

Sustainable Digital Ecosystem Establishment Through Strategizing the Business Model in Public Higher Education Institution

Pham Quang HUY^{1*}, Vu Kien PHUC²

¹ School of Accounting, University of Economics Ho Chi Minh City, Vietnam

² School of Accounting, University of Economics Ho Chi Minh City, Vinh Long Campus, Vietnam

*Corresponding author: pquanghuy@ueh.edu.vn

Abstract

With the present digitalization megatrend (Hoe, 2019), digitalization has transformed business processes (Antonucci et al., 2020) and led to the increasing attention of academic and practitioner world (Caliskan et al., 2020). The current research focuses on providing a coherent picture with respect to how digitalization of accounting information system (DAIS) and internal control system (ICS) demonstrated an impact on open business model (OBM), and also highlight the role of these aforementioned components in shaping sustainable digital ecosystem (SDE). Structural equation modeling was employed to investigate the hypothesized model grounded on statistical data captured from a survey distributed to a cross-sectional sample of 312 accountants in public higher education institutions (PHEIs). The outcomes show positive interlinks among DAIS, ICS and OBM, with varying significance and effect sizes. Additionally, the positive and significant interconnections of these three components and SDE were underscored. These observations guided PHEIs' leaders to realize how to become efficacious in the digital transformation journey as well as devised appropriate strategies to direct their digital transformation process effectively. The value of more fine-grained insights in this article enabled policymakers to promulgate laws and rules regarding of digitalization.

Research purpose:

Establishing the consistent ecosystem for any organization is considered important in helping their business running as planned. This also matters to public sector organizations because they have utilized state budget for assigned responsibilities. In addition, the Forth Industrial Evolution Movement has taken place across different sectors all around the world. Therefore, public entities should manage their activities on digitalized ecosystem to optimize their operations.

Research motivation:

The digital system in public sector organizations is a new topic that has not been studied by researchers and this matter in public sector is very important to developing counties as well as developed countries.

Research design, approach and method:

Structural equation modeling was employed to investigate the hypothesized model on statistical data obtained from a survey distributed to a cross-sectional sample of 312 accountants in public higher education institutions. Based on that, SPSS with SEM is used to verify the reliability of this model.

Main findings:

The outcomes show some positive interlinks among DAIS, ICS and OBM, with varying significance and effect sizes. Additionally, the positive and significant interconnections of these three components and SDE were underscored. These observations guided PHEIs' leaders to realize how to become efficacious in the digital transformation journey as well as devised appropriate strategies to direct their digital transformation process effectively.

Practical/managerial implications:

The value of more fine-grained insights in this article enabled policymakers to promulgate laws and rules regarding digitalization. Managers of public sector entities should set the strategies for constituting their organizational structure and all duties depending on their business models.

Keywords: Digitalization, Internal control system, Open business model, Public higher education institution, Sustainable digital ecosystem.

1. INTRODUCTION

Attributable to the potential of novel necessary competencies for entities (Janowski, 2015), digitalization has been well pondered as global megatrends that has driven both the private organizations and public sector organizations (PSOs) reform through the of information and communication technology solutions implementation to optimize organizational operations and better services to customers – or citizens provision (Hoe, 2019). PSOs have been required to become more adept to addressing discontinuous change and worked with swiftly and cost-efficiently exploiting advanced digital options to stay relevant in era of digitalization (Kankanhalli et al., 2017). As such, the PSOs worldwide have been implementing digital technologies with the goal of generating processes more efficient and effective manner (Janowski, 2015; Lindgren et al., 2019), of these, the PHEIs were not exceptional. Admittedly, higher education has become an extremely competitive higher education market (Wilkins, 2020), and hence there has been extensive pressure on PHEIs for a significant improvement in their process performance (Dwaikat, 2020). Given that digitalization has handled with information processing and everything could be turned into information (Curran, 2018), more and more entities have invested heavily in modern digital technologies, experimenting with novel prospects and changing their business models (Frishammar et al., 2018). By doing so, most of the organizations centered around setting up and adopting digital resolutions to streamline interior and exterior processes as well as offering better services for citizens (Fishenden & Thompson, 2012; Janowski, 2015). Nonetheless, the strategies, structures and organizations of PSOs have necessitated to reform accordingly to support renewed solutions and services to completely apply the potential of digital solutions and services (Oschinsky et al., 2021).

The marching revolution in modern information technology has resulted in a dramatical impact on accounting information system (AIS) (Lutui & Ahokovi, 2018) which was supposed to be a part of the administration information systems of the most effective systems in organizations (Abdallah, 2014). Undeniably, AIS has served as a paramount function in the entity to revamp the performance of operations and reinforce the managerial practices (Gelinias et al, 2012). In this regard, the constant integration and adoption of technology instruments, platforms, and processes throughout the business process have already given rise to considerable breakthrough in AIS (Smith, 2018).

Furthermore, the digital economy has posed new challenges to the organizational management mode of modern PHEIs. Since ICS has long been acknowledged as a procedure or system designed to control, supervise,

and direct the organization in order to achieve a goal (Farida et al., 2021), it thus assisted the organization to reach the efficiency and effectiveness of business operations (Neogy, 2014).

Even with the increasing concerns and discussions about implementation for advanced technologies for the AIS (Smith, 2018) and the ICS in the context of digitalization, nevertheless, there has seemed to be uncertainty on how the integration process would unfold (Smith, 2018) and how to shape and implement the ICS as well.

Grounding on these above analyses, this research was executed with the superlative intent to delve into how ICS and DAIS engendered impacts on OBM towards SDE establishment in the era of digital transformation and determine the empirical relationship which existed between OBM and SDE.

Broadly speaking, this model offered a holistic understanding of input-based factors which demonstrated significant impact on SDE establishment. Concretely, this study has enriched the body of digitalization literature in PHEI among the developing countries. Although the pertinence of the subject and future works regarding to digitalization has discerned in numerous recent publications (Kraus et al., 2019), the recent flood of academic works in term of digitalization have been predominantly directed towards large-firm settings (Eller et al., 2020). Secondly, this research has provided a coherent and apparent definition of DAIS which has long been considered to be complicated and hard to grasp under the perspective of school leaders (Avidov-Ungar and Shamir-Inbal, 2017). Thirdly, this study gave rise to an in-depth understanding of on how to measure ICS in PHEIs in the context of digitalization through a combination between the INTOSAI framework and the previous works related to ICS in the digital era. Drawing on this initiative, this study also highlighted interlink between ICS and DAIS, OBM and SDE. Apparently, ICS took place in the midst of different and constant processes of change which must be taken on simultaneously. This, in turn, seemed to contribute to a broad, comprehensive and complex understanding of what ICS meant for DAIS, OBM and SDE. Fifthly, it linked the two research streams which have, to date, been split pertaining to analysis namely digitalization in accounting and business model. Previous literature on digitalization has primarily investigated the technological standpoint (Liao et al., 2017), by reviewing or surveying a specific research topic such as cloud technologies (Zhan et al., 2015), blockchain technology (Kirbac & Tektas, 2021) and so on. On the other side, previous business model studies have principally stressed on the interplay between digitalization and business model

innovation (i.e., Rachinger et al. (2018); Acciarini et al. (2021). Sixthly, this research contributed to enriching quantitative studies on the interconnection between DAIS and OBM towards the SDE establishment. These findings uncovered the relationship between OBM and SDE. The stakeholders of the PHEIs included institutions, providers, competitors and consumers. The transition from a usual business model to the long-term strategy toward the digitalized management of general resources from PHEIs' stakeholders with the target of setting up the SDE. Seventhly, this study contributed to the body of knowledge of SDE by extending the discussion on the mediating role of DAIS and OBM in the association between ICS and SDE. Stated differently, the PHEIs could increase their potential in SDE establishment through DAIS and OBM rather than only focused only on ICS.

