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Preface

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Preface

We are delighted to introduce the proceedings of the first edition of *International Conference on Computer Science and Enineering* (IC2SE) 2019 with theme "*Industrial Revolution 4.0 Opportunities & Challenges*". The technical program has brought researchers and practitioners around the world to a good forum for discussing, leveraging and developing all scientific and technological aspects that are relevant to digital society. This *IC2SE 2019* acquired 256 full paper with 154 are acceptable with many categories paper with most paper are from Computer Science/Engineering, Information Technology and Education and also authors from almost 13 Countries such as malaysia, New Zaeland, Bangladesh, United Kingdom, Bahrain, Zambia, Nigeria, Saudi Arabia, Uganda, Pakistan, Iraq, and Palestine. This confrence was well-managed for the cooperation of all the committees and co-host from many universities and organisation. We hope that the future *IC2SE* will be as successful and stimulating, as indicated with the contributions presented in this volume.

The Editors
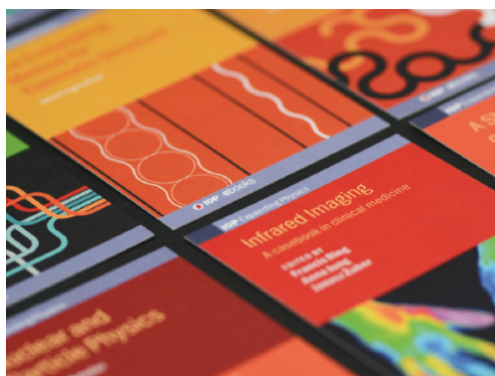Robbi Rahim
Robby Dharma
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All papers published in this volume of *Journal of Physics: Conference Series* have been peer reviewed through processes administered by the proceedings Editors. Reviews were conducted by expert referees to the professional and scientific standards expected of a proceedings journal published by IOP Publishing.

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Technology context and social media adoption among small and medium enterprises

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Abstract. This research paper aims to investigate the relationship between technology context and social media adoption among small and medium enterprise. Technology-organization-environment (TOE) is used to understand the relationship. Twenty-eight small and medium enterprises operating in west Sumatra province (Indonesia) is as research samples. SEM-PLS is applied to analyse the data. In this case, smart-pls is employed. It has two assessments: measurement model and structural model assessment. The result shows that there is a positive and significant relationship between technology context and social media adoption. This paper has practical and theoretical implication and they are discussed in detail. Recommendation for future work is also informed in this paper.

1. Background of the study

Small-medium enterprises (SMEs) have been contributing significantly to the country's economic development [1]. Reference [2] argue that SMEs became the centre of rotation of the economy in local government in Indonesia. There are five benefits of SMEs for Indonesia economy that are owned by local people, mainly agriculture based, labour intensive, financial operation from personal saving, and mainly consumer goods [3]. Reference [1] add that there is almost 75% of employment in Indonesia works in SMEs, and contributing enormously to country's Gross Domestic Product (GDP). To gain the survival and keep growing, SMEs have to fit with its environment. Due to changing in external business environment, especially technology changes, SMEs must reformulate its competitiveness position and come out with strategy. One of functional strategy is marketing strategy. Social media adoption is one of marketing strategy to keep survival and growing for small and medium enterprise.

Social media refers to using real time feedback, exchanging user-generated content and building communities of consumers to support business process [4]. Reference [5] argue that social media adoption by business organization can enhance the business operation, customer support, research and development, and sales and marketing. There are several previous studies investigating the role of social media to boost the SMEs's performance [6]–[13]. Reference [12] develop a framework of social media adoption readiness among SMEs. Reference [7] interview SMEs owners/managers in UAE regarding to adoption of social media. They conclude that SMEs use social media, such as Facebook, Twitter, and Instagram. It will increases their performance. Reference [6] carried out a survey to explore factors

affecting the social media adoption among UAE's SMEs and its impact on SMEs performance. Reference [9] investigated the factors influencing the Facebook usage among SMEs in Malaysia. They find that by using Facebook for SMEs's business will impact on business performance. Reference [8] studies the effect of internet-based social media on SMEs's competitive advantage in Gulf Cooperation Council (GCC) countries. Reference [13] perform a similar survey to establish the effect of social media on SMEs's growth in Nairobi. Reference [10] study the use and measurement of social media for Scottish SMEs. Reference [11] conduct a series of interview regarding to the use of social media and found that social media usage for building customer relationship, advertising and promotion, information search, and branding.

