



## SKILLS GAP OR SIGNALING GAP?

INSIGHTS FROM LINKEDIN IN EMERGING MARKETS OF  
BRAZIL, INDIA, INDONESIA, AND SOUTH AFRICA



# ACKNOWLEDGEMENTS

This report was jointly prepared by LinkedIn and the Solutions for Youth Employment (S4YE) Secretariat based in the World Bank Social Protection and Jobs (SPJ) Practice. The report was authored by Estera Barbarasa (S4YE) with contributions from Jacqueline Barrett (LinkedIn) and Nicole Goldin (S4YE). Graphic design was done by Emmeline Vu (LinkedIn), with photos provided by Emmeline Vu, Sonia Xu, and the World Bank.

The team is grateful to Maryam Ghofraniha (Head of Global Partnerships, LinkedIn for Good) and Namita Datta (S4YE Coalition Manager) for their support.

The team would also like to thank the following individuals for serving as peer reviewers and providing thoughtful and constructive feedback: Tessa Forshaw & Lisa Neuberger-Fernandez (Accenture, Corporate Citizenship); Saori Imaizumi (World Bank, Education Global Practice); Eric Johnson (RTI International); and Susan Schorr, William Natta, & Delia Solari (International Telecommunication Union). The team also benefitted from technical discussions with Maria Laura Sanchez Puerta (World Bank, SPJ).

This report has been made possible through a grant from the World Bank's Jobs Umbrella Trust Fund, which is supported by the Department for International Development/UK AID, and the Governments of Norway, Germany, Austria, the Austrian Development Agency, and the Swedish International Development Cooperation Agency.

Should you wish to cite this report, the correct citation should read: S4YE & LinkedIn (Barbarasa, E., J. Barrett, and N. Goldin). "Skills Gap or Signaling Gap?: Insights from LinkedIn in emerging markets of Brazil, India, Indonesia, and South Africa." Solutions for Youth Employment, Washington D.C. and LinkedIn, Mountain View CA.

The findings and conclusions expressed in this report are those of the authors and do not necessarily reflect the opinion of each individual S4YE partner.



Acknowledgements	03
List of Figures and Tables	05
Executive Summary	06
I. Introduction	11
II. Methodology	15
III. Context: A Look at Emerging Markets of Brazil, India, Indonesia, & South Africa	19
IV. Findings	23
<b>Finding #1:</b> Employers are looking for entry-level with diverse skills	24
<b>Finding #2:</b> Nature of skills varies per country and may not always be a critical concern	27
<b>Finding #3:</b> While the skills gap challenge receives a lot of attention, the skills signaling gap is often neglected	31
<b>Finding #4:</b> Contrary to perception about the young being digitally savvy, youth in Brazil, India, Indonesia, and South Africa underutilize LinkedIn	35
V. Recommendations	39
<b>Appendix 1:</b> Description of LinkedIn Variables	48
<b>Appendix 2:</b> Top industries of Recruitment & Employment on LinkedIn	50
<b>Appendix 3:</b> Top College Majors of Young LinkedIn Members	51
<b>Appendix 4:</b> Detailed Listing of In-Demand and In-Supply Skills	52
References	53

# LIST OF FIGURES AND TABLES

<b>Figure 1:</b> Share of youth employment by sector, Brazil 2014	21
<b>Figure 2:</b> Share of youth employment by sector, Indonesia 2015	22
<b>Figure 3:</b> Share of youth employment by sector, South Africa 2015	22
<b>Figure 4:</b> In-Demand Job-Related Skills, Classified by Skills Groupings	24
<b>Figure 5:</b> Top Skills of 2016 on LinkedIn Global	26
<b>Figure 6:</b> % of Firms Identifying an Inadequately Educated Workforce as Major Constraint: Brazil, India, Indonesia, and South Africa	28
<b>Figure 7:</b> % of Employers Having Difficulty Filling Jobs Due to Lack of Available Talent: Brazil, India, & South Africa	28
<b>Figure 8:</b> Industry Alignment on LinkedIn: Recruitment, Employment, & College Majors	30
<b>Figure 9:</b> Commonly Listed Skills in Youths' LinkedIn Profiles across Brazil, India, Indonesia, and South Africa, Classified by Skills Groupings (% Share among Top 10 Skills)	32
<b>Figure 10:</b> In-Demand Skills across India, Indonesia, & South Africa, Classified by Skills Grouping (% Share among Top 20 Skills)	33
<b>Figure 11:</b> Job Postings on LinkedIn by Experience Level	35
<b>Table 1:</b> In-Demand Skills from Job-Switching Data (youth who have changed jobs in past 12 months) on LinkedIn in Brazil, India, Indonesia, and South Africa	26
<b>Table 2:</b> Average Number of Connections of Young LinkedIn Members, Compared to all Members	37



# EXECUTIVE SUMMARY

# EXECUTIVE SUMMARY

In the last few decades with the rise of the “Digital Age,” the amount of online job portals and professional networking platforms has increased significantly. These platforms can help strengthen the match between employers and job seekers, and often lower recruitment and job search costs. The datasets of these platforms can also provide us with a variety of labor market insights ranging from in-demand jobs and in-supply skills in a certain economy to industries that might experience skills gap-related challenges. For today’s tens of millions of unemployed youth, these insights are especially critical to help understand and address the information gaps and other labor market intermediation impediments that stand between them and their first or next job.

With more than 500 million members worldwide, LinkedIn is the world’s largest online professional networking platform. Tapping into the platform’s rich data repository, LinkedIn and the Solutions for Youth Employment (S4YE) Coalition – a multi-stakeholder partnership among public sector, private sector, and civil society actors to impact the global youth unemployment crisis – embarked on a research collaboration to explore how LinkedIn data can inform the conversation on youth employment and skills gap trends in emerging markets.

