

Aligning University Education with Labor Market Needs: A Systematic Review of Employability among Sri Lankan Technology Graduates

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Abstract: Rapid changes in technology and industry have intensified the necessity for graduates to acquire the skills required to meet the evolving labor market demands. Despite a significant increase in the number of graduates pursuing degrees in science and technology, the majority still encounter underemployment, lack critical competencies, or struggle to meet the requirements of the contemporary workplace. To examine the root causes of the mismatch between university education and labor market requirements, this study conducted a systematic review of 38 peer-reviewed journal articles published between 2010 and 2024. The articles were retrieved through a structured Boolean search across major academic databases, including Scopus, ScienceDirect, and Google Scholar. By conducting a systematic literature review and performing citation and thematic analyses this study aims to highlight key research contributions and emerging themes regarding the alignment of higher education with labor market demands. The findings highlighted several persistent challenges, including gaps in both technical and soft skills, limited opportunities for practical, real-world experience, and outdated curricula that are no longer compatible with current labor market expectations. These results underscore the importance of fostering stronger collaboration between university education and industry, implementing reforms, and initiating targeted measures to enhance graduate employability. Moreover, the study furnishes insights for universities by offering recommendations to bridge the gap between educational outcomes and the competencies and labor market expectations. The findings offer guidance for policymakers, curriculum developers, and university administrators in improving graduate employability through the implementation of targeted strategies to address identified skill gaps. While providing a comprehensive contribution to existing literature, the study is constrained by its reliance on English-language sources and the lack of context-specific empirical evidence. Future research should focus on examining employer expectations, conducting longitudinal analyses of graduate career trajectories, and evaluating the impact of recent higher-education reforms on employability outcomes. Ultimately, this study facilitates the development of an updated framework for re-envisioning higher education, with a focus on producing technology graduates, enhancing their employment prospects, and supporting national economic development.

Keywords: *Curriculum Design, Graduate Employability, Industry Collaboration, Skill Mismatch, Technology Education*

Introduction

Education plays a prominent role in shaping the socio-economic dimensions of countries, particularly higher education, which equips young people with the qualifications needed to pursue diverse job opportunities (Tavares et al., 2023).

Notwithstanding, emerging knowledge-based economic systems present considerable challenges, even for individuals with higher levels of qualifications and education (Tomlinson, 2012). Similarly, the transition from higher education to the labor market has become more complicated due to

underemployment, uncertainty, and lower salary scales, despite graduates possessing adequate qualifications (Suleman & Figueiredo, 2019). In addition, the competencies and skills of graduates often do not align with prevailing labor market demands, resulting in increased unemployment and underemployment among young people (Finamor, 2023). This issue is not limited to developed countries but is also evident in developing nations like Sri Lanka (Emilia, 2012). Moreover, based on findings from Spain, a widespread horizontal mismatch has been observed, as the majority of graduates work in areas unrelated to the degrees they have obtained, which impedes their job satisfaction and career development (Mora & García-Aracil, 2021).

Although higher education plays a pivotal role, the majority of existing literature on education has focused on primary and secondary education, while higher education has received comparatively little attention (Boccanfuso et al., 2015). Furthermore, many studies have examined factors such as educational quality (Boccanfuso et al., 2015; Pradela, 2015b), vocational training (Esposito & Scicchitano, 2022; Oswald-Egg & Renold, 2021; Pradela, 2015a), and labor market conditions (Aronica, 2023; Cerdón-Lagares, 2022; Demissie, 2020; Merie, 2022; Sharaf, 2012). These studies frequently highlight the discrepancy between the skills emphasized in educational institutions and the requirements of employers. However, studies specifically addressing the employability of technology graduates in Sri Lanka are conspicuously lacking (Boccanfuso et al., 2015). Therefore, it is important to investigate the alignment between higher education and the employability of technology graduates. This need is also emphasized by the studies of Boccanfuso et al. (2015) and Oswald-Egg and Renold (2021), although

their research is limited to specific sectors, such as engineering and journalism. These studies also suggest that similar research could be conducted in other sectors. Hence, such studies should consider subject streams like technology in order to better understand labor market requirements related to technology graduates. Likewise, many global studies emphasize bridging the employability skills gap through curriculum redesign and stronger engagement with industry (Koseda et al., 2024; Mason et al., 2023).

Accordingly, this study aims to investigate the alignment between university education and labor market needs, with particular focus on the employability of technology graduates in Sri Lanka. It begins by reviewing recent discussions, arguments, and contributions in this field, highlighting key themes and subtopics such as underemployment, the mismatch between graduate skills and labor market demands, and the role of higher education institutions in preparing graduates for the workforce. Secondly, the study explores emerging directions for future research and new topics in the area of graduate employability, particularly within the technology industry. To identify the primary areas of research related to the employability of technology graduates and their alignment with market needs, citation and thematic analyses will be employed to determine the most significant studies and influential scholars.

