Individual trust model for application e-wallet in Yogyakarta street food outlet workers

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Abstract. Street food outlets have a complex problem that shape the economic landscape of many countries. Many factors such as technology, organization and human factors are involved in this business process. Technology and human cooperation has opened the new realm industry in the real-world settings, in such applications, human and technology interaction plays a critical role in the overall system performance. Digital technology with internet based is one of technology adoptions in 4.0 era. Trust is the main factor that makes successful technology adoption. This research aimed to explore individual trust factors affecting the use and adoption of technology 4.0 in street food outlets. The studies involved in the development of framework of individual trust that separated three concepts of propensity trust, trust for technology and trust for information technology. The model was developed using SEM PLS that was undertaken using 200 participants who have worked in street food outlets. The model indicated that variable Trusting Stance, Situational Trust and Trust for Information Technology were strongly influenced by the indicators. The all estimation parameters showed Q2 value bigger than 0 that all latin endogenous variable has the relevant prediction to model. The findings from this research can inform variables that had influence to individual trust for technology 4.0 of street food outlets.

1. Introduction

Digital technology has been introduced to a wide range of complex since the 50th century. The industrial revolution had changed the mechanical work chain into digital chain. Information technology development driven goods and service transaction being more quick and flexible. Technology 4.0 has become increasingly common both in complex, technical systems (e.g selfdriver), and in everyday life (e.g, e-money, e-wallet, e-learning). Street foods are one economic activity most productive in Indonesia. This requires that Street food must adopt technology 4.0 in their business systems. The Industrial Research and Development Agency (BPPI) that there are five pillars in the industrial era 4.0 are management and organization, people and culture, product and service, technology and factory operation. Based on data of the World Economic Forum (WEF) 2018 that Indonesia became top innovation among developing countries but the low technology readiness index. One component in the successful adoption of technology 4.0 is how much people trust these systems to perform effectively. For instance, trust can affect how workers’ accept and rely upon increasingly technology 4.0 [5].
Trust plays a role in influencing worker’s strategies toward the use technology 4.0. Trust, mentality of workers and risks could affect the use of technology by human as an operator, but the interaction between factors and the magnitude of individual differences made predictions of the use of technology difficult. Factors that influenced performance in digital technology included workload, technology reliability, consistency and interest in technology from fixed indicators [7]. This condition often occurred because the initial conditions did not take into account the selection arrangements between the level of user knowledge and negligence [1]. A questionnaire was developed for trust measurement. Survey questionnaire identified some trust factor such as predictability, reliability and dependability. All factors of trust could be dynamic and could change based on time [2]. The definition of trust suggested above encompasses yet distinguishes between the user’s confidence in the system and the user’s willingness to use the machine to perform the decision task as intended [3]. High competition in the industrial era encourages street food outlets to be prepared for development of technology 4.0 supporting their business. Many Indonesian street food outlets have not implemented appropriate technology 4.0 in supporting worker activities. Low worker trust is one factor that causes low technology adoption.

The research aimed a proposed valid and reliable individual trust model of adoption technology 4.0 especially non cash payment in street food outlets. Determine the factors that most influence the level of individual trust for technology 4.0 adoption in street food outlet workers. However, the literature has little explanation of the relationships between building trust in technology 4.0, worker trust (individual trust), Moreover, to the best of research’s knowledge, studies on such relationship in developing countries are either insufficient. Therefore, this study used the adoption of e-wallet in Yogyakarta street food outlets.

2. Measurement of Trust

The literature on this research is devided in human based trust (propensity trust), human-machine trust (trust for technology) and trust for information technology. Trust has been recognized as essential to the stability of social relationships and vital for the maintenance of cooperation in society [4]. Trust reduces uncertainty about the future and the need to guard against others’ opportunistic behavior, leading to harmony within organizations by eliminating friction and minimizing the need for bureaucratic structures [6].

