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Investor's Learning Style and Knowledge Acquisition Dimension: The Role of ICT in Maximising Knowledge Acquisition

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Abstract
Research aims: This study investigates investor learning style in acquiring knowledge moderated by Information and Communications Technology (ICT).
Design/Methodology/Approach: This study performed an online survey method, comprising 263 convergent-type and 210 assimilative-type as the final sample. The Structural Equation Model using Smart-PLS was employed to estimate the relationship of the latent variable
Research findings: The regression results revealed that convergent-type investors positively affected all knowledge acquisition dimensions due to their high experience and knowledge compared to assimilative-type, even with the help of ICT.
Theoretical contribution/Originality: This research discloses comprehensive constructs of sophisticated and unsophisticated investors in acquiring knowledge. Widely, it contributes to the literature advancement related to investor learning style, knowledge acquisition, and the role of ICT.
Practitioner/Policy implication: It can be used as an ideal individual construct in learning that can be embraced by financial consultants, capital market training institutions, and professional education. Thus, they are also responsible for developing investors' skills, especially novice investors
Research limitation/Implication: This study did not fully capture the exact participants' learning styles. Thus, future research is hoped to provide experimental approaches, reaching the natural cause-effect measurement of investor learning style and knowledge acquisition.
Keywords: Learning style; Sophisticated investors; Novice investors; Knowledge acquisition; Role of ICT

Introduction

This study highlights that the learning style of investors focuses on assimilative and convergent types as a representation of novice and experienced investors. However, both investors could behave differently due to the differences in experiential learning constructs. These considerable dissimilarities occur because of disparency priorities for knowledge needs. Unexperienced investors tend to acquire basic knowledge, whereas experienced investors concentrate on a wide variety of knowledge (Cheng et al., 2017; Dolan & Stevens, 2010; Haddad et al., 2019). Therefore, the research investigates knowledge acquisition dimensions of novice and experienced investors, simultaneously describing their learning behaviour.

Along with these lines, the authors state that investors have main characteristics such as being knowledgeable, rational, and able to measure their risk preferences. In other words, their cognitive dominance naturally shapes their behaviour and attitudes when investing. Thus, this study argues that these demands make them have to be a convergent type in acquiring latent-material, latent-tacit, and kinetic-active knowledge. For the assimilative one, they tend to concentrate on actor-active knowledge acquisition. In addition, ICT supports maximising investors' learning process because "information" is their primary need, and they have to make wise and quality decisions (Kim, 2021; Wasiuzzaman, 2021; Wu et al., 2022). Therefore, this paper places the role of ICT as a moderated variable corroborating the relation between both LS of novice and experienced investors and the knowledge acquisition dimension.

Previous studies mostly have correlated learning styles with broad-ranging professions, such as students (El-Bishouty et al., 2019; Rogowsky et al., 2020; Shen et al., 2019), teachers (Akbarzadeh & Fatemipour, 2014; Khalid et al., 2017; Toyama & Yamazaki, 2020), and nurses (Hallin, 2014; Oldland et al., 2017). Moreover, prior literature related to novice and experienced investors has explained their behaviour in broad topics, for instance, trading behaviour (Abreu & Mendes, 2020; Kim & Ryu, 2021), investment judgments (Henry & Peytcheva, 2020), activities and goal setting digitally, (Riar et al., 2021), and technological usage (Azmi & Mohamed, 2018; Chandrasekera & Yoon, 2018; Chernbumroong et al., 2017). However, this paper takes place in Indonesia, with abundant novice investors marked by the massive growth of retail investors, majorly millennials (KSEI, 2022). Additionally, this research explores investors learning behaviour by constructing fundamental-contested models of novice and experienced investors through learning style preferences, knowledge acquisition dimension, and technology usage.

This study supports the underlying behaviour and attitudes between novice and experienced investors through the novelty of the arguments below. First, this study reveals that when investors search, collect and analyse information, it can differ from one investor to another, confirmed by Kolb and Kolb (2005), stating that generally, each individual has unlike learning preferences. Furthermore, the diversity of investment analysis methods or approaches results from fundamental differences such as investment motivation, personal preferences, and learning environment. Thus, investors must manage their cognitive flow, increasing the optimality analysis and investment decision-making (Dolan & Stevens, 2010; Kolb & Kolb, 2005).

Second, this study shows that the central role of ICT is as a tool used by investors to expand their knowledge and information range. Furthermore, the researchers state that ICT facilitates investors by providing up-to-date information. So, they can assess and analyse an effect efficiently, leading to high-quality decision-making output (Attakora-Amaniampong et al., 2021; Guenther et al., 2018; Hoffmann & Aeschlimann, 2017). In fact, through the use of ICT, investors can create online communities that allow retail investors to exchange information and interact socially (Chepaitis, 2002; Kim, 2021; Wu et al., 2022). In other words, ICT provides a vital role for investors to optimally increase their analysis and investment decision-making because of the wide range of information

obtained at a lower cost level. Thus, this study concludes that both assimilative and convergent investors have the same access and use of ICT to acquire knowledge, especially the search for company information related to the securities being analysed.

Specifically, the third novelty of this study is its methodology which addresses ideal investors in the convergent learning type mastering major knowledge dimensions in comparison with other learning styles, attached to two contested research models (Cheng et al., 2017; Towler & Dipboye, 2003; Van der Lingen et al., 2020). First, by referring to Feldman et al. (2015) and Manolis et al. (2013), the authors classified the learning styles into four types, followed by investment experience. Second, we investigate the dominance of assimilative and convergent learning types with two dimensions of knowledge acquisition; latent (tacit & material) and active (actor & kinetic), with the highest causality relationship value (Giampaoli et al., 2017; Thomas & Gupta, 2021; Wang et al., 2020). Therefore, if the first and second stages are proven valid, these results indicate the robustness of the relationship between either unsophisticated or sophisticated investors and knowledge acquisition dimensions constructed in this study.

