

# FROM CREDENTIALS TO COMPETENCIES AND IMPACT: A SYSTEMATIC LITERATURE REVIEW OF THE HUMAN CAPITAL TRANSFORMATION OF EDUCATION

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## Abstract:

The evolution of human capital theory is now facing a critical inflection point, where the legitimacy of formal diplomas is eroded by qualification inflation and the disruption of artificial intelligence, prompting a shift toward proving real impact. This study uses the Systematic Literature Review (SLR) method with the PRISMA protocol, analyzing 9 selected empirical articles from the Scopus database (2020–2026) to map the dynamics of transformation from the credential regime to the competency regime. The results of the study reveal the trend of adopting micro-credentials and "Agency Capital" which is empirically proven to increase professional self-efficacy in a just-in-time manner. However, this transformation is hampered by conservative "market hegemony", where recruitment still prioritizes institutional reputation and a bias of "cultural fit" over technical competence, as well as the risk of epistemological shallowness that traps the workforce in the precarity of "gig qualifications". It is concluded that the current management of human capital is trapped in a structural paradox; pedagogical innovation will not be effective without authentic validation reforms and deconstructions of market biases, which if ignored will only perpetuate "defensive credentials" without substantive social mobility.

**Keyword:** Human Capital; Credentialism; Competence; Micro-credentials; Agency Capital

## 1. Introduction

If in the early phases of human capital theory, academic degrees are often positioned as the main indicators of productivity, the development of the digital era actually demands adaptability, relearning, and sustainable competency flexibility (Duha, 2025; Msweli et al., 2022; Munawaroh et al., 2025). This condition is driving a paradigm shift from formal credential-based validation to an assessment based on the impact and real capacity of the individual. Competency is no longer understood as an administrative attribute stated in a diploma, but as a holistic ability that can be applied directly in a work and social context (Sokolova, 2021; Wong, 2020). The World Economic Forum's Future of Jobs report shows that skills such as analytical thinking (69%), adaptability (67%), and leadership (61%) are expected to be the most needed abilities by employers in the coming years (Loureiro et al., 2022; Savitri et al., 2021; Trenerry et al., 2021; Zedginidze-Jishkariani & Kvirkaiva, 2025).

However, the shift also reveals structural tensions in education, which Collins calls The Diploma Disease, which is the tendency to make the accumulation of degrees and certificates a purely administrative goal (Dore, 1997, 2009; Little, 1997; Little & Singh, 1992). This phenomenon gives rise to a real inequality between formal credentials and functional competencies, where many college graduates globally still have a mismatch between what they learn in college and the skills the industry requires. To illustrate, UNESCO data shows that only about 37% of graduates in Southeast Asia have job competencies that match the needs of the industry, indicating that simply having a degree does not guarantee the suitability of skills to the demands of the job market (Chaengpromma & Pattanapairoj, 2022).

In the study of education, the concept of human capital theory views education as an investment that increases the productive capacity of individuals through knowledge and skills (Auerbach & Green, 2024; Leoni, 2023; Rothomi & Rafid, 2023). However, in practice, this theory is often reduced to credentialism theory, which is the tendency to make diplomas and certificates the main measure of individual quality. Credentialism gives birth to the phenomenon of credential inflation, where the increase in education level is not always directly proportional to the increase in real competence (Araki

& Kariya, 2022). This condition shows the limitations of the classical human capital approach that overemphasizes formal legitimacy and ignores the substantive function of education in shaping socially relevant abilities (Cohen, 2022).

As a correction to credentialism, a competency-based education approach has developed that emphasizes the mastery of applicative skills as an indicator of the quality of human capital (Hida et al., 2025). This approach is extended through an outcome-based and impact-oriented education framework that assesses education based on real outcomes and impacts on performance, innovation, and social change (Devakumar, 2025; Diyasa et al., 2023; Lkhagvaa et al., 2024; Royani et al., 2025; Saha et al., 2023; Sunra et al., 2024). In this perspective, strengthening human capital places education as a means of expanding human capacity to act and give meaning. The transformation from credentials to competencies and impact marks a theoretical shift in education from an administrative orientation to transformative value and public benefit (Blanch, 2019; Castro et al., 2024).

Although the urgency of this transformation is very real, the current academic literature is still fragmented and has not provided a coherent roadmap. Research by Abdullah and Sahid (2023) shows that the development of education oriented towards learning quality and innovation is more strongly related to human capital productivity and economic growth than simply adding the school year, and emphasizes the need for innovative solutions to bridge the gap between educational output and real economic needs (Abdullah & Sahid, 2023). Abelha et al. (2020) found a recurring mismatch between graduate competencies and job market needs, and emphasized the importance of cross-disciplinary competencies such as problem-solving, communication, teamwork, and self-management as determinants of global employment (Abelha et al., 2020). On the other hand, Rêgo et al. (2023) map seven new competency clusters and show that there is a systematic gap between the competency profile requested by the industry and the curriculum design that is still centered on courses and diplomas (Rêgo et al., 2023). In parallel, García-Álvarez et al. (2022) categorized dozens of transversal competencies for employability and found that employers value job-related basic skills, sociorelational skills, and self-management skills more, while universities still lack to organize curricula and pedagogies to integrate them in their entirety (García-Álvarez et al., 2022).