There is no prior study to investigate social media adoption using an Indonesia's SMEs. Even though, there is studies using SMEs in Indonesia [1]–[3], but they focus on other aspect of SME. For example, reference [1] assess the Indonesia's SMEs competitiveness. In addition, reference [2] identify the critical success factor for downstream palm oil based SMEs. Finally, reference [3] describes three factor in developing SMEs cluster in Indonesia: network, government role and network for cluster SMEs. Besides, there is one study regarding to social media adoption among SMEs [14], but the study is technical study in nature and qualitative approach. Therefore, there is a gap in the literature in term of why Indonesia's SME adopting social media. Thus, this study aims to investigate the effect of technology context on social media adoption among SMEs in west Sumatra, Indonesia. Technology context is suggested by technology-organization-environment (TOE) theory [15]. The theory suggests that there is technology-environment and organization outcome relationship. In fact, reference [16] The hypotheses of this study that is there is positive significant relationship between technology context and social media adoption. Yet, [16]'s finding is not supported. Reference [6] also investigate the relationship between technology context and social media adoption among SMEs in UAE and found the consistent result with [16]. reference [17] investigate the effect of technology context on social media adoption using Malaysia's SMEs. They conclude that relative advantage and compatibility has significant relationship with social media adoption. The effect of technology context on social media adoption is not conclusive. Therefore, this study proposed the hypothesis that technology context has a positive relationship with social media adoption. Further, the proposed conceptual model is as follow.
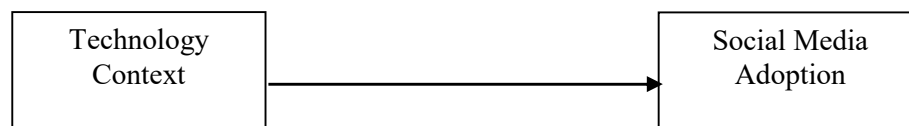
```
┌─────────────────┐                      ┌─────────────────┐
│   Technology    │ ───────────────────▶ │  Social Media   │
│    Context      │                      │    Adoption     │
└─────────────────┘                      └─────────────────┘
```

Figure 1. Research Framework

2. Material and methods

This study uses SMEs owners or managers operating in west Sumatra province as research object. Primary data is used and collected through online survey. There are two types of variable used here: independent latent variable (technology context) and dependent latent variable (social media adoption). Technology context refers to any technology that is either used by the organization, or that is available, and is known to be potentially useful, but is not yet being used [18]. In this study, technology context has twenty four items which are developed by several authors [19]–[22]. Social media adoption has five items and adapt from [23]. Variables are measured by five-scale Likert ranging from strongly disagree and strongly agree. Data is analysed using SEM-PLS due to the conditions relating to sample size, normal distribution are not met [24], [25]. In smart-pls, there are two assessments to achieve the final result that are measurement and structural model [26]. The measurement model assessment has two type of validity test, that are convergent validity and discriminant validity [27]. Structural model assessment is conducted for hypothesis testing [28]. Predictive relevance and power have to be assessed before interpreting a path coefficient and p-value to decide to reject or accept the hypotheses.

3. Result and Conclusion

3.1. Demographic Variables

Small and medium enterprises (SMEs) participated in this study is twenty-eight. Based on type of social media adopted, eight small and medium enterprises are dominantly select WhatsApp to promote their business and product/services. Eleven (39%) SMEs use an Instagram. Followed by seven (25%) SMEs use Facebook. In addition, two SMEs do not provide us with information about type of social media being used. According to number of workers are employed by SMEs, twenty-three (82%) SMEs have workers less than ten workers. In addition, one SMEs have ten to fifty and greater hundred workers. Three SMEs do not supply this type of data.
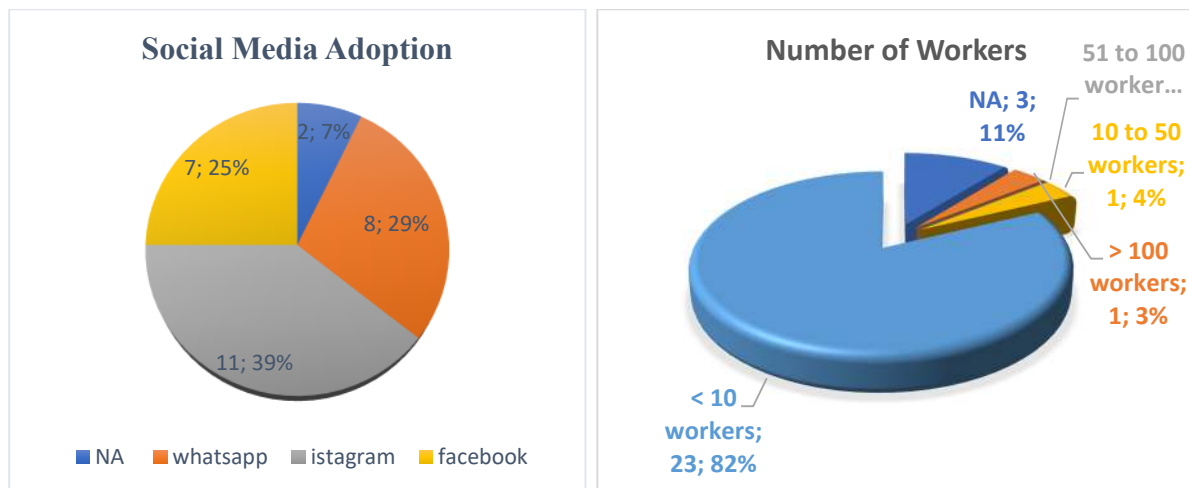

