Measuring Information Systems Success In Yemen: Potential Of Delone And Mcleans Model

Yaser Hasan Salem Al-Mamary

Abstract: Delone and Mclean conducted a study in 1992 in which they identified six components for information systems success. In 2003 they has been updated the model by introducing new variables such as service quality, and net benefits. This study adopts the Updated Delone and Mclean IS in Yemen's telecommunication industry. This is a quantitative research. A questionnaire has been used as the data collection instrument. The data analyzed by using AMOS software and SPSS statistical program. The findings of this study indicated that updated model is not the most appropriate for Yemeni companies. For that, the future study need to consider the other models that lead to successful adoption of IS in context of Yemen.

Index Terms: IS, Success, Updated Model, Yemen.

1 INTRODUCTION

Recently, researchers especially in Yemen are more focused to study about information systems success due to global development in field of information systems. The successful adoption of IS in organizations directly contributes to improve the individual performance of a company (Al-Mamary et al. ,2015a). Delon & McLean (1992) reviewed the research published during the period 1981-1987 and accordingly, they designed a taxonomy of IS success. Based on further studies and researches the Original Delone & Mclean Success model was updated and modified to include new variable; service quality. They also merged individual and organizational impact to one new dimension to be known as net benefits. Updated Delone and Mclean IS Model is influential theory in field of information systems success. Applied by big number of researchers. Updated Delone and Mclean IS Model has been tested in many countries, but the factors that effected on information system success may be different in diverse cultural and social contexts. To determine the generalisability of this model, further empirical studies in other geographical locations (e.g., Middle East) are required to establish whether the research constructs in the model vary across countries. For that, this study needed to investigate whether Updated Delone & Mclean model is the appropriate model to successful adoption of IS in context Yemen or not.

2. THEORETICAL BACKGROUND

2.1 Delon and Mclean IS Success Model

They conducted a study in 1992 in which they identified six components of IS success including: system quality, information quality, use, user satisfaction, individual and organizational impact (Petter et al., 2008). System quality is considered as one of the most important dimensions that measures the way by which hardware and software work together, while information quality focuses on the measurement of the output of information system rather than the quality of the system performance (DeLone & McLean, 1992). Other researchers tend to concentrate on the quality of the information system output, particularly the quality of information produced by the system mainly in the form of reports. In addition, DeLone & McLean (1992) urged that based on many IS conceptual models and empirical studies, the system use is considered as a successful standard. System use is defined as the extent to which employees and customers get benefit from and utilize the abilities and advantages of the information system ; It is measured by times and numbers of use , its frequency ,nature , appropriateness of use , usage's level and the goals of use (Petter et al., 2008). DeLone & McLean (1992) stated that many researchers have identified the system use as a criteria by which they can measure the system success. While the system itself should be useful in order to be used by the end users , non-use does not mean necessarily that it is worthless ; It may indicate that the potential user may have other alternatives to use (Seddon & Kiew, 1996). Inotherwords, Seddon (1997) has his own approach to measuring the success of IS ;he urged that the net benefits gained through usage are considered as a major factor that determines the IS success and not system use. Using a particular system is considered as an indicator of percieved usefulness, when the user is satisfied that using this system contributed in enhancing his or her job performance. Evaluation of IS success depending on its usage may be appropriate only for voulntary users in comparision with captive users (Visser et al. 2013). Other researchers such as Hussein et al. (2007); Pai & Huang (2011); Landrum et al. (2008); adopted "usefulness" , not use , as criteria for IS success. User satisfaction is another important criteria for measuring the overall IS success (Urbach et al., 2010). Petter & McLean (2009) define user satisfaction as the interest and acceptance of the user to adopt IS and its output . For DeLone & McLean (1992), user satisfaction is the user's reaction and desire to use information system output. In addition, DeLone & McLean (1992) define individual influence as the impact of information system on the user's behaviour which is closely related to his performance. According to Cho (2007) individual impact evaluates the degree to which information system enhances the users' understanding of decision context , improves their abilities to making effective decisions, promotes their job performance and increases their awareness on the importance of information system. It

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is closely related to the individual's work effeciency and effectiveness. Using information system will foster all the above-mentioned aspects and consequently increase the productivity of the individual. Goodhue & Thompson (1995) urged that the impact of individual performance can be evaluated through effectiveness, productivity and job performance. Moreover, the impact of IS on the organization's performance is defined as the organizational impact. Such impact can be measured through many indicators including staff reduction, overall productivity benefits, increase of revenues, sales, and profits, work volume increase, improvement of product quality, and contribution to realizing objectives etc (DeLone & McLean, 1992). Moreover organizational performance is the actual outputs and end results of all activities and organization's work processes (Robbins & Coulter, 2002).Figure 1 depicts the theory.

