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# Tertiary Technical Education and Youth Integration in Brazil, Colombia and Mexico

## 1. Introduction

- 1 The acceleration of economic growth experience by Latin America during the 2000s (an average annual Gross Domestic Product (GDP) growth rate of about 5 per cent in 2003–08 (OECD, 2012) can be considered as offering a window of opportunity to ensure development sustainability. Changes in domestic productive systems and labour markets, on-going transformations of information and communication technologies and increasing integration into regional and globalised markets have all combined to create new requirements, and new demands, for qualifications. At the same time, many key skills are found to crosscut different sectors and segments of the labour market (e.g. the ability to manage software, organise work, lead groups, etc.).
- 2 To accomplish the goal of sustainable development, it is key to invest in human capital and human development. In Latin America, the proportion of the total population aged 15 and over that had completed tertiary education grew 12 times over the past 50 years, from 0.6 per cent in 1950 to 7.1 per cent in 2000. Although this was a significant increase, it still lags considerably behind developed countries, where 14.5 per cent of the population aged 15 and older had completed some form of post-secondary education (Barro and Lee, 2010). Within a context of low unemployment across Latin American countries from 2005–10, tertiary education increased the probability of attaining both some form of employment and a better quality of employment (García de Fanelli, 2013a). Moreover, the private rate of return of higher education is quite high in some Latin America countries, averaging 15 per cent per annum for post-secondary education (García de Fanelli, 2013a).
- 3 Unfortunately, data that discriminates between tertiary non-university and university programmes is very scarce. A few studies from the mid-2000s claimed that tertiary technical education in Latin America was insufficient, inadequate and incompatible with the demands of globalisation (Espíndola and García, 2005). According to these studies, negative features of tertiary technical education (also ‘TTE’) included weak ties with the productive sector, high drop-out rates, a deficient coordination with the university sector, as well as public policies that were more concerned, until very recently, about supporting universities than developing the sector more generally. This critical diagnosis stands in contrast to the fact that the continual, though insufficient, expansion of secondary education throughout the region has boosted the demand for higher education. Increasingly, young people aspire to tertiary education because secondary diplomas no longer pave the way to good jobs. To respond to this social demand, the 2000s witnessed a renewed dynamism in public policies aimed at developing tertiary technical education.
- 4 In the context of these concerns, from 2009–12 the International Institute of Educational Planning (IIEP) operated a research project focused on equity and the entrance of tertiary technical education graduates into the labour market.<sup>1</sup> To acquire the fullest possible understanding of the issue, the IIEP employed a comparative approach, examining three case studies: Brazil, Colombia and Mexico. These three countries have very different linkages between education and employment, and help illustrate some of the paths followed in the region.<sup>2</sup>
- 5 The tertiary technical education programmes studied consist of short degree programmes (lasting approximately two or three years) at the post-secondary level geared toward developing technical qualifications that combine both theory and practice. At first, they were generally associated with non-university institutions. Today, however, tertiary technical education is taught at both non-university institutions and universities alike, in both the public and, particularly, the private sector. Moreover, institutional and curriculum integration is

progressively blurring the line between university and non-university education (García de Fanelli, 2013b). At the same time, tertiary technical education courses have increased in length as they incorporate the additional knowledge and skills of information and communication technologies, English language competence and other crosscutting skills.

6 The study analyses the ways in which, from the perspectives of human capital and human development, tertiary technical education works to create opportunities for new graduates. It explores the various advances and contradictions in democratising access to higher education (including universities and tertiary technical education institutions) via institutional diversification, increased enrolment and the possibility of transfer with a tertiary technical education degree to earn a university degree. In doing so, we examined tertiary technical education's contribution to graduates' job placement (e.g. quality of employments, salaries, etc.) to the extent permitted by available quantitative data, but also considered the subjective perspectives of the students themselves regarding their own personal development.

7 Methodologically, the study proceeded in two steps. First, we analysed the available statistical and archival information to describe the trends in the development of tertiary technical education, its respective policies, and its corresponding employment placement for graduates. Additional details regarding the sources and type of quantitative data are provided, as relevant, through the various sections of this chapter. In the second step, a number of qualitative studies were carried out at several conventionally prestigious institutions (three in Colombia, six in Mexico and two in Brazil). These institutional studies included both initial interviews with heads of administration, teaching faculty, students and business leaders, and follow-ups intended to illustrate the educational processes and perceptions of the various actors. In total, more than 100 interviews were conducted in each country. Obviously, this information is not statistically representative and is limited by the dearth of panel data tracer studies tracking graduates' labour market progress over time. This means that, by and large, it is difficult to determine the independent effect(s) of qualifications on employment possibilities. The conclusions of the chapter, therefore, should be read both as a contribution to a crucial, yet often overlooked, subject and a hypothesis for future studies, as well as a source of comparison for similar tertiary technical education-related phenomena in other regions. Based on the above-mentioned research, this chapter examines the extent to which this educational experience offers young people better employment opportunities and improved well-being.

8 Informed by this overarching question, we focus on some specific objectives: to determine the extent of, and rationale for, expansion of this offer; to explore differences in admissions processes and overall between tertiary technical education and university institutions; to investigate the ease (or lack thereof) of tertiary technical education students' transition to universities or postgraduate studies, with respect to both technical regulations and actual practice; and finally, to examine tertiary technical education graduates' transitions into the labour market.