Figure 2. Type of social media adopted (dominated) and number of workers

3.2. Measurement Model Assessment

Measurement model assessment consists of two validity assessment that is convergent validity and discriminant validity. Table 1 presents the result of convergent validity test. from outer loading, both construct has outer loading greater than 0.700 [29] after deleting two items for social media adoption, and four items for technology context. Second criteria for convergent validity test is assessing Cronbach's Alpha and Composite Reliability. Its value must be greater than 0.700 [30]. In addition, final assessment for convergent validity is average variance extracted (AVE) and its value must be greater than 0.500 [30].

Table 1. Measurement Model Assessment: Convergent validity

Construct	Items	Outer Loading	Cronbach's Alpha	Composite Reliability	AVE
Social media adoption	sma1	0.907	0.982	0.983	0.738
	sma3	0.882			
	sma5	0.780			
	tcb1	0.853			
	tcb2	0.872			
	tcb3	0.722			
	tcb4	0.760			
Technology context	tco1	0.896	0.819	0.893	0.736
	tco2	0.882			
	tco3	0.892			
	tco4	0.906			
	tco5	0.870			

tob1	0.916
tob2	0.790
tob3	0.889
tob4	0.902
tr1	0.893
tr3	0.928
tra1	0.847
tra2	0.868
tra3	0.831
tra4	0.792
tra5	0.838
tra6	0.859

The second assessment for model is structural model assessment. There are at least two criteria's that we have to evaluate: Fornell-Lacker criterion and cross-loading [31], [32]. Table 2 provides the result of Fornell-Lacker criterion. It can be concluded that measurement model has better discriminant validity due to the value of square AVE for construct social media adoption (bold, 0.859) is greater than correlation coefficient between social media adoption and technology context (0.647) [31].

Table 2. Discriminant validity-Fornell-Lacker Criterion

Construct	Social Media Adoption	Technology Context
Social media adoption	**0,859**	
Technology context	0,647	**0,858**

Second assessment for discriminant validity is cross-loading. Table 3 shows the result of cross loading. Loading of items for social media adoption (sma1, sma3, and sma4) is higher than loading on other construct (technology context). Therefore, both constructs have achieved the discriminant validity requirement.

Table 3. Discriminant Validity-Cross Loading

Items	Social Media Adoption	Technology Context
sma1	**0.907**	0.511
sma3	**0.882**	0.613
sma5	**0.780**	0.530
tcb1	0.461	**0.853**
tcb2	0.573	**0.872**
tcb3	0.358	**0.722**
tcb4	0.364	**0.760**
tco1	0.570	**0.896**
tco2	0.580	**0.882**
tco4	0.530	**0.906**
tco5	0.692	**0.870**
tob1	0.568	**0.916**
tob2	0.444	**0.790**
tob3	0.658	**0.889**
tob4	0.476	**0.902**
tr1	0.611	**0.893**
tr3	0.596	**0.928**
tra1	0.623	**0.847**
tra2	0.584	**0.868**

tra3	0.571	**0.831**
tra4	0.493	**0.792**
tra5	0.612	**0.838**
tra6	0.510	**0.859**

3.3. Structural model assessment

Second assessment using smart-pls is structural model assessment. This assessment begins with evaluating the predictive relevance and predictive power. It continues to the hypothesis testing by using the path coefficient and *P value* [33]. the structural model has medium predictive relevance [34] and moderate predictive power [24].