Therefore, the flow of the article is as follows. The introduction provides background information and emphasizes the research gap on employability of technology graduates in Sri Lanka. Then the methodology section outlines the systematic literature review process to select relevant academic sources, search strategy, inclusion/exclusion criteria, and data extraction and analysis. Subsequently, the citation analysis is used

to identify the most influential authors, articles and journals in the field, and dominant research areas. Moreover, thematic analysis examines major themes such as skills mismatch, graduate employability, curriculum design and work integrated learning while highlighting the challenges in aligning higher education with labor market needs. The discussion and future direction section interprets the findings, highlights the implications for policy and practice and areas for future research in the context of Sri Lanka's technology education. Finally, the conclusion provides a summary of the review and importance of aligning university education with market realities to enhance graduate employability.

Objectives of the Study

1. To investigate the contemporary alignment of higher education and labor market needs for technology graduates in Sri Lanka.
2. To identify key themes and challenges affecting graduate employability.
3. To analyze influential literature and researchers in this domain through citation analysis.
4. To recommend policy, educational practice, and future research directions to enhance employability outcomes.

Methodology

For the purpose of identifying factors affecting higher education for employability, the researcher has adopted a systematic method to conduct the systematic literature review by ensuring the accuracy of the review process. Therefore, divergent steps have been taken with the purpose of conducting a

meaningful review. As the first step, to find out the suitable research articles for the study, the researcher considered search strings such as Science Direct, Emerald, Jstor, Willey Online Library, and Google Scholar in line with the previous studies like Abdullah et al. (2022). Further, only journal articles were considered to ensure the reliability of review procedure while excluding conference papers, book series, book chapters, magazines, and thesis. To overcome the difficulties in searching relevant articles, the Boolean method was employed. For this purpose, key terms related to the topic of alignment between university education and labor market needs were identified. The Boolean search method was used to manage the large volume of search results and to refine article selection. Boolean searching employs logical operations; therefore, primary operators such as "AND", "OR" along with similar terms were used to filter articles relevant to the study. For instance, (University education OR "tertiary education*" OR "graduates*" OR "undergraduates*") AND ("Labor Market Needs" OR "Employability" OR "Jobs"). To ensure the inclusion of the most contemporary studies, only articles published between 2005 and 2024 were considered. Moreover, the following steps were adopted in selecting the relevant articles for the study. As the first level of screening, book chapters, conference papers, and editorials were excluded and only peer-reviewed articles were retained for further study. Subsequently, titles and keywords listed of the articles were examined and those that clearly fell outside the scope of the study were removed. After the title and keyword filter, abstracts were reviewed to confirm the relevance of each article. Studies focusing on general education reform, non-tertiary education, or labor matters arising outside an educational context were excluded. Thereafter, if the article's relevance remained unsure even after skimming through the abstract, the full

article was read-out to confirm that the study meaningfully compatible with the relationship between university education and employability or labor market alignment. As well as final articles relevant for the study were selected based on the specific focus as only articles that explicitly investigated issues of employability of graduates, alignment of curriculum with the labor market, mismatch of skills, employer expectations, or interaction between universities. Lastly, highly cited articles were given preference under the assumption of greater influence within the academic community. However, articles with fewer citations, but high relevance and methodological rigor, were also considered in the selection.

Hence, an initial search in Science Direct yielded 14,420 articles related to the selected key terms. However, some articles were not compatible with the study despite containing searched key terms. Hence, 30 articles were selected from all other articles from the database of Science Direct after following this strict selection process. Additionally, the same process was carried out to select articles from other databases after removing the duplications, 133 articles remained for further reference. Further, multiple exclusion criteria were then employed to filter the most relevant articles from this pool.. At this stage, abstracts were reviewed to ensure that the articles aligned with the research context. When uncertainty arose regarding the article, the next step was to skim-read the whole paper to get confirmation of the relevance of the article for the present study. As a result, 95 articles were excluded considering the content, as they were not directly focusing on higher education. Eventually, 38 articles were extracted for further analysis. Moreover, the number of citations was also considered in selecting influential articles within the research area. For that, articles were classified

based on the number of citations received from their databases to minimize subjective bias. Furthermore, articles that ranked within the top 10% of citations in the year of publication and research area classification were designated as “highly cited” and were given high priority for inclusion in this study.

On the other hand, journal rankings were also considered when selecting the relevant articles for the study. For that purpose, the selection reviewed the SCImago Journal Rank (SJR) and Scopus quartile rankings (Q1–Q4), giving preference to articles published in Q1 and Q2 journals, recognized by the academic community for their impact and quality. This approach prioritized publications from well established journals in the fields of education, higher education, and employability. In order to identify the themes of the study, thematic analysis was conducted by grouping each article into relevant themes. Each article was coded and allocated to a theme based on its core focus, resulting in overarching themes such as curriculum-employer alignment, graduate employability, skills mismatch, and university-industry collaboration. Subsequently, sub themes were also identified in the field of higher education and labor market needs. This process facilitated in identifying key authors, major areas and future directions of the research. Table 1 in annexures shows the structured steps followed in this study to ensure transparency in the review process.

Additionally, the study used the PRISMA framework which helps transparency and improves article selection. The PRISMA flow diagram illustrates the complete process of study identification and study screening and study eligibility assessment and study inclusion. The scientific databases produced a total of 44,417 articles as initial records related to the study. The researchers conducted a title and keyword screening on the remaining

articles after removing duplicate articles and followed the process by reviewing abstracts to assess relevance. Moreover, excluded the articles that did not examine higher education and labor market alignment. Then, full-text screening was

employed to verify the alignment between the study objectives and the selected articles. Finally, 38 peer-reviewed journal articles were selected for thematic analysis as they satisfied all inclusion criteria.