9 The chapter is divided into four sections, each based on a specific working hypothesis and aimed at discussing and organising the relevant data (though by no means meant as a definitive verification thereof). The first section discusses the current configuration of tertiary technical education in terms its relation to higher education, technical education and vocational education as a whole. The second section shows that increasing proportions of young people have been able to access higher education through this avenue, and examines the causes underlying the surge in tertiary technical education enrolment from 2000–10. The subsequent section presents the legal framework that enables tertiary technical education graduates to go on to university, and the institutional and individuated obstacles to putting it into practice. The fourth and final section analyses maps the labour market destinations of young graduates and the employment quality and career opportunities offered therein.

## **2. Institutional diversification of tertiary technical education: the democratisation of higher education?**

10 In what follows, we first focus on the institutional differentiation of the higher education sector, highlighting the emergence of the tertiary technical education sector and the types of students it

usually attracts. We then present some provisional answers to the questions about the prestige or social status of tertiary technical education institutions in each national and local context and with respect to the selection process for admission to higher education in general.

## 2.1. The emergence of tertiary technical education in the context of higher education expansion

- 11 Higher education enrolment in Latin America is concentrated in undergraduate university programmes, with a preponderance of students pursuing a professional (rather than bachelor's) degree. Only in Argentina, Chile, Colombia, Peru and Venezuela do we see that over 25 per cent of post-secondary enrolment is found in the tertiary, non-university higher education sector (Brunner and Ferrada Hurtado, 2011).
- 12 Low-income students are more attracted to these tertiary, non-university programmes than to undergraduate university courses. Firstly, admittance to the best public and private Latin American universities is based on entrance exams and, in some cases, only a limited number of places are available (as, for example, in Chile, Brazil, Bolivia and Peru) (Brunner and Ferrada Hurtado, 2011). In general, secondary school students from disadvantaged socio-economic backgrounds seeking a higher education lack access to the leading public or private secondary schools.<sup>3</sup> They are often the first in their family to attend university, and thus often receive less support in pursuing their educational goals than do middle- and upper-middle class students. Secondly, non-university higher education institutions are far more regionally dispersed, thus saving students the high cost of moving to the large cities where most universities are located. Finally, these programmes are short term, thus reducing the opportunity cost of foregone earnings for students and their families, and have a vocational or technical orientation (García de Fanelli and Jacinto, 2010).
- 13 The working hypothesis that grounds our examination of this process of institutional diversification and integration in tertiary technical education holds that that it actually broadened the graduates' job opportunities, though this was somewhat tempered by variations in educational quality. The overall process of higher education institutional diversification processes converges with international trends, and raises the question as to whether this reflects greater democratisation or merely greater segmentation of the supply in higher education (Varghese, 2009).
- 14 In principle, tertiary technical education is not only connected to higher education, but also to the history of technical and vocational education in each country. Since the 1950s, vocational training in the region has chiefly taken the form of tripartite arrangements (i.e. run jointly by the state, labour unions and businesses vocational education institutes) or institutes dependent on the states' respective education ministries. The Latin American system of tertiary technical education is distinguished by the considerable participation of the business sector in the creation and maintenance of the system, particularly in countries such as Brazil (Caillods and Jacinto, 2006).
- 15 In Brazil and Colombia, the *institutos tecnológicos* and *institutos de formación de técnicos superiores* (literally, 'technological institutes' and 'higher institutes of technical training') were generally 3-year programmes for professionally oriented post-secondary education in technical fields, historically based on technical and vocational training courses. As qualifications became more complex and education grew in scope, social and productive demand raised them first to the level of secondary technical education and/or vocational training, and later to tertiary technical education (García de Fanelli and Jacinto, 2010). The three countries studied feature diverse modalities of tertiary technical education institutional models.
- 16 In Brazil, four modes of technological education can be discerned, each with its own background and characteristics: (1) a state-run network of technical colleges and technological institutes that provide further education from the secondary to postgraduate level; (2) the so-called 'S' system, which includes the *Serviço Nacional de Aprendizagem Industrial* (SENAI) (National Service of Industrial Apprenticeship), the *Serviço Nacional de Aprendizagem Rural* (SENAR) (National Service of Rural Apprenticeship) and the *Serviço Nacional de*

*Aprendizagem Comercial* (SENAC) (National Service of Trade Apprenticeship) and is managed in partnership with business;<sup>4</sup> (3) the federal network of technological education;<sup>5</sup> and (4) private technical schools and institutions that concentrate on training programmes for the service sector.

17 In Colombia, tertiary technical education forms part of the National System of Training for work: it is offered at public and private institutes and in the *Servicio Nacional de Aprendizaje* (SENA) (the National Apprenticeship Service), a public institution with considerable input from the business sector. Although the tertiary technical institutions arose as a parallel institutional model to that of universities, university degree programmes have been created at the higher technical and technological institutes, and graduates from tertiary technical education may now go on to pursue degrees at university.

