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Theoretical Foundations of Student Tracking into Vocational Pathways after Lower Secondary Education: International Perspectives and Policy Recommendations for Vietnam

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ABSTRACT

Student tracking into technical and vocational education and training (TVET) pathways after lower secondary education has become an important strategy for developing skilled workforces, improving school-to-work transitions, and supporting economic competitiveness. However, its effectiveness remains debated because, while differentiated pathways can enhance labor market responsiveness, they may also reinforce educational inequality if poorly designed. This study examined the theoretical foundations of vocational tracking and synthesized international evidence to identify policy implications for Vietnam's post-Grade 9 streaming reforms. A qualitative systematic literature review was conducted using publications retrieved from Scopus, Web of Science, ERIC, OECD, UNESCO, the World Bank, and other authoritative sources. Evidence was synthesized through thematic analysis guided by five complementary perspectives: human capital, functionalist, social reproduction, career development, and school-to-work transition theories. The review found that effective technical and vocational education and training systems consistently feature coherent governance, strong employer engagement, comprehensive career guidance, flexible progression pathways, and close integration with lifelong learning. Comparative evidence from Germany, Switzerland, Singapore, South Korea, China, and Japan indicates that these institutional conditions strengthen workforce development, educational mobility, and social equity. The study proposes an integrated conceptual framework and provides evidence-based policy recommendations to support technical and vocational education and training reform and improve post-Grade 9 student tracking in Vietnam.

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1. INTRODUCTION

Student tracking, streaming, or pathway differentiation refers to the process by which education systems allocate students into different educational pathways, most commonly academic and vocational routes, based on academic performance, interests, or career aspirations (Bol & van de Werfhorst, 2013; Oakes & Guiton, 1995; Ozer & Perc, 2020; Shavit & Müller, 2000b). In many countries, the transition from lower secondary to upper secondary education represents the first major stage at which this differentiation becomes institutionalized, with students entering academic, vocational, or mixed pathways that shape subsequent educational and labor market opportunities (OECD, 2025; Perico E Santos, 2023). Although the organization and timing of tracking vary considerably across education systems, vocational education and training (VET) continues to play a central role in preparing skilled workers, facilitating school-to-work transitions, and supporting economic development (Ainsworth & Roscigno, 2005; Blommaert et al., 2020; Iannelli & Raffe, 2007; OECD, 2023, Shavit & Müller, 2000a). Across OECD countries, most vocational students are enrolled at the upper secondary level, and many VET programs are designed to facilitate transitions into employment while maintaining opportunities for further education (OECD, 2023). Comparative research suggests that vocational pathways can strengthen labor market matching, reduce youth unemployment, and improve early employment outcomes when supported by strong institutional linkages between schools and employers (Blommaert et al., 2020; Hanushek et al., 2017). However, the design and implementation of tracking systems remain contested because early educational differentiation may also reinforce educational inequality and social stratification, particularly when pathway allocation is strongly influenced by students' socioeconomic backgrounds rather than their interests and abilities (Bol et al., 2014; Hanushek & Wößmann, 2006; Reichelt et al., 2019; Schindler et al., 2024). Consequently, understanding the theoretical foundations and institutional characteristics of vocational tracking has become an important concern for comparative education research and educational policy.

Student tracking remains a central issue in comparative education because it seeks to balance educational efficiency with social equity. While differentiated pathways can improve curriculum alignment, workforce development, and school-to-work transitions, they may also reinforce socioeconomic inequalities when educational mobility and pathway flexibility are limited (Bol & van de Werfhorst, 2013). Recent international evidence indicates that the effectiveness of vocational tracking depends less on the existence of tracking than on the quality of governance, employer engagement, work-based learning, and educational permeability (Hoeckel et al., 2009; Jones & Beom, 2022; Varaprasad, 2024). UNESCO (2018) further emphasizes that vocational education should function as an integral component of lifelong learning through flexible progression pathways, recognition of prior learning, and articulation with higher education. Successful technical and vocational education and training systems in Singapore, Germany, Switzerland, Japan, and Korea share these characteristics, demonstrating the importance of coherent governance, strong employer partnerships, and close alignment between education and labor market needs (Abu Bakar & Yong, 2020; Ho & Lee, 2022; Hoeckel et al., 2009; Jones & Beom, 2022; Juwitasari, 2024; LCS, 2022; Lee & Ho, 2022).

These international developments are particularly relevant to Vietnam. As the country continues its transition toward a knowledge-based and innovation-driven economy, developing a highly skilled workforce has become a national priority. Government policies have promoted student streaming after Grade 9 to increase participation in vocational education and address labor market shortages. However, implementation has remained challenging. Employers

continue to report significant shortages of technical, managerial, and socio-emotional skills, while university education remains considerably more attractive because of its stronger labor market returns and higher social prestige (ILO, 2022; World Bank, 2014, 2021). Studies also indicate that career guidance in lower secondary schools remains uneven and that collaboration between vocational institutions and industry is often insufficient, limiting students' understanding of vocational opportunities and reducing the effectiveness of school-to-work transitions (Anyamene & Ngwakwe, 2020; Antelm-Lanzat et al., 2020; Dang et al., 2021; Fitzpatrick & Costantini, 2022; Ho et al., 2023; Huynh & Le, 2025; Mai et al., 2023; Mtemeri, 2022; Novak et al., 2024; Zhaina et al., 2020). These challenges suggest that expanding vocational participation requires more than increasing enrolment targets; it also depends on improving institutional quality, educational flexibility, employer engagement, effective career guidance, and public confidence in vocational education (Abu Bakar & Yong, 2020; Dang, 2016; Hoeckel et al., 2009; Varaprasad, 2024).

Although research on student tracking and vocational education has expanded considerably over the past three decades, several important gaps remain. First, the literature is theoretically fragmented. Existing studies typically explain vocational tracking through individual perspectives, including human capital theory, functionalist theory, social reproduction theory, career development theory, and school-to-work transition theory. Research on vocational and career guidance, for example, has emphasized students' interests, learning styles, career competencies, counselling support, and school influences on occupational decision-making (Antelm-Lanzat et al., 2020; Coogan, 2017; Fitzpatrick & Costantini, 2022; Mai et al., 2023; Mtemeri, 2022; Novak et al., 2024). While each perspective provides valuable insight into particular dimensions of vocational education, few studies integrate these complementary theories within a single analytical framework capable of explaining both the economic benefits and the social consequences of student tracking. Second, comparative research has primarily focused on individual countries or specific vocational education models rather than systematically synthesizing international experiences across diverse institutional contexts. Previous studies have examined apprenticeship-oriented systems in Germany and Switzerland, school-based and diversified vocational pathways in Singapore and Korea, and workforce development initiatives involving Japan and Southeast Asia (Abu Bakar & Yong, 2020; Jones & Beom, 2022; Juwitasari, 2024; Lee & Ho, 2022; Varaprasad, 2024).

However, relatively few studies have compared these approaches to identify the institutional principles that consistently support effective vocational education. Consequently, there remains limited understanding of how governance arrangements, employer participation, educational permeability, career guidance, and lifelong learning collectively influence the effectiveness of vocational tracking. Existing evidence nevertheless suggests that successful vocational systems depend on coordinated governance, strong links between education providers and employers, credible progression opportunities, and sustained support for students' career development (Abu Bakar & Yong, 2020; LCS, 2022). Third, despite increasing policy attention to post-lower-secondary streaming in Vietnam, relatively little research has integrated international comparative evidence with the country's ongoing vocational education reforms. Existing Vietnamese studies have largely concentrated on occupational education, career guidance, school–industry relationships, workforce development, and labor market needs (Dang et al., 2021; Huynh & Le, 2025; ILO, 2022; Mai et al., 2023). Although these studies provide important evidence on implementation challenges and institutional needs, they offer limited theoretical explanation of why vocational tracking succeeds under certain institutional conditions but performs less effectively under others. As a result, policymakers continue to face uncertainty regarding which international experiences are transferable to

Vietnam and how such lessons should be adapted to the country's educational, economic, and cultural context.

These gaps indicate the need for a comprehensive theoretical and comparative review that synthesizes competing perspectives on student tracking and identifies the institutional conditions that support effective, equitable, and socially accepted vocational pathways. Such a synthesis can provide a stronger conceptual foundation for understanding vocational education reform and inform evidence-based policy development in Vietnam. The aim of this study is to critically examine the theoretical foundations of student tracking into vocational pathways after lower secondary education and to identify lessons from international experience that can inform vocational education policy in Vietnam. To achieve this aim, the study addresses the following research questions:

How do major educational and sociological theories explain student tracking into vocational pathways?

How have different countries designed and implemented vocational pathways after lower secondary education?

What institutional factors influence the effectiveness, attractiveness, and equity of vocational tracking?

What policy implications do these findings have for strengthening vocational education in Vietnam?

This study makes three principal contributions to comparative education and vocational education policy. First, rather than proposing a new theory of student tracking, it develops an integrated multilevel analytical framework that brings together human capital, functionalist, social reproduction, career development, and school-to-work transition perspectives. The distinctive contribution of this integration is that it connects the economic and workforce functions of vocational education with institutional arrangements, social-equity concerns, individual career-development processes, and education-to-employment transitions within a single analytical structure. Second, the framework is applied consistently to the comparative analysis of Germany, Switzerland, Singapore, South Korea, China, and Japan, enabling the study to identify recurrent institutional dimensions—including governance and coordination, employer engagement, pathway flexibility, career guidance, educational permeability, and the social recognition of vocational education—across otherwise diverse education systems. Third, the study links these theoretical and comparative findings to the specific context of post-lower-secondary student tracking in Vietnam. Rather than advocating the replication of any single international model, it identifies transferable institutional principles that can be adapted to Vietnam's educational, socioeconomic, and labor-market conditions. The study therefore extends existing research by linking theoretical explanation, comparative institutional analysis, and context-sensitive policy development within a common framework for examining vocational tracking after lower secondary education.