This study uses combinations of learning style theory, knowledge acquisition and ICT role concepts as a model for conceptual thinking of this paper. First, this research places Kolb and Kolb (2005); Manolis et al. (2013); Van der Lingen et al. (2020), explain learning style types classified into two categories, namely the assimilative type (novice investor) and the convergent type (experienced investor). Furthermore, this study focuses on the two learning styles by reflecting investors with the convergent type as investors with the ideal learning type because they combine theoretical concepts, which are then put into practice and further evaluated in the learning cycle. So, their cognition can continue to develop optimally compared to other types of learning (Cheng et al., 2017; Haddad et al., 2019; Thomas & Gupta, 2021). The first concept is knowledge acquisition stated by Alexander (2017) and Johnson (2010), which precisely in this study involves acquiring investors' knowledge. Specifically, Alexander (2017) explained that knowledge acquisition is ubiquitous terminology and carries opaque understanding, and finally, categorising knowledge acquisition into latent and active knowledge acquisition. Therefore, by posting Alexander (2017), this study conceptualises the behaviour of novice investors who focus on the active-actor acquisition dimension. On the other hand, experienced investors concentrate on latent-material, latent-tacit, and active-kinetic dimensions related to learning and analysing financial management and investment information. The second concept, the role of ICT by Chandrasekera and Yoon (2018); Chernbumroong et al. (2017), as a medium of education and communication, improves investors' cognitive capabilities in exploring and analysing companies through wide-range information comprehensively (Attakora-Amaniampong et al., 2021; Hoffmann & Aeschlimann, 2017; Sachan & Saroha, 2022). Based on the literature mentioned earlier, the researchers argue that ICT significantly supports the investment decision-making process for either novice or experienced investors.

Theoretically and practically, this study contributes to the behavioural construct of sophisticated and unsophisticated investors in acquiring knowledge. Furthermore, it reveals an ideal learning-type construct that novice investors should build to achieve the

effectiveness of the intended learning method, reflected in the construct of sophisticated investors (Morgan, 2022; Sari et al., 2021; Singla & Mallik, 2021). Moreover, this article demonstrates that the experiential learning of investors with convergent types can occur in real-time because of their cognitive capabilities, which consider all aspects of theory, practice, and evaluation of learning (Blankesteijn & Houtkamp, 2022; Lefebvre & Certhoux, 2022; Vrontis et al., 2020). Likewise, ICT's role is to assist the effectiveness of their learning and investment decision-making. The second contribution, practically, is that this study reflects a basic concept of teaching related to the knowledge acquisition dimension that investment institutions and securities companies can embrace. In conclusion, involved institutions, such as securities and investment institutions, are responsible for developing investors' skills (Adil et al., 2022; Jain et al., 2022; Meoli et al., 2022). Thus, this study result can be applied to various teaching concept programs, for example, seminars, investment classes, etc.

The following section discusses the theoretical framework to explain the learning style of investors, the multi-dimension of knowledge acquisition, the role of ICT, and the development of research hypotheses. The third section discusses the research method and measurement of each variable in this study. This study presents the results and statistical findings in section four. Finally, it ends with conclusions and suggestions for further research.

Literature Review and Hypotheses Development

Investors' Learning Style and Knowledge Acquisition

This study posits Curry (1983), Dierking (1991), Furnham (1992), Reynolds (1997) to explain how people learn depending on individual preferences, strengths, and other factors, including motivation and preferred learning environment, namely learning style theory (LS). Prior literature, Kolb and Kolb (2005) demonstrated that LS is human cognitive and affective behaviour to react and interact in acquiring knowledge. Moreover, Bandera et al. (2018); Gemmell (2017), Hamdaoui et al. (2018) categorise individual learning styles as accommodative-, convergent-, divergent-, and assimilative-type. First, Accommodative individuals are more interested in the experiences of others rather than learning the basic concepts of knowledge independently. Hence, they rely on others to gather information and use intuition instead of logic. Second, the convergent types acquire knowledge based on all knowledge conceptually and practically. Therefore, they could transform concepts and ideas into practical, technical, adaptive, and evaluative methods. Third, the divergent types search for knowledge visually compared to direct practice, learning through gathering information and using imagination in problem-solving. Also, they prefer to socialise and work in groups. Finally, assimilative individuals learn through sound and clear explanations by others compared to direct practice. Thus, help from others is the most effective learning method for understanding and organising knowledge into logical formats.

However, in investment viewpoints, there is little evidence explaining LS of investors, and most of them have correlated LS with broad-ranging professions (El-Bishouty et al., 2019; Shen et al., 2019; Rogowsky et al., 2020; Akbarzadeh & Fatemipour, 2014; Khalid et al., 2017; Toyama & Yamazaki, 2020; Hallin, 2014; Oldland et al., 2017). Specifically, Jain et al. (2022) investigated investors' personality traits and these impacts on investment intention moderated by overconfidence bias and financial literacy. Also, Chen et al. (2019) explored the relationship between investors' personalities and investment performance via statistics and machine learning models. Furthermore, Tauni et al. (2020) researched investor-advisor similarity using the Big Five personalities, affecting investors' stock trading performance. Moreover, preceding literature related to novice and experienced investors has explained their behaviour in broad topics, for instance, trading behaviour (Abreu & Mendes, 2020; Kim & Ryu, 2021), investment judgments (Henry & Peytcheva, 2020), activities and goal setting digitally, (Riar et al., 2021), and technological usage (Azmi & Mohamed, 2018; Chandrasekera & Yoon, 2018; Chernbumroong et al., 2017).