18 In countries such as Mexico, in contrast, the history of tertiary technical education owes less to a tradition of technical education than it does to the development of the university system. Technological institutes were created in the 1950s to offer higher technological degrees. By the 1990s and 2000s, these institutes evolved into new technological ‘universities’, or public polytechnics, specifically mandated to offer tertiary technical education. The *Técnico Superior Universitario* (tertiary technical university) degree is mainly offered at technological universities but also at some state and private universities. The trajectory of tertiary technical education’s development in Mexico was strongly informed by a policy commitment to national economic modernisation through education of the labour force, underscored by an overall goal of facilitating the transnational integration of trade and production, particularly with the United States (Flores and Mendoza, 2013).

19 These institutions were originally considered to be stepping stones enabling the middle classes to enter university (Tedesco, 2012). In recent decades, and particularly over the last ten years, the institutional diversification of higher education and development of tertiary technical education should undoubtedly be understood as contributing to democratisation of access to higher education where lower middle classes have been also included. The fact that tertiary non-university students come from lower socio-economic backgrounds than university students, and that tertiary non-university institutions were often created in places that had no other opportunities for higher education, speaks to this trend (García de Fanelli and Jacinto, 2010; Turbay, 2013).

## 2.2. Admission processes and prestige in the diversification of higher education

20 According to interviews conducted with business people and civil servants of different levels, all three countries were found to have a core of public institutions considered superior in quality and prestige. In Brazil, this includes institutions within the S system. The case studies conducted on prestigious institutions in Colombia, Mexico and Brazil indicate that the choice of short tertiary technical education programmes is not a matter of opting for the second-best, as, particularly in Colombia and Mexico, students select tertiary technical education even when they had, or continue to have, aspirations of pursuing a university degree.

21 Studies of Brazil and Colombia, however, include testimonials that cast doubt on the quality of private tertiary technical education centres (García de Fanelli, 2013b), which are especially oriented toward the service sector. It may be that private tertiary technical education grew without sufficient regulation and quality control.

22 In the case of Brazil, this situation may change. Since 2004, Brazil has developed the *Sistema Nacional de Avaliação da Educação Superior* (SINAES) (National System for Higher Education Evaluation) to assess the quality of higher education through the use of, among other tools, a test to measure learning outcomes at the undergraduate level. The SINAES has also developed criteria for the accreditation of programmes and institutions, and has been used to regulate the growing private (for-profit) sector of Brazilian higher education (Pedrosa et al., 2013).

23 In Colombia, the poor quality of many private *Institutos de Educación Superior* (Higher Education Institutes) is reflected in their students’ low scores on academic achievement tests

designed to assess the impact of the ACCES (*Acceso Con Calidad a la Educación Superior*) student loan system, aimed at increasing access to higher education. The higher technical institutions are among those most rated as having average, low and very low academic standing; technological education fares little better (Turbay, 2013). Another study (Gómez, 2011) indicates that private higher technical education programmes concentrate on a few low-investment areas: accounting, financial administration, information systems, sales and so forth. Few technical and technological programmes are in modern fields involving in new technologies, as this would require considerable investment in equipment, laboratories and infrastructure.

24 In Mexico, where education is essentially public, youth and business people alike (in so far as they value training) note a segmentation in potential educational routes, differentiating between tertiary technical education and other universities (Flores Crespo and Mendoza, 2013). Admissions procedures that include exams, a fixed number of places and other selection devices act as an additional constraint on the democratisation of access. Similarly, tuition fees in the private sector in Brazil, and both sectors in Colombia, also constitute obstacles to more inclusive admissions practices.<sup>6</sup>

25 Although public policy strategies have been developed to improve inclusion and retention, such as the provision of scholarships (Brazil and Mexico) and student loans (Colombia) and/or improving the integration of secondary education and higher education through tutorials and remedial courses, the results still seem insufficient. According to research examining the financing of tertiary education in Brazil, Colombia, Mexico and Peru, Colombia is the only Latin American state where student assistance results in a significant improvement in the affordability of tertiary education (Murakami and Blom, 2008). Overall then, while that tertiary technical education might bring wider opportunities for education, it may also widen the gap between different tertiary education segments. Thus, the democratisation of access to tertiary education has been relative. Differences in quality and prestige continue to exist between tertiary technical education programmes and longer university degrees, and young people find it difficult to access and finish their studies.

### 3. Expanding tertiary technical education: between social demand and public policy

26 In all three countries, the expansion of higher education has been accompanied by the growth of secondary education, as indicated by table 4.1.

**Table 4.1. - Net rate of enrolment (NRE) at secondary and tertiary levels, 2000 and 2010, in Brazil, Colombia, and Mexico**

	2000		2010	
	Secondary NRE	Tertiary NRE	Secondary NRE	Tertiary NRE
Brazil*	41.5	10.9	59	17
Colombia	66.2	17.1	79.1	24
Mexico	67.9	18.3	75.2	23.7

\* Data from Brazil are from 2001 and 2011.

Source: Socio Economic Database for Latin America and the Caribbean (SEDLAC); Centro de Estudios Distributivos (CEDLAS), Laborales y Sociales Universidad Nacional de La Plata, Argentina.