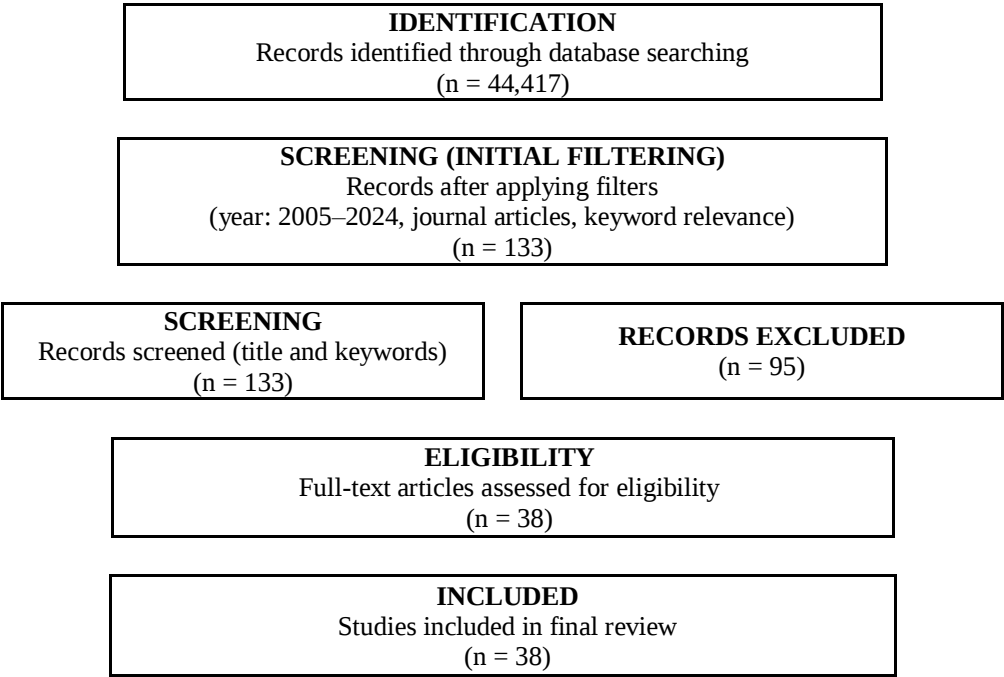


Figure 1. PRISMA flow diagram of article selection process
Source: Developed by the author based on prior literature

Data analysis and Discussion

Citation Analysis

A citation analysis was performed to identify the most influential articles in the field. Accordingly, 38 articles were considered in this study. This revealed key authors and publications that significantly contribute to the discussion on the alignment between higher education and labor market needs. The analysis also highlighted several major research areas, including employability, skills mismatches, underemployment, and the

role of curriculum design in preparing graduates for the workforce.

Thematic analysis

The thematic analysis grouped the selected articles into major themes based on the content and focus of each study. The process involved a careful analysis of the main topics and arguments from the selected literature to identify patterns and commonalities (Nowell et al., 2017). Four primary themes emerged from the literature, each contributing to a broader understanding of the alignment between

university education and labor market needs. These themes address the challenges and gaps that hinder graduate employability, particularly among technology graduates in developing economies such as Sri Lanka.

By systematically coding the relevant and contextual issues, challenges and concepts related to graduate employability, the extracted findings from each article were then aggregated into broad categories based on similar codes. This iterative approach enabled the development of four key themes that represented the most significant influences on the employability of technology graduates in both a global and Sri Lankan contexts. The presentation of these themes within a structured framework provides a clear basis for universities and other policymakers to identify key areas where graduate outcomes could be improved. Refer to the table 02.

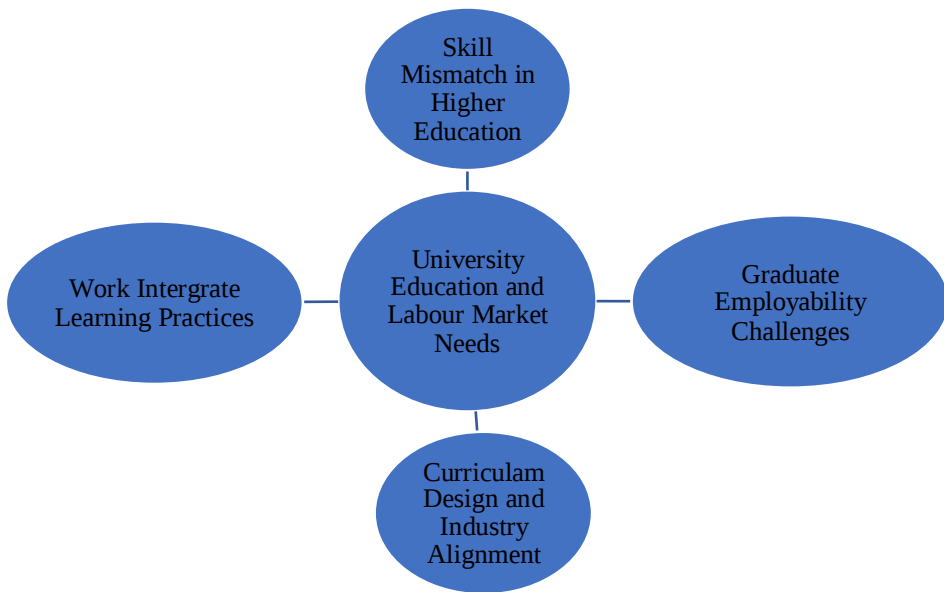


Figure 2. Key themes derived on graduate employability
Source: Developed by the author based on prior literature