However, most studies are still confined to separate silos where one side focuses on training techniques, while the other side dwells on criticism of certification policies. There is a striking research gap in the absence of a comprehensive review that maps how the transition from credentials to impact regimes is managed systemically. There is no clear consensus on valid "impact" indicators beyond student test scores, as well as how new competency models can be integrated without getting stuck back into the same administrative logic.

Therefore, this Systematic Literature Review is here to bridge this epistemological and practical gap. This study aims to dissect the anatomy of educational human capital transformation with four specific objectives: analyzing current literature trends and research gaps (**RQ 1**), mapping new competency models that have emerged in the last decade (**RQ 2**), evaluating empirical evidence regarding the relationship between new competencies and real impacts (**RQ 3**), and identifying structural barriers in the transformation of human capital management (**RQ 4**). Through this synthesis, it is hoped that a clearer framework can be offered to educational institutions that are working to reform their talent management from just a pursuit of credentials to sustainable impact creation.

## 2. Research Methods

This resource elaborates on the transformation of human capital in the educational sector, specifically focusing on the shifting value of credentials and the emergence of new competency models. This study aims to compile a comprehensive mapping of empirical research relevant to the discourse of credentialism versus human capital in the post-2020 era, while highlighting the structural disruptions, market resistance, and pedagogical innovations that define the current landscape. This approach also assesses how educational institutions and the labor market are adapting to the tension between traditional degree signaling and the demand for granular, authentic competencies. The literature selection process in this study follows the PRISMA guidelines (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) to ensure transparency, traceability, and reliability of research procedures (Page et al., 2021).

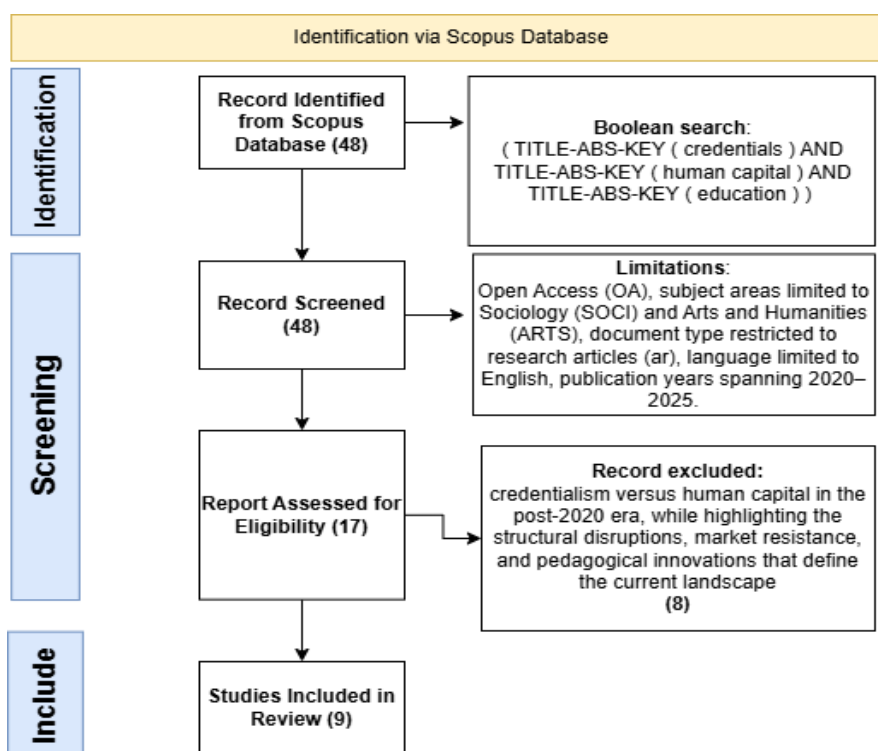
The literature search was carried out exclusively through the Scopus database, utilizing the following Boolean syntax to capture high-quality empirical data:

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( TITLE-ABS-KEY ( credentials ) AND TITLE-ABS-KEY ( human capital ) AND TITLE-ABS-KEY ( education ) ) AND PUBYEAR > 2020 AND PUBYEAR < 2026 AND ( LIMIT-TO ( SRCTYPE , "j" ) ) AND ( LIMIT-TO ( OA , "all" ) ) AND ( LIMIT-TO ( DOCTYPE , "ar" ) ) AND ( LIMIT-TO ( SUBJAREA , "SOC" ) OR LIMIT-TO ( SUBJAREA , "ARTS" ) ) AND ( LIMIT-TO ( LANGUAGE , "English" ) ) )
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This syntax was explicitly designed to limit search results to relevant scientific articles, with a focus on the intersection of credentials, human capital theory, and educational strategy. The search was restricted to Open Access journals to ensure the replicability and accessibility of the data, indexed specifically within the fields of Social Sciences (SOCI) and Arts and Humanities (ARTS), and published within the recent timeframe of 2020 to 2025 to capture the latest trends and post-pandemic shifts.

Inclusion criteria were strictly defined to select empirical research articles (qualitative, quantitative, or mixed methods) that are available in full text, published in Scopus-indexed journals, written in English, and possess direct relevance to the structural transformation of human capital management. Non-empirical articles (such as review papers, book chapters, or conference proceedings), studies that did not focus on the relationship between credentials and labor market outcomes, or articles lacking empirical data were excluded from this study to ensure the validity of the findings.

The initial search yielded 48 articles. Following the deduplication process and the strict application of inclusion criteria (limiting to empirical, open access, and specific subject areas), the pool was reduced to 17 articles. Subsequently, a rigorous screening of titles, abstracts, and full texts was conducted to ensure alignment with the specific research objective regarding the tension between credentials and competencies. A total of 9 articles were ultimately retained for the final synthesis and analysis.