27 The tertiary level demonstrates a clear increase in tertiary technical education enrolment. In Brazil, student enrolment in tertiary technology courses increased seven-fold between 2001 and 2010. The number of technological degrees granted also rose from 9 per cent of undergraduate enrolment in 2008 to 17.8 per cent by 2011. In Colombia, tertiary technical education enrolment soared in the last decade; while enrolment in university grew by 40 per cent from 2002 to 2010, enrolment in tertiary technical education increased 241 per cent over the same period. This is primarily considered to be the effect of government policies aimed at stimulating technical and technological education at the tertiary level, especially through the direct action of SENA and the participation of private institutions (Montañez, 2012). Even in countries like Mexico, where tertiary technical education accounts for only 3.2 per cent of total

enrolment in higher education, the number of students in tertiary technical education nearly quadrupled between 1998 and 2008 (García de Fanelli, 2013b).

28 Our hypothesis suggests that in addition to the development of new technologies and other transformations in the demand for skilled labour, the increase in tertiary technical education has been mainly a response to social demands for more openings in higher education. This demand, in turn, can be attributed to a significant divergence in the ability to access higher education, highly dependent upon the family's socio-economic status. In Brazil, for instance, enrolment in higher education is 15 times greater amongst the wealthiest 20 per cent of the population (the fifth quintile) than amongst the poorest 20 per cent (the first quintile). In Colombia, this gap is five times wider and in Mexico the net enrolment of the wealthiest quintile is three times that of the poorest. That said, none of the countries show evidence of gender discrimination, as women's net enrolment equals or slightly exceeds that of men in all the cases (García de Fanelli, 2013b).

29 Thus, one reason for the rise in tertiary technical education enrolment may be the incorporation of students from low- and low-middle income groups into secondary education and the corresponding increase in the number of students who complete this level. Pressure placed upon access to higher education by lower-income portions of the population is particularly evident in Colombia: the secondary education graduation rate for students from lower socio-economic sectors reached 70 per cent in 2010 (Jacinto, 2013). In this context, enrolment in tertiary technical education comprises 30 per cent of total higher education enrolment.

30 Private education played a key role in this regard in Brazil and Colombia. In Brazil, eight of every ten institutions are private, as are seven out of ten in Colombia. Brazil's private sector is composed of universities, schools and technological centres.<sup>7</sup> In Colombia, private higher education consists of a network of professional technical institutes, technological institutes, university institutes and universities.<sup>8</sup> Education in Mexico, in contrast, is predominantly public.

31 Faced increasing demand for higher education, public policies have responded by creating a few public institutions on the one hand, and by enabling the private sector to provide such education on the other. Moreover, the creation of new public education institutions offering tertiary technical education programmes are often linked to decentralised, regional initiatives that address demands for local development. The new regional centres in Colombia and the increasing federal school system in Brazil are particularly good examples of this process (Jacinto, 2013).

32 Although this expansion initially took place without clear state regulation, to address the heterogeneity in quality and relevance of this expansion, over the last decade governments have been developing quality assurance systems. Recently, all three countries have developed accreditation and evaluation criteria to be applied to all institutions, be they public or private, thus strengthening the role of the state in the field of tertiary technical education.

33 Overall, across contexts and in its various institutional forms, tertiary technical education offers an alternative for secondary school graduates who are also seeking rapid employment opportunities or an intermediate degree prior to university studies. According to statements of the young people interviewed, they have no other options in their places of residence.

#### **4. Does tertiary technical education increase access to university?**

34 To examine the issue of opportunity creation in higher education, we begin with the working hypothesis that, despite the existence of formal regulations in each of the case studies, there are insufficient practical means of bridging the gap between tertiary technical education and university education. For young people to be able to go on to university or post-graduate studies, personal matters (for example, balancing work and study) must be addressed and assurances given as to the quality, pertinence and relevance of the tertiary technical education on offer. The section proceeds by developing arguments to support this hypothesis.

35 In all three cases, progress has been made in connecting tertiary technical education to university level education. In line with international trends in the promotion of lifelong

learning, credit transfer systems are being designed to enable coursework to cross over from one institution to another. The development of vertical institutional models, wherein technological institutions include everything from technical and vocational secondary education to doctorate programs, follows a similar logic. This model is exemplified by Brazil, where the tertiary technical education certificate was turned into an undergraduate degree, thereby allowing students to go on to postgraduate studies. Colombia is following a similar path by enabling tertiary technical and technological institutes to award university degrees. This represents an attempt to address the difficulties tertiary technical education graduates encountered in having their diplomas recognised by universities (Turbay, 2013). In Mexico, the situation is slightly different. The Mexican system does have rules enabling transfer between the different subsystems of technological higher education, but, somewhat ironically, these regulations have served to complicate institutional and curricular reorganisation. In Colombia and Mexico, tertiary technical education graduates may, at least in theory, go on to study for a university degree, but in practice there are institutional, cultural and economic obstacles that often prevent them from doing so. Both countries attempt to integrate these institutions by other means, such as the partial transfer of select modules within university education. Again, in theory, this option would be facilitated by a skills-based system of evaluation from which equivalencies across the different levels might be determined.

36 The institutions analysed in the case studies have also tried to either integrate the different modalities of teaching within the same organisation, or make arrangements with other institutions to further the same goal (García de Fanelli, 2013b). That said, integrating and coordinating institutions with different traditions and levels of social prestige is not easy. This is compounded by competition between universities and non-universities for funding, as an asymmetry of influence is quite typical amongst the different types of higher education. These practical obstacles are exacerbated by the curricular tensions between the predominantly theoretical training of universities and the theoretical-practical training of technical colleges and technological institutes (Gallart, 2002; Bernasconi, 2006). In summary, the process of articulation and integration between non-university and university education remains incipient. While we lack statistics on the educational continuity between one level and another for tertiary technical education graduates, anecdotal evidence suggests the actual number is low across all three studies.