This research focuses on four diverse middle-income countries: Brazil, India, Indonesia and South Africa. Across these countries, we analyzed 390,000 entry-level job postings and 6.4 million LinkedIn profiles of youth inferred to be aged 21-29 to better understand top industries of employment, as well as recruitment and skills trends. Given the nature of the dataset for these four countries, the research focuses on formal sectors and high to middle level skills. We overlaid this analysis with two secondary sources, the World Bank Enterprise Surveys and ManpowerGroup Talent Shortage Surveys, to incorporate employer perspectives on the nature of skills gap in the selected countries.

## Main Research Questions:

1. What are in-demand skills on LinkedIn in Brazil, India, Indonesia, and South Africa?
2. What are areas of alignment or mismatch between supply (youth) and demand (employers) in these emerging markets? What can we learn about the nature of skills gap?
3. Comparing demand for and supply of skills, is the main challenge a skills gap, or is it a skills signaling gap?
4. What are trends in youth usage of LinkedIn in these four countries?

*Four main findings emerged:*

## **1. Employers are looking for entry-level talent with diverse skills.**

Analysis of entry-level job postings in India, Indonesia, and South Africa reveals that employers are looking for youth talent with diverse skills such as computer literacy (i.e., Microsoft Office and email), soft skills (i.e., teamwork, communications, and time management), and job-specific technical skills (i.e., engineering, programming, and marketing). Interestingly, the data shows that skills requirements for entry-level jobs consist more heavily of technical skills, ranging from 42% of the top 20 in-demand skills in Indonesia and up to 71% in India. Among these, services-related skills such as customer service, sales, and consulting are common, reflecting the growth of services sectors in emerging markets. Moreover, LinkedIn data also reveals that youth with skill sets related to advanced information and communications technology (ICT) and the Fourth Industrial Revolution (4<sup>th</sup> IR) (i.e. statistical analysis, data mining, machine-learning, and algorithm) are in high-demand, based on data analyzing skills of young LinkedIn members who switch jobs most frequently (over a time period of twelve months).

## **2. The nature of the skills gap varies per country and may not always be a critical concern.**

When companies have a difficult time finding the right talent, they often face lowered productivity, higher recruitment and training costs, and in some cases, reduced growth prospects. The skills gap – the mismatch between skills and qualifications required by employers and those possessed by job candidates – is also concerning from a youth employment perspective because it

limits the employability prospects of young people that do not possess the right skills and profiles needed for available jobs.

Using youth (supply-side) and employer (demand-side) data, we researched the relation between supply-and demand-side alignment/mismatch. On the demand-side, we looked at industries with high levels of youth employment and recruitment activity on LinkedIn; and on the supply-side, we looked at young peoples' educational majors to see if they are relevant to these same industries. Data revealed that the information technology (IT) field has the greatest alignment between these two sides on LinkedIn. Not only is IT one of the top sectors in which youth are working and a top industry for recruiters, but also, IT majors such as computer science are among the most popular fields of study with young LinkedIn members. Comparatively, other industries such as business, education, banking and finance, human resources, education, and retail show mixed alignment between supply and demand.

Complementary, secondary data from the World Bank Enterprise Surveys and ManpowerGroup Talent Shortage Surveys reveals that Brazilian employers express the greatest difficulty in finding the right employees (ranging from 43% to 75% of surveyed firms), whereas, lower proportions of Indonesian (11% of surveyed firms) enterprises report that an inadequately trained workforce is a major constraint to their operations. Employer opinions in India and South Africa are more mixed across different surveys and indicate that respectively 9%-48% and 9%-34% of the surveyed firms report skills gap problems. Based on the results of these enterprise surveys, findings indicate that not all employers feel that the skills gap is a widespread problem across the four countries, and that inconsistency among employer perceptions may reflect measurement challenges in assessing the nature of the skills gap.



### 3. While the skills gap challenge receives a lot of attention, the skills signaling gap is often neglected.

In some instances, young people may not lack labor market-relevant skills (skills gap), but may lack awareness or knowledge about the skills that employers are looking for. As such, they fail to signal the relevant skills they possess (skills signaling gap). A comparison of commonly listed skills in youth's LinkedIn profiles and required skills in entry-level job postings reveals that the mismatch in skills signaling is most pronounced for soft skills. While soft skills represent 25% of the top 20 skills in job postings, soft skills do not appear among any of the top 10 skills in young peoples' LinkedIn profiles across all four countries. Instead, young people are predominantly listing job-specific technical skills such as IT infrastructure and system management, accounting, or teaching in their online profiles.

The 6.4 million young LinkedIn members included in this analysis are well-educated (on average 58% have some university education), and many of them may have likely acquired some soft skills throughout their studies, internships, capstone projects, and extra-curricular activities. One possible explanation is that youth may not be aware that it's important to signal soft skills to employers, and likely lack the guidance on how to signal these skills in their professional profiles.

### 4. Contrary to the perception about the young being digitally savvy, youth in Brazil, India, Indonesia and South Africa underutilize LinkedIn.

In today's digital economy, it is more and more important for job-seekers to have a digital professional footprint through presence on online platforms. Online job portals and professional networking platforms such as LinkedIn can help match youth to jobs, and provide a forum to signal skills to prospective employers. On the one hand, data from LinkedIn in these four countries shows that on average over 50% of job postings on the platform are for entry-level positions. On the other hand, analysis of over 78 million LinkedIn profiles across Brazil, India, Indonesia, and South Africa shows that youth underutilize LinkedIn compared to professionals above the age of 30. Young professionals account for less than 10% of the total amount of LinkedIn members in these four countries.

Whereas, young people often have less-developed professional networks compared to adults offline, interestingly, once young people overcome barriers to creating a digital profile, they tend to have more professional connections (ranging between 128-220 connections across the four countries) than adults on LinkedIn (ranging between 76-90 connections).

