Content-based Approach to Improve The Marketing Strategy of SMEs in Indonesia. Procedia Computer Science, 59, pp. 373 – 381.

[9] Andriani, D.P., Zamroni, M.H., Alesi, T.C., & Rahman, F. (2018). The Layout Optimization of Production Process Facilities in Apple Processing to Improve Productivity and Sustainability SMEs. 6th IEEE International Conference on Advanced Logistics and Transport (ICALT), pp. 184-188.

[10] Rahmatika, F., & Andriani, D. P. (2019). Perancangan desain interface digital platform penjualan online UKM dengan pendekatan kansei engineering. Jurnal Rekayasa dan Manajemen Sistem Industri, 7 (1).

[11] Janita, I., & Chong, W. K. (2013). Barriers of B2B e-Business Adoption in Indonesian SMEs- A Literature Analysis. Procedia Computer Science, Vol. 17, pp. 571 – 578.

[12] Andriani, D. P., Hamdala, I., Swara, S. E., & Fadli H. (2019). Perancangan Business Digital Platform dalam Mendukung Keberlanjutan IKM dengan Pendekatan Quality Function Deployment. Jurnal Ilmiah Teknik Industri, Vol. 18 (1), pp. 42 – 54.

[13] Mulyono, N. B., & Ishida, Y. (2013). Development of Manufacturing Support System for SME under Disruption Risk. Procedia Computer Science, 22, pp. 753 – 761.

[14] Rachmania, I. N., Rakhmaniar, M., & Setyaningsih, S. (2012). Influencing Factors of Entrepreneurial Development in Indonesia. Procedia Economics and Finance, 4, pp. 234 – 243.

[15] Andriani, D. P., Novianti, V. D., Adnandy, R., & A’yunin Q. (2019). Quantitative risk modelling of occupational safety in green-port. IOP Conf. Series: Materials Science and Engineering, 546 052007.

[16] Frame, D.J. (2003). Managing Risk in Organization. San Fransisco: Josey-Bass.

[17] Morris, M. A. (2011). Failure Mode and Effects Analysis based on FMEA 4th Edition. ASQ Automotive Division Webinar.

[18] Dyadem Press. (2003). Guidelines for Failure Mode and Effects Analysis for Automotive Aerospace and General Manufacturing Industries. Ontario Canada: CRC Press.

[19] Lima, P. F. A., Crema, M., & Verbano, C. (2019). Risk management in SMEs: A systematic literature review and future directions. European Management Journal, in Press.

[20] Kalkan, A., and Bozkurt, O. C. (2013). The choice and use of strategic planning tools and techniques in Turkish SMEs according to attitudes of executives. Procedia - Social and
Behavioral Sciences, 99, pp. 1016 – 1025.

[21] Stamatis, D. H. (2003). Failure mode and effect analysis: FMEA from theory to execution. ASQ Press.

[22] Sirait, N. M., and Susanty, A. (2016). Analisis Risiko Operasional Berdasarkan Pendekatan Enterprise Risk Management (ERM) pada Perusahaan Pembuatan Kardus di CV Mitra Dunia Palletindo. Industrial Engineering Online Journal, 5, pp 1 – 10.

[23] Lo, H. W., & Liou, J. J. H. (2018). A novel multiple-criteria decision-making-based FMEA model for risk assessment. Applied Soft Computing, Vol. 73, pp. 684-696.

[24] Günerergin, M., Penbek, Ş., and Zaptçioğlu, S. (2012). Exploring the Problems and Advantages of Turkish SMEs for Sustainability. Procedia - Social and Behavioral Sciences, Vol. 58, pp. 244 – 251.

[25] Ommani, A. R. (2011). Strengths, weaknesses, opportunities and threats (SWOT) analysis for farming system businesses management: Case of wheat farmers of Shadervan District, Shoushtar Township, Iran. African Journal of Business Management, Vol. 5 (22), pp. 9448-9454.

[26] Andriani, D. P., Sulistyorini, D.H., Novareza, O., Purwandani, F.P., Yuniarto, T. (2019). Parameters optimization of bio composite manufacturing using experimental design. IOP Conference Series: Earth and Environmental Science, Volume 391.