2. THEORETICAL FRAMEWORK

2.1. Conceptualizing student tracking

Student tracking is a form of educational differentiation through which students are placed into, or enter, educational tracks or programmes that provide systematically different curricula, qualifications, progression opportunities, and orientations toward further education or employment. In comparative education, tracking commonly refers to differentiation between academic and vocational programmes or between different types of secondary schools, particularly when placement has consequences for students' subsequent educational

and occupational opportunities (Chmielewski, 2014; Oakes & Guiton, 1995; Shavit & Müller, 2000b; Van de Werfhorst & Mijs, 2010). Tracking should therefore be understood not simply as grouping students according to achievement, but as an institutional process that structures access to differentiated educational opportunities and future pathways. Although the terms *tracking*, *streaming*, *ability grouping*, *pathway differentiation*, and *educational sorting* are sometimes used interchangeably, they describe conceptually distinct forms or levels of differentiation. Tracking generally refers to relatively consequential placement into different programmes, curricula, or school types, such as academic and vocational tracks. Streaming usually refers to assigning students to relatively stable groups or classes according to perceived overall academic ability within a school, whereas ability grouping is a broader instructional practice that may involve grouping students by prior attainment within particular subjects, classes, or learning activities. Such grouping does not necessarily place students in separate educational programmes or lead to different formal qualifications. Comparative research consequently distinguishes within-school ability grouping from between-school or programme-level tracking because their institutional consequences and relationships with inequality may differ (Chmielewski, 2014; Van de Werfhorst & Mijs, 2010). Educational sorting, in turn, is a broader concept encompassing the various processes through which students become distributed across schools, programmes, courses, or qualifications according to achievement, socioeconomic background, preferences, institutional criteria, or other characteristics. Pathway differentiation refers more specifically to the structural availability of distinct routes through an education system, such as general, vocational, technical, or work-based pathways. Tracking can thus be regarded as one institutional mechanism through which pathway differentiation and educational sorting occur.

A further conceptual distinction concerns institutional allocation and individual pathway choice. Institutional allocation refers to decisions or constraints generated by the education system and its institutions, including admission criteria, examinations, achievement thresholds, school recommendations, programme capacity, geographic availability, and other regulatory arrangements. Individual pathway choice refers to decisions made by students and families on the basis of interests, occupational aspirations, perceived academic ability, expected returns, parental expectations, and available information. In practice, however, the two mechanisms are closely interconnected rather than mutually exclusive. Students may formally choose a pathway, but the alternatives available to them can already be constrained by prior achievement, admissions procedures, institutional capacity, local educational provision, family resources, and school guidance. Conversely, institutions may allocate students among differentiated opportunities while taking students' preferences and aspirations into account. Oakes and Guiton (1995), for example, indicate that tracking decisions emerge from interactions between institutional structures and student characteristics rather than from academic ability alone. Research on educational choice similarly shows that apparently individual decisions can be conditioned by social origin, institutional opportunity structures, and perceptions of different tracks (Bol & Van de Werfhorst, 2013; Schindler et al., 2024; Shavit & Müller, 2000b).

These distinctions are important because tracking embodies a persistent tension between educational efficiency and social equity. From an efficiency perspective, differentiated pathways may enable curricula and learning environments to be adapted to students' interests, capabilities, career plans, and different forms of knowledge and skill while helping education systems respond to occupational and labour-market demand (OECD, 2023; Ozer & Perc, 2020). Vocational pathways can provide structured transitions from education to skilled employment, particularly when vocational programmes have strong connections with employers and occupational qualifications (Bol & Van de Werfhorst, 2013; Shavit & Müller,

2000b). Well-designed vocational education systems may therefore contribute to workforce development, employability, and smoother school-to-work transitions through effective governance, employer participation, career guidance, opportunities for work-based learning, and arrangements supporting continued education and lifelong learning (OECD, 2023, 2025).

From an equity perspective, however, tracking may reproduce or intensify existing social inequalities when track placement reflects socioeconomic background, parental resources and expectations, cultural capital, school characteristics, or unequal access to information in addition to academic performance (Oakes & Guiton, 1995; Schindler et al., 2024). Comparative research indicates that systems differentiating students relatively early can generate larger disparities in educational outcomes and opportunities, although effects depend on the design of tracking institutions and the wider socioeconomic and educational context (Hanushek & Wößmann, 2006; Van de Werfhorst & Mijs, 2010). The relevant policy question is therefore not simply whether tracking exists, but how students enter different tracks, how permeable the boundaries between tracks are, whether the tracks provide comparable educational quality and social status, and whether students retain realistic opportunities for subsequent educational progression. Accordingly, contemporary research increasingly focuses on institutional arrangements capable of combining occupational relevance with educational equity, including effective career guidance, strong employer engagement, flexible transitions between vocational and academic programmes, recognition of prior learning, and opportunities for lifelong learning (OECD, 2023; OECD, 2025; UNESCO, 2021;).

These conceptual distinctions are particularly relevant to Vietnam. Following lower secondary education, students encounter differentiated opportunities that may lead toward general upper secondary education, vocational education and training, continuing education, or other education-to-work trajectories. Vietnamese education, therefore, involves both structural pathway differentiation and a process of student sorting across those pathways (Hayden & Tran, 2024; Vinh & Hanh, 2024). The resulting pathway is not adequately described as either compulsory institutional placement or completely autonomous individual choice. Rather, it can be understood as the outcome of interactions among students' academic achievement, admission requirements, the availability and capacity of educational institutions, career guidance, family preferences and resources, occupational aspirations, and perceptions of the relative value of academic and vocational education. Consequently, strengthening career guidance alone may not ensure equitable choices if institutional access or progression opportunities remain constrained; similarly, expanding vocational places may have limited effects if students and families perceive vocational routes as restricting subsequent educational mobility. The effectiveness and equity of tracking, therefore, depend not only on initial placement but also on the quality, attractiveness, permeability, and progression opportunities associated with each pathway.

In the present study, student tracking is conceptualized as the institutional and decision-making process through which students completing lower secondary education become distributed across differentiated academic, vocational, and related educational pathways, through the interaction of institutional allocation mechanisms and student or family pathway choices. This definition distinguishes tracking from narrower forms of classroom-level ability grouping while recognising that educational sorting is jointly shaped by achievement, aspirations, social background, institutional rules, guidance, programme availability, and opportunities for subsequent progression. It therefore provides an appropriate analytical basis for examining how Vietnam can develop a more effective and equitable system of post-lower-secondary pathway differentiation.

2.2. Competing theoretical perspectives

Student tracking into vocational pathways can be explained from several theoretical levels, but no single perspective captures the full process. Human capital theory emphasizes investment in skills and productivity; functionalist theory focuses on the allocation of learners to differentiated social and occupational roles; social reproduction theory questions the neutrality and equity of that allocation; career development theory emphasizes students' interests, agency, and decision-making; and school-to-work transition theory focuses on the institutional arrangements connecting education with employment. These perspectives therefore differ not only in emphasis but also in their assumptions about why tracking occurs, how pathway decisions are made, and what constitutes a successful outcome. Bringing them into dialogue makes it possible to examine three central tensions in vocational tracking: efficiency versus equity, institutional allocation versus individual choice, and skills formation versus successful labor-market transition.

Human capital theory

Human capital theory provides the economic rationale for vocational education and student tracking. Building on Becker (1993) and Schultz (1961), it treats education as an investment that increases knowledge, skills, productivity, and earnings while contributing at the aggregate level to economic growth, technological development, and national competitiveness (Becker, 1993; Schultz, 1961). From this perspective, tracking can improve the match between learners, differentiated curricula, and occupation-specific competencies, thereby helping education systems respond to labor-market demand (Ainsworth & Roscigno, 2005; Blommaert et al., 2020; Shavit & Müller, 2000a). Vocational education is consequently expected to reduce skill mismatches, strengthen workforce readiness, and support economic modernization (Forster et al., 2016; ILO, 2022; OECD, 2023). Evidence on systems combining school-based education with structured workplace learning also associates strong vocational arrangements with smoother school-to-work transitions and lower youth unemployment (Blommaert et al., 2020; Bolli et al., 2021; Hanushek et al., 2017; Hoeckel et al., 2009; Iannelli & Raffe, 2007). Experiences in Germany, Switzerland, Singapore, and South Korea further emphasize employer engagement, competency-oriented curricula, and responsiveness to labor-market needs (Jones & Beom, 2022; Kuczera et al., 2012; Law, 2008; Lee et al., 2019; OECD, 2025; UNESCO-UNEVOC, 2021). The strength of human capital theory is therefore its explanation of why governments and individuals invest in differentiated skill formation. Its limitation is its tendency to treat pathway allocation primarily as an efficiency problem. This provides less explanatory attention to the ways in which socioeconomic background, cultural capital, institutional rules, and unequal opportunities shape both access to pathways and their subsequent returns (Bol & van de Werfhorst, 2013; Bourdieu & Passeron, 1990; Hanushek & Wößmann, 2006; Marginson, 2019; Oakes & Guiton, 1995; Reichelt et al., 2019; Schindler et al., 2024). Human capital theory therefore complements functionalism in explaining the economic purpose of differentiation but conflicts with social reproduction theory over the extent to which educational allocation can be regarded as socially neutral and productivity enhancing.