Previous knowledge acquisition literature Alexander (2017), Almasri (2022), Olanipekun et al. (2020) stated that individuals acquire knowledge latently and actively, with each latent category having tacit and material sub-dimensions and active categories with actor, kinetic, and cross-cutting catalytic epiphany (CCCE) sub-dimensions. On the other hand, knowledge acquisition is classified into two dimensions: knowledge and application (Tavares et al., 2019). Moreover, Tavares et al. (2019) also explained that individuals obtain both aspects through academic learning processes and life experiences. In short, simultaneously, these knowledge dimensions are the scope of knowledge actualisation based on individual competencies, abilities, and related experience in analysing and deciding investment products or other decision making areas.

However, this study refers to Alexander (2017), Olanipekun et al. (2020) as a basis for explaining the multi-dimension of knowledge acquisition. First, the dimension of knowledge acquisition, tacit-latent, is defined as the acquisition of knowledge through practical and repetitive training. For example, an experienced investor could quickly find positions or pages on financial statements. Thus, this habit improves investors' reflectivity in analysing any information, culminating in decision-making optimality. Second, the dimension of material-latent acquisition is a fundamental knowledge type, such as accounting discipline with basic accounting equations, financial literacy scopes with basic concepts of financial planning and management, and identification of financial information. Thus, investors who have mastered these two dimensions tend to analyse and decide on investment decisions quicker, followed by their experience level.

Third, on the active-actor dimension, investors tend to acquire knowledge by studying and understanding basic financial and investment concepts and analysis methods academically or generally referred to as academic knowledge. In short, this sub-dimension is based on traditional learning methods. Last, the kinetic-active dimension defines knowledge with a reactive and exploratory approach through flexible and adaptive techniques. The kinetic-active subdimension is reflected by the accumulation of knowledge and experience related to the investment context. In addition, CCCE is the knowledge that appears randomly and quickly when individuals carry out the learning

process or financial analysis, generally referred to as an "idea." However, we exclude the CCCE type from this study, assuming that CCCE is abstract or because of the epiphany element itself (Alexander, 2017; Sicher, 1982; Strange et al., 2019).

Based on all the aforestated LS and knowledge acquisition literature, this paper aims to investigate the LS preferences of investors in Indonesia by constructing two contested LS models of novice and experienced investors through LS preferences, knowledge acquisition dimension, and technology usage. Moreover, it widely identifies investors' preferred learning methods via four LS types in acquiring knowledge and ICT usage related to investments. Specifically, this study clarifies investors' four LS categories, descending into a convergent style representing experienced investors and assimilative as novice investors. In other words, unsophisticated investors are categorised as assimilative-type due to their dependency on experts or learning media compared to their abilities. Also, the novices usually take time deciding the investment decision-making because they do not have enough experience in this field (Gemmell, 2017; Huang et al., 2022). On the other hand, sophisticated investors are classified as convergent learning styles because of their great experience, accumulated knowledge, and expertise in actualising concepts and theories and changing them as a problem-solving mechanism. Moreover, these accumulations build them adaptively to analyse information containing problematic elements compared to basic and academic investment knowledge, standard or static information (Adil et al., 2022; Chen et al., 2020; Giampaoli et al., 2017). Therefore, this research makes it clear that investors internalise knowledge and actualise it as practical and technical tools to earn profits in the future, supported by ICT.

Investor Behavior and The Role of ICT

Investor behaviour often correlates with emotional and cognitive biases. Moreover, this study argues that the diversity of characters and learning models of each investor, resulting in a diverse risk profile, leads to differences in portfolio diversification. Furthermore, investors are always looking for information with the broadest possible range to expand knowledge and improve comprehensive investment analysis, especially when employing ICT. Conceptually, ICT is an extension of Information Technology (IT) terminology, which includes any product that can store, retrieve, manipulate, transmit, or receive information electronically in digital forms such as computers and smartphones. Specifically, ICT has two prominent roles for its users: as a learning tool for education and communication between other users. Furthermore, previous studies investigated that ICT has a positive impact on the educational environment, such as; ease of access to education, improvement of the quality of learning and teaching, efficiency of education administration, development of governance, and professionalism of teachers (Attakora-Amaniampong et al., 2021; Hoffmann & Aeschlimann, 2017; Lattemann, 2005).

As a further consequence, Colin-Jaeger and Delcey (2020), Malkiel (2005), about the concept of the efficient market hypothesis, with a broad level of access to information, investors could improve their investment analysis capabilities, leading to the optimal investment decision-making process. On the other hand, investors utilise ICT in various activities due to its high-level usefulness (Barber & Odean, 2001; Casillas Martín et al.,

2020). Thus, from hardware to internet access, these elements support investors in seeking and analysing financial information, which are parts of ICT components. Therefore, there is a high dependency on ICT for supporting investment activities. In addition, ICT is critical in accelerating investors' learning cycle and is less costly and time-consuming to overcome all knowledge dimensions.

Depending on the recent literature above, this article explains that ICT could improve the analytical capabilities of investors, both beginners and experienced investors. Furthermore, investors always look for information to support their investment analysis process and use ICT to learn, analyse, and make investment decisions (Chen et al., 2019; Guenther et al., 2018; Hoffmann & Aeschlimann, 2017). Further, ICT can facilitate investors enabling them to share knowledge with other investors through online communities such as WhatsApp and Telegram groups. Moreover, several securities and other investment institutions have formed online communities to market and share information with their clients. In addition, ICT is also able to provide time and cost efficiency that investors may have to spend to gain access to information or other investment analysis results, offering variation degrees of instantaneous according to their preferences (Kanematsu & Barry, 2016; Lattemann, 2005; Vrontis et al., 2020). Thus, by positioning ICT as a moderated variable, this paper comprehends two contested LS models of novice and experienced investors, showing the high-usefulness ICT role to all investors. Therefore, investors can align their learning style and the purpose of using ICT when acquiring knowledge transformed practically to optimise investment decision-making.

