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A scientometric review of the relationship between learning agility and work engagement in modern management context

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Abstract

This study uses a scientometric approach to examine the relationship between learning agility and work engagement in modern management. Using the Scopus database, it identified trends, significant authors, and influential institutions from 1994 to 2023. The data sources in this study were taken from the Scopus database with the keywords "Learning Agility" AND "Work Engagement" AND "Modern Management" from 1994-2023, with a total of 720 documents. Then, it was visualized and analyzed using VOSviewer, RStudio, CiteSpace visualization, and bibliometric mapping software. The results showed that learning agility, the ability to quickly adapt to new experiences, work commitment, focus on completing tasks, and achieving goals are closely related. Machine learning, artificial neural networks, and predictive analytics can improve learning agility and work engagement. Transformational leadership, mental workload, social support, digital competence, and new technology adaptability also improve learning ability and work engagement. Theoretical implications of the study include understanding the dynamics of learning agility and work engagement dynamics. In contrast, practical implications include strategies to increase employee productivity through skill development and targeted interventions. The limitation of this research is the data selection process, which only provides general limitations. Therefore, this research suggests that in the future, data should be explicitly limited by selecting the data to be analyzed one by one by adopting a mixed-method approach.

Introduction

This study assumed that learning and work agility revolve around indirect effects (Saputra et al., 2018). Such as measurement challenges (De Meuse, 2017), the role of technology (Deepa et al., 2021), organizational context (Tikkamäki & Mavengere, 2013), and the need for continuous adaptation in a complex business environment (Milani et al., 2021). Therefore, the significance of modern management greatly influences learning agility and work engagement (Busse & Weidner, 2020; Saeed et al., 2022; Tripathi et al., 2020). This shows the dynamic interaction between an individual's ability to learn and adapt quickly and their commitment and enthusiasm for work (Müceldili et al., 2020). Learning agility, defined as the ability to rapidly acquire knowledge, apply new tactics, and adapt in volatile, unpredictable, complicated, and ambiguous contexts, is widely acknowledged as a vital trait for employees and job seekers (Qin & Nembhard, 2015). Agility promotes the acquisition of new skills and enhances the application of skills across many contexts, ultimately enhancing job performance and engagement (Harsch & Festing, 2020).

On the other hand, work engagement is strongly influenced by perceptions of organizational support and innovative behavior that can be driven by learning agility (Saputra et al., 2018). Several studies indicate that learning agility positively correlates with innovative behavior, with employee

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engagement mediating this relationship (Müceldili et al., 2020; Tripathi & Dhir, 2023). Moreover, perceived organizational support might amplify the beneficial impact of learning agility on innovative behavior by enhancing employee engagement (Chung et al., 2014; Muduli, 2017). This indicates that organizations that promote and cultivate a culture of learning agility generally experience elevated levels of employee work engagement and innovative output (Franco & Landini, 2022). The significance of social aspects, particularly trust and autonomy, in agile teams highlights the necessity of a supportive work environment for improving collaborative engagement and performance, with trust being more crucial than autonomy (Alami et al., 2023). This also posits that worker agility and job engagement are crucial for adaptive performance in government organizations, suggesting a wider relevance of this notion outside the private sector (Ludviga & Kalvina, 2023).

Moreover, staff agility and engagement have significantly impacted an organization's civic behavior (Jo & Hong, 2022), emphasizing the advantageous results of cultivating an agile and engaged workforce (Saeed et al., 2022). The pandemic-induced digital transformation has heightened the necessity for employee adaptability and engagement as organizations strive to navigate swift alterations in the corporate environment (Bennett & McWhorter, 2021). The correlation between work engagement and elements such as leadership style, HRM practices, and organizational commitment underscores the intricacy of managing and improving engagement in contemporary work environments (Albrecht et al., 2015).

Strategic workforce upskilling and cultivating learning organizations are essential for managing the disruptions induced by digitalization, automation, and big data, with individual learning agility vital for success (Mukherjee et al., 2023). Despite the challenges, the benefits of engagement, including the ability to navigate stressful situations and make significant contributions to organizational success, cannot be overstated (Purcell, 2014). The relationship between learning agility and work engagement in modern management is characterized by a reciprocal influence where learning agility enhances work engagement, and a supportive and engaging work environment fosters learning agility. This synergy is essential for organizational adaptation, innovation, and performance in today's rapidly changing business environment.

Some scholars have researched learning agility and work engagement; Derue et al. (2012a) examine the importance of learning agility in improving leadership and adapting to change. This confirms that technological changes and market dynamics require employees to have high learning agility. However, not all individuals can adapt quickly, hindering work engagement. This can reduce productivity and job satisfaction (Dai et al., 2013). According to McCauley et al. (2013), it is essential to underscore management's pivotal role in enabling staff development and adaptation. One method to address this difficulty is implementing a learning agility development plan via continuous training programs, managerial support, and a flexible work culture to enhance employee engagement.

Consequently, this research is urgent to examine the dynamics of transformations in labor and contemporary management, which are becoming progressively intricate. In the modern digital and globalized era, the capacity of organizations and individuals to swiftly adapt to change is a pivotal determinant of attaining a competitive advantage (Koch & Windsperger, 2017). Learning agility encompasses acquiring, adjusting, and applying new knowledge in dynamic contexts (Ghosh et al., 2021). Meanwhile, work engagement pertains to employees' involvement in their tasks, encompassing excitement, dedication, and immersion (Eldor, 2016). This study seeks to elucidate the evolution of research about the correlation between learning agility and work engagement within the framework of contemporary management. These two principles are vital as they give managers and organizational leaders key insights for cultivating a productive and inventive work environment.