Functionalist theory

Functionalist theory shifts the emphasis from individual investment to the role of education in maintaining social order and allocating individuals to social and occupational positions. Rooted in Durkheim (1956) and Parsons (2017), it interprets differentiated pathways as mechanisms for matching students' abilities, interests, and anticipated roles with appropriate forms of education (Ainsworth & Roscigno, 2005; Ozer & Perc, 2020; Shavit & Müller, 2000b). Academic and vocational pathways are therefore expected to perform

complementary functions, with the former preparing students for further academic and professional routes and the latter developing technical competencies required in industry and skilled occupations. This logic converges with human capital theory because both perspectives emphasize efficiency and responsiveness to labor-market demand (Blommaert et al., 2020; Hanushek et al., 2017; Iannelli & Raffe, 2007; OECD, 2023). Comparative experiences similarly indicate that coordinated vocational systems can connect educational differentiation with occupational preparation and changing skill requirements (Hoeckel et al., 2009; Jones & Beom, 2022; Kuczera et al., 2012; LCS, 2022; Lee et al., 2019; OECD, 2025). The principal tension, however, concerns functionalism's meritocratic assumption that educational allocation largely reflects individual ability and societal needs. Research on tracking and stratification indicates that pathway outcomes also depend on family background, institutional resources, and unequal educational opportunities (Bol & van de Werfhorst, 2013; Hanushek & Wößmann, 2006; Oakes & Guiton, 1995; Reichelt et al., 2019; Schindler et al., 2024), while Bol et al. (2014) further draw attention to the relationship between educational differentiation and social inequality. Moreover, pathway decisions are influenced by family expectations, career guidance, and social context rather than academic performance alone (Holland, 1997; Loyalka et al., 2015; OECD, 2021; Super, 1990). Functionalism thus helps explain the institutional rationale for differentiation, but it is directly challenged by social reproduction theory regarding whether allocation is genuinely meritocratic and by career development theory regarding whether institutional needs alone can adequately explain individual pathway choices.

Social reproduction theory

Social reproduction theory provides the strongest critique of the efficiency and meritocracy assumptions embedded in human capital and functionalist accounts. Bourdieu and Passeron (1990) argue that educational outcomes are shaped by unequal distributions of economic, social, and cultural capital; tracking can therefore reproduce existing social hierarchies rather than simply allocate students according to ability (Bourdieu & Passeron, 1990; Reichelt et al., 2019; Schindler et al., 2024; Shavit & Müller, 2000b). Students from advantaged socioeconomic backgrounds generally possess greater access to educational resources, parental support, career information, and institutional knowledge, whereas students from disadvantaged backgrounds may enter vocational routes under more constrained conditions (Ainsworth & Roscigno, 2005; Bol & van de Werfhorst, 2013; Oakes & Guiton, 1995; Reichelt et al., 2019; Schindler et al., 2024). Comparative research likewise associates early differentiation with stronger relationships between family background and educational outcomes (Bol & van de Werfhorst, 2013; Hanushek & Wößmann, 2006; Shavit & Müller, 2000a). Nevertheless, a social reproduction perspective does not imply that all tracking systems necessarily produce identical levels of inequality. Evidence suggests that institutional design matters: flexible progression, high-quality vocational provision, opportunities to transfer between pathways, and strong institutional support can reduce some adverse consequences of differentiation (Blommaert et al., 2020; Hoeckel et al., 2009; OECD, 2023; Perico E Santos, 2023; UNESCO, 2018; Varaprasad, 2024). Pathway permeability, recognition of prior learning, and comprehensive career guidance may similarly contribute to balancing differentiation with greater educational opportunity (Anyamene & Ngwakwe, 2020; Fitzpatrick & Costantini, 2022; Novak et al., 2024; OECD, 2021; UNESCO, 2018). Social reproduction theory therefore corrects the assumption that pathway allocation is socially neutral, but it provides less specific guidance concerning how students exercise agency within structural constraints and how governance, employer participation, and transition institutions can be designed to improve outcomes. These issues are addressed more directly by career development and school-to-work transition perspectives.

Career development theory

Career development theory brings the individual learner more explicitly into the analysis by focusing on interests, aptitudes, personality, aspirations, and the development of educational and occupational preferences over time. Holland (1997) proposes that greater satisfaction and career success occur when individual characteristics correspond with educational and occupational environments, while Super (1990) conceptualizes career development as a lifelong process in which educational decisions represent developmental stages rather than necessarily irreversible choices. From this perspective, effective tracking cannot depend on academic attainment or institutional allocation alone; it also requires self-awareness, reliable information, and informed educational decision-making (Holland, 1997; Super, 1990). International evidence similarly emphasizes the role of developed career-guidance systems in supporting alignment between educational choices, occupational aspirations, and labor-market opportunities (OECD, 2021). Career counseling, aptitude assessment, workplace exposure, and access to labor-market information can therefore support better-informed pathway decisions (Antelm-Lanzat et al., 2020; Fitzpatrick & Costantini, 2022; Huynh & Le, 2025; Loyalka et al., 2015; Mtemeri, 2022; Novak et al., 2024; OECD, 2021; Zhaina et al., 2020). This perspective complements social reproduction theory because both reject explanations of pathway allocation based on academic ability alone, but they locate the problem differently. Career development theory foregrounds individual agency, aspirations, and person–environment fit, whereas social reproduction theory emphasizes the unequal social conditions within which preferences are formed and choices are exercised. Career guidance may improve information, self-understanding, and decision-making, but it cannot by itself eliminate structural inequalities in access to high-quality educational pathways. Career development theory therefore provides an important micro-level explanation of pathway choice while requiring structural and institutional perspectives to explain the opportunity set within which individual choice occurs.

School-to-work transition theory

School-to-work transition theory shifts attention from initial pathway selection to the institutional mechanisms through which education is converted into employment outcomes. Rosenbaum et al. (1990) argue that successful transitions depend on structured relationships among schools, employers, and labor markets. Vocational education is, therefore, most effective when employers participate actively in curriculum development, workplace learning, apprenticeship provision, competency assessment, and graduate recruitment. Germany, Switzerland, and Austria illustrate how collaboration among governments, education providers, employers, and professional organizations can support structured school-to-work transitions (Bolli et al., 2021; Busemeyer & Trampusch, 2012; Forster et al., 2016; Iannelli & Raffe, 2007; Shavit & Müller, 2000a). Singapore and South Korea illustrate related forms of coordinated governance, employer participation, and competency-based vocational provision (Jones & Beom, 2022; Kuczera et al., 2012; OECD, 2025; Varaprasad, 2024). This perspective complements human capital theory but identifies a different causal mechanism. Skills acquisition alone may be insufficient if institutional arrangements do not connect learners with employers, recognized qualifications, and viable occupational routes. Effective vocational systems, therefore, require coherent governance, employer engagement, quality assurance, flexible progression pathways, and lifelong learning arrangements that enable individuals to respond to changing labor-market conditions across their careers (Abu Bakar & Yong, 2020; Busemeyer & Trampusch, 2012; Dang, 2016; Hoeckel et al., 2009; UNESCO, 2018). Nevertheless, effective transition institutions do not necessarily guarantee equitable access to valued pathways or explain how students' preferences are formed. School-to-work transition theory therefore addresses the meso-level coordination that human capital and career

development perspectives leave comparatively underdeveloped, while social reproduction theory remains necessary for examining who gains access to, and benefits from, these institutional arrangements.

Research gap

The five perspectives reveal both important complementarities and substantive contradictions (Table 1). Human capital theory and functionalism explain the economic and institutional rationale for differentiated pathways, but their emphasis on productive matching and role allocation can understate unequal starting conditions. Social reproduction theory directly challenges this assumption by demonstrating how tracking may transform pre-existing social inequalities into differentiated educational opportunities. Career development theory, in turn, prevents structural explanations from treating students as passive recipients of institutional allocation by emphasizing interests, aspirations, guidance, and evolving career choices. School-to-work transition theory extends the analysis beyond initial pathway placement by showing that the value of vocational education also depends on the institutional relationships among education providers, employers, qualifications, and labor markets. The five theories therefore do not merely provide parallel explanations. Rather, they address different analytical levels and stages of the tracking process while making contrasting assumptions concerning efficiency, merit, social structure, individual agency, and institutional coordination.

The resulting research gap is, therefore, not an absence of theories concerning vocational tracking, but the fragmentation of explanation across theoretical traditions. Existing perspectives provide important insights into economic returns and skill formation, institutional allocation, social stratification, individual career choice, or employment transition, but none alone explains how these mechanisms interact in student tracking after lower secondary education. This fragmentation limits the capacity of any single perspective to explain why students enter different pathways, how institutional conditions shape those decisions, whether pathway differentiation reproduces or reduces inequality, and how educational placement subsequently translates into further learning and employment outcomes. To address this gap, the present study integrates the five perspectives within a common analytical framework. Human capital theory and functionalism explain why education systems establish differentiated pathways and seek alignment with workforce requirements; social reproduction theory identifies the risks of socially unequal allocation and differentiated opportunities; career development theory explains the role of interests, aspirations, guidance, and informed student choice; and school-to-work transition theory identifies the institutional coordination required to connect vocational education with employment and continued learning. Their integration links macro-level economic and social conditions, meso-level governance and institutional arrangements, and micro-level student and family decision-making with the transition mechanisms connecting education to employment and lifelong learning. This integrated perspective provides the theoretical foundation for the conceptual framework presented in the following section and enables the study to examine how structural, institutional, social, and individual factors jointly shape vocational pathway decisions and educational outcomes.