From a practical perspective, these findings also contributed to the empirical literature by clarifying the hitherto mixed results regarding the relationship between SDE and its in-put based factors which could sharpen in-depth understanding of PHEIs' managers in fostering innovative business models to generate positive performance on SDE establishment. These observations could be taken as a considerable practical relevance for policymakers to pay heed when promulgating law and guidelines related to digital transformation.

The remaining of this work is composed as follows. A literature review targeting at presenting exhaustively the theoretical underpinning and concepts of existing interconnections in the proposed model are outlined in Section 2. Based on these aforementioned, the research hypotheses and research model are shaped up in Section 3. The research methodology and empirical settings are illustrated in detail in Section 4. The outcomes of the analysis are adduced in Section 5. The final Section ends with recommending theoretical and managerial implications, as well as inherent restrains and future research orientations.

2. LITERATURE REVIEW

2.1. Theoretical underpinning

Institution theory. Institutional theory sprang up the mid-20th century and continued to developed (DeVaujany et al., 2014). This theory was grounded on the perspective that entities necessitated to persuade the public on their legitimacy for being supported to survive and evolve (Meyer & Rowan, 1991). As stated by Hinings et al. (2018), this theory was also obvious about the information existing both on the field and organizational degree and, in interrelated manner. It has long been considered as a prominent theory in formation system literature (Kling & Iacono, 1989; Orlikowski &

Barley, 2001). The institutionalization approach has been regarded fruitful for investigating change-related information systems phenomena, comprising of systems evolvement, application, adoption and utilization (Mignerat & Rivard, 2009). Since this research concerned digitalization as a type of institutional change, the institutionalization approach was deliberated as pertinent theoretical lens

Agency theory. Agency theory has been treated as the most dominant standpoint in the area of corporate governance literature, policy making and practices (Christopher, 2010). This theory speculated human as self-interested and indicated interest conflict occurred between principal and agent (Jensen & Meckling, 1976). Nevertheless, this conflict of interest could be adjusted by either providing suitable incentives or by supervising agent's practices (Chng et al., 2014). The majority of the developing economies have been economically deprived and small investors resultantly coped with the obstacles of different barriers namely dearth of information/literacy about markets (Reardon et al., 2008). As such, a principal-agent framework was corroborated a promising way for analyzing organizational policy commitments since its generation and application involved contractual matters pertaining to information asymmetry, moral risks, bounded rationality, and adverse choices (Eisenhardt, 1989).

Stakeholder theory. The stakeholder theory was set up in the 1980s as a strategic management theory (Freeman, 2010) and has kept on evolving as a management paradigm (Schneider & Sachs, 2015) and has been still well-regarded as a gold standard for theorizing and managing the complicated business and society associations (Lock & Seele, 2016). Any group or a person that illustrated its effect of being impacted by the organizational accomplishment goal could be determined as a stakeholder (Freeman, 1984). As suggested by Mitchell et al. (1997), a stakeholder could therefrom refer to persons, groups, entities or the natural environment even. A series of managerial principles and instruments employed to depict the interlinks between an entity with its stakeholder were deliberated the prime devotion of Freeman (Mitchell et al., 1997). In this regard, the organizational managers were encouraged to handle the demands about the organizational goals and the responsibilities of managers to particular stakeholders in an open and thoughtful manner (Freeman et al., 2010). The stakeholder theory was argued to be the predominant point of view in theorizing organizational sustainable development (Chan & Oppong, 2017).

The abovementioned theories were employed purely as sensitizing instruments in a flexible manner (Klein & Myers, 1999) instead of as a rigid tool for theory testing.

2.2. Conceptual framework

Digitalization of accounting information system.

An AIS has been well-acknowledged as a procedure for data procurement, entering, processing, and storage as well as a series of organized approaches of information storage, management, controlling and reporting in convinced manner and procedures (Romney & Steinbart, 2014). It was also supposed to be as an instrument which was applied into the area of information technology and systems to enable the management and controlling practices in term of organizational economics - finance aspect (Grande et al., 2011). In the meantime, as digitalization was propped up by modern information and communication technologies (Kobus et al., 2018) comprising of virtualization mobility and analytical systems (Loonam et al., 2018), digitalization depicted as any innovation in the entities and their business model in light of the growing electronics and telecommunication technologies application (Verina & Titko, 2019). Taken together, DAIS could be enlightened as a configuration of technical evolution in AIS through increasing digital technology adoption in ameliorating both the performance and the scope of operation of AIS.

Internal control system. ICS has been pondered as a framework covered with policies, processes, procedures, analysis as well as strategies put in place (Schaeffer, 2014) and undertook by organizational board of directors and other personnel (Gray, 2008) with the targets at reaching operational effectiveness and efficiency (Michelon et al., 2015) through overcoming risks and offering reasonable guarantee for organizational missions pursuing and goal achievement in business operations in an orderly, ethical, economical, efficient, and effective manner and accountability obligations performance complied with applicable laws and regulations beyond resources protection against loss, misuse and damage (Sari et al., 2017).

Open business model. There was robust reinforce in literature on the perspective that business model has changed remarkably across the context of research (Seelos & Mair, 2007). Concretely, business model was specified as a conceptual technique consisted of product/service innovation, infrastructure administration, customer associations and financial affairs pillars (Osterwalder & Pigneur, 2002). Business model was also identified as an instrument to depict how organizations interacted through Internet application and how value was given rise for their stakeholders (Applegate, 2001). Along this line, Chesbrough and Rosenbloom (2002) advocated that business model was shaped by technological inputs and economic outputs. Additionally, a business model could be illustrated how the organization structured and managed transactions for

value creation by means of business opportunities exploitation (Zott et al., 2011).

Building on the suggestion of Hultberg and Pal (2021), the OBM was deliberated as a framework in which organization focused on the two such features as labor division and creating together. Of these, the labor division stressed on strategic partnership, stakeholder advantages and replication. Accordingly, entities could access resources and skills that the entities did not possess or could not afford to develop and uphold (Shrimali & Sen, 2020). By doing so, the entities could seek for approaches to establish the OBM in cooperation with the other stakeholders with the target at efficiency and effectiveness enhancement (Hultberg & Pal, 2021). When the goal of enlarging was to boost the effect of the business model instead of the revenues, an efficient and effective strategy was to promote partners to replicate the whole business model was supposed to be free of charge (Minoja & Romano, 2020). In the meanwhile, creating together, it was distinct from the labor division in the adjacency of the participation and the exploration for new chances and linkages, referred to the collaboration between organizations and stakeholders in strategies formulation as well as control elimination for partner assessment to resources or information (Hultberg & Pal, 2021)

Sustainable digital ecosystem. Hinged on the assumption of Sterling (2010), sustainable development was supposed to be a harmony of the economy and the environment on a novel journey of evolvement which would facilitate the long-term humankind sustainable development. Alternatively, sustainable development was well-regarded as a development which conserved the environment as a sustainable environment would result in sustainable development (Duran et al., 2015). In the meanwhile, the digital ecosystem was deliberated as a self-controlling, expandable system comprising of heterogeneous and interlinked digital organizations (Sussan & Acs, 2017) which concentrated on the interplays amongst organizations to gain the system utility, advantages, and information exchange (Rozak et al., 2021). Digital ecosystem also operated as a sort of self-generative environment which performed on a service-oriented logic to assist participants to act as providers simultaneously (Kraus et al., 2019). Taken together, SDE could be illuminated as service-oriented technology ecosystem (Rozak et al., 2021) which stressed on industries and interplay among organizations with the integration and recognition of economic, environmental, and social attentions throughout operations.