This research is essential for addressing contemporary management issues, frequently encountering requests for swift and unforeseen changes. By elucidating the correlation between learning agility and job engagement, organizations may devise more focused training and development strategies and foster a work culture that promotes creativity and sustainability. Consequently, this study is essential to deliver tangible answers for enhancing organizational performance amidst a perpetually evolving corporate landscape.

The subsequent sections of the paper are structured as follows. This section provides a review of the current literature and theoretical framework. The third section delineates the research

methodology utilized. The fourth section presents an overview of the empirical results. The concluding part presents conclusions, limits, and recommendations for future research.

Literature Review

Theoretical Multidimensionality of the Learning Agility (LA) and Work Engagement (WE)

The capacity of LA and WE to assimilate with other theories facilitates its dissemination. LA and WE have been utilized in the Job Demands-Resources (JD-R) model, Competency theory, Self-Determination Theory (SDT), and Organisational Learning frameworks. We examine each element to elucidate the theoretical foundations.

Table 1. Taxonomy Literature Review on Learning Agility and Work Engagement

Theory	Assumptions	Criticism	Research Gaps	Methods	Country	Author/Year
Human Resource Management Practices and Work Engagement	Human resource management practices positively influence work engagement, moderated by adaptability.	Limited empirical studies linking HRM practices to work engagement.	More research is needed on developmental HR practices and their impact on engagement.	Cross-sectional survey, SEM	Italy	(Urbini et al., 2021)
Knowledge Management and Learning Agility	Knowledge management mediates the relationship between learning culture and learning agility.	Focusing on one institution limits generalizations	More extensive research is needed across institutions and sectors.	Cross-sectional survey, PLS-SEM	Indonesia	(Saputra et al., 2021)
Psychological Climate and Work Engagement	Work involvement mediates the relationship between psychological climate and OCB.	For IT professionals only, may not apply to other sectors.	Exploration of other professional contexts is required.	Survey, SEM	India	(Kataria et al., 2013)
Engagement in Study and Adaptability in Learning	Adaptability in learning and time management disposition are positively related to engagement in learning.	Limited to nursing students, not generalizable to other fields.	The need for research in different educational contexts.	Survey, hierarchical linear regression	China	(Liu et al., 2014)
Organizational Climate and Employee Engagement	A favorable organizational climate is closely related to employee engagement.	Focused on Polish companies, it may not be universally applicable.	Further research is needed in a variety of organizational settings.	Survey	Poland	(Szczepanska-Woszczyna & Bogaczyk, 2023)
Leadership and Work Engagement	Engaging leadership influences work engagement through personal and team resources.	Limited to certain leadership styles may not cover all leadership behaviors.	The need for a broader exploration of various leadership styles.	Multilevel-SEM	Not Specified	(Mazzetti & Schaufeli, 2022)

The JD-R model highlights the importance of balancing work demands and resources to improve employee well-being and organizational effectiveness through dual processes, mediation by emotional states, and the protective function of resources. The JD-R model presents two primary approaches: Initially, elevated workplace expectations (e.g., workload, role conflict) induce

strain and health issues, potentially resulting in negative consequences such as burnout and further health complications (Balducci et al., 2011; Bauer et al., 2014; Kaiser et al., 2020). Secondly, elevated workplace resources (e.g., decision-making authority and social support) enhance motivation, resulting in favorable outcomes such as increased work engagement, job satisfaction, and productivity (Lo Presti & Nonnis, 2014). Moreover, job-related affective states (both positive and negative) regulate the link between job demands/resources and outcomes (Balducci et al., 2011).

Competency theory posits that human resources constitute a vital competitive asset (Jibin & Baoqing, 2008). Competency models are essential to align skills with the needs of the organization (Kowal et al., 2022; Krajčovičová et al., 2013), and competence is not only limited to knowledge and skills but also includes critical psychosocial attributes (Krajčovičová et al., 2013). The main assumptions of competency theory in management revolve around the crucial role of competencies in enhancing organizational competitiveness, adding value to stakeholders, and achieving the organization's mission and vision (Santamaria-Ruiz et al., 2023). Although competency theory has been shown to impact individual-level performance positively, there are criticisms regarding its bias toward practical goals and simplification of managerial work. However, the theory has valuable applications in developing competency models for evaluating managers and addressing the innovative potential of high-tech firms.

Self-determination theory argues that all humans have three basic psychological needs: autonomy, competence, and relatedness (Deci & Ryan, 2012; Niemiec & Ryan, 2009; Ryan, 2023; Ryan & Deci, 2019; Shelton-Strong, 2022). This need is essential for psychological growth (Valenzuela et al., 2018) and welfare (Chiu, 2024). Self-determination theory (SDT) is an extensive paradigm that underscores the significance of autonomy, competence, and relatedness in human motivation, offering practical applications across diverse contexts.

Organizational learning theory includes essential ideas such as collective learning, knowledge acquisition, and social interaction, which affect decision-making and have practical implications for developing learning organizations (Sharif & Irani, 2008; Sisaye & Birnberg, 2010; Turi et al., 2018).