37 From the perspective of promoting lifelong learning, improving the articulation between educational systems and opportunities must be a priority in struggle to realise the right to education and training. Although technically permitted by the rules and regulations of each of the three countries, both personal and institutional conditions must be improved if young people are to make these kinds of moves. Furthermore, in Latin America, the formal recognition of the skills of employees working in higher technical positions is weak.

## 5. Does the tertiary technical education diploma lead to greater opportunities in the labour market?

38 What is the productive sector demand for graduates of tertiary technical education? Is there any demand, moreover, for them specifically? In answer to these questions, we hypothesise that while tertiary technical education helps graduates to find employment, their subsequent upward mobility hits a ‘ceiling’. It should be noted that the data we gathered on this subject differs from country to country, and even in countries with greater and more representative data, the question at hand is not fully addressed.<sup>9</sup>

39 With respect to Colombia, quantitative studies from the *Observatorio Laboral*, as well as a study of graduates from three institutions (Turbay, 2013), show that tertiary technical education degrees play a significant role in finding employment. For graduates from technical schools and institutes of technology, the percentage of graduates finding employment in the formal sector (66.4 per cent and 73.6 per cent respectively) is slightly lower than that of university graduates (76.7 per cent) (*Observatorio Laboral para la Educación*, 2011).<sup>10</sup> In general terms, the demand for tertiary technical education graduates is driven by the service sector, for degrees in areas such as accounting, secretarial skills, tourism, computer science,

etc. For tertiary technical education graduates in industrial occupations, demand is more disaggregated, and linked to specific companies and sectors.

40 In terms of the income earned by graduates of the different modalities of higher education, from 2005–07, though tertiary technical education graduates, on average, earned less than university graduates, their income growth rate slightly exceeded that of university graduates (García de Fanelli, 2013b). As would be expected, analysis of the salaries of recent graduates by type of education and gender shows that the higher the level of education, the greater the average starting salary. It also demonstrates that, across the board, the average salary of women is lower than that of men. As a whole, recent female graduates that work as wage earners earn 12.6 per cent less than men. For men, a university degree equated to a starting salary 52 per cent higher than that of a graduate of a technical college and 34 per cent higher than that of a graduate of a technological institute. For women with a university degree, the gap between their starting salary and the starting salary of female graduates from technological institutes is similar to the gap between men, but even greater with respect to female technical college graduates. The average starting salary of a female university graduate is 56 per cent higher than that of a female technical college graduate. Whatever the sector men's salaries are 10 to 15 per cent higher than those of women (García de Fanelli, 2013b).

41 In short, this data shows that the marketplace of occupations and income for graduates from technical college and institutes of technology is not on par with that of university graduates. The percentage of workers employed in the formal sector is high, however, and their salaries have tended to increase more sharply than those of other graduates of higher education. The qualitative data following up the tertiary technical education graduates in the study indicates that after graduation, their incomes improve by 20 to 35 per cent and they are promoted from operators to supervisors, technicians or area managers. That said, they are extremely likely to encounter an income ceiling during their career, as well as other conditions that limit their social and work life. A technical certificate does not enable upward employment mobility in subsequent occupations (Turbay, 2013).

42 In Mexico, the data on tertiary technical education graduates' average monthly income in 2005 indicates that they earn roughly only half of what a university graduate earns.<sup>11</sup> There is, however, some variance depending on the professional field, for tertiary technical education and university graduates alike (García de Fanelli, 2013b).

43 Why are tertiary technical education graduates paid less than their university-educated counterparts? On the one hand, the rates of return on education are usually higher for those with scarcer qualifications. On the other hand, the qualitative case studies reveal that even when filling a technical position, employers tend to prefer people with academic qualifications to those with technical qualifications. This is primarily due to the fact that in Latin American countries, as a result of a highly credentialistic process, the university degrees are more valued in firms (Bourdieu and Passeron, 1973; Rodríguez Gomez, 1999).

44 One of the findings in the Mexican qualitative study is consistent with the 'ceiling' on upward mobility observed in the other two countries (Flores and Mendoza, 2013). Graduates from technical universities, however, show greater horizontal mobility than engineers and holders of bachelor's degrees. Interview data suggests that this may be because the employment conditions encountered by the technological university graduates do not meet their expectations.

45 It is worth considering whether the demand for tertiary technical education graduates is a result of greater *credentialism* stemming from the devaluation of secondary level diplomas. An alternative explanation is that tertiary technical education graduates respond better to the overall demand for greater computer and management skills in at least the formal sectors of the economy. Their greater horizontal mobility could thus perhaps be interpreted as some kind of *screening*. All of these reasons are most likely involved. In regard to Brazil, Barato (2013) argues that, from the perspective of labour force structure, there is no evidence that tertiary technical education is, or should be considered, a distinct, self-contained category. In some cases, tertiary technical education courses are created for emerging occupations in the new information and communication technologies sector. In others, higher-level professional

education stems from the increase training requirements – in terms of both time and skill – of professions that demand mid-level technical certification (such as nursing), and/or regulation by professional associations. In the service sector, however, for example, it is quite common to find technologists in positions a technician could perform. Studies suggest that this overlap may be due to some combination of the process of credential devaluation, a possible glut of higher technologists, and the existence of some overlap in the training of mid-level technicians and higher-level technologists (Jacinto, 2013). Regarding this last point, it should be noted that recent efforts have been made to reorder and reorganise technical and higher technological education. In Brazil, the curriculum is set out in two catalogues: one for mid-level technical education and the other for the higher level. In Mexico and Colombia, a similar process was conducted through the (re)organisation of the national systems of labour skills.

