

Study of Digital Literacy, Coordination, Non-Routine Task, and Ambidextrous Learning

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Abstract

The overarching impact of digital literacy is burgeoning. Moreover, the increase in dependency on information and communication technology (ICT) has become ubiquitous. Organizations of all types are in need of talented individuals who can navigate the complexity of the digital world. Although past studies have covered the impact of digital literacy on other areas, little is known about how digital knowledge in hierarchy can facilitate employees' ambidextrous learning (e.g., employee explorative and exploitative learning), and how coordination and non-routine tasks can mediate the effectiveness of digital literacy on ambidextrous learning. Using data gathered from 200 employees from various kinds of organizations and companies in Vietnam, we examined how digital literacy plays a significant role in ambidextrous learning. The result supports the link between coordination and exploitative learning, and digital literacy to non-routine to explorative learning.

Keywords

Digital Literacy, Coordination, Non-Routine Task, Ambidextrous Learning

1. Introduction

The job market in today's context has become more demanding, and such demand cannot be met without proper digital literacy or adequate comprehension of ICT. With the advent of AI (Artificial Intelligence), the job market is rapidly becoming more challenging than before. Moreover, there has been a major change in the job itself. These changes have stemmed from the development of the sharing economy, the gig economy, or even the crowd economy (Anani, 2018). Amid all these changes and challenges, the role of digital literacy seems omnipresent. This has garnered the attention of many scholars in the domain of digital literacy. Accord-

ing to Walker, Bowkett, & Duchaine, (2018), all types of organizations, including non-ICT companies like government and small businesses, are now in need of employees who are not intimidated by technology. This has led to a critical need for modern educational systems that can address the shortage of a digitally skilled labor force (Tiandem-Adamou, 2025). The OECD (2018) has categorized ICT skills as (a) specialist or advanced, (b) generic, and (c) complementary. These varying ICT skills among employees have further created a digital divide between groups in terms of usage of the internet, with some making more intensive and immersive use, while others using it more practically, further affecting their effectiveness and adaptability in their daily jobs (Calderón-Gómez, Casas-Mas, Ur-raco-Solanilla, & Revilla, 2020). Matraeva, Vasiutina, & Belyak (2020) have discussed the significance of digital literacy among employees in the context of a digitalized labor market, particularly focusing in skill shortages, education system challenges, investment in human capital, and wage implications. Moreover, in digitalized workforce the digital skills and involvement can correlates individual wages (Schnabel et al., 2025). Although, existing studies have discussed the importance of digital literacy in the work force, we have limited empirical evidence of how digital literacy in an organization can facilitate two seemingly contradictory components (employees explorative and exploitative learning). Moreover, it is also important to understand how employees can exploit their digital literacy in a hierarchy to prepare themselves in the challenging digital world.

Explorative learning includes activities such as search, variation, risk taking, experimentation, and innovation, which is essentially a process of creating new ideas. Exploitative learning, in contrast, concerns activities mainly refinement, production, efficiency, selection, and implementation, which is essentially a recipe for improving existing knowledge. These two essential elements although contradictory can complement each other and are often beneficial to organizations (Solís-Molina, Hernández-Espallardo, & Rodríguez-Orejuela, 2018). Since hierarchy is described as an organizational structure with clear departmental boundaries, clean lines of authority, detail reporting mechanisms, and formal decision-making procedures (Powell, 2003), it is important to understand how digital literacy of employees can effectively contribute to both explorative and exploitative learning which is essential for organization growth. This is because clear departmental boundaries, clean line of authority, and formal decision-making procedure can impinge autonomy that is essential for explorative learning (Atuahene-Gima, 2003; Damanpour, 1991; Sheremata, 2000).

In response to the shortcomings and literature gap, this study investigates two important issues pertaining to the digital literacy. First, drawing on the digital literacy and ICT learning (Wei, 2022; Susło et al., 2018; Taskin & Ok, 2022; Lyons & Kass-Hanna, 2021), we advance the role of digital literacy in organizations by developing and testing a model manifesting how digital literacy in individuals, with mediating role of coordination and non-routine task, can foster both exploitative and explorative learning in an organization. Our findings suggest that the

relationship between digital literacy and explorative learning is mediated by non-routine tasks. Moreover, as expected, coordination in hierarchy has a positive effect on exploitative learning, but no significant relationship was found between digital literacy and coordination.

Second, this work investigates the extent to which digital literacy can help an individual navigate the complex labyrinth of the digital world. As jobs have become more challenging and demanding, a proper comprehension of ICT can indeed help individuals to explore the unlimited advantages provided by the digital world. Also, it is important to understand to what extent are the current generation of workers is prepared to face the changing nature of jobs, which has stemmed from the development of the sharing economy, the gig economy, and the crowd economy.

The remainder of the article is organized as follows: First, we briefly explain the theoretical background in constructing our conceptual model. We then present the series of hypotheses derived from the conceptual model. **Figure 1** shows the theoretical framework of the role of digital literacy in ambidextrous learning. The frame work exhibits mediating role of coordination and non-routine task between digital literacy and ambidextrous learning. Third, we present the result, followed by a discussion of the theoretical contribution and managerial implications. Finally, we discuss the research limitations and direction for future research.

