

An Empirical Study on the Learning Agility of Library and Information Service Personnel in the Smart Service Context: Postprint

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Abstract

[Purpose/Significance] Taking learning agility as the entry point, this study explores how library and information science (LIS) professionals can rapidly enhance their competencies and potential to more effectively perform and accomplish new tasks in the unfamiliar context of smart services, providing references and insights for better implementation of smart services in the future. [Method/Process] Through collecting 189 survey questionnaires from domestic “Double First-Class” universities and employing structural equation modeling analysis, this study conducts an in-depth investigation into the learning agility of LIS service professionals in the smart services context, including: whether the key constituent elements for measuring learning agility are valid; the relationships between these key constituent elements and service innovation intention, as well as service effectiveness. [Results/Conclusions] The study finds that: in the smart services context, the learning agility of LIS service professionals comprises four key factors—self-insight, interpersonal acumen, change readiness, and environmental sensitivity—each showing a significant positive correlation with service innovation intention and service effectiveness; simultaneously, service innovation intention demonstrates a significant positive correlation with service effectiveness. Finally, the paper conducts an in-depth discussion on the management of library and information services and proposes corresponding countermeasures and recommendations.

Full Text

An Empirical Study on the Learning Agility of Library and Information Service Personnel in Smart Service Contexts

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Abstract

[Purpose/Significance] This study examines learning agility to explore how library and information service (LIS) personnel can rapidly enhance their competencies and potential to effectively perform and excel in new roles within the unfamiliar context of smart services, providing reference for future smart service development. **[Method/Process]** Through 189 survey questionnaires collected from domestic “Double First-Class” universities, this study employs structural equation modeling to investigate the learning agility of LIS personnel in smart service contexts, including: (1) whether the key components for measuring learning agility are valid; and (2) the relationships between these components and service innovation willingness and service effectiveness. **[Results/Conclusion]** The findings reveal that in smart service contexts, LIS personnel’s learning agility comprises four key factors: self-insight, interpersonal acumen, change alacrity, and environmental mindfulness, each showing significant positive correlations with service innovation willingness and service effectiveness. Additionally, service innovation willingness demonstrates a significant positive correlation with service effectiveness. Finally, the paper discusses LIS management implications and offers corresponding recommendations.

Keywords: smart service context; library and information service personnel; learning agility; structural equation; empirical research

1. Introduction

With the rapid development of internet information technology and the continuous advancement of smart society strategies, constructing smart service contexts has become a crucial strategic choice for library and information service institutions (hereinafter referred to as “LIS services”), including libraries, archives, and scientific information research institutes. This novel and unfamiliar service context, characterized by innovative service technologies, intelligent service functions, and smart service methods [1], creates new opportunities for future business transformation and service innovation in LIS services. Compared with any previous era, organizations now face dynamic and complex new service contexts and innovation environments, particularly in today’s smart service contexts, requiring a new type of composite talent with keen learning potential who can successfully apply what they learn to unfamiliar situations. Learning agility, a frontier topic in international academic research, primarily investigates

the potential and ability of organizational members to learn from experience and apply it in unfamiliar new contexts [2]. Correctly understanding learning agility can meet organizations' needs for identifying and evaluating composite talent in complex, dynamic new contexts; therefore, an objective cognition and assessment of learning agility is necessary. N. Dries et al.'s research has shown that learning agility demonstrates good validity for organizations in identifying talent potential and predicting work performance effectiveness [3].

Through literature review and analysis, we find that: (1) foreign research on learning agility is growing, while domestic research is just beginning—with only two Chinese articles in the CNKI database focusing on conceptual analysis and discussion, lacking objective and empirical data support and verification for conclusions and relationships; (2) existing literature from the perspective of LIS personnel includes many theoretical discussions on competencies [4], career development [5], technostress [6], and self-efficacy [7], but empirical research on analysis and smart service contexts is relatively scarce, with no findings specifically addressing learning agility among LIS personnel in smart service contexts or its influence on service willingness and effectiveness; (3) previous learning agility studies [2-3] were conducted in specific past contexts and cannot adequately explain LIS personnel in smart service contexts.