Hypotheses Development

This study argues that experienced investors cumulatively excel in tacit-latent, material-latent, and kinetic-active knowledge acquisition, leading to optimal learning, analysing, and financial and investment decision-making. Moreover, as the literature mentioned above, the convergent type tends to concentrate on the kinetic knowledge domain, reacting and exploring extensive knowledge of the problem domain to solve problems. This knowledge concentration occurs because the latent dimension (tacit and material part) is already mastered and crystallised into their cognition (Alexander, 2017; Manolis et al., 2013; Van der Lingen et al., 2020). Furthermore, experienced investors have high-degree adaptability and broad knowledge, enabling them to understand problem-solving when investing and be adaptive and flexible in dealing with financial and investment management problems.

H_{1a}: Convergent investors positively correlate tacit-latent of knowledge acquisition.

H_{1b}: Convergent investors positively correlate material-latent of knowledge.

H_{1c}: Convergent investors positively correlate kinetic-active of knowledge acquisition.

With cumulative knowledge and investment experience, experienced investors tend to focus on expanding the range of financial information and generating optimal financial decisions, primarily through ICT (Chernbumroong et al., 2017; Attakora-Amaniampong et al., 2021). Further, ICT facilitates investors to search for related-investment information and communicate with related parties eagerly due to the effortlessness (Azmi & Mohamed, 2018; Sachan & Saroha, 2022). As a further consequence, any information from economic indicators and market indexes to companies' performances is easily reached at any cost level or time due to the vital role of ICT. In other words, ICT could positively increase the relationship of convergent investors to the tacit-latent, material-latent, and kinetic-active knowledge dimensions, optimising their learning and decision-making processes. Thus, this study develops the following hypotheses below.

H_{2a}: *ICT strengthens the correlation between convergent investors and tacit-latent of knowledge acquisition.*

H_{2b}: *ICT strengthens the correlation between convergent investors and material-latent of knowledge acquisition.*

H_{2c}: *ICT strengthens the correlation between convergent investors and kinetic-active of knowledge acquisition.*

For unsophisticated investors, this study's viewpoint is that novice investors tend to be active-actor types in acquiring knowledge. Furthermore, novice investors still need direct and indirect guidance to understand the basic investment knowledge concepts. Again, in the knowledge acquisition process, they learn through careful and clear explanations from experts rather than direct practice, mainly because it is related to capital management followed by a high risk if not managed effectively. In other words, they tend to rely on experts or teachers as knowledge resources, who teach using oral, written, and tutorials to transfer the needed knowledge, furtherly supported by ICT. Furthermore, ICT provides instant data and information acquisition, which can be used as a learning medium for novice investors directly or indirectly. Thus, we argue that ICT could increase the acceleration of knowledge and knowledge acquisition of novice investors and its correlation to active-actor knowledge acquisition. Therefore, we propose the following hypotheses as follows.

H_3: *Assimilative investors positively correlate actor-active of knowledge acquisition.*

H_4: *ICT strengthens the correlation between assimilative investors and actor-active of knowledge acquisition.*

Based on the previous explanation, the research framework of this study is comprised of two constructs in Figures 1 and 2.
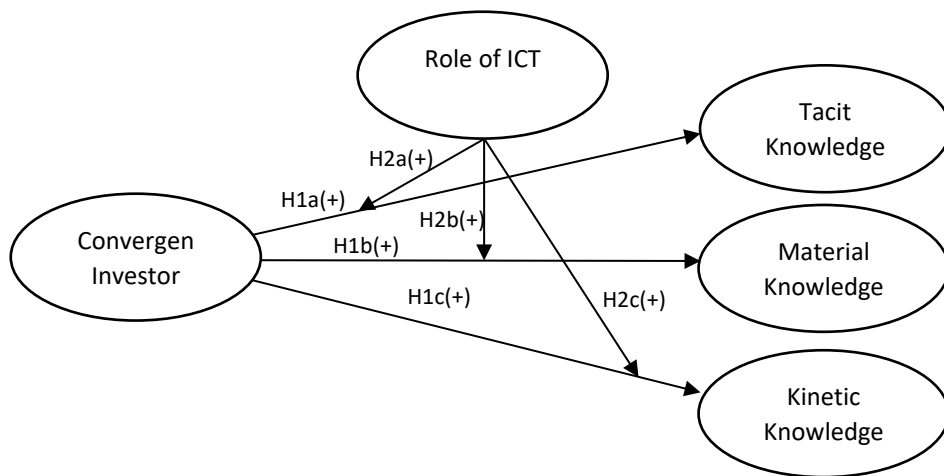
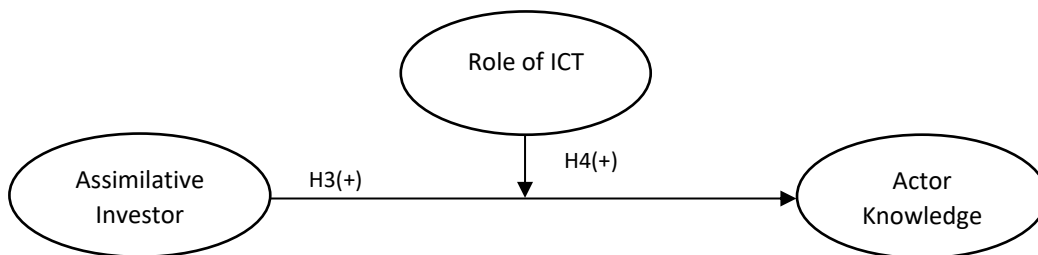**Figure 1** Construct of Sophisticated Investor

Figure 2 Construct of Unsophisticated Investor

Research Method

This study uses an online web-based questionnaire as a data collection tool (Chen et al., 2019; Glaser & Weber, 2007; Tauni et al., 2020). First, this study collects data through an online-form questionnaire that has been provided to answer all question items via Google Form. By adopting a convenience sampling method, this study identifies that these respondents are active investors through criteria form containing questions of ownership of single investor identification (SID), investment experience, and current job. Second, we sent questionnaires to individuals through one of the senior investor groups on the Telegram platform "Ikatan Alumni TICMI," reaching sophisticated investors. Moreover, to achieve a broader sample acquisition, the questionnaire form was distributed using other social media such as Whatsapp and Instagram, reaching out to unsophisticated investors.