The selection and screening process is reported through a PRISMA flowchart, ensuring that all stages are documented systematically (Page et al., 2021). The selected articles were analyzed using a thematic analysis approach to identify the emerging competency models, the empirical evidence of their impact, and the structural barriers hindering transformation. This analysis allows for a critical evaluation of how the credential fatigue and the rise of micro-credentials are reshaping the global understanding of human capital in the contemporary educational ecosystem (Sohrabi et al., 2021).

### 3. Result and Discussion

#### 3.1. Result

##### 3.1.1. Trends and Gaps in the Literature

There is a downward trend in trust in academic degrees where a college diploma is no longer considered the most important proof of ability. Companies now prioritize cultural fit over technical ability. This makes the job selection process less fair because it is more biased towards the applicant's social background (Wheelahan et al., 2021). This problem of loss of trust in diplomas is exacerbated by the findings of Alexander and Belloni (2024) which highlight how artificial intelligence (AI) can manipulate academic outcomes. So it is urgent to prove the need for proof of pure human ability that cannot be imitated by machines (Alexander & Belloni, 2024).

In response, there is a trend of using short certifications or micro-credentials to quickly patch up the shortage of job skills (Parsons et al., 2025; Raghavan et al., 2025). However, this trend has been strongly criticized by Wheelahan and Moodie (2021) because it risks creating a freelance workforce (gig) whose fate is uncertain (Wheelahan et al., 2021). Nevertheless, the reputation of the campus is still the main determinant of job acceptance (Souto-otero et al., 2021). Eventually, this trend leads to new demands that affirm that today's graduates are required to have a strong mentality and high initiative, not just academic grades (Tang & Maat, 2025).

The literature synthesis reveals a fundamental gap in the form of an incomplete transition between the diagnosis of old credential failures and the effectiveness of new solutions. There is a gap in the integration mechanism between the sharp criticism of the vacant degree and the offer of micro competencies (Raghavan et al., 2025; Tomlinson & Watermeyer, 2022). However, the literature has not answered how to adopt a competency model without getting stuck back into the same market commodification logic.

This problem is compounded by epistemological and methodological gaps. Epistemologically, Wheelahan and Moodie (2021) warn that the trend of unbundling the curriculum into micro-credentials is not just a change in format, but risks separating practical skills from their theoretical knowledge base which causes graduates to lose their systemic thinking skills in favor of narrow and prone technical mastery (Wheelahan et al., 2021). On the other hand, methodologically, Alexander and Belloni (2024) reveal the existence of an assessment validity crisis due to Generative AI disruption that damages the function of educational signals, thus confirming the urgency of developing a new verification method that is able to authenticate pure human competence in the midst of algorithmic manipulation saturation (Alexander & Belloni, 2024).

Furthermore, there are theoretical gaps between structures and agencies that have not been reconciled, particularly in non-Western contexts. Tang et al. (2025) emphasize the importance of individual agency capital in developing countries, which contrasts with the deterministic view of Wheelahan and Moodie (2022) that place individuals solely as victims of gig economic structures (Tang & Maat, 2025; Wheelahan et al., 2021).

Finally, there is a sharp market valuation gap. The evidence of pedagogical success and self-efficacy from the micro-credentials found is not necessarily accepted by the job market and is still fixated on the reputation of the institution (Parsons et al., 2025; Souto-otero et al., 2021). On the other hand, this is greatly influenced by the subjectivity and cultural bias of recruiters that have escaped previous analysis (Raghavan et al., 2025; Tholen, 2023; Tomlinson & Watermeyer, 2022).

Authors	Title	Year	Journal	Country	Author Affiliation	Subject or Educational Level
Michael Tomlinson; Richard Watermeyer	<i>When masses meet markets: credentialism and commodification in twenty-first century Higher Education</i>	2022	<i>Discourse: Studies in the Cultural Politics of Education</i>	United Kingdom	University of Southampton; University of Bristol	Higher Education (Sociology/Policy)
Leesa Wheelahan; Gavin Moodie	<i>Analysing micro-credentials in higher education: a Bernsteinian analysis</i>	2021	<i>Journal of Curriculum Studies</i>	Canada (Authors) / Global Focus	University of Toronto (Ontario Institute for Studies in Education)	Higher Education (Curriculum Studies)
Manuel Souto-Otero; Piotr Białowolski	<i>Graduate employability in Europe: the role of human capital,</i>	2021	<i>Journal of Education and Work</i>	Europe (18 Countries)	Cardiff University (UK); Harvard University	Higher Education (Employability)