Skills Mismatch in Higher Education

One of the most significant and recurring themes in the literature is the skills mismatch between what universities teach and the competencies employers seek (Tomlinson, 2012). Further, this skills mismatch can be broadly categorized as vertical mismatch and horizontal mismatch (Fisi et al., 2017). When the level of education of graduates does not match with the job requirement because of under qualification or over qualification can be referred as vertical mismatch. For instance, many graduates have jobs that do not require degree level qualifications while obtaining lower job satisfaction. Sharaf (2012) has emphasized that the overqualifications among job holders in Canada satisfied with less earnings. Nevertheless, horizontal mismatch is also a critical issue, as it occurs when individuals are employed in jobs that do not correspond to their field of study.

As per the findings of Cordón-Lagares (2022) and Tavares (2023) graduates in Spain frequently struggle with horizontal mismatch. The skills gap is also a pressing issue in relation to graduate employability. . Therefore, various studies highlight how universities often emphasize on theoretical knowledge, whereas employers prioritize practical, job-specific skills (Boccanfuso et al., 2015). The mismatch between academic curricula and the practical industry needs leads to a situation where graduates may hold degrees but remain unprepared to meet the demands of the labor market (Suleman & Figueiredo, 2019; Deming, 2017).

The misalignment is highly evident in fields such as technology, where rapid developments create a dynamic job market. Employers in the technology sector would expect their graduates to adapt quickly to new tools, methodologies, and software. However,

universities may be unable to keep up with the technological advancements in the industry (Pages & Stampini, 2009). This would not be the only area of concern; it stretches across a handful of industries, leading to an increasing number of unemployed and underemployed graduates globally. There is a growing need regarding the higher education setup to constantly match curricula and teaching methods to meet ever-changing demands from the job market (Ghosh & Grassi, 2020; Saad & Fallah, 2021; Oreopoulos & Petronijevic, 2018).

In Sri Lanka, this skills mismatch is a prominent issue, as university curricula have lagged in incorporating modern technologies. (Perera & Wijesiri, 2020). Employers in the sector of technology often express dissatisfaction with graduates' lack of hands-on experience and critical thinking aptitudes which are essential for solving real-world problems (Tavares et al., 2023). This gap not only hinders graduate employability, but also poses challenges for the economy, as industries encounter issues in finding workers who are qualified to spur innovation and growth (Mason et al., 2023).

Graduate employability challenges

The growing issue of graduate employability is another major theme identified in the literature. Employability constitutes the ability of graduates to get appointed and to perform well in jobs once hired (Clarke, 2018). As argued by Kibona (2023), several factors influence employability, such as whether academic training is relevant to the labor market and the existence of transferable skills (ex-communication, teamwork, and problem-solving). Besides practical skills such as vocational education, industry experience provides a competitive advantage toward job opportunity as compared to others who do not have any industry-related

experience (Schultheiss & Backes-Gellner, 2023).

Several researchers have pointed out that, although there are multiple numbers of graduates worldwide, the majority of them face difficulties in obtaining suitable jobs, particularly in sectors requiring advanced technical skills (Tyman, 2013; Sarkar et al., 2016). Technology graduates, despite being highly specialized in their fields, are very often refused entry into jobs appropriate to their skills due to the lack of industry exposure and practical experience (Oswald-Egg & Renold, 2021). In developing countries such as Sri Lanka, where the job market for technology graduates is still emerging, the graduate employability issue is merged mainly by economic dimensions (Dayaratna-Banda & Dharmadasa, 2022).

Technology graduates are often employed in jobs that do not match with their field of education and as a result, become underemployed. Most of the researchers indicate that this issue is the outcome of both an overabundance of graduates in certain fields and an educational system that does not adequately prepare students for the needs of the labor market (Aronica et al., 2023).

In order to address the employability gap, universities should not only focus on academic excellence but also ensure that students are given a chance to learn by giving internships, industrial placements, and project-based learning (Osmani et al., 2015). Furthermore, universities must prioritize soft skills of graduates such that employers are increasingly demanding competencies such as problem solving, teamwork, and emotional intelligence (Boccanfuso et al., 2015; Jackson, 2016).

Curriculum design and industry alignment

The structure of the academic programs has been identified as a prominent factor influencing graduate employability (Smith, 2019). Most of the studies have pointed out that the conventional curriculum which focuses on theoretical contents and knowledge, are insufficient to equip the graduates with relevant skills to address the requirements of modern labor markets. Therefore, it is important for the universities to establish a strong collaboration with industry stakeholders to ensure that the graduates obtain necessary skills and knowledge required by the job market (Alanazi & Benlaria, 2023).