## Recommendations:

*Based on these four main findings, we recommend that youth employment practitioners, funders, and policy-makers:*

1. Increase investment in comprehensive youth employment programs that support market-clearing and labor intermediation interventions.
2. Include career counseling and mentoring as part of youth employment programs to provide youth strategies to self-assess their skills and signal in-demand skills to employers.
3. Conduct targeted information campaigns to get more youth to join digital platforms that can connect them to job information, employers, and networks.
4. Integrate and encourage skills training to include soft, advanced ICT, service industry, and “4<sup>th</sup> IR” skills to respond to rising employer demand.
5. Create digital one-stop shops on labor market information, combining big data and traditional data, to track skills trends in real-time.



# I. INTRODUCTION

# I. INTRODUCTION

Labor markets are increasingly complex, and finding a good job is increasingly difficult – especially for young people. The level of unemployed youth is nearly as high today as it has ever been, and hundreds of millions of youth are trapped in low paying, insecure, or poor quality jobs that limit their earnings and future potential. Globally, young people are up to four times more likely to be unemployed than adults.<sup>1</sup>

Several factors are contributing to these challenges. On the supply-side, education and training institutions often fail to prepare youth with the skills and competencies that employers demand (“skills gap”), which hinders their employability prospects. Surveys across 27 low- and middle- income countries worldwide have found less than half of young employees were considered well-matched in the labor market.<sup>2</sup> On the demand-side, there are constraints such as insufficient economic growth and a shortfall in quality job creation. As many as five million jobs a month worldwide are needed to absorb new entrants to the labor force.<sup>3</sup> For young people the employment challenge is complicated by a range of intermediation or market-clearing failures - such as information gaps - that prevent eager young job-seekers from successfully connecting to employers and available vacancies. To help smooth the path to employment, online job and employment information portals are becoming a widely-used tool by recruiters and candidates alike.

In the last few decades with the rise of the “Digital Age”, the amount of online job portals and professional networking platforms has increased significantly. These platforms can help strengthen the match between employers and job seekers, and often lower recruitment and job search costs. The datasets of these platforms can also provide us with a variety of labor market insights ranging from in-demand jobs and in-supply skills in a certain economy to industries that might experience skills gap-related challenges.

With more than 500 million members worldwide across 200 countries, LinkedIn is the world’s largest online professional networking platform. Two new members join LinkedIn every second, and over 100 million unique visitors visit LinkedIn each month. Members can pick from over 50,000 skills to feature in their profiles that can signal their employability to prospective employers. Over 50,000 companies across the globe, and hundreds of thousands of recruiters, use LinkedIn to hire talent. There are more than six million open jobs posted on LinkedIn, including one million entry-level jobs and internships.

Tapping into the platform’s rich data repository, LinkedIn and Solutions for Youth Employment (S4YE) embarked on a research collaboration to explore how LinkedIn data can inform the youth employment and skills gap (the mismatch between skills and qualifications required by employers and those possessed by job candidates) conversation in new ways, focusing on emerging markets.

---

<sup>1</sup> S4YE (Goldin, Hobson et al.) 2015; ILO 2016

<sup>2</sup> Sparreboom and Staneva 2014

<sup>3</sup> S4YE (Goldin, Hobson et al.) 2015

**About LinkedIn:**

Founded in 2003, LinkedIn connects the world's professionals to make them more productive and successful. With more than 500 million members worldwide, LinkedIn is the world's largest professional network on the Internet. LinkedIn's vision is to create economic opportunity for every member of the global workforce.

**About Solutions for Youth Employment (S4YE):**

Solutions for Youth Employment (S4YE) is a multi-stakeholder coalition among public sector, private sector, and civil society actors that aims to provide leadership and resources for catalytic action to increase the number of young people engaged in productive work. S4YE partners include Accenture, Government of Albania, Government of Germany, Government of Norway, International Labor Organization (ILO), International Youth Foundation (IYF), The MasterCard Foundation, Microsoft, Plan International, RAND, The Rockefeller Foundation, United Nations Youth Envoy, World Bank, and Youth Business International (YBI). The S4YE Secretariat is housed in the Social Protection and Jobs (SPJ) practice at the World Bank.

This new research is among the first papers to analyze LinkedIn data from emerging markets<sup>4</sup> to better understand youth employment, skills gap, and skills signaling. The paper focuses on four diverse middle-income countries - Brazil, India, Indonesia, and South Africa - to address four main research questions:

1. What are in-demand skills on LinkedIn in Brazil, India, Indonesia, and South Africa?
2. What are areas of alignment or mismatch between supply (youth) and demand (employers) in these emerging markets? What can we learn about the nature of skills gap?
3. Comparing demand for and supply of skills, is the main challenge a skills gap, or is it a skills signaling gap?
4. What are trends in youth usage of LinkedIn in these four countries?

The remainder of the report is structured as follows. Section Two describes the methodology; Section Three provides economic and labor market context of Brazil, India, Indonesia, and South Africa; Section Four presents the four main findings corresponding to the four research questions outlined above; and Section Five concludes the paper with action-oriented recommendations geared to youth employment practitioners and policy makers.

<sup>4</sup> In recent years, the LinkedIn platform has been rapidly growing in emerging markets. For example, LinkedIn set up its first sales office in India in 2009 and had over 3 million members then. Since then, it has grown rapidly to reach

around 40 million members today, the second highest in the world after the U.S. Goyal, Malini, "India's Problem is to Find Jobs for 10-12 Million Workers Every Year: Akshay Kothari, LinkedIn India" The Economic Times. 2016.





## II. METHODOLOGY

The use of big data and online job portals for labor market analysis has been on the rise in recent years. Researchers point to the advantages and potential of big data labor market information such as timeliness and data granularity. It often allows us to study new aspects of labor market activity that have historically been difficult to analyze, such as in-demand and in-supply skills. However, as noted in the literature on this topic<sup>5</sup>, one of the caveats of using big data and online job portals for labor market analysis is limitations on representativeness. Employers and job seekers represented on the LinkedIn platform are those who selected to be on it, and the composition of the industry and job seekers may not reflect the broader population. As such, the findings presented in this paper should be considered accordingly.