	<i>institutional reputation and network ties in European graduate labour markets</i>					ty (USA) / Wyższa Szkoła Bankowa (Poland)
Leesa Wheelahan; Gavin Moodie	<i>Gig qualifications for the gig economy: micro-credentials and the 'hungry mile'</i>	2022	<i>Higher Education</i>	Canada (Authors) / Global Focus	University of Toronto (Ontario Institute for Studies in Education)	Higher Education (Political Economy)
Gerbrand Tholen	<i>The meaning of higher education credentials in graduate occupations: the view of recruitment consultants</i>	2023	<i>Journal of Education and Work</i>	United Kingdom	City, University of London	Higher Education (Labor Market)
W. Robert J. Alexander; Raffaella Belloni	<i>Artificial Intelligence and the Sustainability of the Signaling and Human Capital Roles of Higher Education</i>	2024	<i>Sustainability</i>	Australia	University of the Sunshine Coast	Higher Education (Economics/AI)
Santhi Raghavan; Nantha Kumar Subramaniam; Ahmad Izanee Awang	<i>Unboxing Micro-Credentials for ODL Universities: Competency Development for Human Capital</i>	2025	<i>Turkish Online Journal of Distance Education (TOJDE)</i>	Malaysia	Open University Malaysia (OUM)	Higher Education (Open & Distance Learning)
Miaorong Tang; Siti Mistima Maat; Norzaini Azman	<i>Graduate Attributes and Influential Factors in Higher Education: Perceptions of International Undergraduates in China</i>	2025	<i>International Journal of Learning, Teaching and Educational Research</i>	China (Context) / Malaysia (Authors)	Universiti Kebangsaan Malaysia (UKM)	Higher Education (International Students)
David Parsons; Hayley Sparks; Anzel Singh; Darcy Vo	<i>Microcredentials as a mechanism for developing human capital in postgraduate education in New Zealand</i>	2025	<i>Discover Education</i>	New Zealand	academy EX; University of Canterbury; EduMax i	Higher Education (Postgraduate)

Discourse Dynamics and the Urgency of Transformation Based on the data collected, it is clear that the discourse on the transformation of education human capital management is experiencing a significant acceleration. The majority of recorded publications were released in a very recent time frame, between 2021 and 2025, with a peak in attention in 2025. The concentration of publications in recent years indicates the urgency and novelty of this topic in the global academic realm, which is likely triggered by post-pandemic disruption and technological explosions. These studies cover a broad but intersecting spectrum, ranging from sociological critiques of the commodification of diplomas in the UK, the impact of Artificial Intelligence disruption on the value of educational signals in Australia, to practical solutions in the form of the implementation of micro-credentials in open universities in Malaysia. The main theme that emerged was an effort to align the mismatch between formal education output and the needs of the increasingly dynamic and fragmented job market.

Geographical Distribution and Cross-Border Perspectives Countries from various continents such as the United Kingdom (United Kingdom), Canada, Australia, New Zealand, to Malaysia and China recorded significant contributions in this study, reflecting the cross-border nature of human capital issues. The dominance of Anglosphere countries (UK, Canada, Australia) tends to contribute a critical framework regarding the dangers of "credentialism" and the gig economy, while representatives from Asia, particularly Malaysia and China, highlight adaptive approaches through Open Distance Learning (ODL) and the perceptions of international students. This geographical diversity emphasizes that the transformation of education is no longer a purely local issue, but a global challenge that requires a contextual pedagogical approach. For example, a study in Europe involving 18 countries highlighted the importance of institutional reputation, while a study in New Zealand focused more on developing individual self-efficacy through micro-credentials at the postgraduate level. This shows that there is a global dialogue between western criticism of the old system and east/pacific adaptation towards a new model of competence.

The paradigm shift from signals to the substance of global trends in this study shows a fundamental paradigm shift, namely from education as a signal mechanism (diploma as proof of ability) to contextual human capital development (competence as proof of ability). This can be seen from the variety of education levels studied, ranging from international undergraduate students in China, job seekers in the European labor market, to professionals at the postgraduate level. The approach used is increasingly multidisciplinary; It is not only limited to education policy, but extends to the sociology of the labor market, political economy, and curriculum studies. This transformation signifies that the education of the future is geared towards producing individuals who not only hold credentialed academic degrees, but also have psychological attributes, agentic capital, and technical adaptability relevant to the era of AI and the digital economy.

Curriculum Implications and the Future of Human Capital The implementation of a curriculum that integrates micro-credentials and non-technical graduate attributes has great potential to redefine national educational goals in different countries. The synergy between theoretical understanding and practical skills as seen in the case of micro-credentials studies in Malaysia and New Zealand suggests that modern education serves as a bridge between self-identity and fluid professional demands. However, the literature also provides critical warnings such as those from studies in Canada that this transformation does not trap graduates into the vulnerability of the gig economy. By continuing to innovate competency validation methods that go beyond traditional diplomas, the education sector is demonstrating its central role in preparing an adaptive generation, which is judged not by the paper they have, but by the impact they are able to make.

Overall, the latest global Research Executive summary shows that the topic of transformation from credentials to competencies is growing rapidly and is seen as urgent, especially in 2025. Countries, both from the Global North and the Global South, have responded to this challenge in a variety of ways: from criticism of degree inflation to the adoption of micro-credentials as a mechanism for new human capital development. This trend marks a shift from purely institution-based validation to competency-based validation and the real impact of graduates. Overall, modern education is geared towards balancing academic reputation and agility, in order to respond to the challenges of the job market disrupted by technology and global economic dynamics.