46 Despite of these efforts, in practice there is considerable tension and overlap between technical and technological education. The study of Brazil, for instance, found that there are several degree programmes, such as medical radiology, in which 60 per cent of the content is similar in both modalities.

47 An additional perspective on labour market entry is provided by surveys and interviews with employers, who, by and large, are satisfied with these graduates. For example, in a study of the Brazilian job market for engineers and technologists (cited by García de Fanelli, 2013b), employers emphasised the shorter duration of the technologists' education as an advantage over engineers, as it enables their training to adjust more quickly to changes in technology and better adapt to the changing needs of the labour market, as well as costing significantly less. Across the businesses interviewed, 7.5 technologists were employed per company, as opposed to 12.7 engineers. That said, 34 per cent of the people interviewed believed future demand for technologists would increase sharply, whereas only 22 per cent thought that for engineers. When asked to assess the quality of the technologists in meeting the needs of the market, survey respondents gave an average of seven points out of ten; technologists were most recognised in the fields of mechanics, computer science and civil construction (CNI et al., 2008). Similarly, the employers interviewed in the Brazilian study noted that even if they remain in operational positions, technologists can generate higher quality products and services (Barato, 2013).

48 In Mexico, data from the Coordinación General de Universidades Tecnológicas from 2011 finds, according to the 53 businesses surveyed, a high degree of employer satisfaction with graduates' knowledge, technical skills and attitude (Flores Crespo and Mendoza, 2013). On the other hand, amongst the less favourable characteristics reported, some employers mentioned a lack of humanistic education in some tertiary technical education graduates. Others noted that tertiary technical education graduates lacked the ability to do independent research and be pro-active regarding matters that need settling.

49 Similarly, in Colombia, 87.5 per cent of the employers surveyed stated their satisfaction with the work done by tertiary technical education graduates. Compared to university graduates, the technicians and technologists were valued by employers for their ability to carry out practical tasks and routine operational work. When employers compared these graduates to those who came from SENA, they observed that the university graduates acquire more general, social and humanistic skills. Nevertheless, most also pointed out that due to out-dated university curricula, gaps in practical training, underdeveloped reading, writing, and communications skills, and inexperience in team management, these graduates require significant on-the-job training to be able to do their job correctly. In terms of tertiary technical education graduates' own subjective assessment, those interviewed in the case studies expressed overall satisfaction with their studies, placing particular emphasis on the value of concrete links with the labour market through internships. Aside from a few criticisms of the quality of some of the internships, this work-study tool proved to be relevant for the companies and students alike. The study by Barato (2013), for instance, points out that a great many students in these courses are offered paid internships because business owners consider the courses to be of good quality and they may want to hire these students in the future. In fact, many young people go on working at their placement companies even after completing the official internships. At

the same time, most of the young people pointed out that their degree programme itself was very important in getting their current job.

50 In Mexico, the data from both the survey done by the Coordinación General de Universidades Tecnológicas de Mexico and our own case study indicated that young people assess their academic education, practical training, and quality of institutional instruction quite positively. According to the survey of graduates in the qualitative study, 31.3 per cent reported that their salary met their expectations, 25 per cent felt their salary was fair and satisfactory, and 23 per cent stated that their salary was fine, but they expected a raise in the future (Flores and Mendoza, 2013).

51 In Colombia, 70 per cent of the graduates interviewed valued the contribution of their technical and technological training in providing opportunities for upward career mobility; 75 per cent were satisfied with the improved social recognition they received in comparison to that of professionals; 91.7 per cent believed their professional training proved beneficial to both their personal life and their social and cultural skills; and 58 per cent felt their training improved their employment stability. In terms of earning power, 33 per cent reported that their income increased significantly, 29 per cent partially, 18 per cent, that it remained the same, and 4.2 per cent, that it decreased (Turbay, 2013).

52 Indeed, these alternatives in higher education are highly valued by the young people who are able to finish their studies. Turbay (2013) notes that due to their flexibility, the institutions analysed in her research are highly inclusive, as enable students to work while they study. Graduates improve their living conditions, income, self-esteem and social and cultural capital. They appreciate the opportunity to receive further education, as they perceive it to have increased their competitiveness in the job market.

53 The relevance of this form of professional education for young people stands in stark contrast with the now-discredited views found in some earlier studies comparing tertiary technical education-style training to university degrees. This contrast is worth exploring. On one hand, this positive evaluation of alternative higher education may derive from segmentation within the tertiary technical education level of education and the fact that the case studies chose prestigious institutions with good results. On the other hand, it also reflects recent changes in tertiary technical education in responding to the demands of society, politics and the job market, all of which should be considered in greater detail.