---

<sup>5</sup> Kurekova et al. 2015; Nomura et al. 2017; Johnson 2016

Across these four countries, we analyzed 390,000 entry-level job postings and 6.4 million LinkedIn profiles of youth inferred to be aged 21 - 29<sup>6</sup> to better understand labor market supply and demand trends on LinkedIn. Box 1 presents a summary of the LinkedIn data variables used in the analysis, and Appendix 1 provides a detailed description of the dataset. The dataset was compiled between June and September 2016.

On the demand side, in the four countries studied in this report, the industries of analysis are based upon composition on LinkedIn; primarily professional, scientific, and technical sectors and occupations (i.e., information technology, education, financial services, etc.). On the supply side, young people who are members of LinkedIn generally have higher levels of education. The majority are university graduates, ranging from 56% of young LinkedIn members in South Africa to 69% in Indonesia. While the analysis generally applies to this demographic of young LinkedIn users, we comment where the insights and recommendations may apply to disadvantaged youth or those not in employment, education, or training (NEET's) where relevant.

To address the skills gap question, we analyzed the relation between supply-and demand-side alignment or mismatch on the LinkedIn platform in these four countries. On the demand-side, we looked at industries with high levels of youth employment and recruitment activity for entry-level talent on LinkedIn; and on the supply-side, we looked at young peoples' college majors (i.e., field of study) to see if they are relevant to these same industries. Please see Appendix 2 & 3 for a listing of (i) top five industries of recruitment, (ii) top ten industries of employment of young LinkedIn members, and (iii) top ten college majors of young LinkedIn members.<sup>7</sup> We overlaid this analysis with two secondary sources, the World Bank Enterprise Surveys and ManpowerGroup Talent Shortage Surveys, to incorporate employer perspectives on the nature of skills gap in the selected countries.

#### Box 1: LinkedIn Data Variables

Entry-level job postings (Demand): job descriptions posted by employers on LinkedIn, which usually include job summary, roles & responsibilities, and required qualifications.

- Top industries with entry-level job postings
- Common job titles for entry-level positions
- In-demand skills with employers

Young LinkedIn member profiles (Supply): online professional profiles created by individuals that display work experience, education, skills, and professional connections.

- Proportion of young LinkedIn members to older LinkedIn members
- Average # of professional connections (and compare to average # of professional connections for older LinkedIn members)
- Education level: highest degree received
- Field of study (college major)
- Industry of employment
- Skills reported in "Featured Skills & Endorsements" (in-supply skills)

Job-switching information (Supply & Demand): Particular skill sets listed among young users who have switched jobs in the past 12 months.

<sup>6</sup> Youth are defined using 3 metrics: (1) Age: inferred birth year is between 1987 and 1995; (2) Education: Year that education ends is greater than or equal to 2009; (3) Work Experience: Year that career begins is greater than or equal to 2009. Members who meet 2 out of 3 of these criteria are considered youth. We are able to expand the number of individuals we are including in the analysis by also using education and work experience metrics since there are some people who are missing age information. For instance, if there is an individual that has the appropriate work experience or graduation year, we will include them even if age information is missing.

<sup>7</sup> "Top industry recruiting entry-level talent" is based on number of job postings per industries. "Top industry of employment among young members" is based on the industry of the current company a young LinkedIn member works at. "Top field of study" is based on the major/concentration at the most recent education institution listed in young member profiles.



To identify demand for skills, we used two methods. First, we conducted text analysis of entry-level open job postings from companies on LinkedIn in India, Indonesia, and South Africa<sup>8</sup> to identify the 20 most frequently appearing skills for each country. The listed skills are not mutually exclusive, rather it is possible for a job posting to have multiple or even all of the top 20 skills listed in its job description. A machine learning algorithm was applied to the text that was scraped from the postings in order to extract the skills. Skills were then clustered into common buckets. Please see Appendix 4 for a listing of the top 20 in-demand skills for each country.

We classified each of these top 20 skills per country into three skills categories, using the World Bank's Skills toward Employment Productivity (STEP) framework with some modification.<sup>9</sup> Using STEP's category of "job-related skills," we further organized skills into three separate skills groupings: (1) computer literacy skills, which include the ability to use computers and related technology (i.e., Microsoft Office, email, Internet skills); (2) soft skills, which cover multiple domains such as social, emotional, personality, behavioral, and attitudinal<sup>10</sup> (i.e., teamwork, communications, and leadership); and (3) job-specific technical skills, which include skills relevant to the specific job of the worker and may pertain to specific industries (i.e., engineering, programming, project management, sales).

While it can be argued that certain skills can fit under multiple categories, for purposes of this analysis we assigned skills to a single category in order to draw out comparisons between different types of skills and identify themes in what employers are looking for in entry-level job candidates. We tallied the frequency counts of the top 20 skills in the job postings, and calculated the relative proportion of each skills category in relation to each other.

Second, we also measured skills demand on LinkedIn based on an estimation of how sought after individuals with particular skill sets are by employers. The analysis identified individuals who changed jobs frequently ("job-switchers"), and aggregated and ranked the skills those individuals possess. A high share of young people with a particular skill set who have switched jobs, over a 12-month period, is indicative of high demand for that skill set. Though there may be limits,<sup>11</sup> the benefits of using job switching as a proxy measure of skills that are in demand include the following: (i) there is broader member and industry coverage in member profile data rather than in job postings data; (ii) it is a proxy that relates to labor market fluidity; and (iii) LinkedIn has internally validated the job switching metric by correlating with unemployment rates, migration, and recruiter activity.

<sup>8</sup> Skills data from job postings in Brazil is not available (postings are in Portuguese). Therefore, the text analysis was conducted across 220,000 entry-level job postings for the three countries.

<sup>9</sup> One of the challenges in conducting skills classification is lack of consistency in skills terminology in the literature, and few available international sources of skills taxonomy. The World Bank's (STEP) Skills Measurement Surveys are instruments tailored to collect data on skills in low- and middle-income country contexts. The STEP taxonomy includes (1) job-related skills; (2) personality traits (also referred to as socio-emotional skills); and (3) personal characteristics. See Sanchez Puerta et al. 2016

<sup>10</sup> Gaëlle et al. 2014.