3. HYPOTHESIS ESTABLISHMENT AND RESEARCH MODEL

3.1. Hypothesis establishment

As there was abundance of confidential information which must be kept safe and secure at all times was encompassed in the accounting systems, it would result in havoc in the accounting department in case the unauthorized assessment occurred (Lutui & 'Ahokovi, 2018). Ironically, the danger sourced from data information transmission and storage has been increased in the age of digital economy (Xiwena et al., 2021). It thus raised a claim on internal controls for AIS for computer viruses, hackers' protection and the network security (Lutui & 'Ahokovi, 2018). Indeed, the effectiveness in internal control would lead to the quality and reliability of information system improvement (Laudon & Laudon, 2012) on such several aspects as sustaining the accuracy, integrity, and security through offering processing techniques, storage methods and outputting of appropriate information to lessen fraud and losses in the adoption of information system (O'Brien & Marakas, 2011), prevent, investigate and correct errors as well as restoring information systems when threats took place (Sacer & Oluic, 2013).

Since the ICS played a critical part in operational and financial management practices assurance, the organizational operations were implemented economically and in accordance with regulations among PSOs (Dewi et al., 2019), especially in PHEI, to reach the efficiency and effectiveness of organizational business operations (Neogy, 2014). Additionally, ICS included all the measures performed by the entities for the goal of safeguarding the organizational resources against waste, fraud and inefficiency, assuring accounting and operating data accuracy and reliability assurance, ensuring compliance with the policies of the organization; accessing the degree of performance in all organizational departments (Eko & Hariyanto, 2011), it also offered reasonable assurance in term of the accomplishment of SDE establishment objectivities. Hence, the research hypotheses were deduced as follows:

Hypothesis 1 (H1). ICS has instigated a significant effect on DAIS in a positive manner

Hypothesis 2 (H2). ICS has instigated a significant effect on OBM in a positive manner

Hypothesis 3 (H3). ICS has instigated a significant effect on SDE in a positive manner

Business has been contemplated as one of the most complicated operations and required prudent thinking and cautious practices in making decisions, remarkably in issues pertaining to planning and accessing

the financial business evolvement of an organization. AIS covered with a paramount function in the entity, was as leverage to revamp the operational effectiveness and efficiency as well as managerial activities support consisting of management decision making (Gelinias et al., 2012). AIS also handled with agglomeration, distribution, analysis, processing and categorization of material and quantitative information to release decisions to the internal and external parties (Laudon & Laudon, 2015). On the other hand, the novel indispensable competencies for entities were produced by digitalization (Janowski, 2015) has resulted in the broad reconsideration on business strategies development (Queiroz et al., 2019). More importantly, digitalization has demonstrated a significantly positive impact on how organizations managed their interconnections with both the internal and external stakeholders (Majchrzak et al., 2016). Therefrom, the research hypotheses were designated as follows:

Hypothesis 4 (H4). DAIS has instigated a significant effect on OBM in a positive manner

Hypothesis 5 (H5). DAIS has instigated a significant effect on SDE in a positive manner

Due to the main goal of becoming a more sustainable economic systems and reaping sustainable development ambitions (Harun et al., 2013), there has been a growing amount of analytical concentration on how PHEI handle with their matters to reinforce their sustainable development goals. It was evident that business model played an increasingly predominant part in organizational achievement, particularly during this present period of turbulent change caused by digitalization and grand challenges, business model might enable PHEI to uphold their positions and generate their advantages in the SDE. It has been substantiated that, while advancing business model, organizations would notice their stakeholders and the society (Upward & Jones, 2015). Moreover, the operational processes which were optimized, would enable an immensely effective coordination between processes, and by creating additional consumers value through increasing user or stakeholders' experiences (Verhoef et al., 2019). As such, the research hypotheses were deliberated as follows:

Hypothesis 6 (H6). OBM has instigated a significant effect on SDE in a positive manner

3.2. Research model

The hypothesized model which put an accent on the interlinks between ICS, DAIS, OBM and SDE in PHEI in the South Vietnam, were illustrated in **Fig. 1**

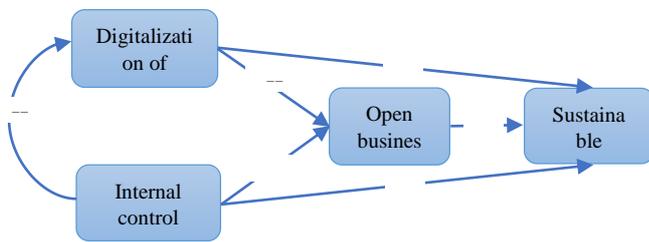


Fig. 1: Hypothesized model

(Source: Suggested by researchers)

4. METHODOLOGY DESIGN

4.1. Research design

In light of the research objectives, the mixed methods research was employed in the present study. This type of method has been considered as the combination or integration of qualitative and quantitative approaches in the same work which resulted in value enhancement and advance contribution to the current research subject in the business fields (Molina-Azorin, 2016) and offered the in-depth understanding of research issues and complicated phenomena than either method alone (Creswell & Plano Clark, 2007). As such, the multistage mixed-methods research which comprised of a qualitative pre-study, a quantitative key study and test execution was performed.

4.1.1. Qualitative pre-study

In the qualitative phase, an in-depth interview was conducted to determine the components of the hypothesized model and adjust the back-translation questionnaire with the participation of three lectures of universities and four leaders at operational-level department in PSOs. The panel of seven experts were selected in the qualitative stage since capturing information in an in-depth manner with a sample was much more appreciated than going in breadth pertaining to sample size (Ritchie et al., 2013). The interviews concentrated on the significance of the dominant constructs and returned proposals about the face validity of the measurement instruments, wording, and flow overall survey involvement to gain face validity. Subsequently, the survey was developed.

4.1.2. Test execution and quantitative preeminent study

Although the used items were adapted from prior literature, such condition did not enable to eliminate the requirement for pre-testing pending the process to full-scale data gathering (Memon et al., 2017). Drawing from the recommendations of Saunders et al. (2012), a group of 50 respondents was involved in the pilot test

through employing purposive sampling. The procured outcome further firmed up the feasibility of the present research protocol, with all the variables illustrated adequate reliability scores (Cronbach's α) and no issue occurred during the data analysis. Succinctly put, all the questions were relevant, clear and well-understood by the participants, without the requirement for further modifications.

A quantitative approach by means of a survey was then applied to investigate the hypotheses incorporated in the proposed model. The geographical scope in this study was framed in the South of Vietnam. The choice of accountants was guided by the fact that they were more likely to obtain the sufficient experiences in accounting as well as specific understanding on the digitalization in accounting. As suggested by Bollen (1989), it should be at least 5 participants for a parameter to be estimated. On the other hand, the volume of respondents was recommended to be above 200 to allow the feasibility of the structural equation modelling (SEM) application for hypothesized interconnections investigation of the proposed model (Sivo et al., 2006; Hoelter, 1983). Through convenient sampling method, accountants from PHEIs spanning across the South Vietnam region participated. The participants were informed that their captured opinions would be kept confidential (Larson & Catton, 1959). The pooling of accountants with a variety of type of PHEIs contributed to the generalization of the observations. After removing 78 questionnaires due to missing data, a remainder of 312 valid cases was yielded, representing an 83.08 percent response rate

The socio demographic profile of the sample advocated that majority of the participants were females, with the proportion amounting to 20.83 percent, whilst males took up 79.17 percent. Moving on to the age of respondents, the group "31-40" constituted 55.13 percent of the whole sample, which was followed by the group 41-50, around 31.41 percent. Meanwhile, the group "over 51" made up a negligible 13.46 percent, ranking last among the given groups. Pertaining to academic capacity, almost all of participants obtained a minimum of graduate degree qualification. These respondents acquired experience of more than 15 years working as accountants.