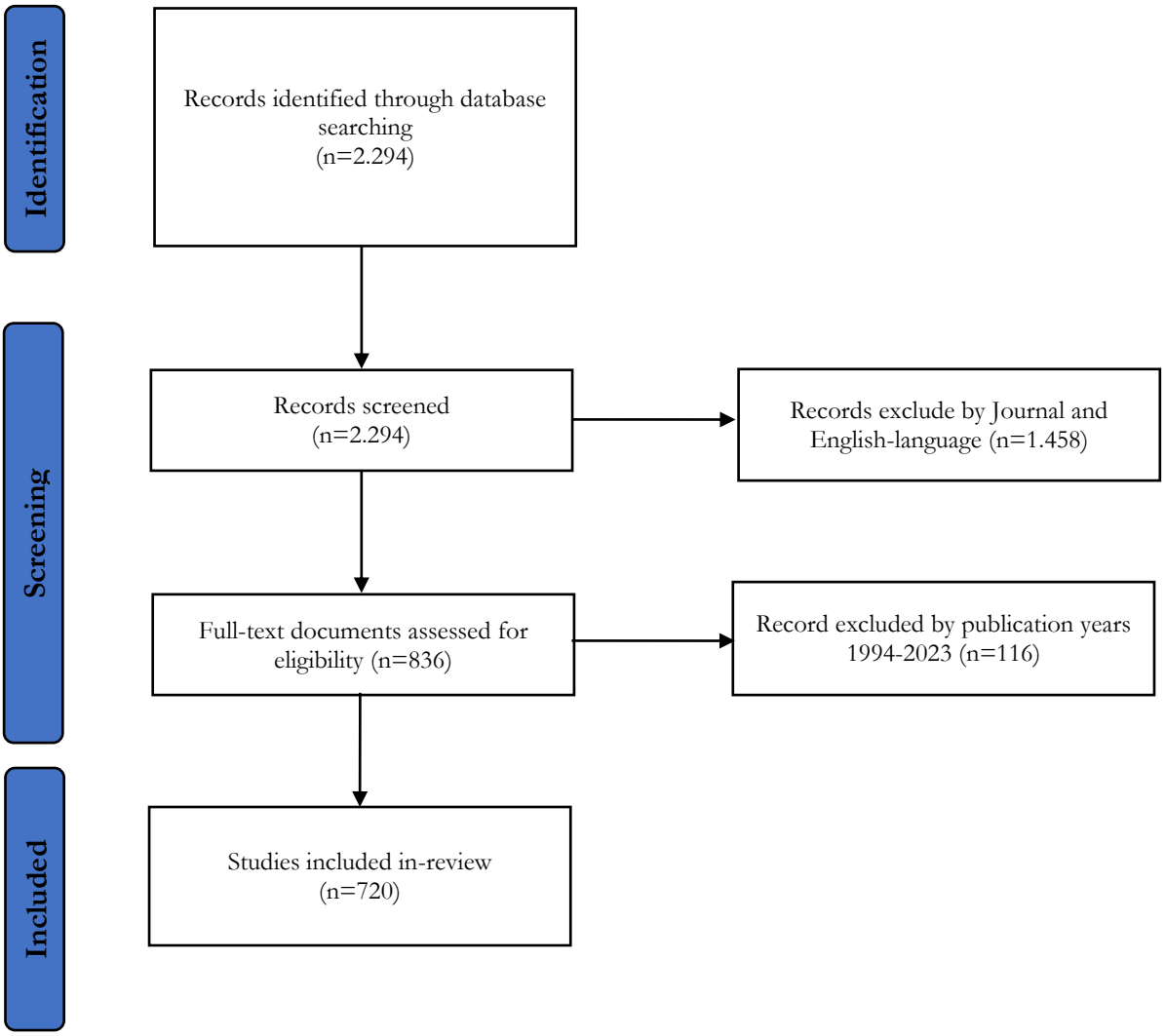
Research Methods

This study utilizes a scientometric method to analyze the relationship between learning agility and work engagement in modern management. It uses the extensive resources of the Scopus database (Zhu & Liu, 2020). The scientometrics technique is a quantitative and statistical methodology to assess and analyze scientific research, technology, and innovation. The methodology started in information and library science but has since been utilized across several disciplines, including natural sciences, engineering, medical sciences, and social sciences (Arencibia-Jorge & de Moya-Anegón, 2008; Sangam, 2017; Li et al., 2021). This research seeks to discover trends, prominent authors, significant institutions, and the evolution of academic work on the topic (Lawelai et al., 2023). The data sources for this study were extracted from the Scopus database using the specified keywords "*Learning Agility*" AND "*Work Engagement,*" AND "*Modern Management*". This database is widely recognized for its comprehensive coverage of peer-reviewed literature in various fields (Schotten et al., 2017), establishing it as an appropriate foundation for an extensive literature study. Using Scopus enables a comprehensive analysis of the development and dissemination of research findings on learning agility and work engagement.

A systematic collection and analysis of pertinent literature were performed utilizing the Scopus database. The dataset was exported in CSV format. The data was subsequently imported into VOSviewer, RStudio, and CiteSpace for visualization and analysis. These instruments are the foundation of the methodological framework for scientific reviews, enabling researchers to visualize patterns, map bibliometric and citation networks, and synthesize data efficiently. Using VOSviewer, RStudio, and CiteSpace enhances comprehension of the gathered material (Guo et al., 2023), allowing for a more thorough study of the data obtained from Scopus. This methodological approach aligns with conventional data collecting and analysis procedures in scientometric research and underscores the significance of visual aids in data extraction and synthesis.

The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) methodology was employed to delineate the screening stages and data selection process (Wang et

al., 2019). This review encompasses exclusively peer-reviewed articles published in English over the past 30 years (from January 1, 1994, to December 31, 2023). This criterion ensures the incorporation of high-quality and relevant literature that mirrors the contemporary dialogue on learning agility and work engagement. The study follows the PRISMA principles, providing a transparent and reproducible selection process augmenting the findings' credibility and dependability.