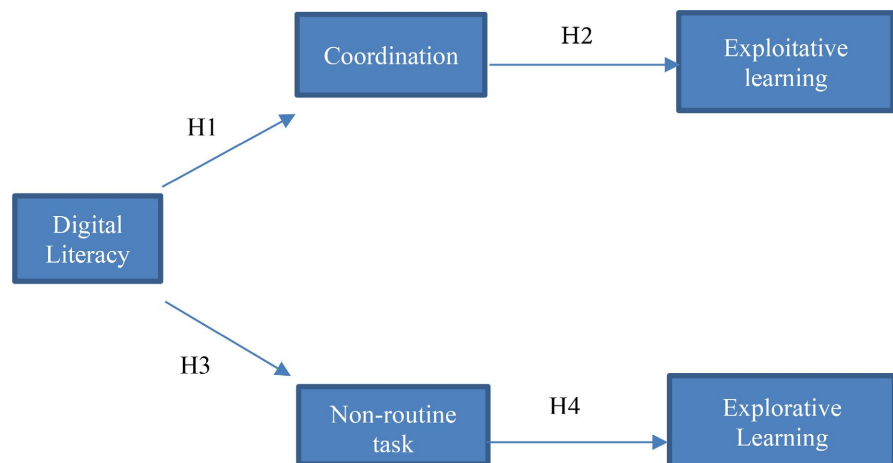


Figure 1. Conceptual model.

2. Theory and Hypothesis

2.1. Addressing Ambidextrous Learning in Organizations

The prime objective of firms and organizations is to remain competitive by exploring new products as well as maintaining the existing one. Hence, the concept of ambidextrous learning, in the management domain, suggests a pair of paradoxical relationship, that involves two contradictory elements that exist simultaneously and are interdependent (Duncan, 1976; Andriopoulos & Lewis, 2009; García-Lillo, Úbeda-García, & Marco-Lajara, 2016). The tension embedded in these

paradoxical relationships, needs to be managed properly implying an organization to sustain balances between these two paradoxical elements (Lewis, 2000; O'Reilly & Tushman, 2013; Luger, Raisch, & Schimmer, 2018; Knight & Cuganesan, 2020). Hence, in order to survive the complex digital world, where the environment have become more demanding, organizations are in need of digitally skilled labor that can innovate new products and services as well as maintain the existing ones.

March (1991) characterized exploration, in the macro management domain, as activities that include the exploration of fresh ideas, experimentation, risk-taking, autonomy in organizations, and loose discipline. It involves discovering alternatives that are superior to conventional practices (Lewin, Long, & Carroll, 1999). This involves playing with ideas, shifting paradigms, new strategies, and knowledge creation. Exploratory innovations, for example, are radically different, they are specifically designed to meet the expectations of emerging generations and new markets (Benner & Tushman, 2003; Danneels, 2002). In contrast, exploitation cycles around activities such as refinement, production, efficiency, selection, implementation, and execution (March, 1991). It is a discipline that involves systematic logic, risk aversion, and defining and measuring performance (Lewin, Long, & Carroll, 1999). Exploitative innovations, for example, are described as incremental innovations designed to meet existing requirements (Benner & Tushman, 2003; Danneels, 2002).

Addressing the choice dilemma between exploration and exploitation, scholars, under macro management domain, have identified three approaches: 1) structural separation that suggest for separate structure within the same organization to facilitate both exploration and exploitation (Tushman & O'Reilly, 1996); 2) Temporal balancing, in organization, that suggest sequential flips between exploration and exploitation (O'Reilly & Tushman, 2013); 3) contextual approach that emphasizes the capacity of behavioral integration that delineates both exploration and exploitation (Gibson & Birkinshaw, 2004). Research, addressing the shift from structural to contextual ambidexterity, have argued that although exploration and exploitation are two contradictory elements, they indeed can also co-exist within a same organizational unit (Gibson & Birkinshaw, 2004; Lavie, Stettner, & Tushman, 2010; Duncan, 1976).

Lately, increasing numbers of studies, under micro management domain, have paid attention to ambidextrous learning at employees level. Exploratory and exploitative learning can both mediate the role of team diversity and team cohesion on team performance (Lee, Chae, & Chung, 2025). To achieve organizational goal, amid developing new ideas and adapting to changes, teams need to follow standardized procedures to complete, which suggest the significance of ambidextrous learning (Zhao, Zong, & Zhang, 2020). The ambidextrous quality in team leader can facilitate both explorative and exploitative learning among employees in a unit (Duc et al., 2020). The studies above, addressing ambidexterity learning, have emphasized contextual approach rather than structural or temporal. Therefore, we

propose that despite clear departmental boundaries, clean lines of authority, detail reporting mechanisms, and formal decision-making procedures in a hierarchy, it is possible for an organization to encourage contextual approach to facilitate ambidextrous learning.

2.2. Addressing Coordination in Hierarchy

Williamson (1991) in his article, "Comparative Economic Organization: The Analysis of Discrete Structural Alternative," described hierarchy as a mode of governance that gives a firms or organization a leeway to exercise coordination as knowledge specific to the transaction (asset specificity) builds up. In the words of Powell (2003), hierarchy is characterized by an organizational structure with clear departmental boundaries, clean lines of authority, detailed reporting mechanisms, and formal decision-making procedures. The interdepartmental conflicts are internally resolved by exercising managerial fiat to ensure maximum coordination (Powell, 2003; Williamson, 1991).