4.2. The measurement instruments

Digitalization of accounting information system. Hinged on the objectives of this research, the measurement scale employed for DOAI comprised of 5 dimensions which were inherited from the work of Lim (2013) and Taskinsoy (2019).

Internal control system. The criteria for ICS in the context of this research was were taken as reference

from the contributions of Xiwena et al. (2021) and grounded on the five-part INTOSAI 9100 framework. This scale evaluated the five fundamental categories including 3 items on Control environment; 3 items on Risk assessment; 3 items on Control activities; 3 items on Information and Communication; 3 items on Monitoring.

Open business model. Measuring of OBM in this work were designed from those proffered by Hultberg and Pal (2021) which comprised of Labor division as well as Creating together. Each component had sub-scales namely strategic partnership, stakeholder advantages, replication in term of the Labor division and community engagement, collaborative platform establishment regarding to Creating together.

Sustainable digital ecosystem. The instrument of SDE covered with three dimensions embraced economic aspect, social aspect, and environment aspect which were operationalized based on item scale by the contribution of Wu and Chen (2018), Kraus et al. (2019), Herdon et al. (2012), Sussan and Acs (2017).

The 60-item questionnaire was assessed on a five-point Likert scale ranging from 1 (extremely

disagree) to 5 (extremely agree) as originally recommended by the applied instrument.

4.3. Data analysis

The IBM SPSS Statistics and SPSS Amos (version 26.0) were employed for the data analysis. As such, reliability was investigated to set up the construct internal consistency, and confirmatory factor analysis (CFA) was implemented to verify the manifestation of variables on their respective constructs. Subsequently, a full SEM procedure was applied to examine the hypothesized associations between the constructs.

4.4. Discriminant validity evaluation

As the associated inter-construct correlations were lower than the square root of the AVE of each construct in the construct correlation matrix and the scores in diagonal were more tremendous than the others in the same column (Fornell & Larcker, 1981). Grounded on the outcomes depicted in **Table 2**, it could lead to the conclusion that there was no discriminant validity problem.

Table 1: Results summary of Convergent validity and Construct reliability

Construct	Item acronyms	Convergent validity		Construct reliability		Discriminant Validity
		Factor Loadings Ranges	AVE	Cronbach's Alpha	Composite Reliability	
DIGITALIZATION OF ACCOUNTING INFORMATION SYSTEM						
Digitalization of accounting information system	DAIS	0.694 – 0.771	0.614	0.816	0.818	Yes
OPEN BUSINESS MODEL						
Labor division						
Strategic partnership	STP	0.691 – 0.763	0.583	0.822	0.824	Yes
Stakeholder advantages	STA	0.703 – 0.754	0.587	0.859	0.860	Yes
Replication	REP	0.710 – 0.757	0.606	0.864	0.867	Yes
Creating together						
Community engagement	CME	0.696 – 0.772	0.589	0.835	0.834	Yes
Collaborative platform establishment	CPE	0.713 – 0.853	0.611	0.813	0.815	Yes
INTERNAL CONTROL SYSTEM						
ICS						
Control environment	COE	0.708 – 0.761	0.618	0.817	0.818	Yes
Risk assessment	RIA	0.722 – 0.862	0.623	0.825	0.826	Yes
Control activities	COA	0.736 – 0.866	0.634	0.874	0.877	Yes
Information and Communication	IAC	0.705 – 0.734	0.626	0.848	0.849	Yes
Monitoring	MON	0.747 – 0.883	0.615	0.866	0.867	Yes
SUSTAINABLE DIGITAL ECOSYSTEM						
SDE						
Environmental facet	ENF	0.717 – 0.867	0.652	0.828	0.829	Yes
Social facet	SOF	0.731 – 0.870	0.628	0.850	0.852	Yes
Economic facet	ECF	0.739 – 0.899	0.646	0.843	0.846	Yes

(Source: gauged primary data, 2021)

Table 2: Results summary of Discriminant validity

	DAIS	STA	STP	REP	CME	CPE	RIA	COE	COA	MON	IAC	ENF	ECF	SOF
DAIS	1													
STA	-0.010	1												
STP	0.203	0.008	1											
REP	-0.040	0.102	0.056	1										
CME	0.118	0.117	0.077	0.042	1									
CPE	0.025	0.054	0.010	0.055	0.135	1								
RIA	-0.050	0.128	-0.009	0.226	0.025	0.067	1							
COE	0.056	-0.006	0.097	0.012	0.051	0.106	0.028	1						
COA	0.063	0.197	0.080	0.100	0.102	0.133	0.103	0.071	1					
MON	-0.057	0.131	0.048	0.198	0.119	0.070	0.233	0.017	0.190	1				
IAC	0.312	0.049	0.136	0.038	0.091	0.066	0.037	0.015	0.134	0.014	1			
ENF	0.094	0.052	0.197	0.075	0.130	0.104	0.102	0.084	0.103	0.166	0.150	1		
ECF	0.057	0.093	0.051	0.050	0.034	0.004	0.204	0.080	0.108	0.065	0.084	0.029	1	
SOF	0.151	-0.007	0.182	0.033	0.070	0.054	0.016	0.063	0.125	0.092	0.086	0.110	0.009	1

(Source: gauged primary data, 2021)

The measurement model and structural model in the SEM were assessed by investigating fit indices and variance explained estimates. Building on the suggestion of Kaynak (2003), the indicators employed to determine the goodness of model comprised of Chi-square to degree of freedom (Chi-square/df), goodness of fit index (GFI), comparative fit index (CFI), root mean square error of approximation (RMSEA) and Tucker-Lewis index (TLI) was also included for further model fitness assurance (Prasetyo et al., 2020). On the basis of the outputs tabulated in **Table 3**, the measurement and structural models were substantiated to perfectly fit the captured data as all of the recorded indices apparently complied with cut-off criteria proposed by previous researchers.

4.5. Hypothesis testing

Direct effect. A wide range of simultaneous regression analysis within SEM with MLE was employed to examine the proposed hypotheses. By doing so, the estimates of the structural coefficients offered the sound base for investigating the proffered hypotheses. Hypotheses were determined via testing the significance degree, direction, and amplitude of the standardized estimates of causal paths which linked independent variables with the dependent variable and were depicted in detail in **Table 4**.

It ought to be heeded that the standardized regression weight for the hypothesized link between ICS and DAIS was authenticated to be positive and significant ($\beta = 0.256^{***}$). Of the two constructs envisaged to demonstrate an influence on OBM, the outcomes flouted that both ICS (H2: $\beta = 0.299^{***}$) and DAIS (H4: $\beta = 0.196^{***}$), with a confidence interval of 99%. The outcomes of this research evinced on an impact between ICS and SDE, with a correlation of 0.269**. Also, a significant positive correlation of 0.342**, between DAIS and SDE was documented. These observations offered a robust reinforce for H6 endorsing that there was a direct and positive interconnection between OBM and SDE ($\beta = 0.214^{***}$). Thereby, H1-H6 were undergirded. Succinctly put, although SDE was driven essentially by OBM achievement, HEI were also recommended to place appropriate emphasis on ICS along with DAIS.