Country	Number of Publication
United Kingdom	2
Canada (Authors) / Global Focus	2
Europe (18 Countries)	1
Australia	1
Malaysia	1

China (Context) / Malaysia (Authors)	1
New Zealand	1

### 3.1.2. Competency Models Emerging in the Literature of the Last Decade

Recent literature constructs the Granular and Embedded Competency Model as the antithesis to the rigidity of traditional degrees, where knowledge accumulation is replaced by agile and contextual micro-competency units. Raghavan et al. (2025) manifested this model through the Just-in-Time Competency mechanism which positions micro-credentials not just certificates, but acceleration instruments to precisely close the digital divide in the open university ecosystem (Raghavan et al., 2025). The dimension of this model is quantitatively deepened by Parsons et al. (2025) through the concept of Embedded Human Capital which revises the definition of competence from a mere theoretical knowledge stock to an iterative integration between learning and real work practice to strengthen professional self-efficacy (Parsons et al., 2025). Nevertheless, the epistemological validity of this model is challenged by Wheelahan and Moodie (2021) who consider it a form of "generism" that erodes the deep knowledge base and is sharply criticized as "Gig Qualification" which structurally only serves short-term market volatility and exacerbates the vulnerability of the workforce (Wheelahan et al., 2021).

The literature also projects a Model of Agency and Psychological Competency that places intrapersonal attributes as the main determinants and subordinates technical abilities alone. Tang et al. (2025) reconstruct the definition of competency through the concept of agency capital, where graduate excellence is no longer measured by the mastery of hard skills, but rather by psychological resilience and strategic initiative in navigating global job market volatility (Tang & Maat, 2025). This construction is empirically validated by Tholen (2023) who reveals the shift in labor market valuation; Recruiters now classify technical competencies as aspects that can be trained post-recruitment, so that the focus of selection shifts completely to cultural fit and personal character, making personality a competency currency that is much more valuable than the legality of a formal diploma (Tholen, 2023).

In response to the erosion of market trust, the literature maps out an Authenticated and Reputable Competency Model that requires a rigorous external validation mechanism. Alexander and Belloni (2024) affirm the urgency of establishing authentic human capital as a bulwark of defense against the manipulation of artificial intelligence, replacing traditional academic signal functions that have lost their reliability. However, this idealism of pure validation clashes with the conservative reality of the market (Alexander & Belloni, 2024). Souto-Otero and Białowolski (2021) prove the persistence of the capital complementarity model, in which individual competencies do not have an independent exchange rate but must be validated by the reputation of institutions and social networks (Souto-otero et al., 2021). This phenomenon affirms Tomlinson and Watermeyer's (2022) structural critique of market credentialism, in which competencies are distorted into mere positional status commodities instead of representing real substantive capabilities (Tomlinson & Watermeyer, 2022).

The transformation from credentials to competencies in education is not a linear shift, but rather a field of contestation between flexibility and legitimacy. Various competency models have emerged to correct the rigidity of degrees, but remain tied to validation mechanisms, institutional reputation, and market logic that risk reducing the depth of knowledge. Therefore, the change in human capital education must be understood as a continuous negotiation between the substantive value of learning and symbolic credentialism that is still dominant.

### 3.1.3. Empirical Evidence of the Relationship Between New Competencies and Real Impacts

Internal impacts in the form of increased professional agility and self-efficacy obtained through empirical evidence show a strong positive correlation between the adoption of new competencies and the strengthening of individual capacity. Parsons et al. (2025) that the integration of micro-credentials into work practice directly increases self-efficacy and professional productivity allowing learners to transfer new knowledge into practical solutions in the workplace (Parsons et al., 2025). These findings are reinforced by Raghavan et al. (2025) who show that just-in-time competency models in open universities are effective in empowering human capital to adapt to the demands of the post-pandemic digital economy (Raghavan et al., 2025). Furthermore, Tang et al. (2025) found that when students (in the international context) develop agency capital and psychological resilience, they are able to formulate more proactive and adaptive career strategies, despite being in an unfamiliar and competitive job market environment (Tang & Maat, 2025).

External impacts in the form of market resistance and economic precariousness show the opposite. The empirical evidence regarding such external impacts points to a bleaker reality. Souto-Otero and Białowolski (2021) found that the increase in technical human capital (competence) alone has a marginal impact on employability if it is not supported by institutional reputation and social connections based on statistical data from 18 European countries. The European job market is still proving to be very

conservative (Souto-otero et al., 2021). This is in line with the findings of Tholen (2023) who revealed that in the eyes of recruiters, the accumulation of formal competencies (degrees/certificates) has undergone a devaluation of meaning, so that it no longer guarantees access to elite jobs without the presence of "cultural fit" (Tholen, 2023). Furthermore, Wheelahan and Moodie (2021; 2022) argue that the transition to "gig qualifications" (micro-competencies) has a structural negative impact: instead of increasing social mobility, this model locks workers into a precarious short-term work cycle, transferring training risks from companies to individuals with no long-term career security (Wheelahan et al., 2021).

The validation crisis as an impact inhibitor also shows the real impact of new competencies hampered by a crisis of trust. Alexander and Belloni (2024) show that the potential economic impact of human capital is now threatened by the market's inability to verify the authenticity of competencies in the midst of AI disruption that undermines the function of educational signals (Alexander & Belloni, 2024). As a result, individual efforts to improve competence are often trapped in market credentialing, where certificates are collected only as a status defense commodity, rather than as a real driver of productivity (Tomlinson & Watermeyer, 2022).

In summary, empirical evidence suggests that new competencies (such as micro-credentials and agency capital) have been shown to be effective in improving the internal quality of individuals, but fail to produce equivalent external impacts in the form of job security or career mobility due to market structural barriers, precariousness risks, and signal validation crises.