Table 1. Comparative summary of theoretical perspectives on student tracking

Theory	Core Assumption	View of student tracking	Major Strength	Main Limitation
Human Capital	Education is an	Allocates learners to	Explains workforce	Underemphasizes equity and social

Theory	Core Assumption	View of student tracking	Major Strength	Main Limitation
Theory	investment hat increases productivity and economic growth.	pathways that develop labor-market-relevant skills.	development and economic competitiveness.	context.
Functionalist Theory	Education allocates individuals to appropriate social and occupational roles.	Matches learners to educational pathways based on abilities and future roles.	Explains institutional efficiency and role allocation.	Assumes meritocratic allocation and overlooks structural inequalities.
Social Reproduction Theory	Education reproduces existing social inequalities through unequal access to cultural and social capital.	Tracking may reinforce socioeconomic stratification.	Explains unequal educational opportunities and social mobility.	Pays less attention to policy mechanisms that can mitigate inequality.
Career Development Theory	Educational decisions should reflect interests, aptitudes, and career aspirations.	Tracking should support informed, learner-centered pathway selection.	Highlights the importance of career guidance and individual agency.	Gives limited attention to institutional and labor-market structures.
School-to-Work Transition Theory	Effective transitions depend on institutional coordination between education and employers.	Tracking should facilitate smooth progression from school to employment.	Explains the importance of governance, employer engagement, and workplace learning.	Focuses primarily on transition processes rather than broader educational equity.

2.3. Integrated conceptual framework

No single theory adequately explains the complexity of student tracking into vocational pathways. This study therefore integrates five complementary perspectives into a unified conceptual framework. Human capital theory emphasizes workforce development and labor-market efficiency; functionalist theory explains educational differentiation and role allocation; social reproduction theory highlights the influence of socioeconomic background and cultural capital; career development theory focuses on students' interests and informed decision-making; and school-to-work transition theory stresses institutional coordination between

education providers and employers. Together, these perspectives conceptualize student tracking as a multidimensional process shaped by interactions among structural conditions, institutional arrangements, individual characteristics, and broader social contexts.

Figure 1 illustrates the integrated conceptual framework adopted in this study. The framework conceptualizes student tracking as a multidimensional process operating across four interconnected levels. At the macro level, structural and policy factors—including national education policies, economic development strategies, labor-market demand, governance arrangements, and qualification frameworks—shape the organization and value of vocational education. At the meso level, institutional factors, such as curriculum design, assessment, career guidance, employer engagement, apprenticeship opportunities, and school–industry partnerships, determine how policies are implemented and influence the quality and attractiveness of vocational pathways. At the micro level, individual characteristics, including academic achievement, interests, aptitudes, career aspirations, self-efficacy, and educational expectations, shape students' pathway choices, underscoring the importance of informed decision-making supported by effective career guidance. Surrounding these three levels are social and contextual factors, including family socioeconomic status, parental education, cultural expectations, gender norms, and urban–rural disparities. These factors influence educational opportunities before pathway selection and continue to shape progression throughout learners' educational and career trajectories. The framework therefore conceptualizes vocational tracking as the product of interactions among policy, institutional, individual, and contextual factors rather than as a simple mechanism for allocating students to academic or vocational pathways. These four groups of factors interact dynamically to influence students' allocation to academic or vocational pathways after lower secondary education. Pathway selection subsequently affects educational outcomes, including learning achievement, skill acquisition, educational progression, and qualification attainment. These educational outcomes, in turn, influence labor-market outcomes such as employability, occupational mobility, earnings, and workforce adaptability. Ultimately, the cumulative interaction of these processes contributes to broader societal outcomes, including human capital development, economic competitiveness, educational equity, and social mobility.

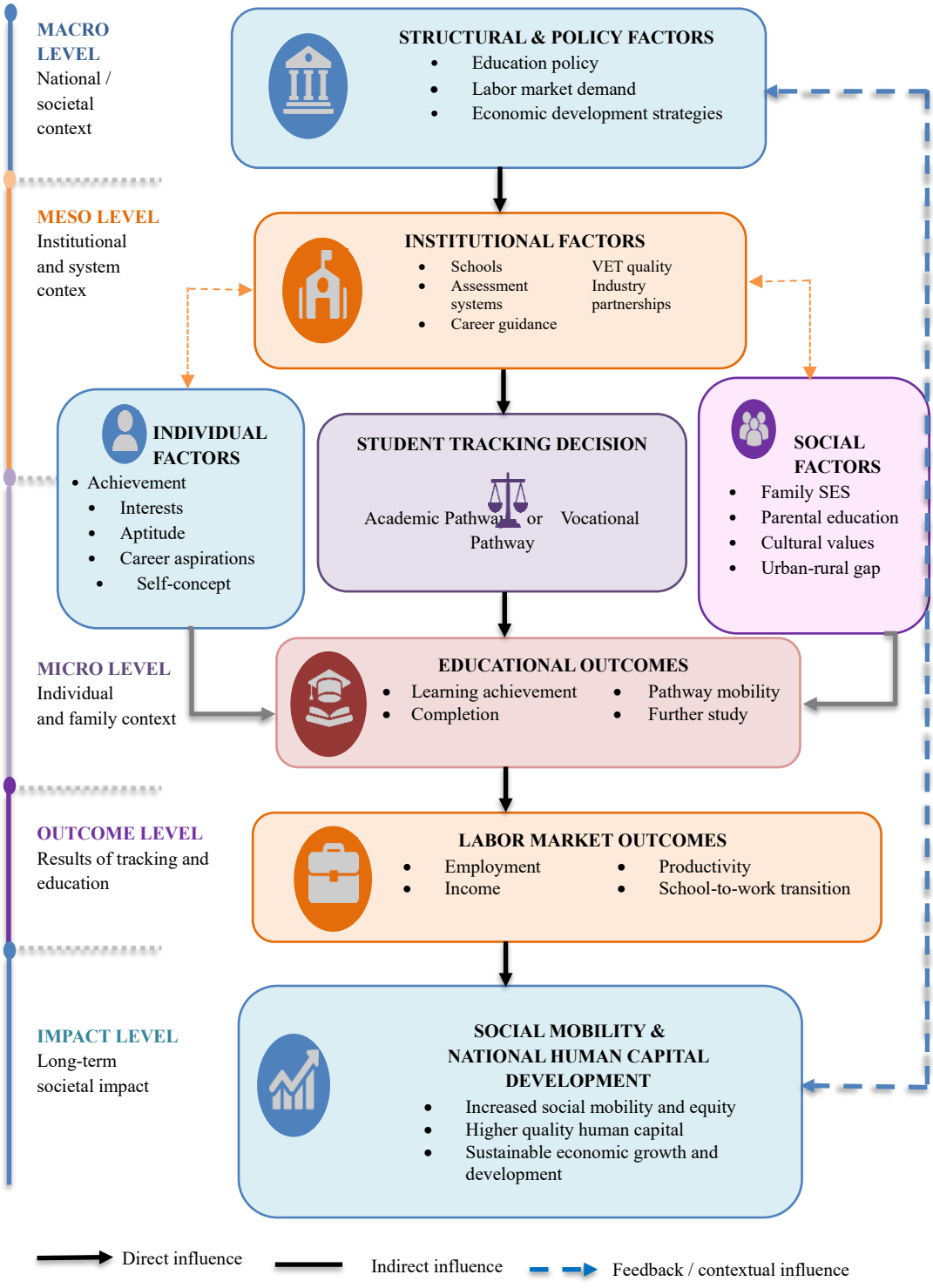


Figure 1. Integrated conceptual framework of student tracking **into vocational pathways after lower secondary education**

Source: Developed by the author based on Becker (1993), Bourdieu and Passeron (1990), Holland (1997), Parsons (2017), Rosenbaum et al. (1990), Schultz (1961), and Super (1990).

3. METHODOLOGY

3.1. Research design

This study employed a qualitative systematic literature review (SLR) to examine the theoretical foundations of student tracking into vocational pathways after lower secondary education and identify international policy lessons relevant to Vietnam. A qualitative SLR provides a transparent, systematic, and replicable approach for synthesizing evidence through explicit search strategies, predefined eligibility criteria, and structured analytical procedures (Petticrew & Roberts, 2006; Snyder, 2019). Compared with traditional narrative reviews, this method enhances methodological rigor, transparency, and reproducibility while reducing selection bias. A qualitative review was appropriate because the study synthesizes theoretical perspectives, comparative policy evidence, and institutional experiences rather than conducting meta-analysis. Guided by a comparative education perspective, the review examines how different theories explain vocational tracking, how countries organize vocational pathways after lower secondary education, and which institutional features support effective, equitable, and flexible vocational education systems applicable to the Vietnamese context.

3.2. Data sources and search strategy

The literature search was conducted using internationally recognized academic databases and policy repositories to ensure comprehensive coverage of both scholarly research and authoritative policy documents. The primary academic databases included Scopus, Web of Science (WoS), and the Education Resources Information Center (ERIC) because they index high-quality peer-reviewed publications in education, comparative education, sociology, public policy, and vocational education. Official reports were also retrieved from the OECD iLibrary, UNESCO Digital Library, World Bank Open Knowledge Repository, International Labour Organization (ILO), European Centre for the Development of Vocational Training (CEDEFOP), and relevant government websites to incorporate internationally recognized evidence on VET, educational policy, labor market development, lifelong learning, and workforce skills. The search covered publications published between January 1990 and December 2025, while searches were conducted between January and March 2026. A comprehensive search strategy combined keywords related to student tracking, educational tracking, streaming, pathway differentiation, VET, technical and vocational education, career guidance, school-to-work transition, educational inequality, educational mobility, apprenticeship, and lifelong learning. Keywords were combined using Boolean operators (AND and OR) and adapted to database requirements. Reference lists of highly relevant publications were manually searched to identify additional eligible studies, enhancing the completeness and replicability.