<sup>11</sup> Drawbacks of using job switching proxy include: (1) It is not possible to disentangle which skills on a member profile are the ones that most directly led to the hire; (2) results will be skewed to the industries that have the highest member penetration on LinkedIn; and (3) comparing across industries may be difficult as certain industries experience more churn than others. Also, it is important to note that while individuals may leave jobs for personal reasons, this will not have an effect on the aggregate.



To assess the supply of skills, we extracted and analyzed data from young members LinkedIn’s “Featured Skills & Endorsement” section. Youth can list up to 50 skills in their LinkedIn profiles, picking from a pool of 50,000 skills. In this research, we were able to draw out the top 10 most frequently listed skills in the professional profiles of the 6.4 million young LinkedIn members in the four focus countries. Appendix 4 presents the detailed listing of top 10 skills per country. The listed skills are not mutually exclusive, and it is possible for young people to list most or all of them in their profiles. We classified these top 10 skills into the three skills categories outlined above. We tallied the frequency counts of the top 10 skills in the young member profiles, and calculated the relative proportion of each skills category in relation to each other.



### **III. CONTEXT: A LOOK AT EMERGING MARKETS OF BRAZIL, INDIA, INDONESIA, AND SOUTH AFRICA**

### III. CONTEXT: A LOOK AT EMERGING MARKETS OF BRAZIL, INDIA, INDONESIA, AND SOUTH AFRICA

The growth of emerging markets has been an important feature of the global economy in the past decades. Since the 2008 financial crisis, they have contributed to more than 80% of global growth and have been a key driver in reduction of global poverty.<sup>12</sup> While growth has slowed in recent years, as a group, they still today account for over 70 percent of global growth; up from 40% only a decade ago.<sup>13</sup> As middle-income economies continue to grow, it will be important to have a strong base of skilled and educated human capital that can contribute to innovation and productivity.

Emerging markets are increasingly becoming service, technology, and knowledge-based economies. Rapidly urbanizing and globalizing middle-income and low-income countries are also experiencing a decline in agricultural share and an increase in the relative share of the manufacturing and services sectors.<sup>14</sup> The services sector offers employment opportunities to women and youth, and young workers have been leaving agriculture for the services sector.

The World Bank projects that future job growth in both developed and developing economies will likely be dominated by services.<sup>15</sup> The services sector has been a reliable source of employment for the four countries of focus for this white paper. For example, from 1990-2015, services sector work has surged in Indonesia to 53% from 34% of employment.<sup>16</sup> In South Africa in 2015, the services sector employed over one million youth, and over the longer period of 2008-2015, services led the way

#### Box 2: Millennials in Emerging Markets\*:

- Young people are important to the future of the global economy, as workers, entrepreneurs, consumers, and citizens. Millennials already form 25% of the workforce in the U.S. and account for over half of the population in India. PwC predicts that by 2020, Millennials will comprise 50% of the global workforce.
- Millennials understand the need for continuous skill development to remain employable over longer working lives. But instead of climbing the corporate ladder, Millennials are focused on learning technical, interpersonal and IT skills
- Vast majority of Millennials see ongoing skills development as an important part of their future careers, and are willing to spend their own time and/or money on additional training.
- Contrary to popular impression of millennials being “lazy”, they are working hard, if not harder than other generation — 73% report working more than 40 hours a week, and nearly a quarter work over 50 hours
- LinkedIn’s data shows that millennials job-hop more than previous generations, and that industry-hopping is more common among recent college graduates (using U.S. data). In the case of emerging markets, between 10-16% of youth in Brazil, India, Indonesia, and South Africa have switched to a new position over a period of twelve months.

Sources: Manpower Group, “Millennial Careers: 2020 Vision”; PwC, “Millennials at Work, Reshaping the Workplace” 2011.

\*Per footnote 6, the youth analyzed in this white paper are roughly from the ages of 21-29, and include millennials.

<sup>12</sup> Lagarde, Christine, “The Role of Emerging Markets in a New Global Partnership for Growth” (speech, University of Maryland, February 4, 2016), <http://www.imf.org/external/np/speeches/2016/020416.htm>