Trust is something that cannot be measured precisely and there is no absolute measurement of trust. Measurement of trust becomes something relative where measurement of must be limited. When someone believes in a system, it is that the system can work well for all but the system has sufficient performance for a specific purpose [7]. Trust has been studied in many fields such as (psychology, human factors and industrial organizations) to obtain relations between human and human or machine. Many types of trust learned have caused a lot of understanding from their own trust. The difference in the concept of trust has caused the notion of trust to be treated, view and behavior [8].

2.1. Triadic trust model

Trust model can be described in three series (Human-related, Technology-Related, and Environmental) as the center of interaction between these three respective factors. The relationship of three trust model can be seen in Figure 1. Trust within technology is comprised of human, technology, and environmental-related elements [9]. The updated triadic model of trust was used to help organize identify factors for construction of a quantifiable metric for assessing trust. Across all experiments, gender, age, and ethnicity were not related to trust, and are thereby suggested to be removed from the triadic model of trust. Personality traits were not significantly correlated with trust pre or post interaction. however there one small significant correlation (r_neuroticism * trustworthiness = .160, p<.05) was found among the five personality traits and trustworthiness for the social technology domain [12].

Suggesting that personality traits may be related to trust measurement for specific domains of robotics. In addition, personality traits may be more important to explaining the variance in the propensity to trust. As this was not the primary focus of this work, additional research should be
conducted to further explore the relationship between societal impact, human traits, and propensity to trust as it impacts pre-interaction human-technology trust [11].

![Figure 1. Three Factors Trust Human-Technology](image)

2.2. Trust measurement

Human-interpersonal and human-automation trust are multiple scale of trust subjective measurement scale. Some previous studies have found large scales that can be applied in measuring individual trust (propensity trust, cognitive trust, affective trust and trustworthiness) [10]. Trust in technology was researched by Giffin, 1967 and he separated the trust level into three stages which can see in Figure 2.

![Figure 2. Visualisation of Trust](image)

Based on sources and media trust can be grouped into three groups:

1. Human-based trust (propensity trust)
2. Human-machine trust
3. Human information technology trust (human-human by technology trust)

Ergonomics is an important parameter in terms of design and development. In ergonomics various factors are examined, both in the form of physical factors and non-physical factors. Trust is a form of ergonomic study in a non-physical form. This can include 4 scopes, namely trust between humans and humans, humans with technology, humans with products/services and humans with policies [13].

3. Methodology

The research objective was to model a valid and reliable model of individual trust to technology 4.0. this study was exploratory in nature. It identifies factors that have significant influence to individual
trust for technology 4.0 adoption in street food outlets. The questionnaire was administered to workers in street food outlets who worked more than two people and applied e-wallet in their payment system. Non probability sampling was adopted which were 200 participants. Individual trust for technology 4.0 in street food outlets was constructed using Structural Equation Model (SEM)PLS using Wrap PLS 6.0 student version. SEM PLS was used because the model had a high complexity, many constructs and indicators, besides that the model did not have a strong theoretical basis because it combined several theories of trust so that the PLS SEM was suitable for conducting this model confirmation. The survey tool was purposefully designed in a clear and straightforward way, using a simple language as it targets various groups in the community with different educational, cultural, and social backgrounds. The questionnaire is divided into two main sections: the first section assembles demographic information of respondents; the second section is related to the identified research constructs where respondents should give their opinions using a Likert scale ranging from 1 “strongly disagree” to 5 “strongly agree”. the flowdiagram in this research is shown in figure 3.

![Flow diagram](image)

**Figure 3.** Research flow diagram
4. Research model

Based on literature review has discussed the adoption and implementation of technology 4.0 in SMEs. Individual trust factors have identified, such as propensity trust, trust for technology, trust for information technology. Thus, based on the literature review, this research will focus on trust as an important factor related to the adoption technology 4.0 such as an e-wallet in SMEs in the food and beverage sector. Table 1 presents the constructs used in the study and related statements which have been modified to reflect the context of the study.