Source: Wang et al. (2019)

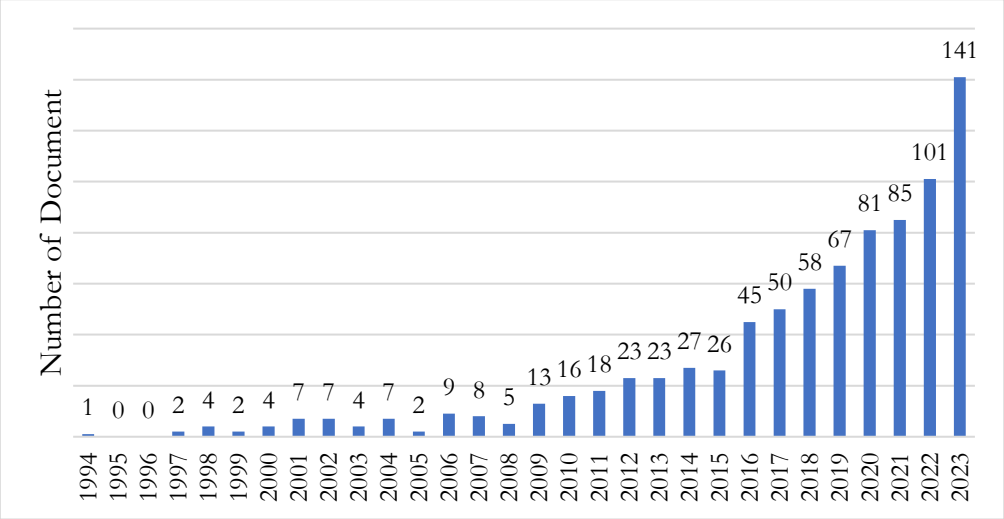
Figure 1. A Modified PRISMA Chart Illustrates the Article Selection Process in Systematic Reviews

The author uses search strings relevant to the topic keywords "Learning Agility" AND "Work Engagement", AND Modern Management". 1994 was chosen because it marked the beginning of a new trend or paradigm in modern management relevant to this study. In some management areas, the period around the 1990s is often associated with significant changes such as globalization, technological advances, and the development of new management theories that are more adaptive and knowledge-based and can be considered part of modern management. For example, during this decade, many organizations have focused more on knowledge-based management, innovation, and faster skill development, which are relevant to learning agility and work engagement. The relationship between learning agility and work engagement is strongly supported by modern management practices emphasizing flexibility, human resources, and adaptive human resource management strategies. These practices, known in the 1990s, continue to evolve and highlight the importance of developing a learning culture and a supportive work environment to increase employee engagement and adaptability (Parent & Lovelace, 2018; Saputra et al., 2021).

Results and Discussion

Research Trends

Research on learning agility and work engagement has shown exciting developments from 1994 to 2023. Initially, these two topics may not have received much attention from academia. Learning agility, which refers to an individual's ability to learn from experience and apply that learning to new situations, and work engagement, which relates to employee commitment and enthusiasm for their work, did not develop as significant areas of study until the late 1990s and early 2000s.



Source: Scopus Database 1994-2023

Figure 2. Trend Publication

Figure 2 shows that from 1994 to 2003, there was a slight increase through 2002, with an average of 3.6 documents per year. Between 2004 and 2013, there was a steady increase, with an average of 12.3 documents per year. From 2014 to 2023, the number of publications increased exponentially, reaching 141 documents, indicating growing interest in learning agility for work engagement. This increase is due to the increasing complexity of the modern work environment, the importance of continuous learning, and the critical role of work engagement in employee productivity and well-being. This study's findings expand knowledge and provide practical insights for developing training programs and corporate policies.

Source: Data processing using RStudio

Figure 3. WordCloud

In studies linking learning agility and work engagement, as shown in Figure 3 and Table 2, several common research themes can be identified based on their frequency of occurrence in the literature. This study found that the most frequently discussed main topic is work engagement, with a frequency of 109. Work engagement refers to employees' involvement, passion, and dedication. This topic has come to the fore because engagement is vital in increasing productivity and job satisfaction.

Table 2. Trend Topics with the Most Occurrences

Topic	Freq	Year_Q1	Year_Med	Year_Q3
Work Engagement	109	2018	2021	2022
Personality	65	2015	2018	2021
Personality Traits	50	2017	2020	2022
Conscientiousness	48	2015	2018	2022
Big Five	24	2012	2018	2021
Learning	20	2015	2016	2018
Self-Efficacy	20	2018	2020	2022
Academic Achievement	17	2012	2014	2020
Machine Learning	15	2020	2021	2022
Academic Performance	14	2012	2020	2021

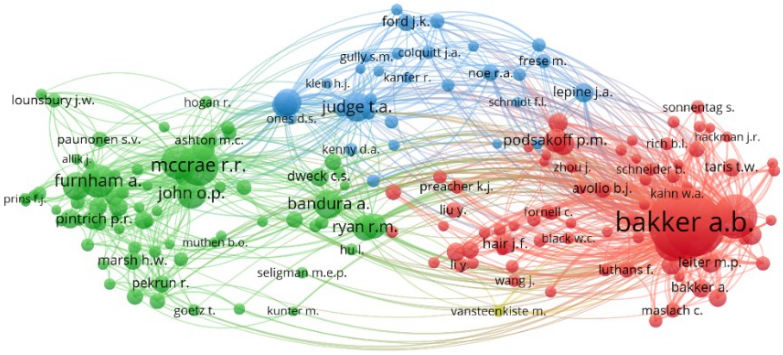
Source: Data processing using RStudio

Personality and personality traits were also frequent themes, with 65 and 50 frequencies, respectively. Personality studies are often conducted to understand how individual traits such as openness to experience, emotional stability, and social ability may influence learning ability and work engagement. This research usually uses the Big Five personality trait model (with a frequency of 24) to classify and analyze personality traits that influence learning ability and work engagement. Conscientiousness, as one of the Big Five personality traits, appears with a frequency of 48. This trait includes thoroughness, diligence, and responsibility, which can contribute positively to work commitment and learning ability. Research shows that highly conscientious individuals tend to adapt more to new situations and devote themselves entirely to their work.