<sup>13</sup> IMF 2016

<sup>14</sup> S4YE (Goldin, Hobson et al.) 2015; ILO 2015

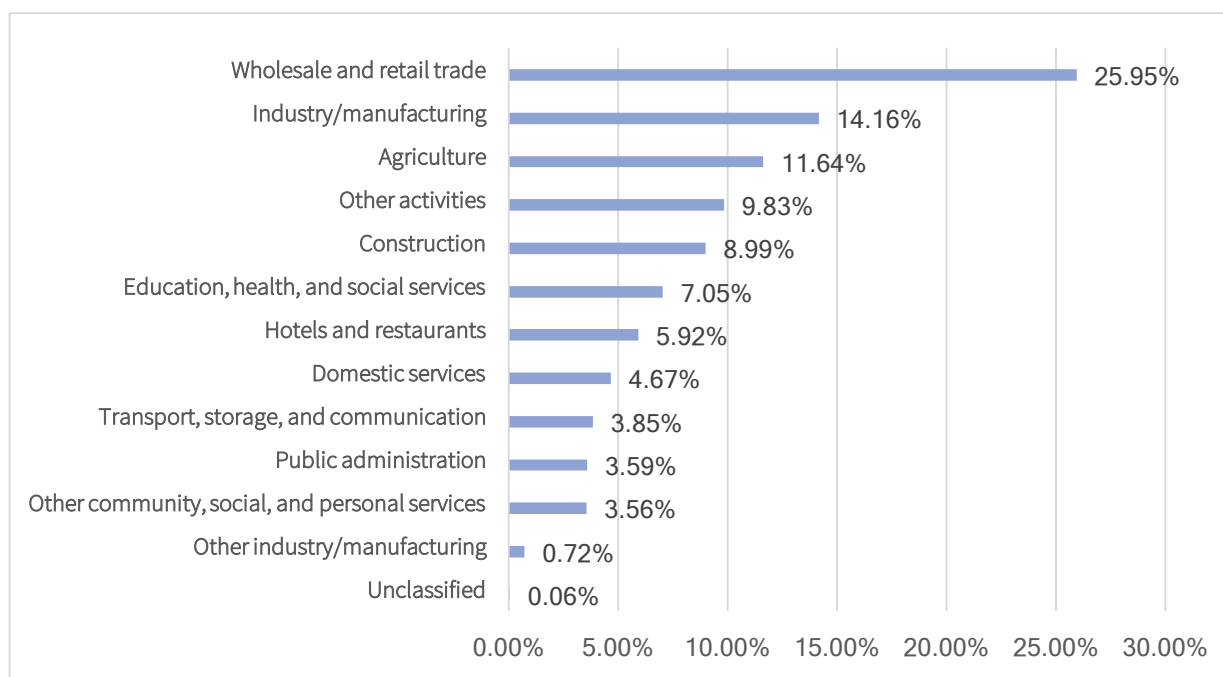
<sup>15</sup> World Bank 2013

<sup>16</sup> Wihardja 2016

in net job creation for youth.<sup>17</sup> In Brazil, the services sector is the largest component of the country’s GDP, and over 62% of the country’s workforce is employed in the services sector.<sup>18</sup>

National-level labor market information (based on most recently available household surveys and labor force surveys<sup>19</sup>) tells us that sectors with high shares of youth employment in Brazil, Indonesia, and South Africa include wholesale and retail trade, manufacturing, agriculture, services, finance, construction, education and health, and hotels and restaurants, among other sectors. See Figures 1 to 3.

**Figure 1: Share of youth employment by sector, Brazil 2014**



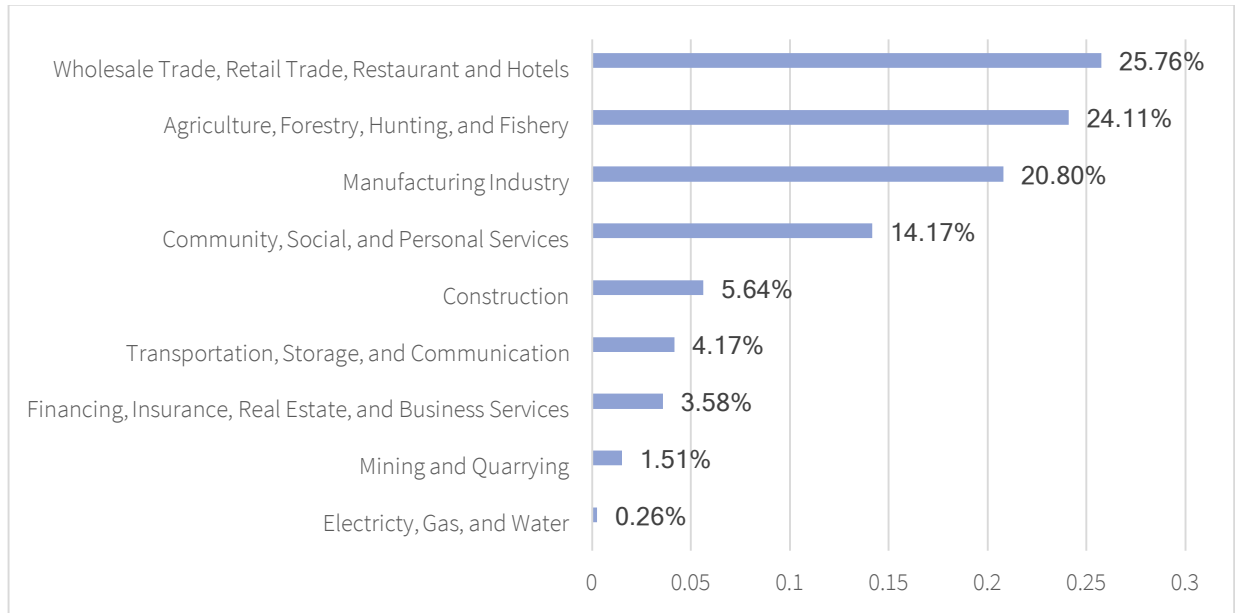
Source: Brazilian Institute of Geography & Statistics (IBGE), Pesquisa Nacional por Amostragem de Domicílios 2014 (PNAD) (National Household Survey)

<sup>17</sup> Statistics South Africa 2008-2015

<sup>18</sup> OECD 2014

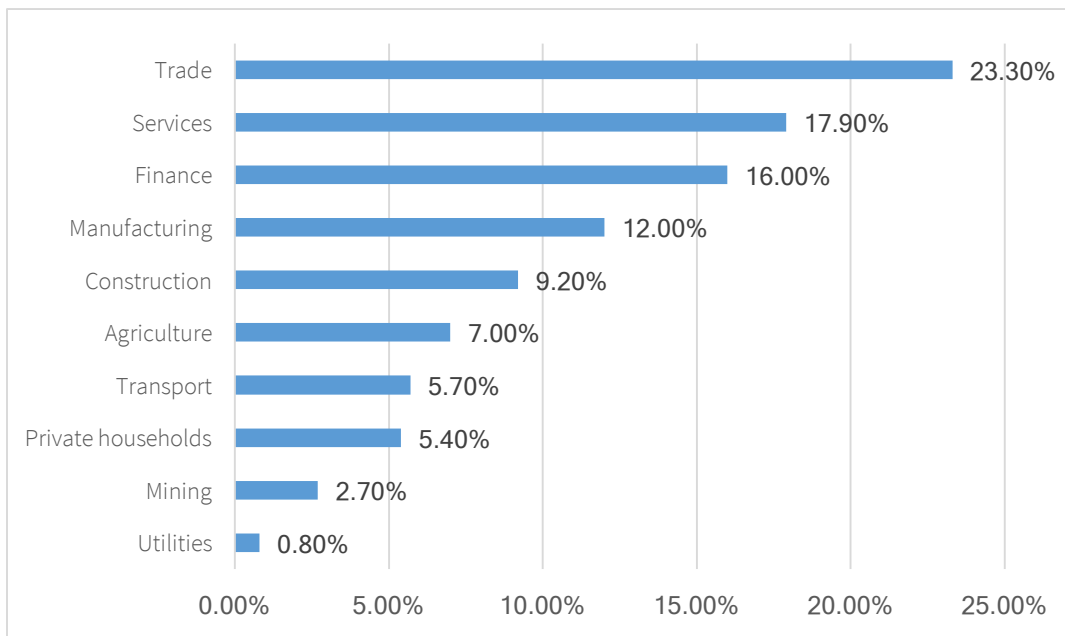
<sup>19</sup> Youth employment by sector not available in India’s national labor force survey.