#### 3.1.4. Obstacles in the Transformation of Education Human Capital Management

The main obstacle to transformation lies not on the supply side (graduates), but in market resistance and reputation hegemony. Souto-Otero and Białowolski (2021) prove that there are structural barriers in the form of reputational hegemony, where the European job market still prioritizes institutional prestige and social connections over real technical competence, thus blocking skill-based meritocracy (Souto-otero et al., 2021). This obstacle is exacerbated by the findings of Tholen (2023) regarding the subjectivity bias of "gatekeepers". Due to credential fatigue, recruiters turn to class-biased cultural fit assessments, considering technical competence only as a secondary aspect that can be trained. (Tholen, 2023). This phenomenon perpetuates what Tomlinson and Watermeyer (2022) call "market credentialism", in which the transformation of competencies is hampered because education remains seen as a positional status commodity, rather than a substantive capability development mechanism (Tomlinson & Watermeyer, 2022).

Another obstacle lies in epistemological distortions and threats of precarity that result in transformation swamps through curriculum granularization (breakdown into micro units) facing obstacles in terms of quality and safety. Wheelahan and Moodie (2021) warn of epistemological barriers in the form of the risk of generism, where the transition to micro-credentials erodes the deep theoretical knowledge base (powerful knowledge) in favor of superficial practical skills (Wheelahan et al., 2021). Furthermore, Wheelahan and Moodie (2022) identified economic-political barriers, where this new competency model has the potential to trap graduates in "gig qualifications" that exacerbate job precariousness and transfer market risk from firms to individuals (Wheelahan et al., 2021). In addition, Alexander and Belloni (2024) highlight a technical obstacle in the form of a "validation crisis", i.e. the presence of generative AI has undermined traditional signaling mechanisms, creating market distrust of the authenticity of graduate competencies that do not yet have new verification standards that are immune to manipulation (Alexander & Belloni, 2024).

The last obstacle is institutional inertia and agency deficit that originates from the unpreparedness of the education ecosystem itself. Raghavan et al. (2025) highlight institutional inertia, where traditional university structures are too rigid to provide the just-in-time competencies that the digital economy requires, thus creating a widening relevance gap (Raghavan et al., 2025). Parsons et al. (2025) added that pedagogical barriers occur because postgraduate education often fails to instill competencies contextually (embedded), so that the human capital formed is theoretical and lacks self-efficacy (Parsons et al., 2025). Tang et al. (2025) identified barriers at the individual level in the form of agency capital deficits, i.e. the current curriculum has not adequately equipped students (especially in the international context) with psychological resilience and crucial strategic initiatives to penetrate these global market barriers (Tang & Maat, 2025).

Overall, the barriers to transformation are systemic, namely the job market refuses to recognize competencies without reputation. Meanwhile, alternative solutions (micro-credentials) carry the risk of knowledge shallowness and work vulnerability. This is often aggravated by the institution's unpreparedness in building student agency.

## 3.2. Discussion

A The literature synthesis maps the declining trend of academic degree confidence. This shows

that there is a fundamental shift from credential hegemony to the search for new competency validity due to signaling failure (Wang, 2025). This trend stems from the phenomenon of market credentialism noted by Tomlinson and Watermeyer (2022), where degree inflation has devalued the meaning of diplomas, a condition that is now amplified by AI disruptions that undermine the authenticity of academic outputs (Alexander & Belloni, 2024; Araki & Kariya, 2022; Tomlinson & Watermeyer, 2022). In response to this validity crisis, the education ecosystem is moving towards the trend of adopting micro-credentials and just-in-time learning as discovered by Raghavan et al. (2025), which is empirically proven by Parsons et al. (2025) to be able to build Embedded Human Capital and increase professional self-efficacy (Parsons et al., 2025; Raghavan et al., 2025). In parallel with that, the trend of graduate attributes also shifted from passive to active which confirms the rise of "Agentic Capital" as a new determinant. From there, psychological resilience and strategic initiative became the main currency in navigating global market volatility (Tang & Maat, 2025).

Instead, the literature uncovers an unresolved transition gap between the diagnosis of old credential failures and the effectiveness of new solutions. There is a disconnect between problem diagnosis and systemic solutions. While Tomlinson and Watermeyer (2022) successfully diagnosed credentialism diseases and Raghavan et al. (2025) offered a solution in the form of micro-competencies (Raghavan et al., 2025; Tomlinson & Watermeyer, 2022). However, the literature does not yet offer a clear mechanism of integration. The gap is how to adopt this new competency model into the macro system of education without getting stuck back into the same logic of market commodification. This transition is still partial and has not touched holistic human capital governance (Blanch, 2019).

Then there are epistemological and methodological gaps. The transformation towards micro-competencies leaves a sharp epistemological and methodological gap. The literature warns of the risk of loss of powerful knowledge due to curriculum fragmentation that gives birth to superficial technical competence, while highlighting the weak validation of assessments due to the lack of authentic standards that are able to distinguish human competence from algorithmic outputs in the AI era (Alexander & Belloni, 2024; Devakumar, 2025).

On the other hand, there is a theoretical gap between structure and agency. The literature shows an unresolved theoretical tension between individual agency optimism and structural pessimism, with the absence of a model that explains the extent to which *Agentic Capital* able to protect graduates from job precariousness without institutional support (Tang & Maat, 2025). Wheelahan and Moodie (2021; 2022) criticized that this curriculum fragmentation risks eroding the powerful knowledge base and trapping the workforce in a precarious "gig qualification" without social security (Wheelahan et al., 2021).