This study investigates all types of learning styles, their correlation to knowledge acquisition, and the role of ICT in supporting the learning process of investors. Furthermore, this study uses an individual unit of analysis using bilingual method-based questionnaire questions to ease respondents' understanding of the research questions

(Anderson et al., 2018; Ganotice et al., 2013). The questionnaire uses a five-point Likert scale and multiple-choice questions of the questionnaire presented in the Appendix.

Each variable was measured utilising indicators from prior literature as follows. For learning style, we used 17 items from Manolis et al. (2013); Van der Lingen et al. (2020). These indicators are classified into four learners' categories: accommodative, convergent, divergent, and assimilative. Moreover, knowledge acquisition dimensions were assessed by four different aspects. The first element is tacit knowledge adopted from Thomas and Gupta (2021); Wang et al. (2020) with three items. The second is material knowledge borrowed from Park and Moon (2003); Rachmawati and Suroso (2020) constructed in ten indicators within multiple-choice. Then, later on, those multiple-choice scales will be transformed into a five-point Likert scale due to the primary variable type and the principle of homogeneity, reaching the typical scaling (Murat, 2022). The third element is actor knowledge, determined by 16 items from Breen and Lindsay (1999); Visser-Wijnveen et al. (2016). The last is kinetic knowledge, measured by twelve items from Giampaoli et al. (2017), Gray (2001). Finally, for the moderated variable, the role of ICT was assessed by eight items adopted from Caldwell (2018); Casillas Martín et al. (2020).

Furthermore, we identify that the previous literature has tested the validity of the research questionnaire items used in this study (Aiken, 1980; Almanasreh et al., 2019). Therefore, this study adopted the previous research instruments and changed the context of the questionnaire items to suit the purpose of this study. In addition, the researchers also conducted a pilot test on several experts in the related field, strengthening the validity of the research instrument.

After collecting the data, this study examined it, reaching data validity and reliability. Moreover, this article identified and categorised all learning styles based on Manolis et al. (2013), clustering each respondent with the highest average score compared to other learning style types (Kao & Green, 2008; Sridhar & Charles, 2021). Then, by operating Smart-PLS 3.0, this study tested the hypotheses of models 1 and 2 using Structural Equation Modeling (SEM) to identify cause-and-effect relationships between variables built in this research model. In addition, the statistical test of this study also considers the validity and reliability of the questionnaire items through Confirmatory Factor Analysis (CFA) (Aiken, 1980; Almanasreh et al., 2019; Babin & Svensson, 2012). Furthermore, the items in each questionnaire that are indicated to be valid and reliable are used to further test the correlation

This study identified the loading factor value to measure the instrument's validity. Furthermore, each item is categorised to meet the validity when the loading factor value of each identified item is more than 0.5. In addition, we recognised each variable's Average Variance Extracted (AVE) value to show a measure of the convergent validity of the data. Simultaneously, when the sum of the square roots of the AVE value is lower than the factor loading, it indicates discriminant validity. Furthermore, when the latent variable indicator is more than half the variance, it is assumed to support discriminant and convergent validity. The reliability test used Cronbach's alpha value; when the value of each variable is above 0.5, inferring these variables collect data from reliable question items. In addition, using composite reliability to measure data representing the reality of

investor behaviour, which shows a value above 0.5, is reflected in meeting reliability. Finally, we analysed the relationship between variable associations in all models when the validity and reliability met the normative standard criteria (Babin & Svensson, 2012; Hair Jr et al., 2017).

This study presents the respondents' minimum, maximum, mean, and standard deviation. The skewness and kurtosis values were identified to assess that each variable was statistically normally distributed. Therefore, it concluded that descriptive statistics are essential to determine that research data meet standard statistical criteria and aim to support each hypothesis and research model that is built (Hair Jr et al., 2017; Hu et al., 2019).

Result and Discussion

Descriptive Statistics

This study collected respondents for three months and conducted the cumulated data control to check these entries continuously. Thus, the authors got 506 responses, reflecting all investor learning style types. However, we excluded 24 responses (accommodative-type) and nine responses (divergent-type) because, based on our collected data, assimilative-type (41.50%) and convergent-type (51.98%) are the most dominant learning style-types, becoming 473 usable responses as final sample. Furthermore, convergent-type dan assimilative-type were identified as having the highest mean value compared to other types, confirming that those learning style types are the typical learning behaviour of sophisticated and unsophisticated investors in Indonesia. Therefore, it presents respondent demography in Table 1.

Table 1 Demographic Data

Respondent Data	Frequency	Percentage (%)
Gender:		
Male	347	73.74
Female	126	26.26
Job:		
College Student	188	39.75
Employee	132	27.91
Entrepreneur	107	22.62
Other Profession	46	9.73
Investment Experience:		
Less than a year	191	40.38
1-3 years	58	12.26
3-5 years	99	20.93
5 years and more	125	26.43
Learning Style:		
Convergent-type	263	55.60
Assimilative-type	210	44.40
N: 473		

Table 2 presents descriptive statistics from two research models. The data set shows a minimum value of 1 for each variable and a maximum weight of 5. The data shows that these variables have an average value of more than 3.00, especially for each learning style type higher than 4.00. In addition, the role of ICT also indicated an average value that is not much different in each learning style type, validating the similarity of perceived benefits in using ICT for each investor type. Finally, this study concludes that all variables are a statistically normal distribution marked by modus and median values equivalencies. Therefore, it ceases to continue testing this study's hypotheses.