Further, curriculum design is vital in technology-driven fields, where the pace of change is required by the graduates with the latest tools and techniques. Universities that fail to revise their programs accordingly with emerging industries, the graduates produced by those universities are outdated when they enter the industry (Sharaf, 2013). Research has also emphasized the demand for curricula to be inter-disciplinary as employers are seeking for graduates who have ability to fit with the multiple domains apply their skills to overcome challenges (Yizengaw & Weidman, 2024).

In addition to aligning curricula with industry requirements, universities should also strive towards developing curricula that motivate both soft skills and hard skills. These are essential for success in rapidly changing industries such as technology, where employers seek more innovative and creative thinkers. Researchers have also highlighted the importance of integrating practical implications into academic programs such as case studies, laboratory works, and projects which enable students to apply

their theoretical knowledge to practical scenarios.

Curriculum design and revisions can be identified as one of the vital areas for enhancing the employability among graduates in Sri Lanka especially for technology graduates (Tavares et al., 2021). The emphasis on standardized testing and rote learning in many current programs does little to encourage the creativity and adaptability required in the modern workplace (Tavares et al., 2023). In order to better meet the demands of the technology industry and give students the tools they need to succeed, universities must take action to update their curricula.

Work Integrated Learning (WIL) Practices

Work-integrated learning (WIL) refers to programs that blend classroom learning with hands-on work experience (Jackson, 2016). It has gained considerable attention recently due to its impact on graduate employability. . Studies show that students who take part in WIL programs, like internships and apprenticeships, are more likely to land a job after graduation and do well in their positions (Boccanfuso et al., 2015). WIL provides students with practical experience and helps to bridge the gap between their academic learning and real world practice. . It enables them to apply their classroom knowledge, engage with industry professionals, and understand workplace expectations. Plus, they get to build useful skills like communication (Boccanfuso et al., 2015).

Research conducted by Oswald-Egg and Renold (2021) indicates that, in fields such as engineering, having structured vocational education and real work opportunities greatly boosts job readiness. Their findings suggest that students who work while studying tend to perform better in their jobs and find work faster after they finish school. Schultheiss and

Backes-Gellner also show that work-integrated learning (WIL) supports continuous education and keeps skills up to date, which is important since job requirements change. WIL also assists to mitigate skill obsolescence, according to Schultheiss and Backes-Gellner (2023). They contend that WIL experiences increase the hard and soft skills' resilience and adaptability to shifting labor market conditions.

Nevertheless, the implementation of WIL can be challenging. Not every student can find quality placements, especially in rural areas or places with limited resources (Demissie et al., 2020). Also, some universities might lack the necessary support or industry connections to make WIL implement effectively. In countries like Saudi Arabia, there is a growing interest in integrating WIL to school programs, driven by national plans like Vision 2030 that emphasize employability for graduates (Alanazi & Benlaria, 2023). These initiatives are trying to ensure students are not just learning in the classroom but also gaining practical experience that fits job market needs. For WIL programs to be successful in the long run, universities must establish strong partnerships with industry stakeholders , provide academic recognition for work experiences, and develop effective mentorship and feedback systems. Future research and practice should explore creative WIL models, like industry-based capstone projects and virtual internships, to improve access and make these programs more inclusive.

Employability Issues in Sri Lanka

Sri Lanka faces significant challenges in the employability of technology graduates, partly due to the large numbers of graduates produced annually from engineering and science faculties (Dayaratna-Banda & Dharmadasa, 2022). Various studies have identified that skill

sets taught in universities differ largely from ones required by employers in the local job market. Jayawardena and Samarasekara (2019) found that IT graduates in Sri Lanka commonly lack the practical and technical skills expected by employers from the industry, thereby limiting their job opportunities in the market.

Karunaratne and Perera (2020) found that graduates have underdeveloped soft skills (like communication and teamwork) and technical skills, which further impede their chances of gaining employment relevant to their training; this is further exacerbated by curricula that have not evolved satisfactorily in relation to rapid technological changes (Perera & Wijesiri, 2020; Tavares et al., 2023). Seneviratne and Fernando (2018) stated that the alignment of curriculum content with the labor market seldom happens, thus challenging graduates to meet immediate industry demands.

The situation is particularly critical for all graduates. Wijewardena and Senanayake (2017) note that even though the engineering graduates possess the skills to meet the job requirements but still find they are underemployed and dissatisfied. Usually practical exposure through work-integrated learning (WIL), which is available to a lot of students, contributes immensely to their employability. Perera and Gunasekara (2021) argues that internships and industry placements assist in enhancing job readiness and adaptability of graduates. Ratnayake and Herath (2023) argued that Sri Lanka's IT sector needs a much stronger collaboration between industry and academia, to help bridge the employability gap. They noted that collaboration between universities and players in the industry can help ensure curricula are up to date and that graduates are equipped with the skills and experience required. Despite this new knowledge, there

continues to be a dearth of local studies specifically focusing on technology graduate employability studies in Sri Lanka (Boccanfuso et al., 2015; Dayaratna-Banda & Dharmadasa, 2022). This indicates a need for more empirical studies to improve curriculum reforms and substantive policy interventions to improve graduate outcomes and graduates' alignment with higher education and labor market realities. Refer to the summary of key findings given in table 03.