**Figure 2: Share of youth employment by sector, Indonesia 2015**



Source: BPS-Statistics Indonesia, Sakernas 2015 (National Labor Force Survey)

**Figure 3: Share of youth employment by sector, South Africa 2015**



Source: Statistics Africa, Labor Force Survey 2015



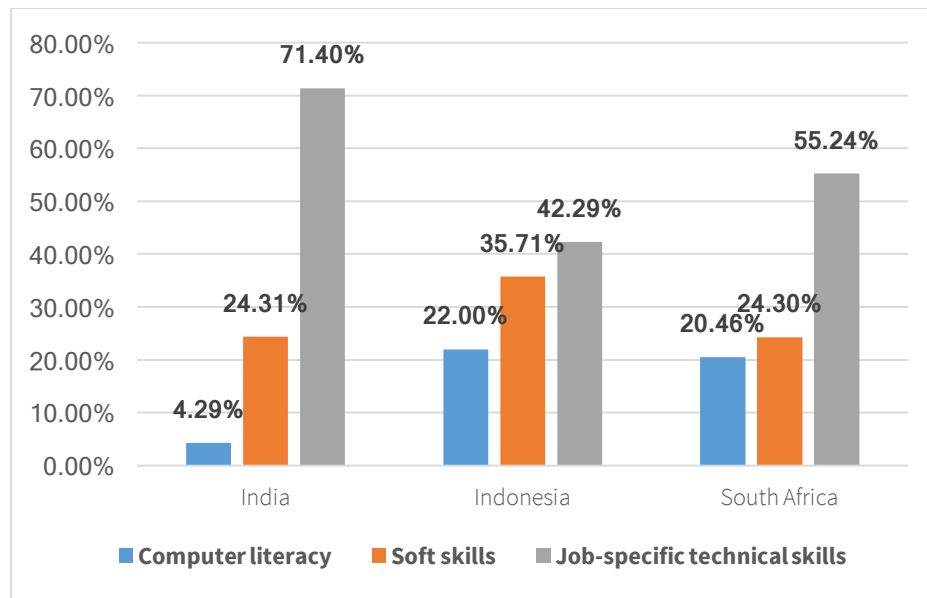
## **IV. FINDINGS**

## IV. FINDINGS

### Finding #1 - Employers are looking for entry-level talent with diverse skills.

Based on the analysis of entry-level job postings in India, South Africa and Indonesia, Figure 4 shows which types of skills are most in-demand (based on top 20 skills listed most frequently in job descriptions – please see Appendix 4 for full listing of skills per country). Several conclusions can be reached.

**Figure 4: In-Demand Job-Related Skills, Classified by Skills Groupings (% share among top 20 skills)**



**While employers are looking for entry-level talent with computer literacy and soft skills, they are prioritizing technical skills.** One often-asked question among youth employment practitioners is whether “hard skills” (i.e., job-specific technical skills<sup>20</sup>) or “soft skills” are valued more by employers. The results show that while both matter, the skills requirements for entry-level jobs that are posted on LinkedIn consist more heavily of job-specific technical skills, ranging from 42% of the top 20 in-demand skills in Indonesia and up to 71% in India. This finding is consistent with recent findings from the STEP employer survey in six middle-income

and low-income countries which found employers in all countries tend to attach the most value to job-specific skills of their workers.<sup>21</sup>

Interestingly, **services-related skills appear among in-demand technical skills listed in the entry-level job postings** in India, Indonesia, and South Africa. These skills include customer service, customer relationship management (CRM), sales, English, business development, consulting, and human resources, among others. Related, sales titles appeared as some of the most frequent job titles in these job postings. The emergence of services-related

<sup>20</sup> As described in Section Two, job-specific technical skills include skills that pertain to specific industries and occupations.

<sup>21</sup> Countries include Armenia, Azerbaijan, Georgia, Macedonia, Sri Lanka, and Yunnan Province, China. See - Sanchez Puerta et al. 2016.



skills among high-demand skills could be the consequence of the broader economic trends discussed in Section Three that emerging markets are becoming increasingly service and knowledge-based economies.

Beyond services skills, other high demand skills include programming skills such as Java, HTML, and C++; human resources and recruiting; marketing and public relations; project management; and social media. This likely reflects the IT, human resources, and business fields that are the most active recruiters on LinkedIn in the four focus countries (see Appendix 2).

**Computer literacy is an important skill required for professional entry-level jobs.**

As shown in Figure 4, computer literacy skills comprise roughly 20% of the top 20 in-demand skills in Indonesia and South Africa, while notably less so in India (only 5%). The majority of computer literacy skills included in job descriptions are specific to Microsoft Office skills including Word, Excel, and PowerPoint, as well as general email skills. Inferred from this is also the ability to use computers. This finding likely reflects the trend that employers expect entry-level employees to have Microsoft Office proficiency and these skills are used in a wide-ranging job functions for professional jobs, including preparing PowerPoint presentations, drafting reports or meeting notes, and/or doing spreadsheet analysis.