54 Overall, our research finds that most tertiary technical education graduates find employment in the formal sector of the economy, but are paid considerably less than university graduates. From a certain perspective, this gap is understandable; the investment in human capital (by states, families and occasionally individuals) for these degrees is correspondingly lower than that of university degrees. That said, in terms of improving work conditions and/or obtaining better employment upon graduation, the higher technical degree seems to be a good investment. Later in tertiary technical education graduates' careers, however, there are indications of a ceiling on the chances for upward mobility.<sup>12</sup> Regrettably, there is no data available with which to observe the evolution of this 'ceiling' effect on tertiary technical education graduates in the labour force.

## 6. Conclusion

55 This chapter synthesised data from case studies carried out in Brazil, Colombia and Mexico to analyse recent developments in tertiary technical education, including the reasons for diffusion and the extent and ways in which it contributes to broadening young people's opportunities for education and work. It may be concluded that tertiary technical education contributed to democratising opportunities for advanced study, as it offers an alternative in educational continuity for new generations of young people who, often uniquely in their family history, have completed their secondary education. In each section we have explored different dimensions of this contradictory democratisation.

56 Our first objective was to determine the extent of, and rationale for, the expansion of tertiary technical education. We conclude that tertiary technical education constitutes a higher education option that is easier to access, takes less time, is more vocational and/or technical

in orientation and costs less than a university degree. The recent increase in tertiary technical education enrolment (at different levels, depending on the country) seems to be due to social and political demand. Pressure from social groups newly and regularly completing their secondary education, matched by subsequent policy responses, is largely responsible for the recent surge in tertiary technical education activity.

57 Our second objective was to explore differences in social prestige/status and selection/admission processes amongst tertiary technical education and university institutions. Most tertiary technical education institutions have lower prestige and status than universities, though there are a core of extremely well regarded public tertiary technical education institutions in terms of quality and prestige. Although public policy experts have developed strategies attempting to improve the inclusiveness, permanence and quality of these programmes, thus far, the results remain insufficient.

58 Our third objective was to investigate the continuity of access of tertiary technical education students to universities or postgraduate studies, from both a regulatory point of view and that of practical, empirical experience. We conclude that even if regulations aimed at easing this transition have been developed, the process of articulation and integration between non-university and university education remains incipient. Successful transitions between tertiary technical education and the university system appear to be scarce, a topic which bears further, systematic investigation.

59 Our fourth objective was to collect evidence about tertiary technical education graduates' transitions into the labour market. tertiary technical education graduates positively value their training. The diploma has value for those entering the service sector, some regulated occupations and, in some cases, the industrial sector. The data also indicates, however, that tertiary technical education graduates earn less than university graduates, and, due to limited demand, are more constrained in their placement in the labour market. In terms of human resource demand, graduates' job placement was largely linked to the generalised spread of information and communication technologies, which sparked the demand for more education, while simultaneously devaluing secondary education diplomas. Overall national growth in job creation during the period of study may also explain improvements in demand for tertiary technical education graduates but, at this time, the longitudinal data required to confirm this hypothesis is not available. Social, political and economic demands all converge in the development of new, broader tertiary technical education programmes in ways that are both complementary and contradictory.

60 Finally, we note the need to develop databases and research projects capable of lending depth to the understanding of the processes now underway. We suggest three steps in that regard. First, more data is needed on the entrance of tertiary technical education graduates into the job market, paired with representative data that can be used to draw comparisons with university graduates and holders of secondary diplomas. This would help clarify the value of tertiary technical education education and better measure social recognition of the youths' general and specific technical skills within the hierarchy of occupational qualifications. To do so, a closer examination of the supply side of employment is required. As such, systematic studies of the most useful qualifications in technological organisations, by specific economic sector, and their linkages with the tertiary educational supply should be conducted. Second, research is needed into the parameters of institutional quality more broadly; we must develop quality parameters that encompass, for instance, not only the demands of the labour market but also the human development needs and expectations of the young people, as well as sustainable social development and technology transfer and innovation. Finally, public-private alliances, which may support tertiary technical education in its mandate to provide more young people with access to quality work and education, also bear further investigation.

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## Notes

1 The results of the research are published in Jacinto, C. (ed.) (2013) *Incluir a los jóvenes. Retos para la educación terciaria técnica en América Latina* (Paris: IPEE-UNESCO).

2 The diversity of models adopted in Latin America and their different historical roots make it hard to generalise about the region. As of yet, there has been no substantive progress on cross-national recognition of technical diplomas within the region. As such, we have preferred to limit ourselves to the three countries mentioned above.

3 The proportion of young people from the poorest strata who manage to complete their secondary education is also very low. See García de Fanelli and Jacinto (2010).

4 Traditionally strongly informed by the demands of the industrial sector, they provide a single institutional home for various levels of education, ranging from secondary technical education to higher education. The institutions in the 'S' system also provide technical consultation to the productive sector and develop technological innovations to meet its needs (Moura Castro and Bernasconi, 2005).

5 They began with 19 schools for craftsmen and apprentices in 1909, later becoming industrial and technical schools. Most of these schools were then turned into *Centro federal de educação tecnológica* (CEFETs – Federal Centres of Technological Education).

6 For more information regarding the higher education costs in tertiary education in Brazil, Colombia, Mexico and Peru, see Murakami and Blom (2008).