Furthermore, there is a gaping market valuation gap. Although new competencies are proving to have an internal impact, the data proves the market inertia that still worships the hegemony of institutional reputation over technical skills (Souto-otero et al., 2021). This is exacerbated by the findings of Tholen (2023) regarding recruitment bias when diploma signals weaken, the market does not shift to objective meritocracy, but retreats to subjective assessments based on cultural suitability (Tholen, 2023). This confirms that the human capital transition is still hampered by conservative and biased market structures, which have not been able to accommodate authentic competency models in a fair manner.

Models granular and embedded are transition from *Human Capital* which is "stock" (static title) through the mechanism *Just-in-Time Competency* (Raghavan et al., 2025). In line with theory *Competency-Low(ed Education)* (Hida et al., 2025) where the validity of education is measured by the instantaneous applicability to close the digital divide (Hida et al., 2025). Parsons et al. (2025) deepen this model through the concept *Embedded Human Capital*, proving that the integration of microlearning into work practice empirically improves self-efficacy and productivity (Parsons et al., 2025). These findings validate the framework *Impact-oriented education*, where education is assessed based on the real impact on performance (Devakumar, 2025; Royani et al., 2025). However, this model faces sharp theoretical criticism. Wheelahan and Moodie (2021) warn that unbundling the curriculum into micro-units risks separating skills from their theoretical knowledge base (*powerful knowledge*). In a political economy perspective, Wheelahan and Moodie (2022) label this model as a gig qualification (Wheelahan et al., 2021). This indicates that the shift to a granular model is not merely a pedagogical innovation, but rather a form of fragmentation that exacerbates the precariousness of the workforce, trapping individuals in short-term training cycles without deep intellectual accumulation.

Agency Competency Model often appears as a correction to the mechanistic view *Human Capital Theory* classics that focus only on technical skills. Tang et al. (2025) prove that in a volatile global landscape, the most valuable attribute of graduates is "Agency Capital" (*Agentic Capital*), namely psychological resilience and strategic initiatives (Tang & Maat, 2025). This finding expands the dimensions *Human Capital* from just productive capacity to the capacity to act and give meaning

(Blanch, 2019). Ironically, market validation of this model actually reveals structural biases. Tholen (2023) found that recruiters now consider technical competence only as an aspect that *trainable*, so that the selection shifts completely to cultural compatibility (*Cultural Fit*) (Tholen, 2023). This phenomenon confirms the failure of formal legitimacy of education when diplomas are no longer trusted, the market does not turn to agency meritocracy, but rather retreats to subjective judgments that are prone to social bias, making personality a more valuable commodity than academic qualifications. (Cohen, 2022).

The last model to appear is the Model Authenticated Competencies as a defensive response to technological disruption. Alexander and Belloni (2024) affirm the urgency of "Authentic Human Capital" because the presence of AI has distorted academic signaling mechanisms (*Signaling Failure*), making diplomas susceptible to manipulation (Alexander & Belloni, 2024). This is in line with the increase in the level of education no longer guaranteeing real competence (Araki & Kariya, 2022). However, this effort to enforce authenticity clashes with the reality of "Market Credentialism" (Tomlinson & Watermeyer, 2022). Souto-Otero and Białowolski (2021) prove that the job market is still fixated on the complementarity model, where individual competencies do not have a high exchange rate without validation of the institution's reputation (Souto-otero et al., 2021). This creates a paradox regarding the education system being driven to produce authentic competencies that are immune to AI, yet the job market still uses the shortcut of the campus brand's reputation as a proxy for quality, hindering the expected meritocratic transformation.

The synthesis of empirical evidence and theoretical studies reveals the phenomenon of sharp impact asymmetry in transformations *Human Capital*, where the success of strengthening the internal capacity of individuals actually clashes with a thick wall of market resistance that hinders economic mobility. Empirical validation of the shift in educational theory from static knowledge accumulation to acting capacity (*capacity to act*) Strongly confirmed by adoption *Micro-credentials* that are integrated into work practice directly increase self-efficacy (*self-efficacy*) and professional productivity *just-in-time* (Blanch, 2019; Parsons et al., 2025; Raghavan et al., 2025). This confirms the effectiveness of impact-oriented education models (*Impact-oriented*), where the value of education no longer rests on the duration of study, but on the ability to transfer knowledge into a practical solution (Devakumar, 2025; Hida et al., 2025). This dimension of impact is expanded by the findings of Tang et al. (2025) that put "Agency Capital" (*Agentic Capital*), namely psychological resilience and strategic initiative, as the most authentic educational output to form autonomous and adaptive educational subjects beyond just the possession of technical certificates.

However, the optimism of the internal impact instantly collapses when faced with external realities that hurt the postulate of linearity *Human Capital Theory* classic. The findings of Souto-Otero and Białowolski (2021) reveal the brutal fact that improving technical competence has a marginal impact on *Employability* in the European job market in the absence of validation of the reputation of elite institutions and social networks. This proves that the market is still trapped in the mechanism *Screening Traditional* (Souto-otero et al., 2021). This stagnation is exacerbated by formal competencies that have experienced a devaluation of meaning due to qualification inflation. So the selection shifts to subjective assessments based on "cultural fit" (*Cultural Fit*) that is biased and shuts down access to meritocracy (Araki & Kariya, 2022; Tholen, 2023). As a result, individuals are trapped in defensive credentialing, where the accumulation of certificates is done simply to maintain social status rather than create real economic added value (Tomlinson & Watermeyer, 2022).