3.3. Literature screening, selection, and eligibility

The literature screening and selection process was guided by PRISMA 2020 principles (Page et al., 2021) and involved identification, title and abstract screening, full-text eligibility assessment, and final inclusion. Records were retrieved from Scopus, Web of Science, ERIC, OECD iLibrary, UNESCO Digital Library, World Bank, ILO, CEDEFOP, relevant institutional websites, and manual reference searches. The review focused on English-language publications published between 1990 and 2025, with earlier seminal theoretical works retained where necessary. The search initially identified 85 records. After removing 20 duplicates, 65 records remained for title and abstract screening. Publications were assessed for relevance to student tracking, vocational education and training, educational pathways, career guidance, educational inequality, pathway flexibility, school-to-work transition,

apprenticeship, labor-market relevance, and lifelong learning. Full-text assessment considered relevance to post-lower-secondary vocational pathways, source credibility, methodological or theoretical transparency, and contribution to the study objectives. Following screening and eligibility assessment, 65 publications were retained for the substantive theoretical, comparative, and policy synthesis. An additional five methodological publications informed the review design and analytical procedures but were not included in the substantive evidence base. The manuscript therefore contains 70 references in total, of which 65 constitute the literature synthesized in the study. The inclusion and exclusion criteria are summarized in Table 2.

Table 2. Inclusion and exclusion criteria

Criterion	Inclusion	Exclusion
Publication period	Publications from 1990–2025; seminal theoretical works published before 1990 where necessary to establish the theoretical framework	Publications before 1990, unless identified as seminal theoretical works
Language	English	Non-English
Source type	Peer-reviewed journal articles; authoritative reports from OECD, UNESCO, World Bank, ILO, CEDEFOP, and other credible institutional or government sources	Sources lacking sufficient institutional credibility, transparency, or evidential basis
Topic	student tracking, VET, educational pathways, vocational pathways, career guidance, educational inequality, school-to-work transition, apprenticeship, lifelong learning, and related post-lower-secondary pathways	Unrelated topics or studies focusing exclusively on higher education
Relevance	Clear theoretical, empirical, comparative, or policy relevance to the research questions	Insufficient relevance to the research questions
Quality and transparency	Sufficiently clear theoretical basis, research design or evidence base, analytical procedure, and conclusions appropriate to the source type	Insufficient methodological, theoretical, or evidential transparency

The quality and relevance of eligible publications were assessed according to source type. Empirical studies were evaluated for clarity of purpose, research design, data quality, analytical transparency, and consistency between findings and conclusions. Theoretical and comparative studies were assessed for conceptual coherence, relevance, clarity of comparative dimensions, and adequacy of supporting evidence. Policy and institutional reports were evaluated based on source credibility, transparency of the evidence base, analytical clarity, and relevance to vocational education and policy. Sources lacking sufficient theoretical, methodological, or evidential transparency were excluded. Eligible publications were coded using a structured framework covering source characteristics, country or education system,

evidence type, theoretical perspective, tracking arrangements, governance, employer participation, career guidance, pathway flexibility and permeability, educational equity, school-to-work transition, lifelong learning, and policy implications. Coding combined deductive categories derived from the five theoretical perspectives—human capital, functionalist, social reproduction, career development, and school-to-work transition theories—with thematic analysis based on Braun and Clarke (2006). Recurrent themes included governance, employer engagement, career guidance, pathway flexibility, educational permeability, equity, social recognition of vocational education, school-to-work transition, and lifelong learning. The synthesis proceeded in three stages. First, the literature was analyzed through the five theoretical perspectives to identify complementary and contrasting explanations of vocational tracking. Second, Germany, Switzerland, Singapore, South Korea, China, and Japan were compared using common institutional dimensions, including pathway differentiation, governance, employer involvement, career guidance, permeability, social recognition, school-to-work transition, and lifelong learning. Third, recurring themes and institutional principles were examined in relation to Vietnam. Rather than recommending direct replication of international models, the analysis identified transferable principles that could be adapted to Vietnam's educational, socioeconomic, governance, and labor-market context.

3.4. Data analysis

The selected literature was analyzed using thematic analysis, a widely accepted qualitative method for identifying, organizing, and interpreting patterns within textual data (Braun & Clarke, 2006). Thematic analysis was appropriate because it facilitates the integration of theoretical perspectives and comparative evidence across diverse educational systems while allowing the researcher to identify common institutional characteristics and policy implications. The analysis proceeded through five stages. First, all eligible publications were read repeatedly to develop familiarity with their theoretical arguments, research methods, and principal findings. Second, an initial coding process identified concepts relating to governance, employer engagement, educational flexibility, educational equity, career guidance, pathway permeability, labor market responsiveness, and lifelong learning. Third, conceptually similar codes were grouped into broader analytical categories through constant comparison. Fourth, categories were refined into coherent themes aligned with the research questions and conceptual framework. Finally, findings were synthesized comparatively across countries to identify recurring institutional patterns, theoretical explanations, and transferable policy lessons. Six major themes guided the analysis: 1) Economic rationale for vocational tracking; 2) Educational efficiency and workforce development; 3) Social equity and educational inequality; 4) Career development and educational decision-making; 5) International models of vocational tracking; and 6) Policy implications for Vietnam.

3.5. Trustworthiness and ethical considerations

The trustworthiness of the review was enhanced using Lincoln and Guba's (1985) framework, addressing credibility, dependability, confirmability, and transferability. Credibility was strengthened through comprehensive searches across multiple academic databases and international policy repositories, together with theoretical triangulation integrating human capital, functionalist, social reproduction, career development, and school-to-work transition theories. Dependability was supported by explicit search strategies, predefined inclusion and exclusion criteria, systematic screening procedures, and adherence to the PRISMA framework, ensuring methodological consistency and transparency. Confirmability was enhanced by maintaining a transparent audit trail documenting search, screening, coding, and theme development, with all findings grounded in published evidence

and accurately cited following APA 7th edition guidelines. Transferability was promoted by synthesizing evidence from diverse national contexts and identifying institutional principles applicable across education systems rather than context-specific practices, thereby providing insights relevant to vocational education policy and student tracking reforms in Vietnam (Lincoln & Guba, 1985). This study relied exclusively on published literature, official policy documents, and publicly available reports and therefore did not involve human participants or require institutional ethical approval. Nevertheless, it adhered to principles of academic integrity by accurately citing all sources in accordance with APA 7th edition guidelines, faithfully representing original authors' arguments, avoiding plagiarism and selective reporting, and distinguishing clearly between published evidence and the author's interpretations.

4. FINDINGS

Student tracking into vocational pathways is implemented differently across countries according to their historical traditions, governance arrangements, labor market structures, and educational philosophies (Table 3). Although Germany, Switzerland, Singapore, South Korea, China, and Japan employ distinctive approaches to vocational education, comparative analysis reveals several institutional characteristics that consistently influence the effectiveness of vocational tracking. Rather than focusing on national models individually, this section compares the selected countries across five analytical dimensions derived from the conceptual framework: governance, employer engagement, educational flexibility, career guidance and school-to-work transition, and social recognition of vocational education. This thematic approach facilitates identification of transferable institutional principles relevant to vocational education reform in Vietnam.

4.1. Governance models

Governance emerged as a key factor distinguishing vocational tracking systems across the six countries. Although all six maintain substantial government oversight, responsibility for curriculum development, quality assurance, qualifications, and workforce planning varies among governments, educational institutions, employers, and professional organizations. Germany and Switzerland adopt shared governance models in which governments, chambers of commerce, employers, and trade unions play complementary roles in regulating vocational education and training. Employer organizations are directly involved in developing occupational standards, apprenticeship regulations, curriculum frameworks, and competency assessment procedures, helping ensure that vocational qualifications remain responsive to labor market needs. In contrast, Singapore, South Korea, China, and Japan place greater emphasis on centralized government leadership. Their governments play a prominent role in establishing curriculum standards, qualification frameworks, funding arrangements, and quality assurance mechanisms, while employers contribute through consultation, internships, and curriculum development. Despite differences in the extent and forms of employer involvement, all four countries have sought to strengthen industry participation in vocational education as part of broader workforce development strategies. These findings suggest that the effectiveness of vocational tracking depends less on whether governance is centralized or decentralized than on the quality of coordination among governments, education providers, and employers.

4.2. Employer engagement

Employer participation represents another defining characteristic of effective vocational education systems. Germany and Switzerland indicate the highest levels of employer engagement. Enterprises function not only as training providers but also as partners in

curriculum design, apprenticeship delivery, competency assessment, certification, and graduate recruitment. Apprentices spend substantial time in authentic workplace settings, allowing them to develop occupation-specific skills while facilitating smooth transitions into employment. Singapore similarly promotes close collaboration between vocational institutions and industry through the Institute of Technical Education (ITE) and polytechnics. Employers contribute to curriculum development, internship opportunities, and technological innovation, although schools retain primary responsibility for educational delivery. South Korea, China, and Japan have strengthened school-industry partnerships through internships, practical projects, Meister High Schools, and structured school-to-work transition programs. Nevertheless, employer participation remains less institutionalized than in the mature apprenticeship systems of Germany and Switzerland. Comparative evidence indicates that sustained employer engagement enhances curriculum relevance, graduate employability, and workforce responsiveness.

4.3. Educational flexibility and pathway permeability

Educational flexibility is another key feature distinguishing contemporary vocational education systems from traditional tracking models. Switzerland and Singapore offer notable examples of pathway permeability, enabling vocational graduates to progress to higher vocational institutions, universities of applied sciences, or traditional universities through clearly defined progression routes. Such opportunities may help reduce the perception of vocational education as a terminal educational pathway. China has increasingly emphasized the integration of vocational and general education while expanding lifelong learning opportunities and pathways for educational mobility. South Korea has also introduced reforms to strengthen articulation between vocational education and higher education through curriculum modernization and expanded progression opportunities. Germany provides routes for further educational advancement, although its apprenticeship system remains strongly oriented toward specific occupations. Japan, meanwhile, places considerable emphasis on transitions from education to employment while maintaining opportunities for continuing education through specialized institutions. Across these six countries, greater educational permeability appears to contribute to the attractiveness of vocational education and may promote greater equity by expanding opportunities for further study and career development.