Indirect effect. The mediating effect transpired in case a mediating variable interfered between the independent and dependent variables which were associated in a positive manner (Otake et al., 2019). For a mediating effect to be existed, the interlinks between the independent variable and the mediating variable as well as between the mediating variable and the dependent

Table 4: Structural coefficients (β) of the hypothesized model

Hypothesis No.	Hypothesized path		Estimate	S.E.	C.R.	Inference
H1	ICS	→ DAIS	0.256***	0.076	3.037	Buttressed
H2	ICS	→ OBM	0.299***	0.067	2.345	Buttressed
H3	ICS	→ SDE	0.269**	0.075	3.529	Buttressed
H4	DAIS	→ OBM	0.196***	0.072	2.784	Buttressed
H5	DAIS	→ SDE	0.342**	0.077	2.546	Buttressed
H6	OBM	→ SDE	0.214***	0.059	3.597	Buttressed

Notes: *p < 0.05; **p < 0.01; ***p < 0.001

(Source: gauged primary data, 2021)

variable ought to be drastically positive (Memon et al., 2018).

Rested on the suggestion of Cheung & Lau (2008), the partial mediation took place if both direct and indirect effects were significantly or the full mediation came about if the indirect effect was significant and direct effect was insignificant. In contrast, no mediating effect was reported if the indirect effect was not significant (Hair et al., 2017).

It was apparent from the output in **Table 5** that there was a mediation effect of OBM in the interlinks between ICS and SDE as well as a mediation effect of DAIS in the interconnection between ICS and SDE. Nevertheless, regarding to the influence of DAIS support to ICS on OBM, the DAIS was not treated as a mediator. Also, OBM did not play the mediating role in the DAIS-SDE link.

Alternatively, the observations of the research assented the positive effect of OBM on the SDE in the studied PHEIs. Apparently, OBM might enable PHEI to uphold their positions and generate their advantages in the SDE, during this present period of turbulent change caused by digitalization and grand challenges. This was because organizations would notice their stakeholder and the society while advancing business model (Upward & Jones, 2015). Notably, these findings also placed an emphasis on the role of DAIS and OBM as the mediators in the interlink between ICS and SDE which thus set a claim on reimagining the role of DAIS for SDE establishment and to reshape existing business model to support for SDE. To summarize, SDE establishment should take the scale and complexity of DAIS and the need to shape a new business model through experience.

Table 5: The outcomes of indirect effect analysis

Route of paths	Direct effect	Indirect effect	Mediation
ICS → DAIS → OBM	0.382***	0.083 ^{NS}	No mediation
ICS → DAIS → SDE	0.375***	0.126***	Partial mediation
ICS → OBM → SDE	0.393***	0.118**	Partial mediation
DAIS → OBM → SDE	0.427***	0.087 ^{NS}	No mediation

Notes: *p < 0.05; **p < 0.01; ***p < 0.001; NS: not significant

(Source: gauged primary data, 2021)

5. CONCLUDING REMARK

5.1. Implication

Theoretical implication. This research was done to aim at explaining the effect of ICS and DAIS on OBM towards SDE establishment, and six hypotheses were studied. The results approved the positive effect of ICS on DAIS, OBM and SDE, the positive effect of DAIS on OBM and SDE, positive effect of OBM on SDE. The results of the first set of three hypotheses were endorsed which underscored the imperative role of ICS in DAIS enhancement, OBM formation and SDE creation. Admittedly, the effectiveness in internal control would lead to the quality and reliability of information system improvement (Laudon & Laudon, 2012). Since the ICS played a critical part in ensuring the organizational operations to implementing in an efficient and effective manner (Neogy, 2014), it also generated reasonable assurance in term of the accomplishment of SDE establishment goals. Also, these findings advocated the second set of hypotheses which propounded that DAIS demonstrated a positive effect on OBM and SDE. It meant that when the intersection between digitalization and AIS were applied, would lead to improvement of OBM and consequently, the SDE would be improved.

Practical implication. The observations of this research allowed recommendations for action in PHEIs. Firstly, the role of ICS as well as its benefits for PHEIs in the context of OBM formulation towards SDE establishment must be brought into concentration. It thus raised an imperative claim on internal control environment reshaping, employees' awareness enhancement on internal control, optimization implementation on several aspects namely risk assessment mechanism and internal supervision, control activities as well as information and communication in appropriate with the development of modern technologies. Secondly, contemplating DAISs' benefits, the accounting works in PHEIs must be digitalized as to provide accurate and timely information. Thus, the potential resolutions of the DAIS should be implemented in a simultaneous manner, those were, infrastructural and technological installation as an instrument of boosting the flow of information to generate interindustry interactions, applicable budget and advanced technology allocation for changing the accounting works processes; accounting staff involvement enhancement in the preparation and development of AIS in the context of digitalization. Notably, the growing concerns should be paid to training and continuing education programs for accounting staff, especially those regarding to DAIS.

Thirdly, the value of OBM was highlighted this research also gave rise to recommendations on seeking several measures to reach. Accordingly, the interconnection with internal and foreign organizations should be strengthened to capture more fruitful information for effective business innovation models formation, on one hand, continuous education and training on the field related to designing and updating business models in combination with investigation the practices of nations pioneering in modern business model building should be conducted, on the other hand. More importantly, the leaders of PHEI were recommended to act as a role model first and foremost through the form of technology application itself and by demonstrating enthusiasm for this adoption. Alternatively, these leaders could report on past experiences to emphasize why the advanced technology would be more beneficial. In some specific cases, the leaders should be capable of reinforce their staff in the events of difficulties. To do so, this also called for digital capabilities that comprised of digital, organizational and leadership aptitudes of PHEIs' leaders (Avidov-Ungar & Shamir-Inbal, 2017). Consequently, these competencies could be achieved through continuous learning and collaborative discussions with other stakeholders in the ecosystem. Last but not least, Government agencies were recommended to promulgate guidance on internal control principles and accounting works in the context of digitalization with the intent to gain the sustainability of this type of organization. Given that digitalization mechanism should be promulgated in law to protect from being abused and misused, greater emphasis on resolutions regarding to intensifying protection of the data and information security and amplifying extensive awareness of risks arising from the non-responsible actions.

5.2. Limitation and orientations for further works

Evidently, the outcomes of this research were recommended to be treated cautiously in light of a series of limitations. Firstly, a consummate picture of SDE establishment through strategizing the business model in PHEI could not reached by virtue of the quantitative data collected through cross-sectional research design. This could direct multiple avenues for further research through replicating this study with longitudinal data. Secondly, the corroboration of the results requested a greater sample of individuals. Additionally, the observations of this research were captured from non-random sampling approach within a single category of department in each organization, which might result in possible response bias. As such, future researchers were encouraged to gather data from multiple other methods and to be extended to additional, more specified target groups to circumvent this common approach bias matter. Thirdly, given that the sample employed in this work narrowed its concentration on a region of an emerging economy, that

was, the South Vietnam, the particular regional nature of the research precluded the extrapolation of outcomes to a national or even international degree as well as other industries which might benefit from digitalization. Thereby, the soundness of the observations acquired in other economies needed further analyses. Last but not least, it could be worth noting for future authors to determine other mediators through literature review and expand this research with due caution.