Theoretical contribution and comparative insights

This review reinforces and extends existing frameworks of graduate employability, notably the Education-Employment Alignment Model and Human Capital Theory (Tomlinson, 2012; Clarke, 2018). The review on technology graduates (alumni) from Sri Lanka signifies how skills mismatch, limited collaboration between industry and universities, and outdated curricula restrict employability. In addition, similar trends have been identified in other developing contexts such as, India (Ghosh & Grassi, 2020), Ethiopia (Yizengaw & Weidman, 2024), and some parts of Latin America (Pages & Stampini, 2009). Sri Lanka is distinct due to the high number of engineering and science graduates each year (Dayaratna-Banda & Dharmadasa, 2022), and a lack of national policy and emphasis on work-integrated learning. Therefore, the review underscores the need for local adaptation of global best practices and contributes to the development of employability models that are grounded within regional contexts. In summary, the study provides a foundation to enhance theoretical frameworks by incorporating the structural constraints of small developing economies into account, especially those where higher education expansion has outpaced labor market reforms.

Conclusion

One major challenge in the traditional economy is the gap between what higher education offers and what employers actually expect from their employees. Finding jobs after graduation is still a big issue, especially in places where degree programs don't line up with what employers want (Jackson, 2016). According to several studies conducted by various scholars, although the universities strive to offer graduates with theoretical knowledge, many jobs actually require hands-on skills and real-life experience that are actually absent from graduates (Smith, 2019; Oswald-Egg & Renold, 2021). This leads to a gap between what graduates learn in universities and what they need to succeed at work.

Furthermore, it is highly imperative for work-integrated learning to connect education and labor market requirements (Perera & Wijesiri, 2020). For instance, WIL includes internships, and cooperative education programs that help graduates to identify how their learnings apply into real world contexts while boosting their chances of getting required jobs with practical skills. There are still difficulties in creating programs that successfully address the changing demands of the job market, even with several attempts at curriculum reform.

Therefore, this review has identified several key areas of concern regarding the alignment between university education and labor market needs, particularly in the context of technology graduates in Sri Lanka. Four main themes served as a guide for the thematic analysis including work-integrated learning, curricular design, graduate employability, and skill mismatch. The existence of a disconnect between education and the labor market was confirmed by the consistent emergence of each of these themes in the reviewed studies. Moreover, the thematic

analysis reveals that while universities are producing an increasing number of graduates, many are not adequately prepared to meet the demands of the labor market. This highlights the need for closer collaboration between higher education institutions and industries to ensure that graduates are equipped with the skills necessary to succeed in the workforce.

The review also identifies several gaps in the literature, particularly in relation to of curriculum design, skill mismatch, work-integrated learning, and the specific challenges especially facing by technology graduates as there are dearth of studies related to the context of technology graduates (Yizengaw & Weidman, 2024; Koseda et al., 2024; Schultheiss & Backes-Gellner, 2023). Ttable 04 in annexures depicts the research gap compared to prior studies.

Implications

Findings of this study emphasize that the higher education institutions have significant implications regarding the persistent gap between skills of graduates and the labor market needs. t. To address this issue, universities should reform their curricula, moving away from the theoretical content and toward a more performance-based/oriented or practical approach for both teaching and learning. Moreover, to equip graduates with technical and transferable employment skills, it is imperative to integrate emerging technologies , problem solving learning methods and real-world practice into the academic programs. Additionally, stronger university - industry collaboration would further contribute to the development of relevant programs through the continuous co-design of curriculum aligned with employer expectations. Embedding work integrated learning (WIL) as an integral part of the degree program through internship, apprenticeship and project - based

learning would further enable students to develop their hands-on experience in the workplace settings along with relevant professional and employability skills.

Subsequently, policymakers must implement strategic frameworks that encourage ongoing review of curricula, offer incentives for collaboration between universities and industry, and use graduate employment rates as an important measure of their success. Universities should also make a concerted effort to develop those students' soft skills, which are increasingly valued by employers..

Indeed, by addressing these gaps between higher education and labor market needs, policymakers and educators may better align educational outcomes with labor market needs which will lead to an improved labor market with high graduate employment rate not only for developed countries but also for developing countries. In sum, achieving higher levels of graduate employability requires collaboration among multiple stakeholders, including higher education institutions, institutions, industry and government, to develop a responsive education system that addresses current needs and anticipates future needs.

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Table 1. Process of selecting articles

Criteria	Description
Search Strategy, Databases and Initial search count	Search articles using: ScienceDirect (14,420), Emerald (4,000), JSTOR (1,895), Wiley Online Library (12,502), Google Scholar (11,600). Boolean Search Strategy ("University education" OR "tertiary education" OR "graduates" OR "undergraduates") AND ("Labor market needs" OR "employability" OR "jobs")` as guided by Abdullal et al. (2022)
Inclusion Criteria	Focus on peer-reviewed journal articles Published:2005-2024 Key themes: ● Graduate employability ● Alignment between curriculum and labor market needs ● Skills mismatches ● Expectations of employers ● University vs. industry interaction Used highly cited articles searched through SCImago and Scopus.
Exclusion Criteria	Excluded conference papers, book chapters, theses, magazines, non-peer reviewed material
Screening & Selection Process	Step 1 Initial search- all articles were identified related to this study Step 2 Title and key words screening- Removed irrelevant articles Step 3- Abstract Screening- Access for topic alignment Step 4- Full text skim reading- Applied when abstracts are not clear
Quality Evaluation	Preferred Q1/Q2 ranked journals in SCImago, Scopus Used citation counts for influence and relevance
Thematic Analysis	Each article was coded based on its main focus Grouped into major themes. ● Curriculum-employer alignment ● Graduate employability ● Skills mismatch. ● University-industry collaboration Broke down into sub-themes for deeper analysis

Source: Developed by the author based on a systematic literature review of peer-reviewed journal articles retrieved from scientific databases (2005–2024).