4.4. Career guidance and school-to-work transition

Effective career guidance supports informed educational decision-making and reduces mismatches between students' aspirations and educational pathways. Singapore places strong emphasis on career education before pathway selection, enabling students to make informed choices based on interests, abilities, and labor market opportunities. Germany and Switzerland complement formal career guidance with apprenticeship recruitment processes that expose students to workplaces before entering vocational education. Japan illustrates the importance of institutional coordination in facilitating school-to-work transitions. Long-standing partnerships between schools and employers support graduate placement and contribute to relatively smooth transitions into employment. South Korea and China have strengthened career guidance and employer collaboration in response to changing labor market demands, although implementation remains uneven across regions and institutions. Collectively, these experiences indicate that career guidance is most effective when integrated with employer engagement and educational progression pathways.

4.5. Social recognition of vocational education

The reviewed literature indicates that the social recognition of vocational education varies considerably across national contexts and is closely associated with employment

outcomes, progression opportunities, institutional quality, and the perceived status of vocational qualifications. In Germany and Switzerland, vocational pathways are strongly embedded in coordinated education-employment systems, and apprenticeship qualifications are closely connected with occupational entry and further progression opportunities (Bolli et al., 2021; Busemeyer & Trampusch, 2012; Forster et al., 2016; Hoeckel et al., 2009). These institutional features contribute to comparatively strong acceptance of vocational routes, although vocational and academic pathways do not necessarily carry identical social status. In Singapore, the reviewed studies indicate that sustained public investment in the Institute of Technical Education (ITE), polytechnics, industry alignment, and progression opportunities has strengthened the position of vocational and applied education within the wider education system (Abu Bakar & Yong, 2020; Law, 2008; UNESCO-UNEVOC, 2021; Varaprasad, 2024). In South Korea, by contrast, the literature points to continuing competition between vocational pathways and strong societal preferences for university education, despite reforms intended to strengthen vocational training and employment linkages (Jones & Beom, 2022; Kuczera et al., 2012; Lee et al., 2019). For China and Japan, the evidence reviewed in this study supports more cautious conclusions. In China, policy reforms have increasingly emphasized vocational development, progression, and stronger connections between education and employment, but the evidence base reviewed here is insufficient to justify a simple ordinal classification of public recognition. In Japan, vocational and technical pathways continue to play an important role in industrial and occupational skill formation, although academic education remains a major route within the broader education system (Juwitasari, 2024). The reviewed evidence suggests that the social recognition of vocational education cannot be explained by educational quality alone. Employment prospects, opportunities for further education, permeability between pathways, employer confidence, and the public credibility of vocational qualifications also appear to shape how vocational education is perceived. This interpretation should therefore be understood as a synthesis of recurring patterns in the reviewed literature rather than as a direct measure of social status across countries.

Table 3. Comparative synthesis of vocational tracking systems

Dimension	Germany	Switzerland	Singapore	South Korea	China	Japan
Governance	Coordinated governance involving federal/state institutions and social partners (Busemeyer & Trampusch, 2012; LCS, 2022)	Shared responsibility among public authorities, professional organizations, and employers (Bolli et al., 2021; Hoeckel et al., 2009)	Strong state coordination with nationally organized vocational institutions (Law, 2008; Varaprasad, 2024)	Government-led system with increasing coordination between vocational institutions and industry (Jones & Beom, 2022; Kuczera et al., 2012)	Strong central policy direction with continuing reform of vocational provision; evidence in the reviewed corpus is less detailed regarding governance at subnational levels	Nationally structured education system with vocational provision linked to industrial and technical skill formation (Juwitasari, 2024)
Employer engagement	Institutionalized employer participation through apprenticeship and occupational training arrangements (Busemeyer & Trampusch, 2012; Forster et al., 2016)	Employers play a central role in apprenticeship provision and workplace training (Bolli et al., 2021; Hoeckel et al., 2009)	Employer participation is incorporated into skills development and workforce-oriented vocational provision (Law, 2008; UNESCO-UNEVOC, 2021)	Employer engagement has been strengthened through vocational training and employment-oriented reforms (Jones & Beom, 2022; Lee et al., 2019)	Industry-education cooperation is an important reform objective, although the reviewed evidence does not support a precise comparative rating	Vocational and technical education supports sector-specific industrial skill development (Juwitasari, 2024)

Dimension	Germany	Switzerland	Singapore	South Korea	China	Japan
Educational flexibility and permeability	Progression opportunities exist, although movement between pathways can remain institutionally structured (Forster et al., 2016)	Multiple progression routes connect vocational education with further and higher education (Hoeckel et al., 2009)	Applied and vocational pathways provide opportunities for progression within the wider education system (Abu Bakar & Yong, 2020; Varaprasad, 2024)	Reforms have sought to strengthen progression and employment pathways from vocational education (Kuczera et al., 2012; Lee et al., 2019)	Pathway flexibility is an area of continuing reform; available evidence in this review does not justify an ordinal rating	Vocational pathways provide occupational specialization, although academic routes remain prominent (Juwitasari, 2024)
Career guidance and transition support	Vocational pathways are closely linked to occupational preparation and school-to-work transition (Busemeyer & Trampusch, 2012; Forster et al., 2016)	Apprenticeship structures provide direct links between education and employment (Bolli et al., 2021; Hoeckel et al., 2009)	Career and skills development are closely connected with education-to-employment planning (Law, 2008; UNESCO-UNEVOC, 2021)	Career and employment support has been strengthened as part of youth employment and vocational reforms (Jones & Beom, 2022; Kuczera et al., 2012)	Career and transition support is developing alongside broader vocational reforms; comparative evidence in the reviewed corpus remains limited	School-to-work linkages operate through technical and occupation-specific education in selected sectors (Juwitasari, 2024)

Dimension	Germany	Switzerland	Singapore	South Korea	China	Japan
Social recognition of VET	Vocational qualifications are institutionally established and closely linked to occupational outcomes; this supports comparatively strong acceptance	Apprenticeship qualifications have established labor-market value and progression opportunities, supporting strong institutional legitimacy	Public investment, pathway development, and workforce relevance have strengthened the position of vocational and applied education	University education continues to exert strong social attraction despite efforts to strengthen vocational pathways	The reviewed evidence indicates continuing reform, but is insufficient for a defensible ordinal assessment of social recognition	Vocational pathways retain an important occupational role, but the reviewed evidence does not support a simple high-moderate-low classification

Note. The table presents a qualitative synthesis of findings reported in the reviewed literature rather than a numerical or ordinal scoring system. Terms describing institutional arrangements are based on documented characteristics of each system; where the reviewed evidence was insufficient for a robust comparative judgment, this limitation is stated explicitly.

The comparative evidence does not support the identification of a single vocational tracking model that can be transferred directly across national contexts. The reviewed studies instead point to several recurring institutional features associated with stronger vocational systems, including coordinated governance, sustained employer participation, flexible progression opportunities, career and transition support, and credible vocational qualifications. However, the form and effectiveness of these arrangements vary according to national governance structures, labor-market institutions, educational traditions, and social expectations. On the basis of this comparative synthesis, the study interprets these recurring features as transferable institutional principles rather than universal prescriptions. For Vietnam, this implies that reforms after Grade 9 should focus not only on increasing vocational enrolment but also on strengthening governance coordination, employer participation, educational permeability, career guidance, progression opportunities, and public confidence in vocational qualifications. These policy implications are therefore derived from recurring patterns across the reviewed systems while remaining sensitive to the institutional and socioeconomic conditions of Vietnam.

5. DISCUSSION

The comparative analysis suggests that the effectiveness of student tracking depends not simply on whether vocational pathways exist or when differentiation occurs, but on the institutional environment surrounding those pathways. Germany, Switzerland, Singapore, South Korea, China, and Japan differ substantially in governance structures, labor-market institutions, educational traditions, and pathway organization. Nevertheless, the reviewed evidence points to recurring relationships among governance, employer engagement, educational permeability, career guidance, and social recognition. These factors should not be interpreted as independent characteristics or as a checklist of successful practices. Rather, they operate as an interconnected institutional system in which the strength or weakness of one element can reinforce or constrain the others. The discussion therefore focuses on how these relationships can be interpreted through the five theoretical perspectives developed earlier and why they matter for understanding vocational tracking.

5.1. Reconciling theoretical perspectives

Human capital theory helps explain why governments invest in vocational education: vocational pathways can support skills formation, productivity, workforce development, and economic competitiveness when training is aligned with labor-market requirements (Becker, 1993; ILO, 2022; Juwitasari, 2024; Schultz, 1961). The comparative evidence is consistent with this logic insofar as vocational provision across the six countries involves varying combinations of competency development, workplace learning, and employer participation (Dang, 2016; Hoeckel et al., 2009; Varaprasad, 2024). Germany and Switzerland illustrate how classroom instruction and enterprise-based training can be institutionally connected through apprenticeship arrangements, thereby linking skill formation directly with occupational demand (Bolli et al., 2021; Busemeyer & Trampusch, 2012; Hoeckel et al., 2009; LCS, 2022; OECD, 2023). Singapore demonstrates a different institutional route, in which vocational and applied education are closely connected with national workforce and economic priorities through institutions such as the Institute of Technical Education and polytechnics (Abu Bakar & Yong, 2020; Ho & Lee, 2022; Lee & Ho, 2022; UNESCO-UNEVOC, 2021).