Coordination refers to the systematic organization of different elements of one single body or hierarchy enabling them to work effectively and efficiently to achieve common goals. Formalization and centralization are the two important mechanisms of coordination under hierarcal structure to control behavior (Cardinal, 2001; Lin & Germain, 2003; Miller & Dröge, 1986; Zmud, 1982). Centralization refers to the extent to which the decision-making of an authority is concentrated in the hierarchy (Aiken & Hage, 1968). In a typical hierarchy, the decision-making is concentrated on the top echelon, generally from the CEO to dapartment heads to their subordinates. It is also a vertical system where decision-making flows from top to bottom, or is centralized in head office. In relation to centralization, formalization reflects the rules and regulations that have been internalized to ensure efficiency and avoid mishaps. It also refers to the extent to which the rules, regulations, procuedures, instructions, and communication are formalized as an internal policy (Khandwalla, 1977). In a hierarchy, formalization aims to reduce loopholes by gradually making improvements in processes and outputs (Benner & Tushman, 2003), and to enhance existing routines (Zollo & Winter, 2002).

Both centralization and formalization are favorable for exploitation. The vertical decision-making system, under centralization, allows information to flow efficiently, which favors exploitative learning (Jansen, Van Den Bosch, & Volberda, 2006). Likewise, the existence of rules and regulations, under formalization, reduces loopholes and improves existing routines (Benner & Tushman, 2003) favorable for exploitative learning. In the contrary, exploration requires activities that are explorative such as risk-taking, experimentation, flexibility and loose discipline (March, 1991). Centralization and formalization, as these mechanism emphasize stringent measures and control, does not facilitate flexibility and autonomy that are essential for exploration. However, hierarchy can indeed be more beneficial in terms of idea selection that is favorable for organization (Keum &

See, 2017). Likewise, different hierarchical arrangements can be beneficial to both capability development and organizational performance (Gavetti, 2005). Indeed, formalization and centralization play a significant role in perceived fairness (Schminke, Ambrose, & Cropanzano, 2000) that are beneficial to long-term performance.

2.3. Digital Literacy and Coordination

We first postulate that, given the growing overarching impact of digital literacy in modern workforce, the digital skills in employees, to some extent, serves them to contemplate the role of coordination in a hierarchy. The two mechanisms of coordination, centralization and formalization, are both required to ensure smooth functioning of an organization (Cardinal, 2001). If formalization emphasizes the rules and regulations that have been internalized to ensure efficiency and avoid discrepancies, centralization refers to the concentration of decision making to the authority mostly serving at upper echelon in the hierarchy. The main purpose of centralization of decision making is to ensure smooth flow of decision making (Jansen, Van Den Bosch, & Volberda, 2006), which complements formalization. The importance of digital literacy for employees in the context of the evolving job market is omnipresent. The foundational digital skills, such as basic literacy and numeracy, are essential for workers to remain competitive in a rapidly changing economy (Anani, 2018). This rapidly changing economy has enabled all types of organization to seek digitally talented employees who can navigate the digital world without being intimidated (Walker, Bowkett, & Duchaine, 2018). Not only companies today seek employees who can perform basic tasks such as operating email, navigating web pages, using excel spreadsheets, and understand the importance of data security, but individuals who can perform coherently along with the principles and prime objectives of the organization. This requires employees to be digitally prepared and qualified enough to understand the basic norms and discipline of the organization to survive the complexities of hierarchy and the flow of information within the organizations. Thus,

H1) Digital literacy is positively related to coordination.

2.4. Coordination and Exploitative Learning

March (1991) described exploitation as activities that involves refinement, choice, production, efficiency, selection, implementation, and execution. Such activities are designed to meet the needs of existing customers or markets (Benner & Tushman, 2003). Moreover, they sharpen existing knowledge and skills, augment existing product and services, and increase the efficacy of existing distribution channels (Abernathy & Clark, 1985). Past studies, in ambidexterity, have addressed the role of coordination in exploitation. Since exploitation revolves around refinement and efficiency, organizational forms and customs that emphasizes rules, regulations, and formal procedures complements such activities (Jansen, Van Den Bosch, & Volberda, 2006). Studies in micro management domain have also argued that to promote team exploitative learning, it is necessary for supervisors to strictly

encourage employees to adhere to rules and regulations to avoid discrepancies in their behavior (Zhao, Zong, & Zhang, 2020). Strickly adhering to organizational norms and policy can indeed enhance team performance via exploitative learning (Lee, Chae, & Chung, 2025). Setting up performance standard and team monitoring by supervisor can promote exploitative learning (Chen, Zhang, & Wang, 2014). Thus,

H2) Coordination is positively related to exploitative learning.

3. Addressing Non-Routine Task

The organization is conceptualized as a network of interrelated task position (Brass, 1981). It assumes that each individual job is embedded in a larger organizational structure, the structure that develops as the activities as segregated. For example, different workers are assigned different tasks. Hence, according to Hage & Aiken (1969), in an organization if much is known about the particular process of certain task, with stable clients and uniform results, then it is a routine task or work-flow. Whereas, if there is a situation where employees have little understanding of particular process of a task, where a task has little uniformity, then the employees are facing non routine task (Hage & Aiken, 1969). Routine tasks are characterized as task having low level of task variability, and repetition of task processes (Richard, 1974). They are generally a familiar task and are accomplished in the same way, with predicable results (Thompson, 2017), without much diverse repertoire possessed by employees. In contrasts, non-routine tasks require problem solving, have few sets of procedures, and have a high degree of uncertainty (Van de Ven, Delbecq, & Koenig Jr, 1976). Jehn, (1995) argued that in groups performing routine tasks, disagreements about the task could hinder group functioning. While, in groups performing non-routine tasks, disagreements about the task had mild detrimental effect, instead in some cases, such disagreements were indeed beneficial.