REFERENCES

- [1]. Abdallah, A. A. J. (2014), "The Impact of Using Accounting Information Systems on the Quality of Financial Statements Submitted to the Income and Sales Tax Department in Jordan", *European Scientific Journal*, **9**, 41-48.
- [2]. Ali, F., Rasoolimanesh, S.M., Sarstedt, M., Ringle, C.M., and Ryu, K. (2018), "An assessment of the use of partial least squares structural equation modeling (PLS-SEM) in hospitality research", *International Journal of Contemporary Hospitality Management*, **30**, (1), 514–538.
- [3]. Antonucci, Y. L., Fortune, A., and Kirchmer, M. (2020), "An examination of associations between business process management capabilities and the benefits of digitalization: all capabilities are not equal", *Business Process Management Journal*, ahead-of-print (ahead-of-print).
- [4]. Applegate, L. (2001) *Emerging E-Business Models: Lessons from the Field*, Boston, US: Harvard Business School Press.
- [5]. Avidov-Ungar, O., and Shamir-Inbal, T. (2017), "ICT Coordinators' TPACK-based leadership knowledge in their roles as agents of change", *Journal of Information Technology Education Research*, **6**, (16), 169-188.
- [6]. Bagozzi, R.R., and Yi, Y. (1988), "On the evaluation of structural equation models", *Journal of the Academy of Marketing Science*, **16**, 74-94.
- [7]. Bollen, K. A. (1989), "A New Incremental Fit Index for General Structural Equation Models", *Sociological Methods & Research*, **17**, (3), 303–316.
- [8]. Caliskan, A., Özkan Özen, Y. D., and Ozturkoglu, Y. (2020), "Digital transformation of traditional marketing business model in new industry era", *Journal of Enterprise Information Management*, ahead-of-print (ahead-of-print).
- [9]. Chan, A. P. C., and Oppong, G. D. (2017), "Managing the expectations of external stakeholders in construction projects. Engineering", *Construction and Architectural Management*, **24**, 736–756.
- [10]. Chesbrough, H., and Rosenbloom, R. S. (2002), "The role of the business model in capturing value from innovation: evidence from Xerox Corporation's

- technology spin-off companies”, *Industrial and Corporate Change*, **11**, (3), 529–555.
- [11]. Cheung, G. W., and Lau, R. S. (2008), “Testing mediation and suppression effects of latent variables: bootstrapping with structural equation models”, *Organizational Research Methods*, **11**, (2), 296-325.
- [12]. Chin, W. W. (1998a), “Issues and opinion on structural equation modelling”, *MIS Quarterly*, **22**, (1), 7-14.
- [13]. Chin, W. W. (1998b), “The partial least squares approach to structural equation modeling”. In G. A. Marcoulides (Ed.), *Modern methods for business research* (pp. 295-336). New York, NY: Lawrence Erlbaum Associates.
- [14]. Chng, D. H. M., Shih, E., Rodgers, M. S., and Song, X.-B. (2014), “Managers’ marketing strategy decision making during performance decline and the moderating influence of incentive pay”, *Journal of the Academy of Marketing Science*, **43**, (5), 629–647.
- [15]. Christopher, J. (2010), “Corporate governance—A multi-theoretical approach to recognizing the wider influencing forces impacting on organizations”, *Critical Perspectives on Accounting*, **21**, (8), 683–695.
- [16]. Creswell, J. W., and Plano Clark, V. L. (2007) *Designing and Conducting Mixed Methods Research*. Thousand Oaks, CA: Sage.
- [17]. DeVaujany, F.-X., Carton, S., Mitev, N., and Romeyer, C. (2014), “Applying and theorizing institutional frameworks in IS research”, *Information Technology & People*, **27**, (3), 280–317.
- [18]. Dewi, N, Azam, S, and Yusoff, S, (2019), “Factors influencing the information quality of local government financial statement and financial accountability”, *Management Science Letters*, **9**, (9), 1373-1384.
- [19]. Duran, C.D., Gogan, L.M., Artene, A., and Duran, V. (2015), “The components of sustainable development - a possible approach”, *Procedia Economics and Finance*, **26**, 806-811.
- [20]. Dwaikat, N. Y. (2020), “A comprehensive model for assessing the quality in higher education institutions”, *The TQM Journal*, ahead-of-print (ahead-of-print).
- [21]. Eisenhardt, K. M. (1989), “Agency Theory: An Assessment and Review”, *The Academy of Management Review*, **14**, (1), 57-74.
- [22]. Eko, S., and Hariyanto, E. (2011), “Relationship between Internal Control, Internal Audit, and Organization Commitment with Good Governance: Indonesian Case”, *Managerial Auditing Journal*, **32**, (5), 6-13.
- [23]. Eller, R., Alford, P., Kallmünzer, A., and Peters, M. (2020), “Antecedents, consequences, and challenges of small and medium-sized enterprise digitalization”, *Journal of Business Research*, **112**, 119–127.
- [24]. Farida, I., Mulyani, S., Akbar, B., and Setyaningsih, S.D. (2021), “Implementation and Performance of Accounting Information Systems, Internal Control and Organizational Culture in the Quality of Financial Information”, *Utopía y Praxis Latinoamericana*, **26**, (1), 222-236.
- [25]. Fishenden, J., and Thompson, M. (2012), “Digital Government, Open Architecture, and Innovation: Why Public Sector IT Will Never Be the Same Again”, *Journal of Public Administration Research and Theory*, **23**, (4), 977–1004.
- [26]. Fornell, C., and Larcker, D. F. (1981), “Evaluating Structural Equation Models with Unobservable Variables and Measurement Error”, *Journal of Marketing Research*, **18**, (1), 39–50.
- [27]. Freeman, R. E. (1984) *Strategic Management: A Stakeholder Approach*, Boston, US: Pitman.
- [28]. Freeman, R. E. (2010) *Strategic management: a stakeholder approach*. Cambridge, UK: Cambridge University Press.
- [29]. Frishammar, J., Richtnér, A., Brattström, A., Magnusson, M., and Björk, J. (2018), “Opportunities and challenges in the new innovation landscape: Implications for innovation auditing and innovation management”, *European Management Journal*.
- [30]. Grotz, O., Liehr-Gobbers, K., and Krafft, M. (2010), “Evaluation of structural equation models using the partial least squares (PLS) approach”. In W. W. V. En, & V. Esposito (Eds.), *Handbook of partial least squares* (pp. 691–711). Springer.
- [31]. Gefen, D., Straub, D. and Boudreau, M. (2000), “Structural Equation Modeling and Regression: Guidelines for Research Practice”, *Communications of the Association of Information Systems*, **4**, (7).
- [32]. Gelinas, J. R., Ulric, J., Dull, R. B. and Wheeler, P. R. (2012) *Accounting Information System* (9th ed.), USA: South Western Cengage Learning.
- [33]. Grande, E., Estébanez, R. P., and Colomina, C. I. (2011), “The impact of Accounting Information Systems (AIS) on performance measures: empirical evidence in Spanish SMEs”, *The International Journal of Digital Accounting Research*, **11**, 25-43.
- [34]. Gray, I. (2008) *The Audit Process: Principles, Practice and Cases*. Patrick Bond.
- [35]. Hair, J. F. (2010) *Multivariate Data Analysis: A Global Perspective*, Upper Saddle River: Pearson.
- [36]. Hair, J. F., Hult, G. T. M., Ringle, C. M., and Sarstedt, M. (2017) *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)* (2nd ed.). Sage: Thousand Oaks.
- [37]. Hair, J. F., Risher, J. J., Sarstedt, M. and Ringle, C.M. (2019), “When to use and how to report the results of PLS-SEM”, *European Business Review*, **31**, (1), 2-24.