The themes of learning and self-efficacy each appeared with a frequency of 20. Learning agility is the ability to adapt and learn from new experiences quickly. Meanwhile, self-efficacy refers to an individual's belief in completing tasks or achieving goals. Both are essential in improving work engagement, as individuals confident in their learning ability are more motivated and engaged. Although this topic is more related to the educational context, it is relevant in work engagement research because academic achievement is often an early indicator of an individual's ability to adapt and learn in the work environment. Machine learning with a frequency of 15 indicates an interest in using advanced technologies to analyze and predict factors that affect learning speed and work engagement. Using algorithms and machine learning models can help understand complex patterns and make more accurate predictions about employee engagement and learning ability.

Network Analysis

Network analysis of authorship-based shared citations is based on a simple calculation of shared citations, which does not consider citation content (Loyal & Chen, 2022). Shared citation analysis involves searching for pairs of articles cited together in the source material. Research clusters begin to form when the same pair of papers are cited by multiple authors (van Eck & Waltman, 2017). In this cluster, articles cited together have several common themes with specific subjects. Link strength indicates the total strength of a researcher's shared citation relationship with other researchers.



Source: Data processing using VOSviewer

Figure 4. Authors Co-citation Network

Based on VOSviewer's analysis, the study found that lead authors such as Arnold B. Bakker, Wilmar B. Schaufeli, Evangelia Demerouti, Albert Bandura, and Miguel Salanova had significantly influenced research on learning agility and work engagement. Bakker is the most influential writer in this field, with 774 citations. Figure 4 shows how often the researchers (with at least ADD citations) are cited in the same article. The node indicates the author, while the connection reflects the shared citation relationship. Authors with larger nodes have more citations. The strength of the relationship shows how often they are quoted together. Scholars are usually referenced and generally grouped in knots of the same color.

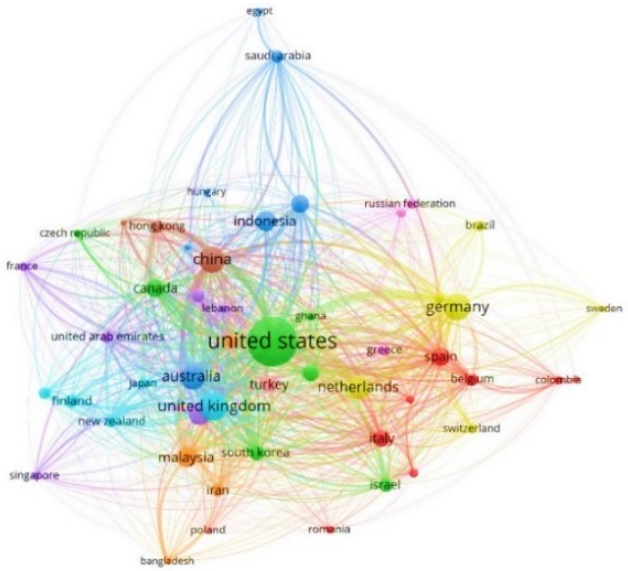
Table 3. Journals with the Most Documents Based on Citations and Link Strength

Journal	Documents	Citations	Link Strength
Learning and Individual Differences	34	327	935
Sustainability (Switzerland)	13	15	35
Journal of Chemical Information and Modeling	10	34	1
Journal of Chemical Education	8	4	12
Personnel Review	8	17	745
Journal of Vocational Behavior	7	22	244
Computers In Human Behavior	6	254	148
Development and Learning in Organizations	6	15	3
Education and Information Technologies	6	23	160
Education Sciences	6	3	22

Source: Data processing using VOSviewer

Table 3 shows some journals that most frequently publish research on learning agility to work engagement in the Scopus database. Based on an analysis using VOSviewer, this study found that the most influential journals with the most publications and link strength were Learning and Individual Differences and the Journal of Social Science and Humanities, which had the highest number of citations. These two journals stand out not only in the number of publications but also in citations, which shows their significant impact in this field of research.

Learning and Individual Differences and Pertanika Journal of Social Science and Humanities are the most influential journals in research on learning agility for work engagement. The VOSviewer analysis confirms their importance for spreading knowledge and stimulating further discussion. Research published in these journals helps organizations and professionals understand how best to develop and support learning among employees, which in turn improves work engagement and performance.