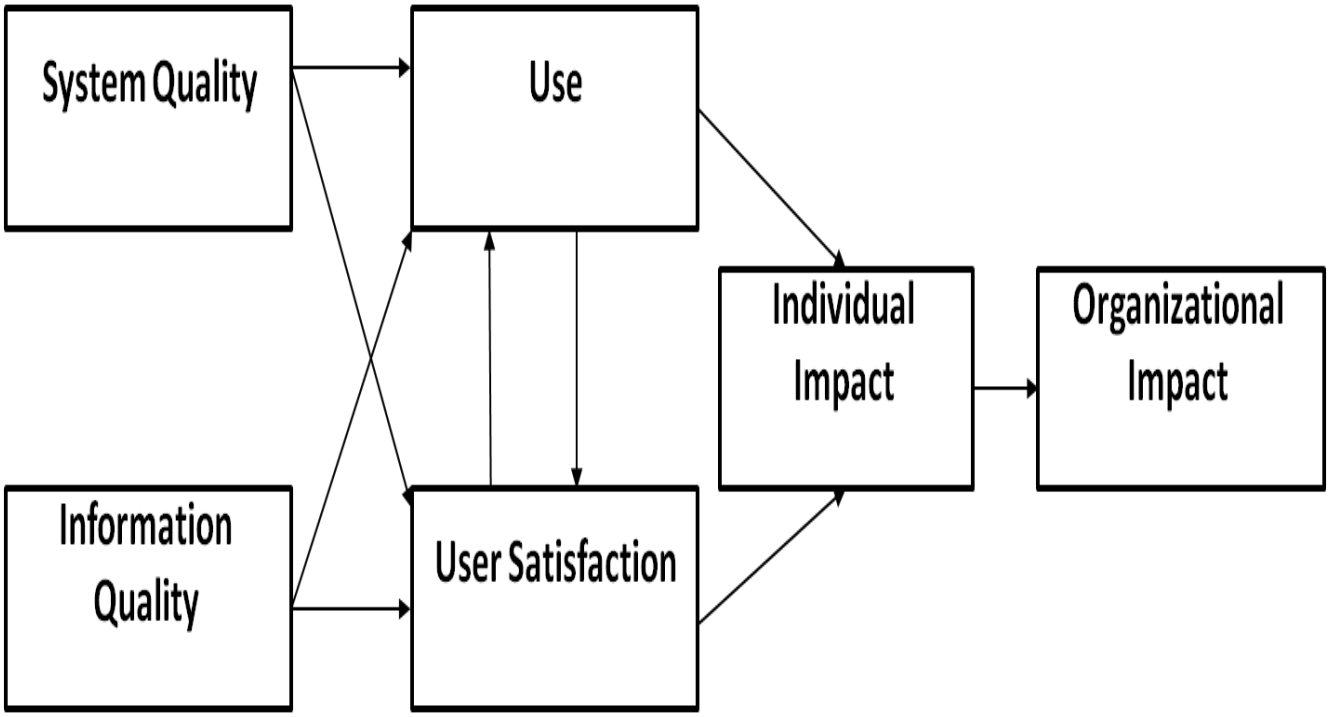

Figure 1: *Delon and Mclean IS Success Model*

2.2 Updated Delone & Mclean (2003)

The variables used in the updated model of Delone and Mclean including the following : System quality is one independent variable in IS success model which evaluates the overall quality of a system along with information processing system itself ; Information quality measures the quality of the information and outputs that the system is able to store , deliver and produce ; It focuses on evaluating the quality of information system output rather measuring the quality of system performance. According to Petter & McLean' (2009) definition , service quality is the support provided by users through information systems department , while Delone and Mclean (2003) defined it as the whole support furnished by service provider regardless of the source of this support , whether it IS section , new unit in the organization or external source of internet service suppliers. Moreover, DeLone and McLean (1992) urged that system use can be