Given this, this study focuses on LIS personnel, employing structural equation modeling and SmartPLS 3.0 software to quantitatively investigate learning agility in smart service contexts, including: (1) whether the key components for measuring learning agility are valid; (2) the relationships between these components and service innovation willingness and service effectiveness; and (3) based on these, proposing research hypotheses and a conceptual model to deeply reveal the essential principles of LIS personnel's learning agility and provide reference for future smart service development.

2. Research Background and Literature Review

2.1 Learning Agility The concept of learning agility (LA) was formally proposed in 2000 by internationally renowned HR experts M. Lombardo and W. Eichinger, originating from enterprise HR management practice and innovation based on organizational needs for identifying and evaluating talent potential. Once proposed, learning agility quickly gained attention in foreign academic theory and practice, with related theoretical research rapidly becoming an important new methodology for talent potential identification. Scholars such as A. Mitchinson, S. Goebel, and J. Batcheller explored learning agility's conceptual connotation [8], measurement and evaluation [9], and development and application [2] from a business application perspective. S. A. Hezlett, D. S. DeRue, and others conducted in-depth theoretical analyses distinguishing learning agility from related concepts like learning ability [11], cognitive ability [12], learning goal orientation [13], and practical ability [14]. C. L. Bedford and B. C.

Smith employed empirical research methods to investigate measurement tools [15] and influence relationships [16].

Domestically, a CNKI database search using “learning agility” as the keyword yielded only two relevant articles as of January 2018: Lin Guangming’s “Transformation Era, Is Your Learning Agility Still Okay?” [17] and Li Weiyang et al.’s “Learning Agility: Concept, Measurement, Research Progress, and Hot Debates” [18]. This indicates that learning agility is a very novel topic in China requiring further investigation, while also demonstrating the value and necessity of this study.

Although widely recognized in academia and business, learning agility remains a novel concept without a unified academic definition. Referencing N. Dries and Lin Guangming’s research [17, 19], this study defines learning agility from an LIS service perspective as: the potential of LIS personnel in libraries (or information service institutions) to rapidly acquire new competencies and achieve high performance in novel, unfamiliar technological service contexts. Like the principle of acceleration, learning agility is the acceleration of competency when facing unprecedented new situations, helping LIS personnel rapidly enhance their qualities and effectively perform and excel in new roles within a short timeframe.

Learning agility comprises four key elements: (1) **Self-Insight (SI)**: accurate self-cognition, including abilities, values, beliefs, weaknesses, and goal orientation; (2) **Interpersonal Acumen (IA)**: interacting with others, understanding their motivations, strengths, weaknesses, purposes, and value orientations, and motivating teammates to progress together; (3) **Change Alacrity (CA)**: accepting new thinking, behaviors, and situations with an open attitude, eager to work through continuous learning and innovation; and (4) **Environmental Mindfulness (EM)**: observing and utilizing new surroundings, paying attention to new role and responsibility requirements, remaining objective, calm, and wise, and being well-prepared to respond to environmental changes.

2.2 Service Effectiveness The analysis, measurement, and evaluation of LIS service effectiveness have always been important research issues. The Association of College and Research Libraries (ACRL) stated in its June 1998 white paper “Task Force on Academic Library Outcomes Assessment Report” that library service effectiveness refers to changes in users through utilizing library resources and facilities, closely related to LIS missions and tasks [20]; satisfaction or dissatisfaction are both forms of service effectiveness, with simple satisfaction being relatively easy to achieve. Domestically, Zhang Hongxia [21] argues that both performance and effectiveness are crucial for library service quality assessment, where performance refers to input, output, and efficiency, while service effectiveness refers to impact and outcomes. Yang Lanfang et al. [22] note that service effectiveness has narrow and broad definitions: broadly, it equals service system effects, including human, financial, and material inputs, service processes, and user assistance, systematically evaluating the service system; narrowly, it refers to changes in user behavior, skills, and attitudes. This

study adopts the narrow definition, referring to the quality and effectiveness of services and activities provided by libraries (or information institutions) and the efficiency of resource allocation, including service system construction effectiveness, service resource construction effectiveness, and user-perceived service effectiveness, aiming to address specific user service needs and influence user behavior, attitudes, skills, or knowledge.