Table 2. Articles used for the Study

Authors (Year)	Journal	Citation Count
Alanazi, A. S., & Benlaria, H. (2023)	Social Sciences	5
Abdullah, N. S. S., Abd Majid, M. Z., & Hussin, M. (2022)	Int. Journal of Academic Research in Economics and Management Sciences	3
Aronica, M., Faggian, A., Insolda, D., & Piacentino, D. (2023)	Population, Space and Place	12
Boccanfuso, D., Larouche, A., & Trandafir, M. (2015)	World Development	45
Clarke, M. (2018)	Studies in Higher Education	60
Cordón-Lagares, E., & García-Ordaz, F. (2022)	European Journal of Education	8
Dayaratna-Banda, O. G., & Dharmadasa, P. D. C. S. (2022)	South Asian Survey	4
Deming, D. J. (2017)	Quarterly Journal of Economics	150
Demissie, M. M., et al. (2020)	Education Research International	6
Emilia, H. (2012)	Procedia - Social and Behavioral Sciences	20
Esposito, P., & Scicchitano, S. (2022)	Structural Change and Economic Dynamics	10
Finamor, L. (2023)	Economics of Education Review	7
Flisi, S., et al. (2017)	Social Indicators Research	30
Ghosh, S., & Grassi, E. (2020)	Papers in Regional Science	15
Jackson, D. (2016)	Higher Education Research & Development	50
Koseda, E. M., et al. (2024)	Policy Futures in Education	2
Kibona, B. (2023)	Journal of International Development	5
Mason, G., Williams, G., & Cranmer, S. (2023)	Social Sciences	4
Merie, H. E., et al. (2022)	Education Research International	3
Mora, T., & García-Aracil, A. (2021)	Journal for Labour Market Research	9
Nowell, L. S., et al. (2017)	Int. Journal of Qualitative Methods	40
Oreopoulos, P., & Petronijevic, U. (2018)	Journal of Human Resources	25
Osmani, M., et al. (2015)	Int. Journal of Educational Management	18

Authors (Year)	Journal	Citation Count
Oswald-Egg, M. E., & Renold, U. (2021)	Economics of Education Review	12
Pages, C., & Stampini, M. (2009)	Journal of Comparative Economics	35
Perera, L., & Wijesiri, M. (2020)	Industry and Higher Education	10
Pradela, A. (2015a)	Procedia - Social and Behavioral Sciences	22
Saad, A. F., & Fallah, B. (2021)	Labour Economics	8
Sarkar, M., et al. (2016)	Int. Journal of Innovation in Science and Mathematics Education	14
Schultheiss, T., & Backes-Gellner, U. (2023)	Industrial Relations: A Journal of Economy and Society	6
Sharaf, M. F. (2012)	International Scholarly Research Notices	5
Sharaf, M. F. (2013)	International Scholarly Research Notices	5
Smith, E. (2019)	Higher Education Research & Development	20
Suleman, F., & Figueiredo, M. D. C. (2019)	Journal of Youth Studies	12
Tavares, O., et al. (2021)	European Journal of Education	9
Tavares, O., et al. (2023)	Bulletin of Economic Research	4
Tomlinson, M. (2012)	Higher Education Policy	30
Tymon, A. (2013)	Studies in Higher Education	25
Yizengaw, J. Y., & Weidman, J. C. (2024)	Int. Journal of Educational Development	3

Source: Developed by the author using citation data obtained from scientific databases, with journal quality verified using SCImago Journal Rank.

Table 3. Summary of key findings

Theme	Key Takeaways from Literature	Implications	Number of Studies
Skills Mismatch in Higher Education	Both horizontal and vertical mismatches are still common (Sharaf, 2012; Cerdón-Lagares & García-Ordaz, 2022). Disparity between practical skills and theoretical knowledge (Suleman & Figueiredo, 2019; Abdullah, Abd Majid, & Hussin, 2022). Particularly important in fields that are changing quickly, like technology (Pages & Stampini, 2009; Mason, Williams, & Cranmer, 2023). Overeducation and over skilling, a kind of skill mismatch, are always affect labor market outcomes (Flisi et al., 2017; Ghosh & Grassi, 2020; Dayaratna-Banda & Dharmadasa, 2022).	The curriculum needs to be updated to reflect the demands of the job (Smith, 2019; Koseda et al., 2024). Improved incorporation of necessary practical skills (Perera & Wijesiri, 2020; Clarke, 2018).	18 articles
Graduate Employability Challenges	Affected by Soft Skills, relevance to the Job Market, and Practical Experience (Kibona, 2023; Deming, 2017).	Employability tactics need to extend beyond scholarly understanding (Oreopoulos & Petronijevic, 2018).	22 articles