considered as a successful criteria for evaluating the IS success as manifested in many IS conceptual models and empirical studies. System use is the extent to which customers and users can get benefit from and utilize the capabilities of information system (Petter et al., 2008). Moreover, DeLone and McLean (1992) defined user satisfaction as the the degree to which a user is pleased or satisfied with using information system. Meanwhile Petter et al. (2008) defined net benefits as the level of contribution made by IS towards the success of individuals, groups, organizations, industries, and nations. According to Petter & McLean (2009) net Benefits is the impact of information systems on an individual, group, organization, industry, society, etc. Many methods can be used for measuring net benefits; the most common are organizational performance, perceived usefulness, and job effectiveness.

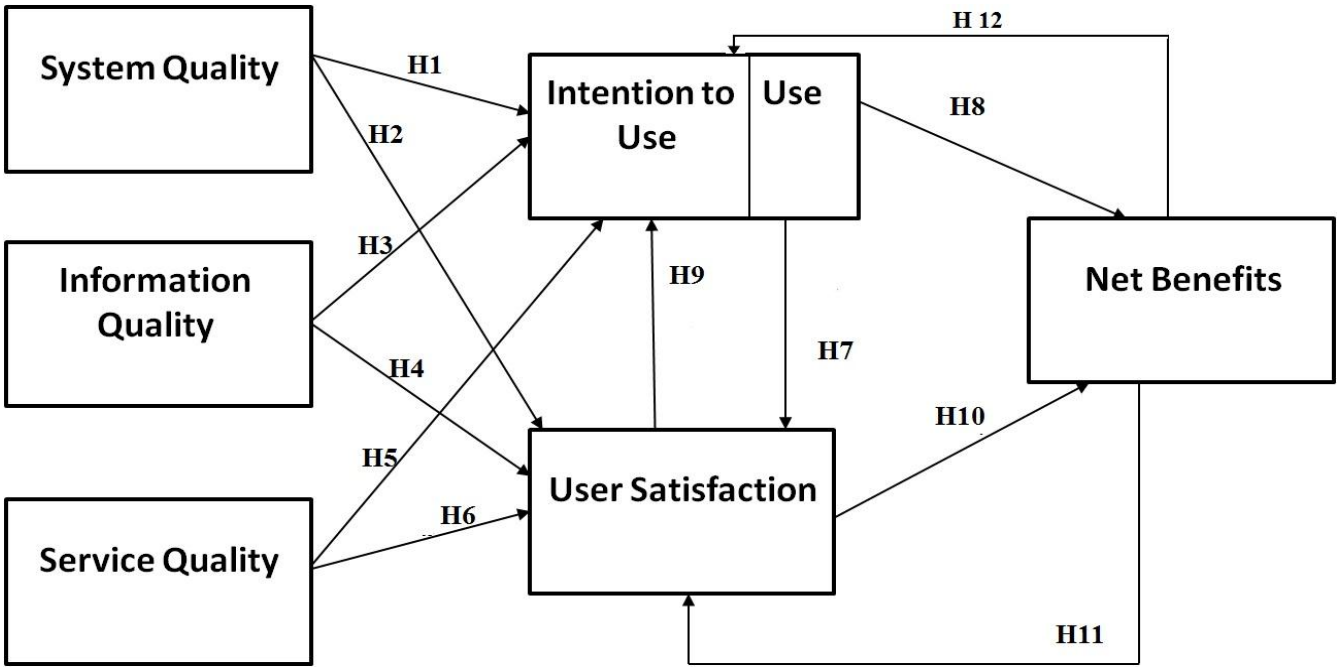

Figure 2: Updated Model

2.3 Development of the Measures

Table 1, and Table 2 listed the measures that adopted in this study.