2.3 Smart Service Context Rapid IT development and emerging artificial intelligence have made smart service a new reality in LIS services. For example, Finland's Luo University Library proposed in 2003 that smart service is an intelligent service model perceivable anytime, anywhere, intelligently meeting different users' personalized service needs [23]. Subsequently, 22 LIS institutions in New Zealand's Greater Wellington region formed the Smart Libraries Consortium, offering public services including book and periodical lending, CD searching and downloading, smart location queries, and smart library cards [24]. Domestically, Wang Shiwei [25, 26] views smart service as based on digitalization, networking, and intelligence, characterized by connectivity, efficiency, and convenience, with green development and digital benefits as pursuits—a new concept and practice for modern LIS development. Zeng Jianxun [27] considers smart service a novel, perceivable, computable, and visualizable creative service mode, a high-level product form of traditional LIS services with personalization, humanization, intelligence, and interactivity, driving traditional LIS institutions toward technological upgrading, conceptual transformation, management innovation, and service transition.

Since this paper does not focus on “what is smart service” and domestic and foreign experts have comprehensively studied it, no repetitive description is provided. This study emphasizes the smart service context because LIS personnel are core institutional forces whose individual qualities and learning capabilities crucially impact service effectiveness. The smart service context, characterized by technological novelty, service intelligence, and innovative methods, is complex, dynamic, unfamiliar, and challenging for most people, requiring new composite talent with keen learning abilities who can successfully apply their learning to unfamiliar contexts.

2.4 Theory of Reasoned Action The Theory of Reasoned Action (TRA), proposed by M. Fishbein and I. Ajzen in 1975, explains and studies individual behavior; the famous Theory of Planned Behavior (TPB) model originated from TRA and has been widely applied. The theoretical model is shown in Figure 1 [Figure 1: see original paper]. H. K. Bang et al. used TRA to analyze how consumer attitudes, knowledge, and beliefs influence attitudes and behaviors toward renewable energy [29]. D. Mishra et al. applied TRA to green IT acceptance [30]. A. A. Oni et al. combined the user acceptance model with TRA to empirically study online political participation [31]. Domestically, Chen Shu, Liu Bailing, and Xu Linjia used TRA to explore factors influencing microblog users' forwarding behavior [32], mobile shoppers' information disclosure willingness [33], and

consumer attitudes and behaviors in brand international communication [34].

The TRA model posits that when people think rationally and make decisions, subjective norms and attitudes determine behavioral intention and ultimately affect behavioral outcomes; subjective norms represent self-perceived behavioral implementation, while attitudes represent self-emotions toward target behaviors (positive or negative). This study's hypotheses and conceptual model derive from classic TRA, referencing the above research to propose relevant hypotheses and focusing on exploring and analyzing learning agility's key components and their impact on service innovation willingness and service effectiveness from the TRA framework of attitudes and subjective norms.

3. Hypothesis Development

3.1 Impact of Learning Agility on Service Innovation Willingness In smart service contexts, learning agility represents excellent potential and capability among LIS personnel, encompassing both attitudes and subjective norms that directly influence service innovation willingness. While no literature specifically examines learning agility's impact on service innovation willingness, some scholars have explored related elements' effects from perspectives of self-insight, interpersonal acumen, change alacrity, and environmental mindfulness. For example, J. Ehrlinger et al. argue that self-insight is a crucial trait of excellent talent and an important factor for innovation willingness, as incompetent workers often lack self-insight [35]. M. T. Tsai et al., using Taiwan's high-tech industry workers as an example, found that knowledge workers' interpersonal relationships affect innovation performance, with interpersonal acumen positively related to innovation willingness [36]. A. Trembath studied why people resist new technologies, finding that excellent talent typically possesses strong change alacrity and willingness to continuously try and innovate [37]. J. J. P. Jansen et al. found that innovators' environmental mindfulness importantly moderates innovation willingness and performance, representing an indispensable element [38]. Therefore, referencing the above literature, this study proposes:

H1: In smart service contexts, LIS personnel's learning agility positively correlates with service innovation willingness.