| Tabel 1. Operational Variabel (Research Constructs) |
|-----------------------------------------------|
| Construct | Indicators | Sources |
| Trust Stance (TS) | Stability | Linda Lewis, 2014 |
| | Hope | Snyder, 2000 |
| | Fear | Lazarus, 1970 |
| | Rationality | Jin-Hee Cho, 2015 |
| | Optimistic | Jin-Hee Cho, 2015 |
| | Familiarity | David Gefen, 2018 |
| Situational Trust (ST) | Knowledge | Kristin E. Schaefer, 2016 |
| Human-Machine Trust/ | Reliability | Holly A. Yanco, dkk, 2016 |
| Trust for Technology (TT) | Risk/Uncertainty | Jin-Hee Cho, 2015 |
| | Usability | Kristin E. Schaefer, 2016 |
| | Acuracy | Castel Franchi and Falcone 2010 |
| Human information Technology | Tranparancy | Castel Franchi and Falcone 2010 |
| | Security | Castel Franchi and Falcone 2010 |

This exploratory study attempts to validate the proposed model through finding out the factors affecting the adoption of technology 4.0 for food and beverage workers. The following hypotheses are suggested:

H1: There is significant relationship between trusting stance and propensity trust.
H2: There is significant relationship between situational trust and propensity trust.
H3: There is significant relationship between propensity trust and individual trust.
H4: There is significant relationship between trust for technology and individual trust.
H5: There is significant relationship between trust for information technology and individual trust.

5. Result

Data extracted from 200 questionere responses are analyzed using WrapPLS 6.0 Student Version because WRAP PLS was able to analyze data with constructs and indicators of more than 30 indicators. The results are reported as bellows:

5.1. Demographic characteristics of sample

The sample was 30% males and 70% females, most respondents (665,5%) were aged 15-24 and 91% had senior high school degrees, as shown in Table 2.

| Tabel 2. Demographic characteristics of the research sample |
|---------------------------------------------------------|
| Demographics | Frequency | Percentage |
| Gender | Male | 60 | 30% |
| | Female | 140 | 70% |
| Age | 15-24 | 133 | 66,5% |
| | 25-38 | 65 | 32,5% |
| | 39-58 | 2 | 1,00% |
| Education | Junior High school | 14 | 7,00% |
5.2. Research construct validity
Before model was analyzed every indicator from model variable was employed for validity and reliability. Convergent Validity was done to determine the validity of the relationship between the indicator and the constructs of other latent variable in the model. Convergent validity of the model by reflecting indicators was assessed based on the correlation between the component score and the construct score estimated by the PLS program. Convergent validity was done twice because there were the invalid model with loading factor < 0.50. Invalid indicator ST3, KN1 and RE3 were eliminated from the model because loading factor values were 0.312, 0.352, 0.129 respectively. Convergent validity results after re-estimation can see in Table 3.

| Latent variable | code | Outer loading |
|-----------------|------|---------------|
| Stability       | ST1  | 0.877         |
|                 | ST2  | 0.916         |
| Hope            | HO1  | 0.855         |
|                 | HO2  | 0.837         |
|                 | HO3  | 0.770         |
| Fear            | FA1  | 0.830         |
|                 | FA2  | 0.895         |
| Rationality     | RA1  | 0.530         |
|                 | RA2  | 0.821         |
|                 | RA3  | 0.813         |
| Optimistic      | OP1  | 0.780         |
|                 | OP2  | 0.822         |
| Familiarity     | FA1_2| 0.688         |
|                 | FA2_2| 0.664         |
| Knowledge       | KN2  | 0.757         |
|                 | KN3  | 0.760         |
| Reliability     | RE1  | 0.870         |
|                 | RE2  | 0.758         |
| Risk or Uncertainty | RI1 | 0.801    |
|                 | RI2  | 0.898         |
|                 | RI3  | 0.807         |
| Usability       | US1  | 0.779         |
|                 | US2  | 0.742         |
| Accuracy        | AC1  | 0.741         |
|                 | AC2  | 0.827         |
| Tranparency     | TR1  | 0.873         |
Measurement of discriminant validity was used to ensure that each concept of each construct was different from other variables. A model that has good discriminant validity if the construct correlation value with the measurement item was greater than the other construct correlation values. Cross loading value in evaluating discriminant validity can be seen by the square root of the average variance extracted (AVE) for each construct of a latent variable. The model was said to have good validity if the value of the AVE square root value for each construct is greater than required 0.50. AVE values and AVE square roots for each construct can be seen in Table 4.