Source: Data processing using VOSviewer

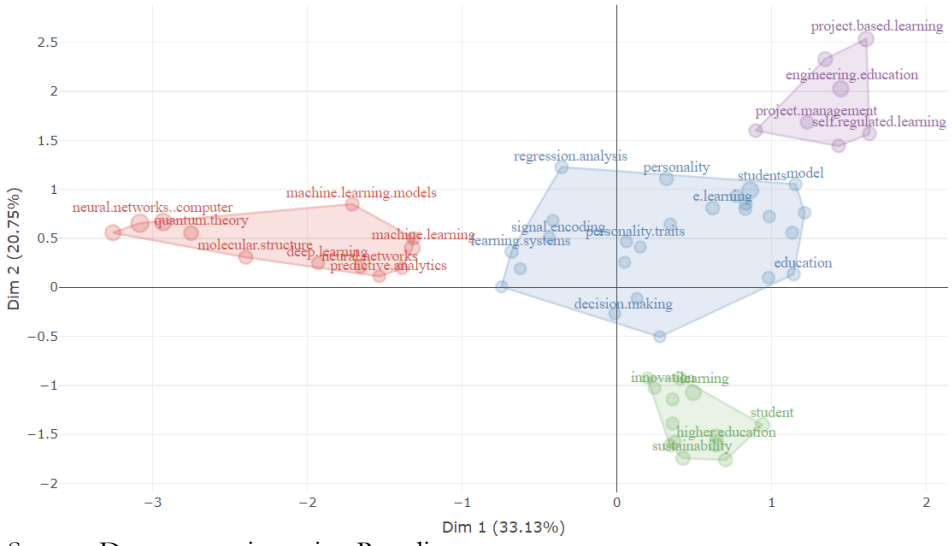
Figure 5. Network of Publications in Various Countries

Figure 5 shows some bibliographic coupling countries that most frequently publish research on learning agility and work engagement in the Scopus database. Based on VOSviewer analysis, this study found that the United States has the most publications, with 172 documents, followed by the United Kingdom, with 55 papers. In this study, Ghana and Norway have the highest number of citations, with 2957 and 1753 citations, respectively.

This study's findings indicate that while the quantity of publications serves as a crucial metric of research activity, the true impact of research is frequently more apparent than the citation count. Countries like Ghana and Norway indicate that substantial contributions to global knowledge can arise from high-impact research, albeit not to the same degree as nations with more significant publishing volumes, such as the United States and the United Kingdom.

Mapping Research Topic

Utilizing conceptual structure maps and timeline visualization to map research subjects effectively comprehend the academic research landscape and identify significant trends, patterns, and themes within a specific field (Basnet et al., 2023; Marrone & Linnenluecke, 2020). This procedure entails utilizing software such as RStudio for data processing and CiteSpace for visualizing citation networks and timelines.



Source: Data processing using Rstudio

Figure 6. Conceptual Structure Map

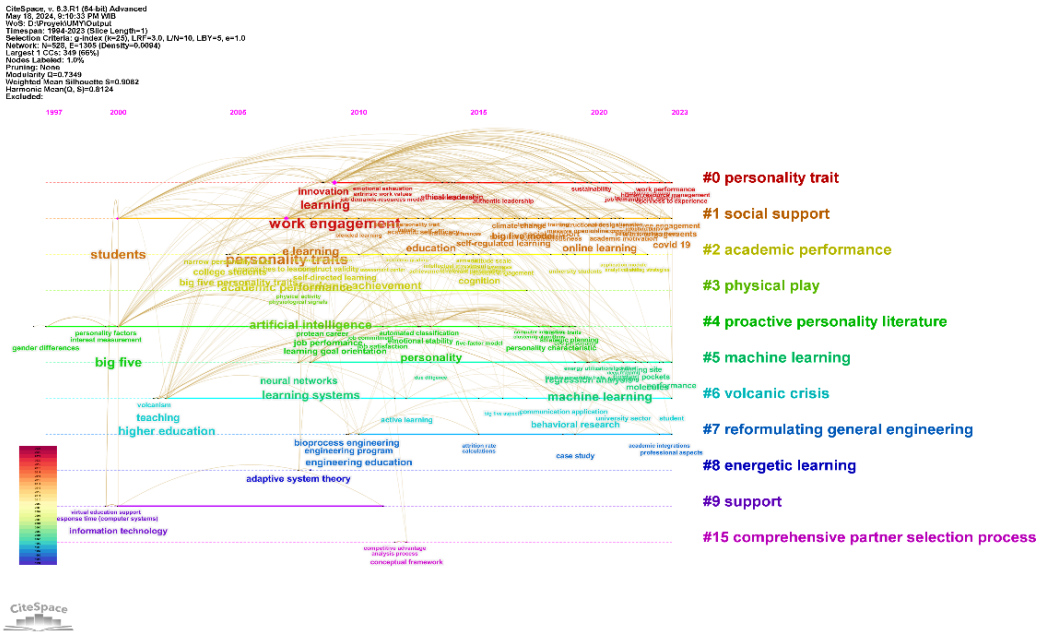
The factorial analysis's initial cluster (depicted in red) underscores the significance of sophisticated technology and science in learning agility and work engagement. The research revealed that the concepts within this cluster demonstrate how machine learning, artificial neural networks, and predictive analytics may enhance employee adaptability and engagement in the workplace. Machine learning, artificial neural networks, and predictive analytics enhance learning agility and engagement in the workplace (Shafiabady et al., 2023). They assist organizations in identifying critical elements that affect employee engagement, facilitate knowledge acquisition, and forecast future agility (Khatri et al., 2023). Departmental learning facilitates the connection between decision support systems and departmental agility, underscoring the significance of organizational learning in enhancing agility and performance (Al-Nammari et al., 2023).

The second cluster (depicted in blue) encompassed agile learning related to job engagement, revealing that the phrases inside this cluster denoted a spectrum of interconnected subjects, such as digital learning, personality, academic and professional performance, motivation and design, and decision-making. Learning agility is essential for academic achievement, career development, and digital proficiency. It entails rapid comprehension, adaptability, and connectivity (Jeon et al., 2022). Digital proficiency enhances learning agility (Patwardhan et al., 2023). Enhancing

learning agility via digital proficiency and mitigating academic burnout can elevate engagement and performance (Derue et al., 2012b).