Table 1: Examples of Success Measures (1):

SQ/ Al-Mamary et al. (2015b)	IQ/ Al-Mamary et al. (2015b)	SerQ Al-Mamary et al. (2015b)
1. Ease of use	1. Relevance	1.Prompt service (responsiveness).
2. Ease of learning	2. Understandability	2. Accurate service.
3. System reliability	3. Accuracy	3. Dependable service (reliability).
4. Response time	4. Conciseness	4. technical competence.
5. System flexibility	5. Completeness	5. Empathy of the personnel staff.
6. Sophistication	6.Timeliness	6. Knowledge to do their job well (assurance).
7. Intuitiveness	7. Usability	

Table 2: Examples of Success Measures (2):

System Use / Al-Mamary & Shamsuddin (2015c)	User Satisfaction Palvia (1996)	Net Benefits (Measured in terms of organizational performance) Al-Mamary et al. (2015b)
1. help to make decisions	1. The system meets our needs.	1. Productivity
2. help to record the information	2. Satisfied with the system efficiency.	2. Efficiency
3. help to communicate with colleagues	3. Satisfied with the system effectiveness.	3. Profitability
4. help to share the general information	4. The system is successful.	4. Market value
5. help to share the specific information	5. The system meets our expectations.	5. Competitive advantage
	6. Overall, we satisfied with the system.	6. Cost reduction
		7. Revenue enhancement
		8. Overall firm performance

3. Reliability

In this study Cronbach's Coefficient Alpha method was used to measure the reliability between various items in the questionnaire. Table 3 shows the reliability for each variable.

Table 3: Testing Reliability Result

Item	Cronbach's Alpha	N	No of Items
SysQ	0.860		7
IQ	0.898		7
SerQ	0.910		6
Use	0.942		5
US	0.942		6
NP	0.939		8

4. ANALYSES AND RESULT

4.1 Sampling and Profile

The type of sample technique used in this study was a purposive sample. The researcher distributed the questionnaire to all private and public mobile phone companies in Yemen. Where, the researcher submitted the questionnaire to public administration in each company. Those companies distributed the questionnaire to all employees in head office in the following departments: IS/IT department, customer service department, human resource department, marketing and sales department, and accounting and finance department. Table 4 presents the demographic profile.

Table 4: demographic profile

		Frequency	Percent
Company	Yemen Mobile	101	33.7
	Sabafon	64	21.3
	MTN	79	26.3
	Y	56	18.7
Department	Information Systems/ IT	130	43.3
	Customers Service	122	40.7
	Marketing and Sales	9	3.0
	Human Resource	14	4.7
	Accounting and Finance	25	8.3
Gender	Male	254	84.7
	Female	46	15.3
Designation	Administration Staff	103	34.3
	Technical Support Staff	78	26.0
	Head of Department	15	5.0
	Manager	8	2.7
	Others	96	32.0

4.2 Measures of Goodness-of-Fit

Table 5 present the information concerning the fitness index category, their level of acceptance.

Table 5: Goodness-of-Fit indexes

Name of Index	Level of Acceptance
Chisq/df	chisq/df < 5.0 / Al-Mamary & Shamsuddin (2015d)
NFI	NFI >= 0.9 means satisfactory / Al-Mamary & Shamsuddin (2015d) Fit 0.8 < NFI< 0.9 means acceptable fit / Al-Mamary & Shamsuddin (2015d)
CFI	CFI>= 0.9 means satisfactory fit / Al-Mamary & Shamsuddin (2015d)
GFI	GFI >= 0.9 means satisfactory fit/ Al-Mamary & Shamsuddin (2015d) 0.8< GFI< 0.9 means acceptable fit / Al-Mamary & Shamsuddin (2015d)
TLI	TLI >= 0.9 means satisfactory fit / Al-Mamary & Shamsuddin (2015d)
RMSEA	RMSEA < 0.08 / Al-Mamary & Shamsuddin (2015d)

4.3 Model Fit Analysis

The model did not fit well. The CFI, GFI, and TLI not achieved the required level as specified in Table 5.