7 During the last decade, a significant for-profit private higher education sector has also gained greater importance (Rama, 2012).

8 For more information about the programmes offered at these types of institutions, see García de Fanelli (2013b).

9 As we use aggregate data, it is not possible to discern what may be very dissimilar patterns in different subsectors of technical qualification. Some evidence about this matter was collected in the qualitative studies, however, as will be discussed shortly.

10 This source only provides data regarding the formal sector of the economy.

11 Regrettably, there is currently no data available that would enable comparison of this variable with that of graduates of secondary education.

12 It should be noted, however, that this provisional conclusion rests on the analysis of data that should be regarded with a degree of caution. (The conclusion relies on: data from the Observatorio in Colombia, some partial follow-ups in Brazil and Mexico, and qualitative studies conducted at high-quality institutions in Brazil, Colombia and Mexico).

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## Abstracts

Vocational training versus a traditional university education. This chapter seeks to answer the question of whether ‘tertiary technical education’ has contributed to increasing economic and social opportunity for young people in Latin America, using three case studies from Brazil, Colombia and Mexico. It examines the extent to which tertiary technical education has contributed towards democratising access to education through institutional diversification, expanded enrolment and, at least theoretically, improved access to quality employment. The analysis shows that tertiary technical education has contributed to widening of opportunities by offering an alternative form of education to new generations of young people. Tertiary technical education is more accessible, shorter in duration, has a vocational orientation, and tends to be cheaper than a university education. However, the case studies also reveal that while a tertiary technical education diploma is an asset for young people seeking employment, it nonetheless does not have the same perceived value as a traditional university education. Available data appear to indicate that graduates of tertiary technical education earn less on average than university graduates and face several challenges in the labour market. Furthermore, the studies reveal that despite the presence of highly regarded tertiary technical education institutions in all three countries, these carry less prestige and status than universities.

## L’enseignement technique supérieur et l’intégration des jeunes au Brésil, en Colombie et au Mexique

Que choisir entre formation professionnelle ou formation universitaire traditionnelle? Cet article s’efforce de déterminer si l’enseignement technique supérieur a aidé à accroître les possibilités économiques et sociales pour les jeunes en Amérique latine en se basant sur trois études de cas au Brésil, en Colombie et au Mexique. Il analyse dans quelle mesure l’enseignement technique supérieur a favorisé la démocratisation de l’accès à l’éducation par l’entremise d’une diversification institutionnelle, d’une augmentation du taux d’inscription et, du moins en théorie, d’un meilleur accès à des emplois de qualité. Il ressort de cette analyse que l’enseignement technique supérieur a contribué à un élargissement des possibilités en offrant une forme d’éducation alternative aux nouvelles générations de jeunes, plus accessible,

moins longue, orientée vers un métier et qui tend à être moins coûteuse que l'enseignement universitaire. Toutefois, les études de cas révèlent aussi que si un diplôme d'enseignement technique supérieur constitue un atout pour des jeunes cherchant un emploi, on n'y accorde pas la même valeur qu'à un diplôme universitaire traditionnel. Les données disponibles à ce jour semblent indiquer que les diplômés de l'enseignement technique supérieur ont en moyenne un salaire inférieur aux diplômés universitaires et font face à un certain nombre de difficultés sur le marché du travail. De plus, les études montrent qu'en dépit de la présence, dans les trois pays, d'établissements d'enseignement technique supérieur très réputés, ces derniers ont un statut inférieur à celui des établissements universitaires et jouissent d'un moins grand prestige.

## Educación técnica terciaria e integración de los jóvenes en Brasil, Colombia y México

Formación técnico-profesional frente a formación universitaria tradicional. A través de tres estudios de caso de Brasil, Colombia y México, este capítulo trata de responder a la pregunta de si la «educación técnica terciaria» ha contribuido a aumentar las oportunidades económicas y sociales de los jóvenes en América Latina. En él se examina hasta qué punto esta modalidad educativa ha contribuido a democratizar el acceso a la educación a través de la diversificación institucional, el incremento del número de estudiantes matriculados y, al menos en teoría, un mejor acceso a empleos de calidad. El análisis muestra que la educación técnica terciaria ha contribuido efectivamente a generar más oportunidades en la medida en que constituye una forma de educación alternativa para las nuevas generaciones. La educación técnica terciaria es más accesible, de menor duración, tiene una orientación vocacional y es en general más barata que la formación universitaria. No obstante, los estudios de caso también revelan que, si bien un título de educación técnica terciaria es un activo para los jóvenes que buscan empleo, no se le otorga el mismo valor que a un título universitario tradicional. Según los datos disponibles, los egresados de la educación técnica terciaria ganan, de media, salarios menos elevados que los egresados universitarios y tienen que afrontar varios desafíos en el mercado laboral. Los estudios revelan además que a pesar de que en los tres países existen centros de educación técnica terciaria muy bien considerados, su prestigio y estatus son muy inferiores a los de las universidades.

### *Index terms*

*Mots-clés géographiques* : Brésil, Colombie, Mexique

*Mots-clés thématiques* : éducation, formation professionnelle, enseignement supérieur

*Thematic keywords* : youth, training, skills, data, aid effectiveness, human rights, vocational education, education, higher education

*Geographic keywords* : Brazil, Colombia, Mexico

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