Table 2 Descriptive Statistics

Variables	N	Mean	Min	Max	Std. Dev.	Excess Kurtosis
Model 1:						
Convergent LS	263	4.03	2.000	5.000	0.706	-0.398
Tacit Knowledge Acquisition	263	3.59	1.000	5.000	0.748	-0.615
Material Knowledge Acquisition	263	3.93	1.000	5.000	0.692	-0.206
Kinetic/elastic Knowledge Acquisition	263	3.98	1.000	5.000	0.658	-0.422
The Role of ICT	263	4.03	1.000	5.000	0.706	-0.398
Model 2:						
Assimilative LS	210	4.17	1.000	5.000	0.620	-0.081
Actor Knowledge Acquisition	210	3.64	1.000	5.000	0.785	-0.446
The Role of ICT	210	3.99	1.000	5.000	0.684	-0.715

The statistical test then analysed the collected data to determine reliability, convergent, and discriminant validity with standard criteria generated by the simultaneous model in Table 3. Furthermore, it shows that the factor loading value of each item used is more than 0.5, concluding that each item is valid. Reliability test using Cronbach Alpha, the value of each variable is above 0.7, confirmed that all items are reliable and consistently have strong reliability. For the AVE value, each variable has a value of more than 0.6, indicating a qualified convergent validity measure. In other words, latent variables can explain the average of more than half the variance of the indicators. The AVE value is obtained from the sum of the squares of the loading factor divided by the error. Therefore, the test results conclude that the measurements in each model show that these variables are highly reliable, convergent, and discriminant. As a side note, this study removed Act10, Act11, and Kin9 on model-1 to obtain standard measurements. Finally, we conclude that all statistical results have valid and reliable indicators. Therefore, this study uses these variables according to the designed model.

Table 4 shows that the NFI value for each model is 0.271 and 0.357 is greater than 0.1. In other words, the model built in this study was fit. Furthermore, the SRMR value identified in each model is 0.082 and 0.083, indicating that the research model meets the appropriate principle standard (Hair Jr et al., 2017). Thus, it is concluded that the built model deserves further statistical testing.

Table 3 Result of Validity and Reliability Test

Variable	Item	Factor Loading	AVE	Corrected Item Total Correlation	Cronbach's Alpha	Composite Reliability
Model 1						
Convergent LS	Con1	0.778	0.672	0.666	0.902	0.925
	Con2	0.865		0.804		
	Con3	0.835		0.753		
	Con4	0.775		0.667		
	Con5	0.790		0.689		
	Con6	0.869		0.811		
Tacit	Tac1	0.829	0.645	0.584	0.725	0.845
	Tac2	0.767		0.534		
	Tac3	0.811		0.524		
Material	Mat2	1.000	1.000	-	1.000	1.000
Kinetic	Kin1	0.811	0.681	0.783	0.953	0.959
	Kin2	0.816		0.783		
	Kin3	0.859		0.796		
	Kin4	0.813		0.786		
	Kin5	0.808		0.774		
	Kin6	0.835		0.765		
	Kin7	0.820		0.794		
	Kin8	0.829		0.797		
	Kin10	0.848		0.783		
	Kin11	0.818		0.792		
	Kin12	0.818		0.786		
Actor	Act1	0.762	0.629	0.733	0.955	0.960
	Act2	0.792		0.747		
	Act3	0.818		0.765		
	Act4	0.793		0.760		
	Act5	0.806		0.774		
	Act6	0.804		0.778		
	Act7	0.797		0.768		
	Act8	0.803		0.769		
	Act9	0.795		0.766		
	Act12	0.780		0.737		
	Act13	0.756		0.718		
	Act14	0.810		0.755		
	Act15	0.796		0.758		
	Act16	0.790		0.743		
The Role of ICT	ICT1	0.919	0.798	0.901	0.963	0.969
	ICT2	0.826		0.759		
	ICT3	0.928		0.912		
	ICT4	0.839		0.776		
	ICT5	0.934		0.919		
	ICT6	0.919		0.900		
	ICT7	0.839		0.776		
	ICT8	0.933		0.919		

Table 3 Result of Validity and Reliability Test (cont')

Variable	Item	Factor Loading	AVE	Corrected Item Total Correlation	Cronbach's Alpha	Composite Reliability
Model 2						
Assimilative LS	Asi1	0.814	0.646	0.739	0.939	0.948
	Asi2	0.850		0.828		
	Asi3	0.799		0.757		
	Asi4	0.808		0.731		
	Asi5	0.804		0.726		
	Asi6	0.856		0.835		
	Asi7	0.812		0.770		
	Asi8	0.706		0.638		
	Asi9	0.724		0.653		
	Asi10	0.851		0.830		
Actor	Act1	0.753	0.644	0.730	0.963	0.967
	Act2	0.770		0.749		
	Act3	0.811		0.768		
	Act4	0.839		0.815		
	Act5	0.816		0.780		
	Act6	0.830		0.809		
	Act7	0.850		0.829		
	Act8	0.809		0.771		
	Act9	0.812		0.788		
	Act10	0.827		0.806		
	Act11	0.849		0.827		
	Act12	0.746		0.709		
	Act13	0.729		0.709		
	Act14	0.798		0.751		
	Act15	0.803		0.765		
	Act16	0.789		0.746		
The Role of ICT	ICT1	0.916	0.757	0.900	0.953	0.961
	ICT2	0.779		0.690		
	ICT3	0.916		0.901		
	ICT4	0.821		0.745		
	ICT5	0.927		0.915		
	ICT6	0.898		0.879		
	ICT7	0.796		0.714		
	ICT8	0.892		0.870		

Note: N= 263 (convergent-type); 210 (assimilative-type), Factor loadings (pattern matrix) and unique variances

Table 5 shows that, statistically, hypothesis 1a is supported with an estimated beta value of 0.328, which is significant at 1%. In line with this argument, we confirm that convergent investors correlate with the tacit-latent dimension of knowledge acquisition. Furthermore, hypothesis 1b has an estimated beta value of 0.793 and is significant at the 1% level, mirroring that experienced investors are positively related to the material-latent knowledge dimension.