In line with previous authors, we concur on the idea that in order to achieve ambidexterity, we suggest that is best achieved not through structural separation, or temporal balancing but by building a business unit context that encourages employees to perform both routine and non-routine task (Zhao, Zong, & Zhang, 2020; Gibson & Birkinshaw, 2004). Since contextual approach emphasizes multi-dimensional approach, where individuals in a unit can deliver value to existing customers as well as pursue for changes in task environment (Gibson & Birkinshaw, 2004), such approach can facilitate non-routine task which is beneficial for explorative learning.

3.1. Digital Literacy and Non-Routine Task

In an organizational literature, the theme that has occurred multiple times, is that the successful organization in dynamic environment are ambidextrous (Gibson & Birkinshaw, 2004). This means that the organizations are aligned and efficient in their management in such a way that they are capable of meeting customer's de-

mand and at the same time are receptive enough to changes in the environment (Duncan, 1976). This has also created demand at micro management level where the importance of employees' skills has burgeoned. In the context of evolving job market, not only employees are expected to have basic digital skills, but are continuously required to up-skill to adapt changes in the environment (Anani, 2018; Walker, Bowkett, & Duchaine, 2018). Not only just ICT companies, even non-ICT companies like government and small businesses, are in dire need of employees who can easily navigate the complex labyrinth of digital world (Walker, Bowkett, & Duchaine, 2018), since all kinds of information are now digitally available. As organizations, in order to meet growing demand, are contextually structured, employees are expected to perform not only regular task, but task that requires problem solving, creativity, and gives employees a sense of accomplishment after completion of task. Thus,

H3) Digital literacy is positively associated with non-routine task.

3.2. Non-Routine Task and Explorative Learning

We speculate that non-routine task can predict explorative learning. Non-routine task is characterized as a kind of task that requires problem solving, have few sets of procedures, have a high degree of uncertainty, and with less uniformity (Van de Ven, Delbecq, & Koenig Jr, 1976; Aiken & Hage, 1968). The non-routine tasks require employees to spend more time than they do on regular task; employees involving on such task have least knowledge about protocols and procedures. Such situation demands employees to be more creative, and enthusiastic to solve problem. In ambidextrous environment, explorative learning involves those activities that includes search for fresh ideas, experimentation, risk-taking, and discovering alternatives that are far better than traditional practices (March, 1991; Lewin, Long, & Carroll, 1999). In the context of evolving job market and dynamic environment, where new ideas constantly originate and proliferate, organization have developed system that encourages employees to decide on their own to split their valuable time between conflicting demands for alignment and adaptability (Gibson & Birkinshaw, 2004). Thus,

H4) Non-routine task is positively associated with explorative learning.

4. Research Methods

4.1. Data Sample

To test our hypotheses, we collected sample from Hanoi City, Vietnam. We chose several industries (private and public) in Vietnam, as our study primarily focused in assessing digital literacy of employees in various sectors, and how it contributed to their ambidextrous learning in their regular jobs. The industries included in the sample were: 1) Health and welfare, 2) consultancy, 3) hospitality, 4) media, 5) trading, and 6) manufacturing (Table 1). We first developed an English version of the questionnaire and translated the survey to Vietnamese language. For clarity

Table 1. Classification of organization in the sample.

		Frequency	Percent	Valid percent	Cumulative percent
Valid	Health and welfare	46	23.8	23.8	23.8
	Consultancy	12	6.2	6.2	30.1
	Hospitality	6	3.1	3.1	33.2
	Media	55	28.5	28.5	61.7
	Trading	8	4.1	4.1	65.8
	Manufacturing	66	34.2	34.2	100.0
	Total	193	100.0	100.0	

and correctness of the wordings used in Vietnamese version, we consulted an independent translator.

The survey was conducted in two phases. The first phase entailed the participation of individuals from higher position in their respective organizations to assess the clarity, structure, length, and ease of use of questionnaire. We conducted pilot study with 14 prominent individuals assuming higher position such as department heads, CEOs, Managing Directors, and CFOs. Respondents were quite cooperative, and they not only answered all the questions but also provided their opinions and insights concerning the design and structure of the questionnaire. Based on their comments, we finalized the questionnaire. The second phase involved both visual and aural communication to improve response rate. Visual communication was conducted through emails using google forms, with an option for both English and Vietnamese versions. Those respondents who were not reachable through emails were personally handed questionnaires in their offices through their human resources department (HRD). The aural communication focused on non-respondents, which involved follow-ups through telephone calls as a reminder which was structured to maximize the response rate (De Leeuw, 2005). The total of 200 responses were received, out of 200 responses, 7 respondents were discarded as cases contained values either far above or below the majority of other cases. The elimination of 7 cases resulted net response of 193.