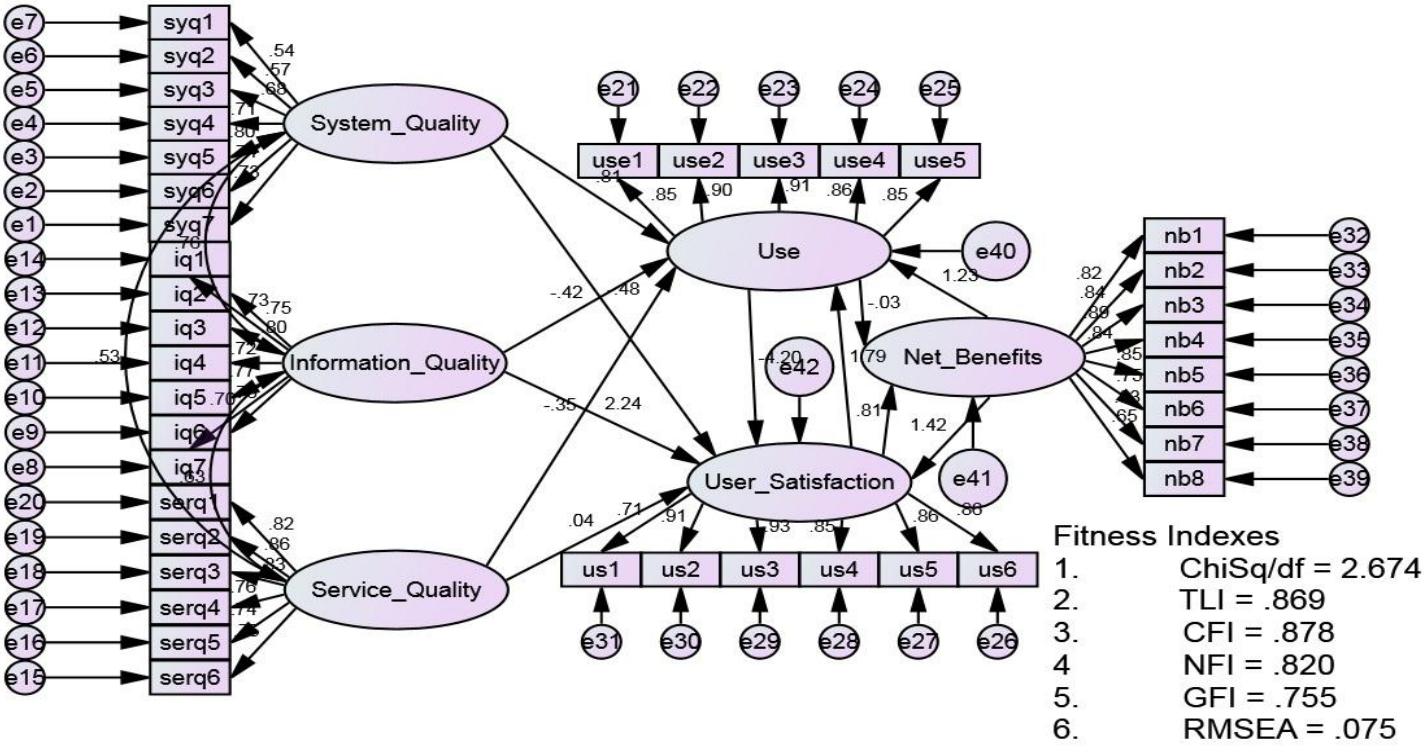

Figure 3: Initially structural model

After dropping the problematic items, the structural model was re-run. Final structural model is depicted in Figure 4.