Table 4. Assessment of Structural Model

Endogenous Construct	Q square	Decision	R square	Decision
Social media adoption	0.268	Medium	0.419	Moderate
Relationship	Path coef.	t statistic	*P-value*	Decision
Technology context -> social media adoption	0.647	8.756	0.000	Supported

Based on the result of t statistic, we can conclude that technology context has a positive relationship with the social media adoption among SME (p-value= 0.000, β=0.647). This finding is supported by previous research [17]. However, this result is not consistent compared to finding of [16]. Figure 2 provides us with structural model. Social media adoption is relatively low (means=2.76). Social media adoption is due to the perceived relative advantage, compatibility, complexity, trialability, and observability of social media. SMEs manager/owner believe that they will gain some benefit because adopt the social media. The benefit could be in term of business performance, financial gain and competitive advantage. Social media adoption by SMEs are due to fitness of social media with its business process, including with its suppliers and customers. Besides, social media adoption by SMEs is also perceived as something which is not complex and applicable to their current business. In addition, SMEs perceive that social media is easy to try and observe it.
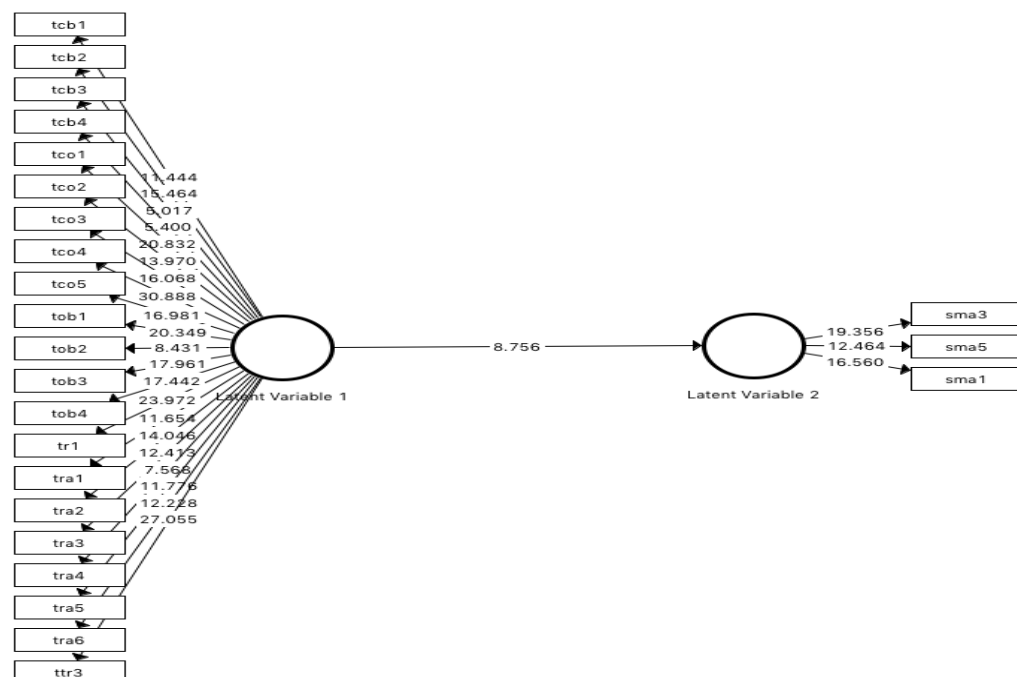

Figure 3. Structural model

Note: latent variable 1 and 2 are technology context and social media adoption respectively

4. Conclusion and recommendation

Business environment has been changing over the time. In strategic perspective, technology is one of external environment factors (PEST) that have to be monitored their changes. This technology changes influence the way the business to be managed. It is usually an input in strategy formulation. In addition, technology should be accommodated into strategy, including in functional management, such as marketing. Social media is derived from digital marketing strategy. Social media adoption among large company has been explored. However, lack of prior study uses SMEs in Indonesia's case. The result shows that social media adoption is determined by technology context. Due to technology advantage, compatibility, complexity, trialability and observability, SMEs tend to adopt the social media as a strategic tool to gain the competitive advantage. This finding contributes to the technology-organization-environment (TOE) model [15]. Practically, this finding can be used by SMEs owners/managers or other stakeholders to increase the social media adoption among SMEs. The SMEs stakeholders, such as local government, can increase the awareness of the important of a technology. This effort will change the attitude of SMEs owners/managers toward technology. If they have a positive attitude toward technology, they will tend to accept or adopt that technology. Our finding in this article is subject to a least three limitations. First, this study uses a limited number SMEs. Second, this study investigates the social media adoption for only one variable. Finally, this study sees the social media adoption from one perspective (TOE). Future research should therefore concentrate on investigation of social media adoption by adding other variables from other perspective. Besides, further investigation also can widen the number of SMEs participating in research.

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