- [38]. Hair, J.F., Black, W.C., Babin, B.J. and Anderson, R.E. (2010) *Multivariate Data Analysis* (7th ed.), New York, NY: Pearson.
- [39]. Harun, Z., Khamis, N.K., Isa, M.D., Mohamed, Z., and Hashim. H. (2013), “The roles of professional engineers at the institutions of higher learning in nation-building”, *International Education Studies*, **6**, (6), 137-142.
- [40]. Herdon, M., Várallyai, L., and Péntek, Á. (2012), “Digital business ecosystem prototyping for SMEs”, *Journal of Systems and Information Technology*, **14**, (4), 286–301.
- [41]. Hinings, B., Gegenhuber, T., and Greenwood, R. (2018), “Digital innovation and transformation: An institutional perspective”, *Information and Organization*, **28**, (1), 52–61.
- [42]. Hoe, S. L. (2019), “Digitalization in practice: the fifth discipline advantage”, *The Learning Organization*, **27**, (1), 54–64.
- [43]. Hoelter, J. W. (1983), “The Analysis of Covariance Structures”, *Sociological Methods & Research*, **11**, (3), 325–344.
- [44]. Hu, L., and Bentler, P. M. (1999), “Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives”, *Structural Equation Modeling: A Multidisciplinary Journal*, **6**, (1), 1–55.
- [45]. Hultberg, E., and Pal, R. (2021), “Lessons on business model scalability for circular economy in the fashion retail value chain: Towards a conceptual model”, *Sustainable Production and Consumption*, **28**, 686–698.
- [46]. Janowski, T. (2015), “Digital government evolution: from transformation to contextualization”, *Government Information Quarterly*, **32**, (3), 221-236.
- [47]. Jensen, M. C., and Meckling, W. H. (1976), “Theory of the firm: Managerial behavior, agency costs and ownership structure”, *Journal of Financial Economics*, **3**, (4), 305–360.
- [48]. Kankanhalli, A., Zuiderwijk, A., and Tayi, G. K. (2017), “Open innovation in the public sector: A research agenda”, *Government Information Quarterly*, **34**, (1), 84–89.
- [49]. Kaynak, H. (2003), “The relationship between total quality management practices and their effects on firm performance”, *Journal of Operations Management*, **21**, (4), 405–435.
- [50]. Kirbac, G., and Tektas, B. (2021), “The Role of Blockchain Technology in Ensuring Digital Transformation for Businesses: Advantages, Challenges and Application Steps”, *Proceedings*, **74**, 17.
- [51]. Klein, H. K., and Myers, M.D. (1999), “A Set of Principles for Conducting and Evaluating Interpretive Field Studies in Information Systems”, *MIS Quarterly*, **23**, (1), 67-93.
- [52]. Kling, R., and Iacono, S. (1989), “The institutional character of computerized information systems”, *Office: Technology and People*, **5**, (1), 7-28.
- [53]. Kobus, J., Westner, M., Strahringer, S. and Strode, D. (2018), “Enabling digitization by implementing Lean IT: lessons learned”, *The TQM Journal*, **30**, (6), 764-778.
- [54]. Kraus, S., Palmer, C., Kailer, N., Kallinger, F. L., and Spitzer, J. (2018), “Digital entrepreneurship”, *International Journal of Entrepreneurial Behavior & Research*.
- [55]. Kraus, S., Palmer, C., Kailer, N., Kallinger, F. L., and Spitzer, J. (2019), “Digital entrepreneurship: A research agenda on new business models for the twenty-first century”, *International Journal of Entrepreneurial Behaviour and Research*, **25**, (2), 353–375.
- [56]. Larson, R. F., and Catton, W. R. (1959), “Can the Mail-Back Bias Contribute to a Study’s Validity?”, *American Sociological Review*, **24**, (2), 243.
- [57]. Laudon, K. C., and Laudon, J. P. (2012) *Management Information Systems - Managing the Digital Firm*, Pearson Prentice Hall.
- [58]. Laudon, K. C., and Laudon, J. P. (2015) *Management Information Systems: Managing the Digital Firm*, Prentice Hall Press, Upper Saddle River.
- [59]. Liao, Y., Deschamps, F., Loures, E. D. F. R., and Ramos, L. F. P. (2017), “Past, present and future of Industry 4.0-a systematic literature review and research agenda proposal”, *International Journal of Production Research*, **55**, (12), 3609-3629.
- [60]. Lim, Francis Pol C. (2013), “Impact of Information Technology on Accounting Systems”, *Asia-Pacific Journal of Multimedia Services Convergent with Art, Humanities, And Sociology*, **2**, (2), 1-15.
- [61]. Lindgren, I., Madsen, C.Ø., Hofmann, S., and Melin, U. (2019), “Close encounters of the digital kind: A research agenda for the digitalization of public services”, *Government Information Quarterly*, **36**, (3), 427–436.
- [62]. Lock, I., and Seele, P. (2016), “Theorizing stakeholders of sustainability in the digital age”, *Sustainability Science*, **12**, (2), 235–245.
- [63]. Loonam, J., Eaves, S., Kumar, V. and Parry, G. (2018), “Towards digital transformation: lessons learned from traditional organizations”, *Strategic Change*, **27**, (2), 101-109.
- [64]. Lutui, R., & ‘Ahokovi, T. (2018) The relevance of a good internal control system in a computerised accounting information system, *In proceedings of the 16th Australian Information Security Management*