The third cluster (depicted in green) emphasizes higher education, innovation, and sustainability within an academic framework, as identified by the study. Learning agility is essential for responding to evolving surroundings and enhancing work engagement in academic settings, especially in higher education, innovation, and sustainability. It facilitates the connection between academic fatigue and engagement among undergraduate students, sustaining elevated productivity in academic environments (Bolmsten & Kitada, 2020). Learning agility fosters innovation, enhances frugal innovation, and is linked to the objectives of higher education (Marjerison et al., 2022). Incorporating sustainability into research and innovation is essential for future decision-making and the creation of sustainable solutions (Sharma & Sharma, 2021).

The fourth cluster (depicted in purple) revealed a robust integration of technology, novel pedagogical approaches, and project management within technical education. Learning agility is crucial in technical education, encompassing technology integration, creative methodologies, and project management (Deepa et al., 2021). Digital capabilities enhance learning outcomes, whereas project-based learning fosters soft skills development (Kligyte et al., 2023). These components in technical education augment work engagement, foster adaptation, and facilitate project management in a swiftly changing technological environment (Dogara et al., 2020).



Source: Data processing using CiteSpace

Figure 7. Timeline View of Research Topic

The largest cluster, identified as the #0 personality feature, comprises 73 members with a silhouette value of 0.917. This study identified work engagement, learning, knowledge sharing, transformational leadership, and ethical leadership as the most often cited issues within this cluster. Ethical leadership and diverse leadership styles profoundly influence work engagement, learning, and knowledge dissemination (X. Liu et al., 2023). Transformational leadership improves job performance and promotes innovative work behaviors (Houston et al., 2022). Ethical leadership cultivates psychological safety and encourages a promotion-oriented mindset (Alamri, 2023). Leadership styles such as servant, empowering, and charismatic are positively associated with employee engagement, whereas abusive supervision adversely affects engagement (Gutu et al., 2022).

The central article cited by the cluster is Putkonen (2009), which explains that mental workload significantly impacts work quality and productivity, affecting short-term performance and project completion time. Conventional project planning overly optimistically predicts project completion, leading to delayed mental fatigue (Putkonen, 2009). Work quality and productivity are

significantly influenced by various factors, including interruptions, physical activity, and self-perceived work ability (Leijten et al., 2014). Understanding distractions, managing rework, promoting physical activity, and ensuring adequate rest can significantly improve work quality, increase productivity, and accelerate project completion (Giurgiu et al., 2021).

The second largest cluster (#1 social support) has 62 members and a silhouette value of 0.832. This study found that the most cited members in this cluster are social support, personality traits, students, e-learning, education, and online learning. Agility in online learning is significantly influenced by social support, digital competence, and adaptability to new technologies (Kakkar et al., 2023). This agility improves work engagement and learning results, especially in remote work settings (Luan et al., 2020). The COVID-19 pandemic has expedited this transition, underscoring the significance of these elements in professional education (Hutahayan, 2020).

The primary article referencing this cluster is Cohen and Baruth (2017), which elucidates that students' satisfaction is substantially influenced by their openness to experience and conscientiousness and that analogous personality traits tend to favor similar synchronous channels, thereby enhancing their satisfaction with online courses (Cohen & Baruth, 2017). Learning agility is essential for student engagement and academic achievement. It entails swiftly comprehending novel circumstances and adapting to concepts (Derue et al., 2012b). Research indicates it mitigates academic burnout and augments learning engagement (Jeon et al., 2022). Fostering learning agility in students can enhance workplace engagement and talent management strategies (Dries et al., 2012).

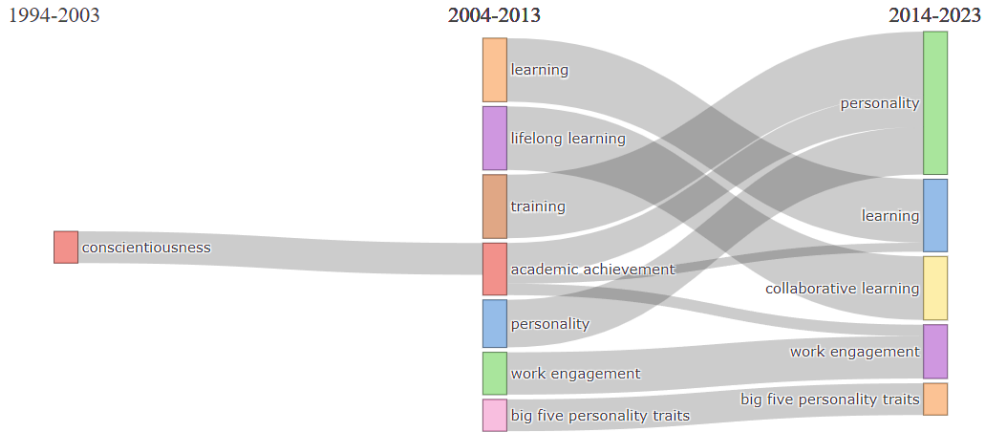
The third largest cluster, designated as #2 in academic performance, comprises 42 members with a silhouette value of 0.875. This analysis identified that this cluster's most frequently referenced elements include academic performance, academic achievement, Big Five personality traits, college students, and learning methodologies. The Big Five personality qualities, such as conscientiousness and neuroticism, are significant predictors of academic achievement and emotional intelligence characteristics (Deepa et al., 2021). The correlation between academic self-efficacy and achievement and learning engagement is evident among Chinese university students (Luo et al., 2023). This highlights the necessity for ongoing skill enhancement and measures to augment emotional resilience and stress management capabilities.