Theme	Key Takeaways from Literature	Implications	Number of Studies
	Many recent graduates are either underemployed or mismatch their job with their degrees (Oswald-Egg & Renold, 2021; Esposito & Scicchitano, 2022). Financial difficulties are faced by university graduates in Sri Lanka (Aronica et al., 2023; Dayaratna-Banda & Dharmadasa, 2022). Employability depends on personal attributes rather than theoretical knowledge (Clarke, 2018; Jackson, 2016). Knowledge and experience on technical tools handling may enhance graduate employability (Oreopoulos & Petronijevic, 2018).	The goal of programs should be to prepare graduates holistically (Tyman, 2013; Kibona, 2023).	
Curriculum Design and Industry Alignment	According to Alanazi and Benlaria (2023) and Tavares et al. (2023) many curricula are often focused on theoretical approach and are not concerned about current trends. There's a growing demand for content that matches what industries actually need and crosses different fields (Yizengaw &	Curricula should be updated to encourage creativity, problem-solving, and employability (Smith, 2019; Alanazi & Benlaria, 2023). Enhance industry-university collaboration (Yizengaw & Weidman, 2024).	17 articles

Theme	Key Takeaways from Literature	Implications	Number of Studies
	Weidman, 2024; Mason et al., 2023). Tavares et al. (2023) and Perera & Wijesiri (2020) noted that in Sri Lanka, the curricula tend to emphasize memorizing facts instead of fostering critical thinking skills.		
Work-Integrated Learning Practices (WIL)	This method can help people get jobs faster and improve their chances of finding work (Boccanfuso et al., 2015; Oswald-Egg & Renold, 2021). Reduces skill obsolescence while enhancing hard and soft skills (Schultheiss & Backes-Gellner, 2023). In areas with limited resources, getting access is tough (Demissie et al., 2020; Merie, Dessie, & Bizuneh, 2022).	Increase WIL through collaborations, online internships, and easily accessible positions (Demissie et al., 2020). Integrate WIL into the curriculum using models that grant credit (Merie et al., 2022).	14 articles
Employability Issues Specific to Sri Lanka	A large volume of graduates from engineering and science faculties increases competition for jobs (Dayaratna-Banda & Dharmadasa, 2022). Local graduates in IT and engineering lack important soft skills, and applied technical	Revised Sri Lankan higher education curricula to incorporate local and global trends of market demand (Perera & Wijesiri, 2020; Tavares et al., 2023). Make WIL compulsory components include projects, labs, experiential work, and hands-on practical training in tech areas (Perera & Gunasekara,	9 articles

Theme	Key Takeaways from Literature	Implications	Number of Studies
	knowledge that relates to industry (Jayawardena & Samarasekara, 2019; Karunaratne & Perera, 2020). Curriculum has not kept pace with rapid changes in the technology sector (Perera & Wijesiri, 2020; Seneviratne & Fernando, 2018). Limited opportunities for work integrated learning means graduates are not prepared to adapt (Perera & Gunasekara, 2021). Industry and academia do not collaborate effectively (Ratnayake & Herath, 2023).	2021; Oswald-Egg & Renold, 2021). Enhance partnerships and relationships by involving universities and industry with co-designing programs and internships (Ratnayake & Herath, 2023; Alanazi & Benlaria, 2023)..	

Source: Developed by the author through thematic analysis of selected peer-reviewed journal articles.

Table 4. Research context and research gaps in the graduate employability literature

Research Area	Prior Studies	Research Gaps
Skill Mismatch in Higher Education	Extensively researched in developed nations (such as the US, Canada, and the EU). Pay attention to mismatches that are both vertical and horizontal. The majority of research is quantitative. Usually, surveys or secondary labor data are used to measure mismatches	Dearth of research evidence from developing nations like Sri Lanka that is specific to a given context. There is a dearth of sector-specific analysis (such as manufacturing, technology and ICT). More qualitative information about employer and graduate perceptions is required. Mixed methods are used sparingly to triangulate results.
Graduate Employability Challenges	investigated in the global north with a focus on industry readiness, transferable skills, and academic-to-work transitions (e.g., Kibona, 2023; Oswald-Egg, 2021). Focus on transferable skills (teamwork, communication, and flexibility).	There is little data from lower-middle-income or South Asian nations. Underemployment, job relevance, and rural graduates are specific issues that have not received enough attention. Less attention is paid to the disparity in critical thinking, emotional intelligence, and innovation-focused skill sets in technology-related fields.
Curriculum Design and Industry Alignment	Curriculum-industry alignment is emphasized in curriculum design research, especially in STEM fields (e.g., Alanazi & Benlaria, 2023)	There aren't enough studies examining Sri Lankan curriculum design procedures or how industry feedback loops influence changes to academic programs. Cultural and political barriers to reform are rarely discussed, and little emphasis is placed on how local universities alter or oppose change.
Work-Integrated-Learning Practices	An expanding corpus of work in some Asian and Western contexts. a focus on apprenticeships, cooperative education, and internships (e.g., Boccanfuso et al., 2015). There is broad support for the positive effects on job readiness, skill development, and employability.	There aren't many empirical studies looking at the quality, structure, or accessibility of WIL programs at Sri Lankan universities. There isn't any solid data on informal placements, virtual internships, or university-industry collaborations unique to Sri Lanka.

Source: Developed by the author through critical analysis of prior empirical literature.