H1a: In smart service contexts, LIS personnel's self-insight positively correlates with service innovation willingness.

H1b: In smart service contexts, LIS personnel's interpersonal acumen positively correlates with service innovation willingness.

H1c: In smart service contexts, LIS personnel's change alacrity positively correlates with service innovation willingness.

H1d: In smart service contexts, LIS personnel's environmental mindfulness positively correlates with service innovation willingness.

3.2 Impact of Learning Agility on Service Effectiveness Prior research consistently concludes that individual potential and capability positively correlate with work effectiveness (or performance). For example, J. M. Phillips et al. used structural equation modeling to empirically study personality traits, individual abilities, and research goals, finding that self-insight and other individual potentials positively correlate with target outcomes [39]. J. Park et al. found that in IT services, information interaction, knowledge sharing, interpersonal relationship management, and communication effectiveness—especially interpersonal sensitivity—significantly impact IT service development and maintenance [40]. Yang Chunjiang et al. studied transformational leadership's impact on employee task performance, finding that change alacrity positively affects work effectiveness [41]. Zhang Lei's survey of sci-tech novelty search services found that environmental factors (policy, resource, and market environments) significantly and positively impact sci-tech novelty search institutions' performance [42]. Therefore, referencing the above literature, this study proposes:

H2: In smart service contexts, LIS personnel's learning agility positively correlates with service effectiveness.

H2a: In smart service contexts, LIS personnel's self-insight positively correlates with service effectiveness.

H2b: In smart service contexts, LIS personnel's interpersonal acumen positively correlates with service effectiveness.

H2c: In smart service contexts, LIS personnel's change alacrity positively correlates with service effectiveness.

H2d: In smart service contexts, LIS personnel's environmental mindfulness positively correlates with service effectiveness.

3.3 Impact of Service Innovation Willingness on Service Effectiveness Xing Rui et al. built a theoretical model of entrepreneurial orientation, innovation willingness, incubation environment, and incubated firms' innovation performance, finding that innovation willingness significantly and positively affects innovation performance, while also fully and partially mediating relationships among entrepreneurial orientation, incubation environment, and innovation performance [43]. Ji Min et al. reviewed innovation willingness, network relationship strength, and innovation performance theory, finding positive correlations between innovation willingness and enterprise innovation performance, as well as mediating effects among innovation willingness, network relationship strength, and enterprise innovation performance [44]. Referencing the above literature, this study proposes:

H3: In smart service contexts, LIS personnel's service innovation willingness positively correlates with service effectiveness.

3.4 Conceptual Model Based on the above hypotheses, this study's conceptual model is shown in Figure 2 [Figure 2: see original paper]. Following R. C. Liden et al.'s research, control variables ensure stable and valid results [45]; therefore, to prevent and reduce errors from irrelevant variables, this study includes respondents' identity, age, salary, and professional background as control variables.

4. Research Methods

4.1 Survey Questionnaire and Variable Measurement This study primarily uses survey questionnaires. Sample participants were contacted through library colleagues, classmates, and friends. SmartPLS 3.0 software conducted structural equation analysis to validate relationships and influence degrees among learning agility, service innovation willingness, and service effectiveness in smart service contexts. Variables, items, and sources are shown in Table 1. Questionnaires were distributed in both paper and electronic versions.

Content covers three aspects: learning agility, service innovation willingness, and service effectiveness. Learning agility includes self-insight, interpersonal acumen, change alacrity, and environmental mindfulness. Specific measurement items were selected from mature scales in foreign literature, appropriately adjusted after consulting domain experts to meet this study's needs. A 5-point Likert scale was used (1 = strongly disagree, 5 = strongly agree). Data analysis included descriptive statistics, reliability and validity analysis, and partial least squares (PLS) structural equation modeling.

4.2 Research Sample and Data Collection To maximize typicality, relevance, and validity, sample participants were selected from "Double First-Class" universities (world-class universities in Categories A and B) based on smart service context characteristics. Distribution includes: (1) Regional distribution: 3 in Beijing, 2 in Guangdong, 2 in Heilongjiang, 2 in Hubei, and 2 in western China; (2) Personnel structure: librarians responsible for service or technology development, department heads, division leaders, and LIS students (undergraduate, master's, and doctoral). The 6-month study distributed 216 questionnaires, yielding 189 valid responses (87.50% validity rate) for empirical analysis.