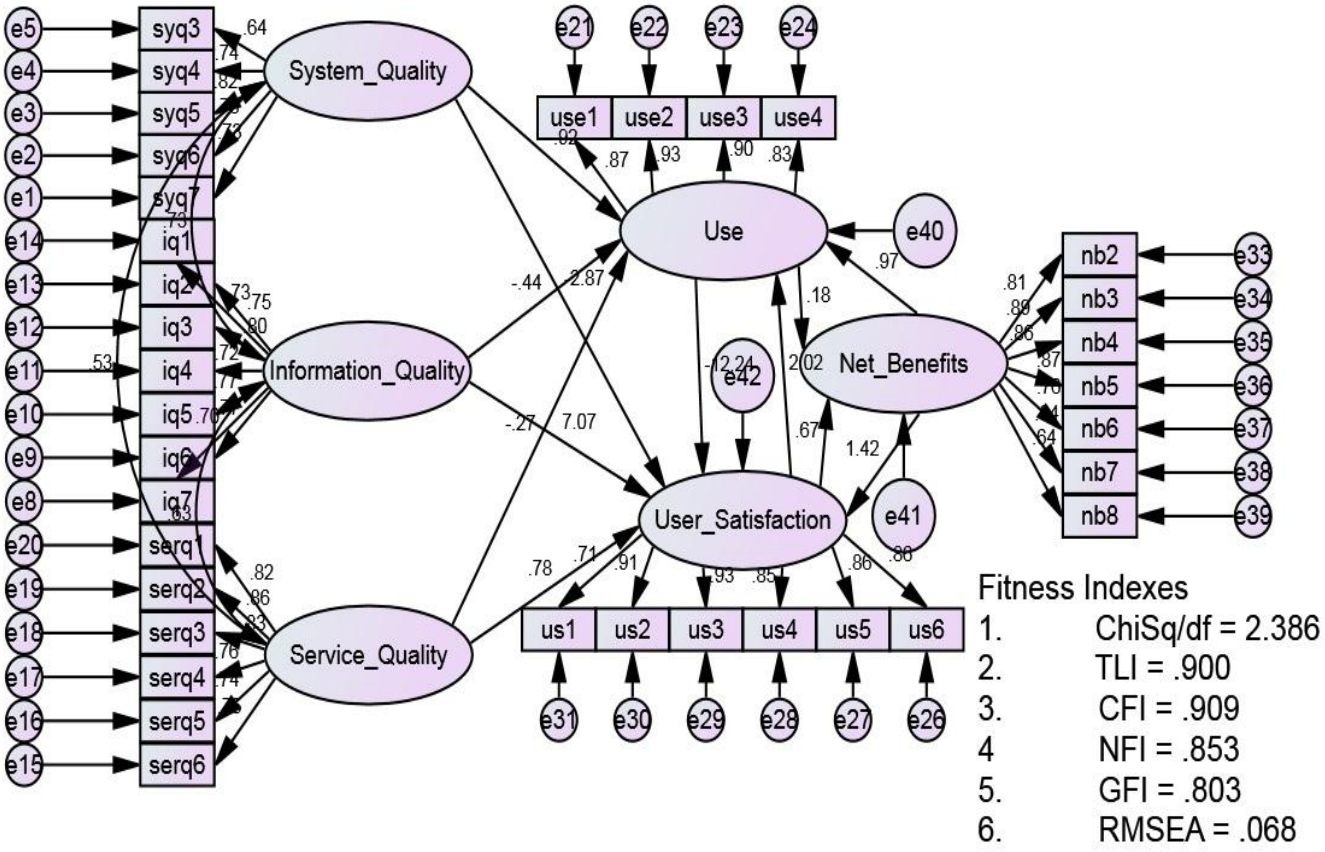

Figure 4: Revised Structural Model

The goodness-of-fit indexes reflect the fitness of the model. In this study the revised structural model fit well based on Goodness of Fit indexes as specified in Table 5., and Figure 4. The TLI, CFI were above 0.90, NFI, GFI above 0.80, the ChiSq/df < 3, and the RMSEA was below 0.08. That's mean all the indexes achieved required level as recommended in Table 5.

5. Discussion and Conclusion

The research findings in this study indicated that system quality is found to have a significant and positive relationship with use the system, in support of hypothesis H1. The quality of systems needs to be high enough in order to ecourage the end-user to use the system. In general, the lower level of system quality causes the lower level of system use. Where, system quality is considered as important dimension for successful adoption of IS in Yemeni context. In addition, the research findings indicated that user satisfaction is found to have a significant and positive relationship with use the system and net benefits, in support of hypotheses H9, H10. User satisfaction is one of the most important factors for the success of any system. As we known, if the end-users is satisfied with the system, they will use it. For that, user satisfaction considered as an important dimension for successful adoption of IS in Yemeni context In addition, if the end-users are satisfied with the system, they will try to prove the benefits of use it. Moreover, the research findings in this study indicated that net benefits is found to have a significant and positive relationship with user satisfaction and use of the system, in support of hypotheses H11, H12. There is a reciprocal relationship between net benefits and user satisfaction as satisfaction will lead to obtain benefits as well as obtain the benefits will lead to satisfaction. In addition, when the users feel that the system is useful, and they have received benefits from it. This will encourage them to continue to use the system. Finally, the rest of hypotheses in this study are not supported. The findings indicate that Delone and Mclean model is not the most appropriate model for successful adoption of IS in context of Yemen. Twelve hypothesized relationships tested by SEM, five were found to be significant and seven is not significant. In general, most of the hypotheses were rejected. The findings indicate that Delone & Mclean information system success updated model not useful in context of Yemen. This is due to the culture of the Yemen's context. It is suggested that future research need to include culture as one of the parameters.

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