- Conference (pp. 29-40)*, Perth, Australia: Edith Cowan University.
- [65]. Majchrzak, A., Lynne Markus, M. and Wareham, J. (2016), "Designing for digital transformation: lessons for information systems research from the study of ICT and societal challenges", *MIS Quarterly: Management Information Systems*, **40**.
- [66]. Memon, M. A., Ting, H., Ramayah, T., Chuah, F., and Cheah, J. H. (2017), "A review of the methodological misconceptions and guidelines related to the application of structural equation modeling: A Malaysian scenario", *Journal of Applied Structural Equation Modeling*, **1**, (1), i-xiii.
- [67]. Memon, M. A., Cheah, J., Ramayah, T., Ting, H., and Chua, F. (2018), "Mediation analysis issues and recommendations", *Journal of Applied Structural Equation Modelling*, **2**, (1), i-ix.
- [68]. Meyer, J. W., and Rowan, B. (1991), "Institutionalized organizations: formal structure as myth and ceremony", *The new institutionalism in organizational analysis*, 41-62.
- [69]. Michelon, G., Bozzolan, S., and Beretta, S. (2015), "Board monitoring and internal control system disclosure in different regulatory environments", *Journal of Applied Accounting Research*, **16**, (1), 138-164.
- [70]. Mignerat, M., and Rivard, S. (2009), "Positioning the Institutional Perspective in Information Systems Research", *Journal of Information Technology*, **24**, (4), 369-391.
- [71]. Minoja, M., & Romano, G. (2020), "Managing Intellectual Capital for Sustainability: Evidence from a Re-municipalized, Publicly Owned Waste Management Firm", *Journal of Cleaner Production*, 123-213.
- [72]. Mitchell, R.K., Agle, B.R., and Wood, D. J. (1997), "Toward a Theory of Stakeholder Identification and Salience: Defining the Principle of Who and What Really Counts", *Academy of Management Review*, **22**, (4), 853-886.
- [73]. Molina-Azorin, J. F. (2016), "Mixed methods research: An opportunity to improve our studies and our research skills", *European Journal of Management and Business Economics*, **25**, (2), 37-38.
- [74]. Neogy, D. (2014), "Evaluation of the efficiency of accounting information systems: A study on mobile telecommunication companies in Bangladesh", *Global Disclosure of Economics Business*, **3**, (1), 40-55.
- [75]. O'Brien, J., and Marakas, G. (2011) *Management Information System* (10th ed.) New York, NY: McGraw-Hill Education.
- [76]. Orlikowski, W. J., and Barley, S. R. (2001), "Technology and institutions: What can research on information technology and research on organizations learn from each other?", *MIS Quarterly*, **25**, (2), 145-165.
- [77]. Oschinsky, F. M., Stelter, A., and Niehaves, B. (2021), "Cognitive biases in the digital age – How resolving the status quo bias enables public-sector employees to overcome restraint", *Government Information Quarterly*.
- [78]. Osterwalder, A., & Pigneur, Y. (2002), "An e-Business Model Ontology for Modeling e-Business", 15th Bled Electronic Commerce Conference e-Reality: Constructing the e-Economy, Bled, Slovenia, 1-12.
- [79]. Otache, I., Umar, K., Audu, Y., and Onalo, U. (2019), "The effects of entrepreneurship education on students' entrepreneurial intentions", *Education + Training*, ahead-of-print(ahead-of-print).
- [80]. Prasetyo, Y. T., Castillo, A. M., Salonga, L. J., Sia, J. A., and Seneta, J. A. (2020), "Factors Affecting Perceived Effectiveness of COVID-19 Prevention Measures among Filipino during Enhanced Community Quarantine in Luzon, Philippines: Integrating Protection Motivation Theory and Extended Theory of Planned Behavior", *International Journal of Infectious Diseases*.
- [81]. Queiroz, M. M., Pereira, S. C. F., Telles, R., and Machado, M. C. (2019), "Industry 4.0 and digital supply chain capabilities", *Benchmarking: An International Journal*, ahead-of-print(ahead-of-print).
- [82]. Rachinger, M., Rauter, R., Müller, C., & Vorraber, W., and Schirgi, E. (2018), "Digitalization and its influence on business model innovation", *Journal of Manufacturing Technology Management*, **30**, 8, 1143-1160.
- [83]. Reardon, T., Taylor, J. E., Stamoulis, K., Lanjouw, P., and Balisacan, A. (2008), "Effects of Non-Farm Employment on Rural Income Inequality in Developing Countries: An Investment Perspective", *Journal of Agricultural Economics*, **51**, (2), 266-288.
- [84]. Ritchie, J., Lewis, J., Nicholls, C.M., and Ormston, R., Eds. (2013) *Qualitative Research Practice: A Guide for Social Science Students and Researchers*, Thousand Oaks, CA: Sage.
- [85]. Romney, M. B., & Steinbart, P. J. (2014) *Accounting Information Systems: Accounting Information Systems* (13th ed.). Prentice Hall.
- [86]. Rozak, H. A., Adhiatma, A., and Fitriati, I. R. (2021), "Strengthening digital ecosystem for SMEs through readiness to change and agile leadership", *Jurnal Siasat Bisnis*, **25**, (2), 155-165.
- [87]. Sacer, I. M., and Oluic, A., (2013), "Information Technology and Accounting Information Systems Quality in Croatian Middle and Large Companies", *Journal of Information and Organizational Sciences*, **37**, (2), 117-126.

- [88]. Sari, N., Ghozali, I., and Achmad, T. (2017), “The effect of internal audit and internal control system on public accountability: The empirical study in Indonesia state universities”, *Technology*, **8**, (9), pp. 157-166.
- [89]. Saunders, M., Lewis, P., and Thornhill, A. (2012) *Research Methods for Business Students* (6th ed.) New York, NY: Pearson.
- [90]. Schaeffer, M. S. (2014) *Internal Controls in Accounts Payable*, United State of America, US: Crystallus, Inc.
- [91]. Schneider, T., and Sachs, S. (2015), “The Impact of Stakeholder Identities on Value Creation in Issue-Based Stakeholder Networks”, *Journal of Business Ethics*, **144**, (1), 41–57.
- [92]. Seelos, C., and Mair, J. (2007), “Profitable Business Models and Market Creation in the Context of Deep Poverty: A Strategic View”, *Academy of Management Perspectives*, **21**, (4), 49–63.
- [93]. Shrimali, G., and Sen, V. (2020), “Scaling reliable electricity access in India: A public-private partnership model”, *Energy for Sustainable Development*, **55**, 69–81.
- [94]. Sivo, S. A., Fan, X., Witte, E. L., & Willse, J. T. (2006), “The Search for “Optimal” Cutoff Properties: Fit Index Criteria in Structural Equation Modeling”, *The Journal of Experimental Education*, **74**, (3), 267–288.
- [95]. Smith, S. S. (2018), “Digitization and Financial Reporting – How Technology Innovation May Drive the Shift toward Continuous Accounting”, *Accounting and Finance Research*, **7**, (3), 240-250.
- [96]. Souto, J. E. (2015), “Business model innovation and business concept innovation as the context of incremental innovation and radical innovation”, *Tourism Management*, **51**, 142–155.
- [97]. Steiger, J. H. (2007), “Understanding the limitations of global fit assessment in structural equation modeling”, *Personality and Individual Differences*, **42**, (5), 893–898.
- [98]. Sterling, S. (2010), “Learning for resilience, or the resilient learner? Towards a necessary reconciliation in a paradigm of sustainable education”, *Environmental Education Research*, **16**, 511-528.
- [99]. Sussan, F., and Acs, Z. J. (2017), “The digital entrepreneurial ecosystem”, *Small Business Economic*, **49**, 55–73.
- [100]. Taskinsoy, J. (2019), “Blockchain: Moving Beyond Bitcoin into A Digitalized World”, *Electronic Journal*, **1**, (1), 1–21.
- [101]. Upward, A., and Jones, P. (2015), “An Ontology for Strongly Sustainable Business Models”, *Organization & Environment*, **29**, (1), 97–123.
- [102]. Verhoef, P. C., Broekhuizen, T., Bart, Y., Bhattacharya, A., Qi Dong, J., Fabian, N., and Haenlein, M. (2019), “Digital transformation: A multidisciplinary reflection and research agenda”, *Journal of Business Research*.
- [103]. Verina, N., and Titko, J. (2019), “Digital transformation: conceptual framework”, *International Scientific Conference Contemporary Issues in Business, Management and Economics Engineering*, Vilnius.
- [104]. Wilkins, S. (2020), “The positioning and competitive strategies of higher education institutions in the United Arab Emirates”, *The International Journal of Educational Management*, **34**, (1), 2020, 139-153.
- [105]. Wu, C.-M., and Chen, T.-J. (2018), “Collective psychological capital: Linking shared leadership, organizational commitment, and creativity”, *International Journal of Hospitality Management*, **74**, 75–84.
- [106]. Xiwena, L., Xub, D., and Shiyu, S. (2021), “Research on the Internal Control Problems Faced by the Financial Sharing Center in the Digital Economy Era1—An example of Financial Sharing Center of H Co. Ltd”, *International Conference on Identification, Information and Knowledge in the internet of thing 2020, Procedia Computer Science*, **187**, 158–163.
- [107]. Zhan, Z.-H., Liu, X.-F., Gong, Y.-J., Zhang, J., Chung, H. S.-H., and Li, Y. (2015), “Cloud computing resource scheduling and a survey of its evolutionary approaches”, *ACM Computing Surveys*, **47**, (4), 1-33.
- [108]. Zott, C., Amit, R., and Massa, L. (2011), “The Business Model: Recent Developments and Future Research”, *Journal of Management*, **37**, (4), 1019–1042.