**Table 4. AVE dan AVE square roots**

| Variable | AVE | AVE square roots | Validity |
|----------|-----|-----------------|----------|
| ST       | 0.840 | 0.917           | Valid    |
| HO       | 0.694 | 0.833           | Valid    |
| FA       | 0.782 | 0.884           | Valid    |
| RA       | 0.638 | 0.799           | Valid    |
| OP       | 0.771 | 0.878           | Valid    |
| FM       | 0.745 | 0.863           | Valid    |
| KN       | 0.818 | 0.904           | Valid    |
| RE       | 0.756 | 0.869           | Valid    |
| RI       | 0.675 | 0.822           | Valid    |
| US       | 0.749 | 0.865           | Valid    |
| AC       | 0.724 | 0.851           | Valid    |
| TR       | 0.674 | 0.821           | Valid    |
| SC       | 0.709 | 0.842           | Valid    |

5.3. Research construct reliability
The research model has to be tested construct reliability by looking at the composite reliability value of each indicator block that measured its constructs. A construct was declared to have reliability if the composite reliability value was > 0.50. The value of Warp PLS output for reliability measurements from composite reliability values can be seen in Table 5.

**Table 5. Model Composite Reliability**

| Variable | Composite Reliability |
|----------|-----------------------|
| ST       | 0.827                 |
| HO       | 0.736                 |
| FA       | 0.759                 |
| RA       | 0.649                 |
| OP       | 0.746                 |
| FM       | 0.714                 |
| KN       | 0.802                 |
| RE       | 0.728                 |
| RI       | 0.702                 |
| US       | 0.719                 |
| AC       | 0.688                 |
| TR       | 0.625                 |
| SC       | 0.670                 |
5.4. Model structure evaluation
Evaluation of the structural model could be done by looking at the value of the coefficient of determination (R2), path coefficient value, Cohen effect size (f2), and predictive relevance (Q2).

5.5. Deterministic coefficient value of model (R²)
The value of R² of each endogenous latent variable could be grouped into three groups, the first around 0.19 was considered weak, the value around 0.33 was considered moderate, and the value of around 0.67 was considered strong. The value of R² of all endogenous latent variables can be seen in Table 6.

| Variable | R²   | Explanation |
|----------|------|-------------|
| TS       | 0.599| Moderate    |
| SIT      | 0.634| Moderate    |
| PT       | 0.652| Moderate    |
| TT       | 0.563| Moderate    |
| TIT      | 0.670| Strong      |
| IT       | 0.493| Moderate    |

5.6. Path coefficient values (β)
Path coefficient is a standardized regression coefficient (β) that shows the direct effect of independent variables on the dependent variable in the path model. Based on the calculation of the path coefficient in the research model, the path coefficients are in the range 0.236 to 0.578. Path coefficient values that are in the range of -0.1 to 0.1 are considered to be insignificant values, coefficient values > 0.1 are significant values. The path coefficient value is showed in table 7.

| Path    | Coefficient (β) |
|---------|-----------------|
| ST→TS   | 0.236           |
| HO→TS   | 0.274           |
| FA→TS   | 0.280           |
| RA→TS   | 0.390           |
| OP→TS   | 0.310           |
| FM→SIT  | 0.578           |
| KN→SIT  | 0.523           |
| RE→TT   | 0.387           |
| RI→TT   | 0.433           |
| US→TT   | 0.516           |
| AC→TIT  | 0.452           |
| TR→TIT  | 0.404           |
| SC→TIT  | 0.443           |
| PT→IT   | 0.295           |
| TT→IT   | 0.485           |
| TIT→IT  | 0.333           |

5.7. Effect size / Cohen effect (f²)
The value of f² calculation is used to see the effect of independent constructs to dependent latent variable whether it has a substantive influence. The value of the Cohen effect f² has a small, medium
and large effect at the structural level if the sequential value is around 0.02, 0.15, 0.35. The results of the Cohen $f^2$ effect on individual trusts can be seen in Table 8.