To test the hypotheses generated from the conceptual model, which shows the effect of digital literacy on ambidextrous learning, and the mediating role of coordination and non-routine task, we used PLS software. PLS caters construct scores, i.e., proxies of the constructs, which are measured by one or several indicators (Henseler, Ringle, & Sinkovics, 2009). It is a causal modelling approach used in strategic management research (Hulland, 1999). Although, partial least square is similar to regression, it simultaneously models the structural path, (i.e., conceptual relationship among latent variables) and the measurement path: relationship between latent variables and its indicators (Chin, Marcolin, & Newsted, 2003). As these procedures considers the measuring errors in the underlying indicators, it provides more accurate estimate of interaction effects between latent

variables. PLS discloses the significant effects of the different latent variables on each other, while every latent variable itself is reflected by its measures. Moreover, the latent variables are estimated as linear combinations of its measures by maximizing the explained variance for the indicators and the constructs. As a result, the latent variable is not only maximally correlated with its own set of measurements, but also with other latent variables in the model (Chin, Marcolin, & Newsted, 2003). Beside theory confirmation, PLS can also be applied to suggest whether there exists a relationship or no link exist between constructs, further suggesting subsequent testing in future (Chin & Newsted, 1999). Marcoulides & Saunders (2006) have warned researches using PLS as 'silver bullet' while Hair, Ringle, & Sarstedt, (2011) have specified certain conditions where PLS might indeed be a silver bullet. Hence, the scaling, the number of cases, and distribution of the sample data are the specific conditions that are need to be considered prior to using PLS. In contrast to AMOS, PLS can deal with small samples, depending on the complexity of the model and the size of the effects to be detected (Chin & Newsted, 1999). Moreover, PLS does not require a normal distribution of the data (Chin, Marcolin, & Newsted, 2003). For this study, with 193 cases, the number of cases exceeds the number of indicators, meeting one of the conditions for PLS. The essence of PLS is that it uses bootstrapping, a cross validation method, to uncover the significance of the interaction effects in the model. It is a resampling procedure, which produces the same number of cases as in the original sample. The result may slightly vary in every iteration, as bootstrapping is based on trial and error. The number of resamples was chosen to be 1000, exceeding the minimum requirement of 200 as indicated by Chatelin, Vinzi, & Tenenhaus, (2002).

4.2. Measurement Model

To measure the reliability of individual item (measurement scales), cross-loadings between the indicators and the constructs were checked. Every measuring item should have a cross-loading higher or above 0.4, while the value above 0.70 is also desirable (Hulland, 1999). The cross-loading of all the individual items used in this study have exceeded the given threshold (Table 2).

To assess the convergent validity of the measurement model, we chose composite reliability as developed by Fornell & Larcker (1981). Cronhach's alpha tends to underestimate the internal consistency in PLS path model (Henseler, Ringle, & Sinkovics, 2009), hence composite reliability was preferred to measure the convergent validity of the constructs. According to Nunnally, (1978), the cutoff point for both measure is 0.7 as a benchmark. In this study, Composite Reliability scores of all variables were above 0.7 (Table 2).

Discriminant validity, which measures represents the extent to which measures of a construct differ from measures of other constructs in the same conceptual model (Hulland, 1999), is the traditional approach to convergent validity. Discriminant validity can be assessed by using the AVE (i.e., the average variance shared between a construct and its measures). AVE confirms that a latent variable explains more variance it its indicators than it shares with other constructs. The

Table 2. Operationalization of construct.

Construct	Average varia	Composite reliability	r ²	Cross loading	Indicator questions operationalized using 5 - point Likert scales from 1 (strongly disagree) to 5 (strongly agree)
Digital literacy	0.556	0.735	0.00	0.742	I know how to solve my own technical problem.
				0.767	I know about a lot of different technologies
				0.713	I am confident with my search and evaluate skills in regards to
				0.760	I am familiar with issues related to web-based activities e.g., cyber safety, search issues, plagiarism
Ambidextrous learning	Explorative learning 0.610	0.885	0.097	0.414	Team members were systematically searching for new possibilities during the project
				0.805	Team members offered new ideas and solutions to complicated problems (were inventive).
				0.880	Team members experimented with new and creative ways for accomplishing work.
				0.877	Team members evaluated diverse options regarding the course of the project.
				0.829	The members of our team developed many new skills during the project.
				0.834	The members of our team recombined existing knowledge for accomplishing work
	Exploitative learning 0.678	0.923	0.484	0.823	In our team, we primarily performed routine activities.
				0.725	During the project, our team implemented standardized methodologies and regular work practices.
				0.845	Team members improved and refined their existing knowledge and expertise during the project.
				0.882	Team members mainly used their current knowledge and skills for performing their tasks.
Coordination	0.726	0.929	0.009	0.960	There can be little action taken here until a supervisor approves a decision
				0.809	A person who wants to make his own decision would be quickly discouraged
				0.955	Even small matters have to be referred to someone higher up for a final decision
				0.940	Unit members need to ask their superior before they do almost anything
				0.959	Most decision people make here have to have their supervisor's approval
				0.255	Written jobs descriptions are formulated for positions at all levels in the organizational unit.

Continued

Non-routine task	0.507	0.737	0.152	0.580	One thing people like around here is the variety of work
				0.801	Most jobs have something new happening every day
				0.801	There is something different to do every day
				0.637	Your job is challenging

*Discrimination validity achieved: If square root of AVE > Inter-construct Mean.

square root of the AVE should be higher than the construct correlations. Furthermore, all AVEs should be above 0.5. **Table 3** and **Table 4** shows that both requirements are met.

Table 3. Discriminant validity (Fornell-Larcker Criterion).

	Coordination	Digital literacy	Exploitative learning	Explorative learning	Non-routine task
Coordination	0.852*				
Digital literacy	0.037	0.746*			
Exploitative learning	0.31	0.063	0.823*		
Explorative learning	0.05	0.541	0.225	0.781*	
Non-routine task	-0.213	0.389	-0.047	0.304	0.712*

Table 4. Correlation matrix.