Descriptive statistics are shown in Table 2. Notably, the sample includes top universities and LIS students because they have strong learning abilities, embrace new things, possess innovative thinking capabilities, and will be core future LIS professionals. Therefore, they serve as appropriate participants for this study.

5. Empirical Analysis

This study uses partial least squares (PLS) structural equation modeling to evaluate measurement and structural models, employing structural equation modeling (SEM) for empirical analysis to assess and construct hypothesized relationships and research models.

5.1 Research Model Measurement The measurement model was evaluated using factor loadings, reliability, and validity, including reliability tests and validity tests.

5.1.1 Reliability Test

Reliability assessment includes composite reliability (CR) and Cronbach's alpha, as shown in Table 3. All factor loadings exceed 0.6, indicating good explanatory power for measurement variables. Both CR and Cronbach's alpha values exceed 0.8, demonstrating good reliability and passing reliability tests.

5.1.2 Validity Test

Validity assessment includes content validity, discriminant validity, and convergent validity: (1) Measurement items originate from authoritative journal literature, indicating good content validity; (2) Table 3 shows all average variance extracted (AVE) values exceed 0.6, demonstrating good convergent validity; (3) Table 4 shows AVE square roots on the diagonal exceed other correlation coefficients, indicating good discriminant validity. In summary, the measurement model demonstrates good validity.

5.2 Data Analysis and Results PLS-SEM evaluated and tested hypothesized relationships and structural equations. Final results are shown in Figure 3 [Figure 3: see original paper] and Table 5. All VIF values are below 10, indicating no multicollinearity.

Results in Table 5 show:

1. Learning agility components—self-insight ($\beta = 0.110$, $p < 0.1$), interpersonal acumen ($\beta = 0.305$, $p < 0.1$), change alacrity ($\beta = 0.302$, $p < 0.05$), and environmental mindfulness ($\beta = 0.134$, $p < 0.1$)—significantly and positively correlate with service innovation willingness, supporting H1a, H1b, H1c, and H1d.
2. Learning agility components—self-insight ($\beta = 0.062$, $p < 0.1$), interpersonal acumen ($\beta = 0.192$, $p < 0.1$), change alacrity ($\beta = 0.288$, $p < 0.01$), and environmental mindfulness ($\beta = 0.267$, $p < 0.01$)—significantly and positively correlate with service effectiveness, supporting H2a, H2b, H2c, and H2d.
3. Service innovation willingness significantly and positively correlates with service effectiveness, supporting H3 ($\beta = 0.173$, $p < 0.01$).

4. Notably, change alacrity and interpersonal acumen show the strongest relationships with both service innovation willingness ($\beta = 0.302$, $p < 0.01$; $\beta = 0.305$, $p < 0.1$) and service effectiveness ($\beta = 0.288$, $p < 0.01$; $\beta = 0.192$, $p < 0.1$).

6. Discussion and Implications

6.1 Results Discussion and Management Implications This study introduces learning agility components (self-insight, interpersonal acumen, change alacrity, environmental mindfulness) and uses survey questionnaires and PLS-SEM to propose and test hypotheses, measuring learning agility's impact on service innovation willingness and service effectiveness in smart service contexts. The findings have important practical significance and management value for future smart service innovation and LIS talent development.

Results discussion and management implications:

1. **Learning agility significantly and positively affects service innovation willingness** (H1, H1a-H1d supported). Path coefficients between learning agility components and service innovation willingness are 0.110, 0.305, 0.302, and 0.134, meeting significance requirements. These results align with R. W. Eichinger et al. [48], providing corroborating evidence. LIS personnel with strong learning agility possess higher self-insight, interpersonal acumen, change alacrity, and environmental mindfulness, making them more willing to actively try and innovate in new smart service contexts.

Management implication: LIS institutions should prioritize building a high learning agility workforce to effectively promote smart service innovation. These personnel lead ordinary LIS staff as main forces in advanced technology services and key participants in frontier smart service product/project innovation, development, and exploration.