| Path | $f^2$ | Explanation |
|------|-------|-------------|
| ST→TS | 0.052 | Small |
| HO→TS | 0.112 | Small |
| FA→TS | 0.097 | Small |
| RA→TS | 0.197 | Medium |
| OP→TS | 0.141 | Medium |
| FM→SIT | 0.348 | Large |
| KN→SIT | 0.287 | Medium |
| RE→TT | 0.140 | Medium |
| RI→TT | 0.165 | Medium |
| US→TT | 0.258 | Medium |
| AC→TIT | 0.243 | Medium |
| TR→TIT | 0.195 | Medium |
| SC→TIT | 0.232 | Medium |
| PT→IT | 0.099 | Small |
| TT→IT | 0.275 | Medium |
| TIT→IT | 0.119 | Medium |

5.8. Predictive relevency ($Q^2$)
The value of $Q^2$ illustrates how well the observation value produced by the model and also the estimated parameters. The value of $Q^2$ greater than 0 means that the model shows predictive relevance, whereas if less than 0 shows the model shows less predictive relevance. The results of the $Q^2$ model are showed in Table 9.

| Variable | $Q^2$ | Explanation |
|----------|-------|-------------|
| TS | 0.592 | Predictive |
| SIT | 0.639 | Predictive |
| PT | 0.658 | Predictive |
| TT | 0.561 | Predictive |
| TIT | 0.668 | Predictive |
| IT | 0.497 | Predictive |

Figure 4 shows the proposed model and factors that have a significant relationship with technology 4.0 trust of food and beverage SMEs workers. The model indicates that trusting stance and situational trust as well as their interactions have significant relationships with propensity trust, supporting H1 and H2; On the other hand, propensity trust, trust for technology and information technology trust have a significant relationship with individual trust, supporting H3, H4 and H5.
5.9. *Causalitas Index of Model*

Overall structure model validation can be measured by Goodness of Fit (Gof) index. The Goodness of Fit index in the model ≥ 0.1 shows the overall quality of the small, when Gof index ≥ 0.25 means the quality of the middle model and ≥ 0.36 shows the overall quality of the large model. The Gof index value of this model based on output is 0.644, which means that overall the individual trust model has a large model quality because the GoF index value is ≥ 0.36.

6. *Discussion*

Trust for technology, trust for human-machine have been explored by many researchers, although various studies identified factors that are critical in trust for technology, such as propensity trust, trust for technology, trust for information technology. The model results show that the variable trusting stance (TS) has a positive influence on its constructs. The construct TS consists of stability, hope, fear, rationality and optimistic where rationality of the five indicators is the most influential indicator of trusting stance because the path coefficient of rationality to trusting stance is 0.390. Situational trust (ST) variables are positively influenced by indicators in the form of familiarity and knowledge where indicators of knowledge and familiarity have almost the same effect on individual beliefs in a situation on the technology 4.0.

The variable trust for technology (TT) is influenced by the indicators positively (reliability, risk/uncertainty and usability). Usability variable has significant influence to TT which path coefficient value is 0.516, which means that the more the technology is useful for the individual, the individual's trust will increase. The trust for information technology variables are positively affected by the variable accuracy, transparency and security where the three variables almost have the same effect, so that the individual trust in information technology is strongly influenced by the three indicator variables. The individual trust variables are significantly affected by the indicator trust for technology and information technology trust these two variables have a significant effect on individual trust because they have the greatest value in influencing individual trusts.
7. Conclusion
The results of testing individual trust are based on convergent validity that the model is valid after one re-estimate by eliminating the variables ST3, KN1 and RE3. The test results of the model discriminant validity. The results of the model validity test are based on the composite reliability value that this model is reliable. The R2 value of the individual trust variable is 0.44.

The results of the individual model found that the indicators that most influence individual trust variables in technology 4.0 are indicators of the trust for technology variable and information technology trust indicators with the coefficient path value of 0.485 and 0.333.

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