	Coordination	Digital literacy	Exploitative learning	Explorative learning	Non-routine task	√AVE
Coordination	1					0.852
Digital literacy	0.037	1				0.746
Exploitative learning	0.31*	0.063	1			0.823
Explorative learning	0.05	0.541	0.225	1		0.781
Non-routine task	-0.213	0.389*	-0.047	0.304*	1	0.712

The scales that were used in operationalizing the construct were derived from past studies related to ambidextrous learning, digital literacy, coordination, and routine technology (**Table 2**). We measured digital literacy using Ng (2012) five-item scale which assessed digital literacy of the respondents. For ambidextrous learning, we measured two constructs using Zhao, Zong, & Zhang (2020) five-item scales which assessed both explorative and exploitative learning. Coordination which constitutes two dimensions (centralization and formalization), was measured using Jansen, Van Den Bosch, & Volberda, (2006), five-item scale which

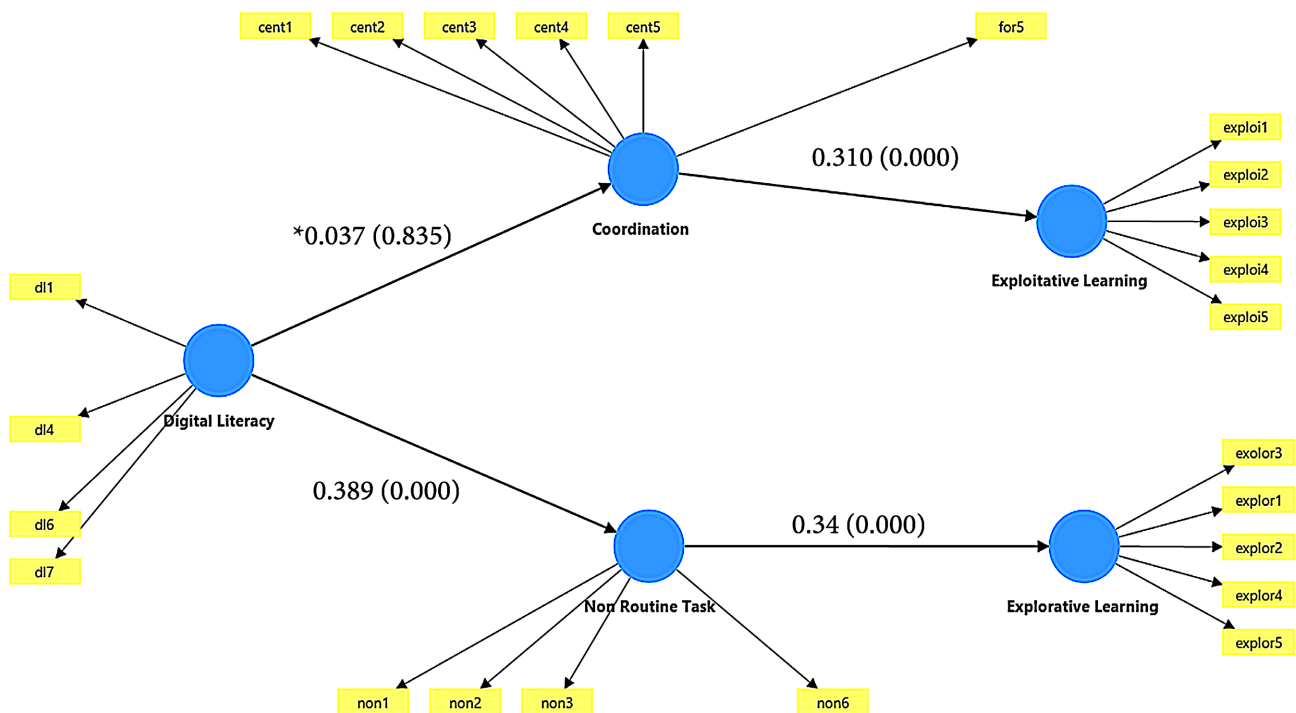
assessed coordination. For non-routine task, we used scales from Hage & Aiken (1969), five-item scales, which assessed non-routine task.

4.3. Structural Model

The extent to which the path coefficient can be trusted depends on the significance level, verified by the p-values ($p \leq 0.05$), that are generated with the bootstrapping procedure Hair, Ringle, & Sarstedt (2011). The model was conceptualized based on the hypotheses prior to collection of the data, the sample data were used to test hypothesis only, and not determine the structure of the model itself. Therefore, further model validation was not deemed necessary (Kumar, 2010). Three out of four hypotheses were confirmed with positive relationship, where their p-values were less 0.05 (Figure 2). Table 5 summarizes the path coefficient of all four hypotheses and their p-values. H2, H3, and H4 were found statistically significant at p-values less than 0.05. H1, which postulated that digital literacy is positively associated with coordination, as contrary to our expectation, the hypothesis was not statistically significant ($\beta = 0.037$; $p \geq 0.05$). However, H2, which posited that coordination is positively related to exploitative learning was statistically confirmed ($\beta = 0.31$; $p \leq 0.05$). Coordination, which refers to the systematic organization of different elements of one single body enabling them to work effectively and efficiently to achieve common goals, has positive impact on exploitative learning. This is because, as we predicted, exploitation which involves activities such as refinement, choice, production, efficiency, selection, implementation, and execution can thrive under such governing mechanism. Likewise, H3 postulated that digital literacy is positively associated with non-routine task was statistically significant ($\beta = 0.389$; $p \leq 0.05$). In this digital workforce, non-routine task which is characterized as a task which has few sets of procedures, and that requires great ability to solve problem can only be accomplished provided that the individuals working in a unit are digitally skilled. Finally, H4 posited that non-routine task is positively associated with explorative learning. As we expected, the hypothesis was statistically significant ($\beta = 0.304$; $p \leq 0.05$). According to this hypothesis, explorative learning includes activities such as search for fresh ideas, experimentation, risk-taking, and discovering alternatives that are far better than traditional practices can thrive better where employees are encouraged to perform non-routine task. Table 6 summarizes the results of all four hypotheses. Furthermore, in terms

Table 5. Path coefficient and significance (direct effect).