Table 4 Goodness-of-Fit

	Model-1		Model-2	
	Saturated Model	**Estimated Model**	**Saturated Model**	**Estimated Model**
SRMR	0.082	0.109	0.083	0.093
d_ULS	6.396	11.269	8.879	10.923
d_G	130.915	131.066	27.281	27.451
Chi-Square	24.383	24.565	12.149	12.281
NFI	0.271	0.265	0.357	0.350

Finally, hypothesis 1c is correlated with a beta of 0.501 and a significance value of 1%. Thus, convergent investors are tied to the kinetic-active type of knowledge. Furthermore, hypotheses 2a; 2b; and 2c have an estimated beta of 0.204, respectively 0.106; 0.132, with a significant level of 1%; 1%; and 1%, revealing that investors who utilise ICT improve the relationship of convergent learning styles to each dimension of knowledge in model 1, achieving optimisation of their learning and decision-making processes.

Table 5 Statistical Results

Hyp.	Causalities	Model-A			Model-B		
		Coeff.	**C.R**	**P-value**	**Coeff.**	**C.R**	**P-value**
H1a(+)	Con -> Tac	0.328	5.566	0.000***			
H1b(+)	Con -> Mat	0.793	34.30	0.000***			
H1c(+)	Con -> Kin	0.501	9.232	0.000***			
H2a(+)	Con*ICT --> Tac	0.204	3.318	0.001***			
H2b(+)	Con*ICT --> Mat	0.106	2.788	0.006***			
H2c(+)	Con*ICT --> Kin	0.132	2.661	0.008***			
H3(+)	Asi -> Act				0.401	5.465	0.000***
H4(+)	Asi*ICT -> Act				0.151	2.131	0.034**

Note: DC: Significant sign: *p<0.10, **p< 0.05, ***p<0.01.

The results of hypothesis 3 show an estimated alpha of 0.401 and significant at 1%, proving that novice investors are generally active-actor types in acquiring knowledge due to the high need for essential guidance or teaching. Finally, the results of the statistical test of Hypothesis 4 are supported by the estimated beta value of 0.151 and significant at the 5% level. Thus, it concludes that ICT increases the correlation of assimilative learning styles in acquiring active-actor knowledge.

As a part of robustness models, this study also found that the relationship between assimilative-type with tacit-latent, material-latent, and kinetic-active was not supported, likewise with moderation relationship by the role of ICT. In other words, these main research models are approved to be robust. The overall results of hypotheses testing show that convergent-type are proven to acquire knowledge of various types, namely tacit, materials and kinetics. Furthermore, it is proven that novice investors with their assimilative learning style tend to be in the actor acquisition of knowledge rather than other dimensions. Thus, it is clear that novice investors need tutors to learn fundamental investment and other conceptual knowledge. Finally, sophisticated and unsophisticated investors were validated in this study, demonstrating the need for ICT, leading to optimising learning or obtaining all kinds of information related to their finances and investment management.

Experienced Investors' Learning Style on Tacit, Material, and Kinetic Knowledge

From the hypotheses testing, this study reveals that convergent type mirrors experienced investors' learning behaviour due to their high ability to master three knowledge dimensions. It also means that sophisticated investors are knowledgeable, rational, and risk-averse managed. This investor usually adapts their cognitive function in any condition due to owned real-time thinking from abundant experiences. Shortly, their cognition is always formed to dynamically focus and excel in acquiring material-latent, tacit-latent, and kinetic-active financial knowledge. This study aligns with the above-mentioned literature by Adil et al. (2022), Chen et al. (2020), Guenther et al. (2018), Kim (2021), Henry and Peytcheva (2020) expose how sophisticated investors overcome all problems in various problem-solving ways. In other words, this study concludes that convergent-type investors reflect the effective learning cycle model, presenting the importance of conceptual and practical learning actualisation.

Learning Style of Novice Investors on Actor Knowledge

As previously explained, model-2 represents a significant investment sample in Indonesia, millennials (KSEI, 2022). Moreover, this study reveals that novice investors only concentrate on the actor knowledge dimension because of the lack of investment knowledge domain conceptually and low experience, as proved by significant results (1-5% of significant sign) of the model. Also, inlines with prior studies from Glaser and Weber (2007), Kim (2021), Wasiuzzaman (2021), Henry and Peytcheva (2020), this paper strengthens that novice investors should reach prerequisites at first and later on, they can gradually acquire new knowledge followed by their experience.

The Moderated Effect of ICT on Experienced and Novice Investors

Based on the research result, this paper found that ICT strengthens both relationships of experienced and inexperienced investors with all knowledge dimensions. Majorly, the hypotheses result shows a significant level of 1%, proving the high-critical role of ICT. Also, this result corroborates prior research, Attakora-Amaniampong et al. (2021); Chen et al. (2019), Guenther et al. (2018), Hoffmann and Aeschlimann (2017), Sachan and Saroha (2022) reveal that they use ICT to identify information related to investment and utilising it as a medium for learning, analysing, and making investment decisions. In addition, this study also toughens previous literature by Abreu & Mendes (2020), Kim and Ryu (2021), Henry and Peytcheva (2020), Riar et al. (2021), Azmi and Mohamed (2018), Chandrasekera and Yoon (2018), Chernbumroong et al. (2017), disclosing high differences between novice and experienced investors through their learning behaviour, especially in acquiring knowledge.