Human capital theory alone, however, does not explain why similarly work-oriented programs may produce different educational and social outcomes. Functionalist theory extends the explanation by emphasizing the role of educational differentiation in linking individuals with different occupational roles (Parsons, 2017). From this perspective, tracking can contribute to educational efficiency when differentiated pathways correspond with students' capabilities and occupational requirements. The comparative findings nevertheless suggest that differentiation does not become effective merely because students are allocated to different programs. The value of vocational pathways depends on governance, qualification quality, employer participation, and institutional coordination that maintain the relevance and credibility of vocational qualifications (Hoeckel et al., 2009; OECD, 2023). Thus, the functional value of tracking is conditional on the institutional arrangements that support the differentiated pathways.

This qualification is important because social reproduction theory challenges the assumption that educational allocation is inherently meritocratic. Students encounter vocational and academic pathways within unequal social contexts in which family resources, cultural expectations, and perceptions of educational status influence pathway decisions (Abu Bakar & Yong, 2020; Bourdieu & Passeron, 1990). Evidence from South Korea and China, for example, indicates that policies to strengthen vocational education coexist with strong social preferences for university-oriented education (Jones & Beom, 2022; Lee et al., 2019; UNESCO, 2021). The implication is that creating technically strong vocational programs may not be sufficient if students and families perceive them as lower-status or as limiting future educational mobility. Conversely, evidence from Germany and Switzerland suggests that the social consequences of differentiation can be moderated when vocational qualifications are closely connected with recognized occupations, employment opportunities, and routes for further education (Hoeckel et al., 2009; OECD, 2023). The relevant theoretical issue is therefore not simply whether tracking reproduces inequality, but how institutional arrangements shape the consequences of being placed in, or choosing, a vocational pathway. Pathway permeability is particularly important because opportunities to continue into further or higher education can reduce the extent to which an early decision becomes irreversible. In this respect, social reproduction theory and human capital theory identify different but complementary criteria for assessing vocational systems: one emphasizes the distribution of opportunity, whereas the other emphasizes the development and utilization of skills.

Career development theory adds the dimension of student agency. Effective pathway differentiation requires students to understand not only what options exist but also how those options relate to their interests, aptitudes, aspirations, and prospective employment opportunities. Career counseling, workplace exposure, and structured career education can support such decision-making (Anyamene & Ngwakwe, 2020; Coogan, 2017; Fitzpatrick & Costantini, 2022; Mtemeri, 2022; Novak et al., 2024). Evidence concerning learning characteristics, vocational interests, career competencies, and occupational guidance further suggests that pathway decisions cannot be reduced to academic attainment alone (Antelm-Lanzat et al., 2020; Huynh & Le, 2025; Mai et al., 2023; Zhaina et al., 2020). Career guidance, however, cannot compensate for weak pathways. Guidance may help students make informed choices, but those choices remain constrained if vocational programs have limited progression opportunities, weak employer links, or low social recognition. This illustrates an important interaction between individual agency and institutional structure: students can exercise meaningful choice only when credible alternatives exist. School-to-work transition theory provides the corresponding institutional explanation by emphasizing the relationships among schools, vocational institutions, employers, counselors, and policymakers that connect educational choices with occupational outcomes (Dang et al., 2021; Hoeckel et al., 2009).

Career development theory therefore explains how individuals navigate pathways, whereas school-to-work transition theory explains how institutions make those pathways consequential in the labor market.

The five theoretical perspectives are complementary because they illuminate different mechanisms within the same tracking process. Human capital theory explains the economic rationale for developing vocational skills; functionalism explains the institutional rationale for differentiated pathways; social reproduction theory identifies the risks of unequal access and status; career development theory explains how students interpret and choose among available pathways; and school-to-work transition theory explains how institutional coordination converts education into employment opportunities. Their integration suggests that vocational tracking should be evaluated simultaneously in terms of economic relevance, institutional quality, distributive equity, meaningful student choice, and transition outcomes. Weakness in any one dimension can undermine the others.

5.2. Institutional conditions for effective vocational tracking

The comparative findings identify five recurring institutional conditions—governance, employer engagement, pathway flexibility, career guidance, and social recognition—but their significance lies primarily in their interaction. Governance is foundational because it establishes the rules, responsibilities, incentives, and coordination mechanisms through which the other components operate. Germany and Switzerland distribute responsibilities across public institutions and social partners, whereas Singapore, South Korea, China, and Japan rely to varying degrees on stronger governmental coordination and structured relationships with employers (Abu Bakar & Yong, 2020; Jones & Beom, 2022; Juwitasari, 2024). These differences suggest that no single governance structure is inherently necessary. What matters is whether responsibilities are sufficiently coordinated to connect curriculum development, qualifications, employer demand, career information, and progression arrangements. Employer engagement is particularly dependent on this governance capacity. Participation by employers in curriculum development, workplace learning, competency assessment, and recruitment can improve the connection between training and occupational requirements (Hoeckel et al., 2009; OECD, 2023; Varaprasad, 2024). However, employer participation is unlikely to be sustained if it relies only on informal or short-term cooperation. Institutional arrangements that define employer roles and connect them with education providers can make workplace learning more systematic and qualifications more credible. The reviewed evidence from different systems, therefore, suggests an interaction between governance and employer engagement: governance creates the conditions for sustained participation, while employer participation supplies labor-market information and workplace experience that make vocational provision responsive and relevant (Abu Bakar & Yong, 2020; Jones & Beom, 2022). Employer engagement also interacts with social recognition. When employers participate meaningfully in training and recruitment, vocational qualifications can acquire clearer labor-market value. Strong employment outcomes may then increase the confidence of students and families in vocational pathways. Conversely, weak employer demand can undermine public confidence even when programs are formally well designed. Social recognition should therefore be interpreted partly as an outcome of institutional performance rather than solely as a cultural attitude.

Pathway flexibility performs a different but equally important function. Vocational tracking creates greater equity risks when entry into a vocational pathway sharply restricts subsequent educational opportunities. Permeable systems reduce these risks by enabling transfer, articulation, recognition of prior learning, and continued progression into further education and lifelong learning. Evidence from Switzerland and Singapore illustrates how

progression opportunities can reduce the perception of vocational education as an educational endpoint (Ho & Lee, 2022; Hoeckel et al., 2009; LCS, 2022; Lee & Ho, 2022; OECD, 2023). Flexibility therefore matters not only for educational mobility but also for social recognition: vocational pathways are likely to be more attractive when students and parents perceive that choosing them does not permanently close later options. Career guidance interacts directly with this flexibility. Guidance is most meaningful when counselors can present students with credible information about multiple routes, progression opportunities, employment outcomes, and possibilities for subsequent learning. Career education, counseling, workplace exposure, and individualized support can help students connect interests and abilities with educational and occupational opportunities (Antelm-Lanzat et al., 2020; Anyamene & Ngwakwe, 2020; Coogan, 2017; Fitzpatrick & Costantini, 2022; Huynh & Le, 2025; Mai et al., 2023; Mtemeri, 2022; Novak et al., 2024; Zhaina et al., 2020). In this sense, career guidance functions not merely as an information service but as a mechanism linking student agency to institutional opportunities. Its potential contribution to equity is greatest when students from different social backgrounds receive comparable access to reliable information and viable progression routes (Anyamene & Ngwakwe, 2020; Fitzpatrick & Costantini, 2022; Novak et al., 2024).

Social recognition is therefore best understood as both an institutional condition and an outcome of the other four factors. Vocational education is more likely to gain public confidence when qualifications lead to credible employment opportunities, when employers recognize the skills acquired, when pathways permit further education, and when students receive reliable guidance about these opportunities (Hoeckel et al., 2009; Jones & Beom, 2022; OECD, 2023). Conversely, attempts to improve the public image of vocational education are unlikely to succeed if qualification quality, progression opportunities, or labor-market outcomes remain weak. The reviewed evidence therefore suggests that social recognition cannot be strengthened through communication alone; it is closely connected with the substantive quality and consequences of vocational pathways (ILO, 2022; OECD, 2023; Varaprasad, 2024). These interactions indicate that effective vocational tracking depends on an institutional ecosystem rather than isolated interventions. Governance coordinates actors; employer engagement strengthens labor-market relevance; permeability protects future educational opportunities; career guidance enables informed choice; and credible education and employment outcomes reinforce social recognition. These relationships can also operate in the opposite direction: weak coordination can reduce employer participation, poor employment outcomes can weaken social recognition, low-status pathways can discourage capable students, and limited permeability can intensify concerns about early tracking. The comparative evidence therefore supports a systemic interpretation in which the effectiveness and equity of vocational tracking depend on how these institutional conditions reinforce one another rather than on the presence of any single feature.

6. POLICY IMPLICATIONS FOR VIETNAM

The comparative evidence suggests that strengthening vocational tracking after lower secondary education in Vietnam requires institutional development rather than the direct adoption of any single international model. Germany, Switzerland, Singapore, South Korea, China, and Japan have developed vocational education systems shaped by different governance traditions, labor-market structures, and social contexts. Nevertheless, the reviewed evidence identifies several recurring institutional conditions associated with effective vocational pathways, particularly coherent governance, employer engagement, pathway flexibility, comprehensive career guidance, and stronger social recognition of vocational education (Abu Bakar & Yong, 2020; Jones & Beom, 2022; Juwitasari, 2024; LCS, 2022; Varaprasad, 2024). For Vietnam, these principles differ in their degree of transferability. Some can be applied relatively directly through improvements to existing institutions and practices,

whereas others require adaptation to Vietnam's governance arrangements, regional labor markets, institutional capacity, and educational culture.