	Path coefficient (β)	P values ($p \leq 0.05$)
Coordination -> exploitative learning	0.310	0.000
Digital literacy -> coordination	0.037	0.835
Digital literacy -> non-routine task	0.389	0.000
Non-routine task -> explorative learning	0.304	0.000



*The path from digital literacy to coordination is statistically not significant.

Figure 2. Significant paths in the PLS model (reflective model) of digital literacy, coordination, non-routine task, and ambidextrous learning.

Table 6. Confirmation of hypotheses.

Hypothesis 1:	Digital literacy is positively related to coordination.	H1:	Not confirmed
Hypothesis 2:	Coordination is positively related to exploitative learning.	H2:	Confirmed
Hypothesis 3:	Digital literacy is positively associated with non-routine task.	H3:	Confirmed
Hypothesis 4:	Non-routine task is positively associated with explorative learning.	H4:	Confirmed

of indirect effects of digital literacy on ambidextrous learning, as per our expectation, the indirect path from digital literacy to explorative learning was found statistically significant, however, the path from digital literacy to exploitative learning was found statistically insignificant (Table 7).

A bootstrapping procedure was conducted to estimate the 95% confidence intervals (CI) for the structural path coefficients. A path is considered statistically significant at the 5% level if the confidence interval does not include zero (Hair, et al., 2022). The results indicate that out of six relationships (both direct and indirect), only two relationship was found insignificant (Table 8). The path from digital literacy to coordination was not found significant since the value of CI at 95% confidence was negative. Likewise, CI value of the path from digital literacy to exploitative learning was also found statistically negative (Table 8). The remaining four relationships including path from digital literacy to explorative learning was found statistically significant as the value of CI at 95% confidence (Table 8).

Table 7. Path coefficient and significance (indirect effect).

	T statistic	P values ($p \leq 0.05$)
Digital literacy -> exploitative learning	0.185	0.853
Digital literacy -> explorative learning	3.159	0.002

Table 8. Confidence intervals (Total effects).

	Original sample (O)	Sample mean	2.50%	97.50%
Coordination -> exploitative learning	0.31	0.339	0.243	0.453
Digital literacy -> coordination	0.037	0.02	-0.306	0.304
Digital Literacy -> exploitative learning	0.011	0.008	-0.109	0.115
Digital literacy -> explorative learning	0.118	0.133	0.067	0.213
Digital literacy -> non-routine task	0.389	0.402	0.276	0.52
Non-routine task -> explorative learning	0.304	0.329	0.206	0.446

*Confidence level of 95%.

For each endogenous construct, the explanatory power of structural model was assessed using coefficient of determination (R^2). According to PLS-SEM guidelines, R^2 values of approximately 0.75, 0.50, and 0.25 can be characterized as substantial, moderate, and weak (Hair et al., 2022). Values below 0.25 indicate relatively low explanatory power (Hair et al., 2022). Table 9 provides the R^2 values for each endogenous construct. These values insinuate that our model exhibits weak explanatory power, as all the R^2 values fall below the accepted benchmark of 0.25 (Hair et al., 2022). However, with R^2 value of .151 (Adjusted $R^2 = 0.147$), non-routine task demonstrates the highest explanatory power, among the endogenous constructs (Table 9). This indicates that “Digital literacy” explains 15.1% of the variance in non-routine task.

Table 9. R^2 values of endogenous constructs.

	R-square	R-square adjusted
Coordination	0.001	-0.004
Exploitative learning	0.096	0.091
Explorative learning	0.092	0.087
Non-routine task	0.151	0.147

Variation Inflation Factor (VIF) was used in evaluating inner model collinearity assessment to examine whether predictor constructs in the structural model are highly correlated. In PLS-SEM, VIF values below 3.3 (or more conservatively 5.0) indicate that collinearity is not a concern (Hair et al., 2022). Since, VIF values of all structural paths, as shown in Table 10, are equal to 1, indicates complete ab-

sence of multicollinearity among the predictor constructs.

Table 10. Inner model collinearity list.

	VIF
Coordination -> exploitative learning	1.00
Digital literacy -> coordination	1.00
Digital literacy -> non-routine task	1.00
Non-routine task -> explorative learning	1.00

5. Discussion

Based on ambidextrous learning, coordination, and digital literacy literatures, we examined how digital literacy relates to ambidextrous learning among employees in Vietnam. Furthermore, our result showed that where organization is contextually structured, the mediating role of non-routine task between digital literacy and explorative learning is significant. Such effects are more pronounced under contextual approach.