The primary study referencing this cluster is Lounsbury et al. (2005), which revealed that the Big Five qualities explained 45% of the variance in life satisfaction, while sense of identity contributed 7% and college satisfaction 6%. This indicates that college experience and fulfillment are predominantly influenced by student identity, akin to studies regarding academic success and adult career happiness (Lounsbury et al., 2005). Academic performance and satisfaction are significantly influenced by student identity, which is shaped by factors such as digital experiences, family influence, and learning agility (Luan et al., 2020). Enhancing student identity awareness is essential for increasing engagement and equipping graduates for workforce preparedness (Daniels & Brooker, 2014).

Evolution of Research Topics

Sankey diagrams illustrate the growth of study topics, enabling researchers to monitor the transition of shared interests into independent subjects, utilize topic modeling, and apply neural networks to forecast future trends (Harikandeh et al., 2023). RStudio analyses themes and delineates word-topic associations, offering insights into topic intensity and development. These approaches provide an extensive perspective on study domains.

Sankey diagrams illustrating the evolution of research on learning agility and work engagement from 1994 to 2023 indicate notable shifts in research themes. During the first period of 1994-2003, this research identified a theme centered on "conscientiousness", highlighting the influence of personality qualities, specifically conscientiousness, on work engagement. A substantial association exists between the Big Five personality traits, especially neuroticism, and extraversion, and work engagement (Anderson & Ones, 2003). These characteristics are associated with job satisfaction, while diminished agreeableness and extraversion correlate with elevated blood pressure and stress hormones (Deary et al., 1998). The research emphasized the significance of acknowledging individual variances in the workplace.



Source: Data processing using Rstudio

Figure 8. Sankey Diagram of Thematic Evolution

During the decade from 2004 to 2013, this research identified a thematic focus on learning, lifelong education, training, academic success, personality, work engagement, and the Big Five personality traits. Learning agility, a crucial component of lifelong learning forecasts high-potential people (Dries et al., 2012). Personality qualities, particularly the Big Five, affect learning methodologies, academic performance, motivation, and work involvement (Swanberg & Martinsen, 2010). These characteristics also affect emotional tone, narrative themes, and structural complexity in life narratives (McAdams et al., 2004). This study underscores the importance of lifelong learning and training as essential catalysts for work engagement. Continuous education and vocational training are seen as crucial for improving work engagement. The Big Five personality traits are a central emphasis in personality studies.

From 2014 to 2023, this research identified personality, learning, collaborative learning, work engagement, and the Big Five personality traits. Learning agility, an essential component of work engagement is affected by personality traits such as honesty-humility and workplace spirituality (Saeed et al., 2022). Organizations must concentrate on individual, team, and organizational elements to enhance agility (Meskelis & Whittington, 2020). Informed individuals and cooperative learning can develop a culture of perpetual learning and adaptability (Macke et al., 2022). During this period, they have transitioned to more participatory and collaborative learning approaches, fostering social contact, knowledge exchange, and the development of interpersonal skills.

Consequently, the scientometric analysis identifies three principal opportunities. Initially, incorporating modern technologies like machine learning can enable the customization of educational programs and improve work engagement via predictive analytics. Furthermore, the influence of transformational leadership in cultivating an organizational culture that encourages learning agility and creativity warrants additional examination. Thirdly, solid digital competency may facilitate the connection between learning agility and work engagement, particularly within digitalization and remote work. These prospects provide strategic contributions to tackling the complexities of contemporary management.

Implication and Conclusion

This scientometric study provides substantial theoretical and practical contributions to the discipline. The study theoretically enhances the comprehension of the dynamic interplay between learning agility and work engagement in contemporary management. The findings highlight the pivotal importance of job engagement as a fundamental component of human competence, specifically regarding task fulfillment and goal attainment. Conversely, learning agility is recognized as an essential element in adjusting to novel experiences. Technological advancements such as machine learning and predictive analytics are acknowledged as possible instruments to improve learning velocity and engagement. The study also finds critical characteristics that affect agility and

engagement, such as personality traits, social support, and digital competencies. The intermediary function of departmental learning in connecting decision support systems and agility underscores the necessity of aligning learning techniques with organizational objectives.

The study findings indicate that organizations should prioritize transformational leadership, control cognitive burdens, and foster digital capabilities to cultivate an atmosphere that enhances learning agility. Enhancing involvement and preparedness for future difficulties can be achieved by cultivating awareness of student identity and emphasizing ongoing skill development. These tactics promote individual development while also improving overall organizational effectiveness.

Subsequent research may expand upon these findings by exploring the integration of advanced technologies in employee training programs, analyzing cross-cultural differences in the correlation between agility and engagement, and formulating a framework to improve learning agility in remote or hybrid work settings. Moreover, longitudinal research could enhance the comprehension of how agility and engagement evolve.

Nonetheless, it is essential to acknowledge that this study has certain limitations. Although scientometric tools are adequate for trend analysis, they may inadequately capture the qualitative subtleties in the link between learning agility and engagement. The sole emphasis on peer-reviewed English-language publications from the Scopus database may restrict the generalisability of the results. Moreover, the practical ramifications, although substantial, necessitate meticulous contextual adaption across various industries and organizational cultures. Future research should employ a mixed-methods approach to fill these gaps and confirm the broader relevance of these findings.

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