The first priority is to strengthen governance and institutional coordination. Comparative experience indicates that effective vocational education systems depend on clearly defined responsibilities and sustained coordination among governments, education providers, employers, and professional organizations. Such coordination supports curriculum modernization, quality assurance, teacher development, labor-market forecasting, and workforce planning (Busemeyer & Trampusch, 2012; Loh & Yeo, 2024 ~~CEDEFOP, 2024)~~. This principle is directly applicable to Vietnam, where stronger coordination among the Ministry of Education and Training, vocational education authorities, provincial governments, employers, and industry associations could improve policy coherence and responsiveness to regional workforce needs (ILO, 2022). National and sectoral advisory mechanisms with meaningful employer representation could also strengthen curriculum development and qualification standards. However, the specific governance arrangements used in Germany or Switzerland should not be transferred directly. Their shared-governance structures reflect institutional traditions and employer organizations that differ from those in Vietnam. Vietnam therefore needs to adapt the principle of coordinated governance to its own administrative structure and the capacities of provincial and sectoral institutions.

The second priority is to strengthen employer participation and school–industry partnerships. The reviewed evidence indicates that employer engagement is most effective when it extends beyond short-term internships to curriculum development, workplace learning, competency assessment, teacher professional development, and graduate recruitment (Forster et al., 2016). Germany and Switzerland demonstrate the value of institutionalized employer participation, while Singapore illustrates how coordinated relationships among government, education providers, and industry can support workforce responsiveness and technological change (Emmenegger & Seitzl, 2020; Ho & Lee, 2022; Loh & Yeo, 2024; OECD, 2023; Varaprasad, 2024). Greater employer involvement is directly applicable to Vietnam, particularly because existing research already identifies the importance of stronger relationships between vocational education providers and enterprises (Dang, 2016; Dang et al., 2021). Vietnamese institutions could involve employers more systematically in curriculum review, workplace learning, competency assessment, and recruitment. What requires adaptation is the intensity and organizational form of employer participation. Replicating the German or Swiss dual apprenticeship model would require consideration of differences in enterprise size, employer capacity, sector structure, local labor-market conditions, and the ability of firms to provide sustained workplace training.

A third priority is to develop more flexible and learner-centered vocational pathways. International experience increasingly emphasizes educational permeability rather than rigid separation between academic and vocational routes. Credit transfer, recognition of prior learning, articulation between vocational and higher education, and opportunities for continued study can reduce perceptions of vocational education as a terminal pathway (UNESCO, 2021). The principle of maintaining opportunities for educational progression is directly relevant to Vietnam, because students and families are more likely to regard post-Grade 9 vocational pathways as viable when these pathways preserve opportunities for further education and career advancement (Abu Bakar & Yong, 2020; Lee & Ho, 2022; OECD, 2023). However, the specific mechanisms used internationally require adaptation to Vietnam's qualification structures, institutional capacities, admission arrangements, and quality-assurance requirements. The policy objective should therefore be to increase permeability progressively while ensuring that transitions between vocational, continuing, and higher education are supported by transparent standards and credible qualifications.

The fourth priority is to strengthen career guidance while improving the quality and social recognition of vocational education. Comparative evidence indicates that pathway decisions are more effective when students receive career education before completing lower secondary education. Career guidance should extend beyond the provision of general information to include aptitude assessment, exposure to workplaces, mentoring, individualized counseling, and reliable information about occupations and labor-market opportunities (Antelm-Lanzat et al., 2020; Fitzpatrick & Costantini, 2022; Huynh & Le, 2025; Mtemeri, 2022; Novak et al., 2024). This recommendation is directly applicable to Vietnam, particularly at the lower-secondary level, where students and families make decisions about pathways after Grade 9. Schools could strengthen the connection between career guidance, students' interests and abilities, local training opportunities, and realistic employment information. Improving social recognition, however, requires more than communication campaigns. Sustained investment in curriculum quality, teacher development, digital infrastructure, institutional quality assurance, employment outcomes, and progression opportunities is necessary to strengthen confidence in vocational qualifications. Evidence from Singapore and other systems suggests that the attractiveness of vocational education is closely related to the credibility and outcomes of the pathways themselves (Abu Bakar & Yong, 2020; LCS, 2022). Public communication highlighting successful vocational graduates, employment outcomes, and opportunities for further education can complement these improvements. The communication strategies used elsewhere require contextual adaptation, because attitudes toward vocational and university education in Vietnam are shaped by local family expectations, perceptions of occupational status, and opportunities for educational mobility.

The fifth priority is to align vocational education more closely with regional economic development and lifelong learning. Human capital theory suggests that vocational education contributes most effectively to workforce development when skills provision responds to changing labor-market demand and technological development (Becker, 1993; Schultz, 1961). This principle is directly applicable to Vietnam, where vocational program planning can be informed more systematically by regional labor-market information and collaboration with local industries (ILO, 2022). Training provision should respond to sectors with demonstrated or emerging workforce demand, including advanced manufacturing, digital technologies, artificial intelligence, renewable energy, logistics, and healthcare. However, specific sectoral priorities should be determined regionally rather than applied uniformly nationwide, because industrial structures and employment opportunities differ across provinces and economic regions. The lifelong-learning principle is likewise applicable, but its implementation requires gradual institutional development. Vocational education should provide opportunities for workers to update and extend their skills throughout their careers through flexible learning arrangements and recognition of competencies acquired through employment (OECD, 2023; UNESCO, 2021). Rather than importing a particular international lifelong-learning model, Vietnam should develop arrangements compatible with its qualification system, institutional capacity, employer demand, and patterns of workforce participation.

These recommendations distinguish between transferable principles and context-dependent institutional arrangements. Strengthening career guidance, increasing employer participation, improving coordination, enhancing vocational quality, using labor-market information, and preserving opportunities for educational progression are directly relevant to Vietnam's current post-Grade 9 tracking challenges. By contrast, dual apprenticeship structures, shared governance models, specific credit-transfer systems, and institutional arrangements developed in other countries require adaptation before implementation. The comparative evidence therefore supports selective policy learning rather than institutional replication. The future effectiveness of vocational tracking in Vietnam consequently depends

not simply on increasing vocational enrolment but on strengthening the institutional ecosystem within which students make pathway decisions. Improved governance, meaningful employer engagement, flexible progression opportunities, comprehensive career guidance, stronger public confidence, and closer alignment with regional workforce development and lifelong learning can together support economic competitiveness, educational equity, and sustainable human capital development (Abu Bakar & Yong, 2020; Hoeckel et al., 2009; ILO, 2022; OECD, 2023). From this perspective, post-Grade 9 tracking should be treated not merely as the allocation of students between academic and vocational routes, but as part of an integrated system connecting informed student choice, high-quality education, employment opportunities, and continued learning throughout the life course.

7. CONCLUSION

Student tracking into vocational pathways after lower secondary education has become an increasingly important policy issue as education systems seek to balance workforce development, educational equity, and lifelong learning. This study examined the theoretical foundations of vocational tracking and synthesized international evidence from Germany, Switzerland, Singapore, South Korea, China, and Japan to identify institutional principles that may inform vocational education policy in Vietnam. The findings indicate that no single theoretical perspective adequately explains the complexity of vocational tracking. Human capital theory and functionalist theory emphasize the contributions of vocational education to workforce development, labor-market efficiency, and economic competitiveness, whereas social reproduction theory highlights the risks of educational inequality associated with early pathway differentiation. Career development theory and school-to-work transition theory further indicate that effective vocational tracking depends on informed educational decision-making, strong institutional coordination, and meaningful connections between education and employment. Rather than viewing these perspectives as competing explanations, the study integrates them into a comprehensive analytical framework for understanding vocational tracking. The comparative analysis further indicates that successful vocational education systems share several common institutional characteristics despite considerable differences in governance arrangements and educational structures. Effective systems are characterized by coherent governance, sustained employer engagement, flexible educational pathways, comprehensive career guidance, educational permeability, and positive social recognition of vocational education. These institutional characteristics can facilitate smoother school-to-work transitions while expanding opportunities for lifelong learning and further educational progression. The study contributes to the literature by integrating multiple theoretical perspectives with comparative policy analysis to inform evidence-based reforms in Vietnam. Rather than replicating any single international model, policymakers should adapt transferable institutional principles to Vietnam's specific educational, socioeconomic, and labor-market context, with particular attention to strengthening governance, employer partnerships, pathway flexibility, career guidance, educational permeability, and educational quality. More broadly, the comparative evidence suggests that an effective vocational tracking system should not be defined solely by its capacity to allocate students to vocational pathways, but by its ability to provide high-quality and socially valued pathways that preserve opportunities for further education, support successful transitions into employment, and promote greater educational equity and lifelong learning.

8. LIMITATIONS AND FUTURE RESEARCH

This study has several limitations. First, it is based exclusively on a qualitative systematic literature review of published academic literature and official policy documents. Although this approach provides a comprehensive synthesis of existing evidence, it does not

capture the perspectives of students, parents, teachers, employers, or policymakers directly involved in vocational education. Second, the review included only English-language publications published between 1990 and 2025, which may have excluded relevant evidence available in Vietnamese or other languages. Third, the comparative analysis focused on six countries with well-established vocational education systems. Differences in governance, institutional capacity, economic development, and cultural contexts may therefore limit the direct transferability of policy lessons to Vietnam. Finally, the study emphasizes theoretical synthesis rather than empirical or quantitative evaluation and cannot establish causal relationships between vocational tracking and educational or labor-market outcomes. Future research should incorporate qualitative and quantitative studies within Vietnam, expand comparative analyses to additional countries, undertake longitudinal investigations of students' educational and career trajectories, and examine how digital transformation, artificial intelligence, Industry 4.0, and the green economy are reshaping technical and vocational education and training and lifelong learning.

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Transparency: The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

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