5.1. Limitations

Although our study focused on the importance of digital literacy among employees in ambidextrous learning in the modern context of digitalized labor, is not without limitations. First, there is a possibility of potential biasness in the sample, despite we employed two phase data collection approach to alleviate the problem. Second, we relied on cross-sectional survey to measure the impact of digital literacy on ambidextrous learning, and mediation role of non-routine task and coordination. Cross-sectional studies are limited to a single snap shot, precluding researchers from tracking changes in behavior, trends, or development of phenomena over time. Hence, longitudinal method is encouraged in future, to examine the impact of digital literacy on both explorative and exploitative learning. Third, our data were solely collected in Vietnam, where there is a possibility of relatively high levels of power distance, and there may be presence of cultural issues in our findings. In such scenario, coordination may have strong impact on exploitative learning than non-routine tasks have on explorative learning. Hence, we recommend future research to replicate our findings in other cultural backgrounds.

5.2. Theoretical Contribution and Implications

Our study contributes to the theory and research on digital literacy by focusing on the role of digital literacy among employees in ambidextrous learning in the context of digital work force. Past digital literacy researches have only focused on its importance in the modern workforce and the overarching importance in the digital economy. However, there has been limited focus on how digital literacy in employees can benefit them in both explorative and exploitative learning in hierarchy. We contribute to the literature by identifying the importance of the con-

cept, in the management domain, that suggest a pair of paradoxical relationship, involving two contradictory elements that not only simultaneously exist but are also interdependent. With the support of evidence, in digitalized job market, we identified that the digital literacy has direct impact on non-routine task, however path from digital literacy to coordination was found insignificant. Although, conceptually, we showed the mediating role of coordination and non-routine task, the result showed no impact of digital literacy on coordination. However, as expected the relationship between coordination and exploitative learning was significant, and non-routine task was positively associated with explorative learning. These findings provide valuable insights in digital literacy literature that how digital literacy has become a basic requirement to survive the complexity digitalized workforce.

Second, we tested model that showed the mediating role of coordination and non-routine task between digital literacy and ambidextrous learning. Coordination refers to the systematic organization of different elements of one single body or hierarchy enabling them to work effectively and efficiently to achieve common goals. Although no relation between digital literacy and coordination was found, our findings suggested that the coordination has strong impact on exploitative learning. This is because, exploitation involves activities such as refinement, choice, production, efficiency, selection, implementation, and execution. These kinds of activities that are designed to meet existing customers demand and sharpen existing knowledge and skills can thrive in an environment that encourages efficient flow of information, and rules and regulations that reduces loopholes and improves existing routines. Non-routine tasks that require problem solving, have few sets of procedures, and have a high degree of uncertainty has strong association with explorative learning. Exploration involves activities that include search of fresh ideas, experimentation, risk-taking, autonomy in organizations, and loose discipline. Our findings support the path from digital literacy to non-routine tasks to explorative learning. This supports the notion that with strong digital literacy employees can seek solution to new problems, and face task that has high uncertainty, which is beneficial to explorative learning.

Third, in line with previous studies (Zhao, Zong, & Zhang, 2020; Gibson & Birkinshaw, 2004), we found that ambidexterity is best achieved when the organizational system supports contextual approach rather than structural separation and temporal balancing. This approach emphasizes multidimensional approach, where employees at their own discretion, can decide to split their time between following standardized procedures to complete daily task, as well as developing new ideas and adapting to changes. Under this perspective, we identified mediating role of non-routine task to demonstrate the efficacy of digital literacy on explorative learning. Also, the results supported the role of coordination on exploitative learning. As such, our findings, add additional value to the existing literature of ambidexterity by demonstrating strong impact of coordination and non-routine task on exploitative and explorative learning respectively. Based on the

evidence, our study supports the premise of contextual perspective that exploitative and explorative learning can coexist to foster team development in digital economy.

5.3. Practical Implications

Based on the findings, we have two practical implications. First, as job market has increasing become competitive and dynamic amid advent of AI, employees need to pursue equilibrium between the paradoxical demands to remain competitive. Our study demonstrated that individuals with strong digital literacy can not only follow standardized procedures to improve internal efficiency and cater existing demand, but also can equally allot time to pursue new ideas and adapt to changes of external environment. Therefore, management at higher echelon, must understand the impact of digitalized economy that has on job market, which has created demand of employees that are digitally skilled and are capable of upgrading their skills to adapt changes in the environment.

In addition, prior studies have amplified the role of contextual approach to achieve ambidexterity (Zhao, Zong, & Zhang, 2020; Gibson & Birkinshaw, 2004). Our study supports this argument by testing the model that showed the mediating role of coordination and non-routine task between digital literacy and ambidextrous learning. The evidence showed the strong impact of coordination on exploitative learning, and strong relationship from digital literacy to non-routine task to explorative learning. Hence, to achieve ambidexterity, upper management must learn to shift their managerial practices between empowering and controlling in accordance with the changes in external environment.

6. Conclusion

In regards to the competitive and dynamic external environment that organizations face, it has become imperative for organizations to recruit individuals that are digitally competent. Our evidence supports the idea that in the dynamic environment, individuals must up-skill their digital literacy to survive the complexity of digital economy. Furthermore, our study advances research on importance of ambidextrous learning by examining the role of coordination and non-routine as mediating variable between digital literacy and ambidextrous learning within the perspective of contextual system. The result, however, failed to support the path from digital literacy to coordination, contrary to our expectation. Hence, we recommend to replicate our studies in other cultural background to bring more positive results that concur with our conceptual model, and support the idea that with profound digital literacy employees can explore new ideas amid maintaining efficiency.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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