Furthermore, this asymmetry leaves profound structural risks regarding the future of the workforce. Sharp criticism of Wheelahan and Moodie (2021; 2022) asserts that without institutional protections, transitioning to a micro-competency model risks trapping workers in vulnerable "gig qualifications" (*Precarious*), where the risk of training is transferred entirely from the corporation to the individual with no guarantee of a long-term career (Wheelahan et al., 2021). This crisis reached its peak with the findings of Alexander and Belloni (2024) regarding AI disruption that undermines the function of educational signals. When authentic competencies are difficult to validate amid a flood of algorithmic manipulation, the market loses faith in new competency signals. This forces the education ecosystem to look for radical validation methods so that the internal impact that has been built is not in vain eroded by market distrust (Alexander & Belloni, 2024).

The first and most dominant obstacle is Market Hegemony, where the demand side (*demand-side*) rejects a meritocracy based on pure skills. The European job market systematically blocks the mobility of graduates by prioritizing institutional prestige and social connections over technical competence, an inertia exacerbated by gatekeeper bias (*Gatekeepers*) (Souto-otero et al., 2021; Tholen, 2023). Due to fatigue in the face of qualification inflation (Araki & Kariya, 2022), recruiters are retreating from objective assessments to subjective-based assessments *Cultural Fit* (Araki & Kariya, 2022). Thus perpetuating what is called "market credentialism", a condition in which education is still treated as a

positional status commodity (*positional good*) instead of the substantive capability development mechanisms expected of impact-based education theory (Devakumar, 2025; Royani et al., 2025; Tomlinson & Watermeyer, 2022).

Responding to the market impasse, technocratic efforts through curriculum granularization actually create obstacles Epistemological Distortions and the Risk of Precarity. Sharp criticism of Wheelahan and Moodie (2021) warns that the transition to *Micro-credentials* triggers intellectual shallowness or "generism", in which practical skills are separated from the deep theoretical knowledge base (*powerful knowledge*) (Wheelahan et al., 2021). Furthermore, this model traps graduates in gig qualifications that transfer market risk entirely from corporations to individuals with no guarantee of job security (Alexander & Belloni, 2024; Wheelahan et al., 2021). This distortion is complicated by technical obstacles in the form of validation crises in which generative AI disruption has undermined traditional signaling mechanisms, creating market distrust of the authenticity of competencies that do not yet have new verification standards that are immune to manipulation, so that curriculum innovation loses its external legitimacy (Alexander & Belloni, 2024).

Finally, the two external barriers are locked by the third obstacle, namely the Institutional Inertia and Agency Deficit. At the macro level, the rigidity of traditional university structures that fail to provide competence *just-in-time* responsively, creating a widening relevance gap (Raghavan et al., 2025). This failure seeps to the pedagogical level, where graduate education often fails to inculcate competencies contextually (*embedded*), produce graduates who are theoretical but have minimal self-efficacy (Parsons et al., 2025). At its peak, there is a deficit of agency capital at the individual level, where the current curriculum does not adequately equip students with psychological resilience and strategic initiative, even though agency is an absolute prerequisite for breaking through the thick walls of market hegemony and navigating global economic volatility (Tang & Maat, 2025).

### 3.3. Connection to Research Objectives

The findings and discussion of this study are intrinsically aligned with the primary research objective to dissect the anatomy of human capital transformation from static credentials to dynamic competencies. By mapping the shift towards agentic capital and just-in-time competency while simultaneously exposing the critical valuation gap and epistemological risks, this review successfully addresses the four formulated research questions: analyzing current literature trends regarding the shift from credentials to competencies (RQ1), identifying emerging competency models that respond to signaling failures (RQ2), evaluating the empirical evidence of their impact on self-efficacy and employability (RQ3), and diagnosing the systemic barriers hindering effective transformation (RQ4). Consequently, this synthesis provides a coherent framework for educational institutions to navigate the paradox between pedagogical innovation and persistent market resistance, offering a clear roadmap for reforming talent management in the post-credential era.

## 4. Conclusion

This study concludes that the transformation of educational human capital from a credential regime to a competency regime is currently trapped in a structural paradox. Although the pedagogical ecosystem has responded to the failure of diploma signals through the adoption of micro-credentials and "Agency Capital" that are empirically proven to strengthen professional self-efficacy, these initiatives hit a thick wall of market hegemony. Reality shows that "credential inflation" is not necessarily replaced by a meritocracy of competence, but rather mutates into a new recruitment bias; The job market still worships institutional reputation and "cultural fit" over authentic evidence of technical expertise, creating a sharp valuation gap between the supply of agile graduates and conservative market demand.

Critically, this study reveals that technocratic solutions in the form of curriculum granularization carry the risk of "epistemological shallowness" and economic precariousness. The shift towards just-in-time practical competencies has the potential to erode the powerful knowledge base and trap the workforce in a cycle of "gig qualifications" with no long-term security guarantees. This threat is amplified by AI disruptions that undermine the validity of academic outputs, creating a systemic trust deficit that forces individuals to re-engage in degree accumulation solely as a mechanism of defensive credentialism.

Thus, the main challenge of this transformation is no longer the innovation of learning methods, but the crisis of validation and institutional inertia. The future of human capital management depends on the ability of education systems to build new authentication standards that are immune to algorithmic manipulation, as well as the courage of the market to deconstruct reputation bias. Without demand-side structural reforms, this competency transition will only perpetuate the vulnerability of the workforce without providing substantive social mobility.

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