2. **Learning agility significantly and positively affects service effectiveness** (H2, H2a-H2d supported). Path coefficients are 0.062, 0.192, 0.288, and 0.267, meeting significance requirements. These findings align with G. R. Dai et al. [49], providing corroborating evidence. LIS personnel with strong learning agility achieve more significant service effectiveness, demonstrating positive change alacrity for service innovation. Multiple learning agility elements interact to deliver better user experiences and ultimately produce superior service outcomes.

Management implication: LIS institutions should use the 13th Five-Year Plan as an opportunity to develop talent cultivation and evaluation mechanisms based on learning agility components, rapidly upgrading and selecting high-potential LIS personnel to substantially improve service effectiveness. These personnel focus on new technology applications in smart ser-

vices, understand their strengths and weaknesses, handle interpersonal relationships in new contexts, and remain sensitive to environmental changes—foundational qualities for delivering high-quality services and improving effectiveness.

3. **Service innovation willingness significantly and positively affects service effectiveness** (H3 supported), with a path coefficient of 0.173 meeting significance requirements. Research by Chen Mang et al. and H. Liao et al. [46-47] provides corroborating evidence. Service innovation willingness remains a crucial factor for service effectiveness and continues to be an important research focus.

Management implication: LIS institutions should employ flexible incentive methods—material rewards, compensation, recognition, and promotion opportunities—to activate, enhance, and elevate service innovation willingness, fostering staff identity, belonging, and satisfaction. This enables them to better adopt user perspectives in creating service atmospheres, considering service content, and innovating service methods, thereby improving service effectiveness.

6.2 Research Contributions, Limitations, and Future Directions

Research contributions: (1) Proposes an empirical analysis method for LIS personnel's learning agility in smart service contexts, supplementing and improving domestic theoretical research; (2) Clarifies influencing factors, relationships, paths, and degrees of impact among learning agility, service innovation willingness, and service effectiveness; (3) Provides practical implications by integrating conclusions with service practice and offering management recommendations for learning agility, service innovation willingness, and service effectiveness relationships.

Research limitations: (1) The questionnaire survey method limited sample size, potentially restricting generalizability; (2) Cognitive differences among respondents may affect understanding of smart service contexts and learning agility, requiring deeper analysis. These limitations represent important future research directions.

While commercial practice on learning agility is flourishing, academic research lags far behind. Most foreign research appears in HR management literature, while only two domestic theoretical articles exist. Research on learning agility in LIS services is novel with substantial potential. Future research should focus on specific service contexts, segmented service subjects, personalized service needs, and quantifiable service effectiveness for more comprehensive, in-depth, and differentiated studies to improve related theories.

In smart service contexts, with Internet+, big data, cloud computing, artificial intelligence, mobile services [50], and talent convergence, learning agility research offers vast theoretical and practical development space for discovering and solving problems.

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Author Contributions

Chen Mang: Data collection and analysis, manuscript writing and revision.

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English Abstract

[Purpose/Significance] Based on the study of learning agility, this paper explores the problems associated with the unfamiliar new situation of the intelligence service, which rapidly improves the self-quality and potential ability and thus effectively competes the new job, to provide reference for smart service development. **[Method/Process]** By collecting 189 questionnaires from domestic “Double First-Class” colleges and universities, this paper attempts to analyze the key components of learning agility based on smart service, and its relationship with service innovation willingness and service effectiveness, which uses the method of structural equation. **[Results/Conclusion]** Results suggest that: (1) In the context of intelligent service, the learning agility of a librarian is composed of four key factors, such as Self-Insight (SI), Interpersonal Acumen (IA), Change Alacrity (CA) and Environmental Mindfulness (EM). (2) These factors have a significant positive correlation to service innovation intention and service effectiveness. (3) The service innovation intention has a significant positive correlation to service effectiveness. Finally, this paper makes a thorough discussion on the management of library and information services, and puts forward the corresponding countermeasures and suggestions.

Keywords: smart service situation; the staff of library and information service; learning agility; structural equation; empirical research

Note: Figure translations are in progress. See original paper for figures.

Source: ChinaXiv –Machine translation. Verify with original.