Conclusion

This study shows a fascinating result, revealing the ideal construct for an investor in acquiring knowledge. Meanwhile, the learning method should be based on an experiential

learning cycle, conceptualised and operationalised practically and continually. This result also discloses the fundamental problem of novice investors: their ineffective behaviour and technique in learning. This learning behaviour refers to the slow development of their knowledge, leading to an imperfect experiential learning cycle. Furthermore, this founding reveals the needs of ICT for both types of investors, helping them reach broader information and cumulative knowledge, and leading to optimisation of the decision-making process.

This study results have extended references for investors and capital market training institutions to continue developing their abilities kinetically. Specifically, it can be used as an ideal individual construct to acquire knowledge embraced by financial consultants, capital market training institutions, and professional education. Thus, they are also responsible for developing investors' abilities, especially novice investors.

This study did not fully capture the exact participants' learning styles due to the natural limitation of this study approach, namely questionnaire-related errors. Moreover, this article developed relatively new models that need further examination in external and internal validities. Therefore, future research is hoped to provide experimental approaches, reaching the natural cause-effect measurement of investor learning style and knowledge acquisition. In addition, further research with different sampling subjects will help the models' generalisation widely.

Acknowledgement

Appendix

Variables and Questionnaire Items

Variables	Questionnaire Items
Learning Styles; Manolis et al. (2013); Van der Lingen et al. (2020)	When studying, I like to do it by watching and listening
	When studying, I like to think of various ideas
	I can learn optimally if I use hunches and feelings
	I can learn optimally if I do it by listening and watching carefully
	I can learn optimally when I rely on logical thinking
	When studying, I have strong feelings and reactions
	When studying, I tend to think of various ways to overcome the existing problems
	I usually learn through hunches/feelings
	I usually learn by watching
	I usually learn by being directly involved/doing it directly
	When studying, I'm the type of person who likes to observe it first
	When studying, I am the type of person who always thinks logically
	I can learn optimally by observing/researching something in depth

Variables and Questionnaire Items (cont')

Variables	Questionnaire Items
Tacit Knowledge Acquisition; Thomas and Gupta (2021); Wang et al. (2020)	I can learn optimally through repeated experiments and practice
	I can learn optimally, if by trying it directly
	When studying, I like to do it by observing
	When learning, I like to do it by being directly involved
	I have found an investment method that fits my desired risk profile
	I've found the right combination of portfolio diversification
	I have found the most optimal investment analysis technique for me
Material Knowledge Acquisition; Park and Moon (2003); Rachmawati and Suroso (2020)	When analysing a company's stock, I generally source information from:
	Which investment instrument is the riskiest?
	The ratio used to measure the company's ability to meet short-term financial obligations in the form of short-term debt is called …
	Value investing is …
	Elements that are directly related to profit measurement are …
	The concept of the upcoming value of money from the amount of cash received or paid in the present by taking into account a specific interest rate prevailing in the calculation period is known as the concept of …
	Growth investing is …
	Ideally, my funds' allocation in the preparation of financial planning prioritises…
	If an issuer goes into liquidation, then the main order as the recipient of claims is …
	A point when the stock price moves down then stops and reverses up is referred to as the point …
Actor Knowledge Acquisition; Breen and Lindsay (1999); Visser-Wijnveen et al. (2016)	*I am not confident about my knowledge and investment analysis skills to successfully manage my finances and invest
	Cumulatively, I continue to learn the basic concepts of financial literacy and investment
	It does not matter to me whether the investment course instructor/others acknowledge my financial literacy and investment skills or not
	There is influence from other people on my investment decision making
	*Investment or financial literacy courses that I took and studied were not satisfactory/fun
	I am actively involved when studying knowledge about investment
	*The investment lessons/courses I took were uninteresting
	The financial literacy and investment learning modules that I learned can be flexibly actualised
	*I am not familiar with the provisions/standards of financial and investment management
	A structured, interpretive, and easy-to-understand explanation of financial literacy and investment information/knowledge is crucial for me
	The high/low quality of teaching investment courses or financial and investment literacy learning resources (websites, social media, etc.) is not essential to me
	The quality of information sources is critical to me when studying financial literacy and investment knowledge

Variables and Questionnaire Items (cont')

Variables	Questionnaire Items
	Financial literacy and investment contents are something that is not important to me during the learning process and investment course that I take
	Support from teachers/others is not essential to me during the course/learning process
	*Communication with teachers/other people is something that is not important during the course/learning process
	The role of teachers and other learning media is vital for me in understanding financial literacy and investment knowledge better
Kinetic Knowledge Acquisition; Giampaoli et al. (2017); Gray (2001)	I face every new issue and idea in the process of learning, analysing, and investment decision making
	*I ignore new and creative solutions that emerge in the process of learning, analysis, and investment decision making
	I always feel challenged by the possibility of the emergence of a new investment analysis concept or mindset or issues related to investment
	I always try to understand every evaluation result of my previous investment decision making
	I always understand first every issue related to investment before making investment decisions
	*I tend to think about what investment method is the most effective for me when learning to invest
	I am looking for a solution specifically for the evaluation of investment decision-making that I have done previously
	Systematically, I investigate specific issues from every investment analysis I do
	I always look for solutions to every error in the analysis process and investment decisions that I made before
	I get unexpected information or understanding when studying or analysing a company's stock
	I absorb every idea or thought that happens to arise when studying investing or analysing a company's stock
	*I tend to ignore the idea or think of investment techniques that are not common every time I study or analyse a company's stock
The Role of ICT; Caldwell (2018); Casillas Martín et al. (2020)	When learning, technology is an essential tool
	Using technology when studying has a positive impact on me, especially when analysing company stocks
	I need technology to support my learning properly
	Using technology helps me to understand better what I'm learning
	Using technology helps me remember what I learn
	Through the use of technology, I can reach more information and thus result in better investment decision making
	Using technology (smartphone, internet, social media, etc.) motivates me to keep learning
	*For me, the use of technology when studying is a source of distraction

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