**Soft skills continue to be in-demand skills with employers.** There is growing evidence in the youth employment literature<sup>22</sup> that employers highly value soft skills like working in teams and communicating effectively, which are important for getting the job done in a variety of job functions and occupations. As illustrated in

Figure 4, our analysis shows that soft skills feature as 24% of the 20 most in-demand skills in job postings in India and South Africa, and 35% in Indonesia. Communication, management, teamwork, time management, and leadership were the most commonly listed soft skills by employers.

Some of the youth employment literature suggests that soft skills may be more important than hard skills. For example, recent meta-analysis of 27 studies reveals that while employers value all skill sets, there is greater demand for socio-emotional skills and higher-order cognitive skills than for basic cognitive or technical skills.<sup>23</sup> The study finds that the results are robust across region, industry, occupation, education level. Related, in another study in Brazil, firms reported socio-emotional skills as being more valuable than general or industry-specific knowledge when asked about the value of different types of skills.<sup>24</sup> While there are divergent findings on the relative importance of soft skills versus hard skills, there is agreement in the literature that both job-specific technical skills and soft skills are important for the labor market.

**Demand for advanced ICT and “4<sup>th</sup> IR” skills are also on the rise.**

The results from job switching data (see Table 1) show that ICT skills such as mobile development, web programming (including Perl/Python/Ruby), social media marketing, software development, and Salesforce.com are in-demand skills among job-switchers. Similarly, as discussed, text analysis of the job postings in India showed that the industry-specific programming skills such as Java, SQL, HTML, and C++ figure most prominently among in-demand skills (See Appendix 4).

<sup>22</sup> S4YE (Goldin, Hobson et al.) 2015; Lippman et al. 2015

<sup>23</sup> Cunningham and Villaseñor 2016

<sup>24</sup> OECD 2014

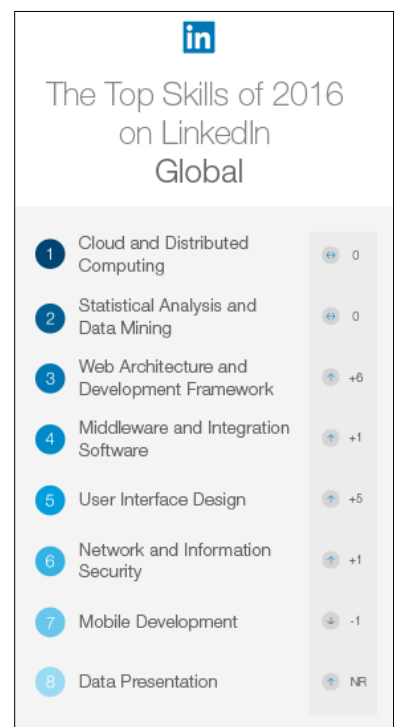
**Table 1: In-Demand Skills from Job-Switching Data (youth who have changed jobs in past 12 months) on LinkedIn in Brazil, India, Indonesia, and South Africa**

Brazil	India	Indonesia	South Africa
1. Social Media Marketing	1. Social Media Marketing	1. Social Media Marketing	1. Salesforce.com Development
2. Mobile Development	2. Machine Learning	2. Marketing Campaign Management	2. Social Media Marketing
3. Perl/Python/Ruby	3. Economics	3. Mobile Development	3. Soft Skill and Personality-People Skills
4. Machine Learning	4. Soft Skill and Personality-People Skills	4. Salesforce.com Development	4. Mobile Development
5. HR Recruiting	5. Perl/Python/Ruby	5. Perl/Python/Ruby	5. Economics
6. Software Revision Control System	6. Other Software Development Skills	6. Other Software Development Skills	6. Statistical Analysis and Data Mining
7. Software and User Testing	7. Mobile Development	7. Mathematics	7. Data Presentation
8. Statistical Analysis and Data Mining	8. Algorithm	8. Statistical Analysis and Data Mining	8. Mathematics
9. Web Programming	9. Salesforce.com Development	9. Software and User Testing	9. Algorithm
10. Economics	10. Statistical Analysis and Data Mining	10. Algorithm	10. Perl/Python/Ruby

The demand for advanced ICT skills on LinkedIn is likely reflective of broader economic trends in these four countries. For example, in the case of India, between 2000 and 2010, the number of direct jobs in ICT in India jumped from 284,000 to more than 2 million.<sup>25</sup> As another example, in South Africa, ICT, business process outsourcing (BPO), and financial services industries are among the country’s fastest growing sectors, and are sectors with high demand for entry-level digital skills such as content developers and IT support agents.<sup>26</sup>

Looking more globally at LinkedIn’s top skills of 2016 (See Figure 5) across 14 countries (including Brazil, India, and South Africa) - an annual list of the most in-demand skills with employers based on platform data<sup>27</sup> - we see that ICT skills also feature predominantly.

Moreover, technologies of the Fourth Industrial Revolution (4<sup>th</sup> IR) are changing the nature of work globally, including in emerging markets, albeit less immediately.<sup>28</sup> The 4<sup>th</sup> IR is characterized by the rise in machine intelligence, robotics, automation, artificial intelligence, big data, Internet of Things, and other disruptive technologies that can be used in a variety of functions to reshape production and consumption of goods and services, and transform many industries.



**Figure 5: Top Skills of 2016 on LinkedIn Global**

<sup>25</sup> UNDP 2015

<sup>26</sup> Dalberg and The Rockefeller Foundation 2013

<sup>27</sup> LinkedIn analysed hiring and recruiting activity on the platform from January to September 2016 to outline the skills attracting most interest from employers. See Catherine Fisher, “LinkedIn Unveils the Top Skills That You Can Get Hired In 2017, Offers Free Courses for a Week,” 2016.

<sup>28</sup> Maloney and Molina 2016

LinkedIn job-switching data shows that 4<sup>th</sup> IR skills appear to be sought-after by employers. As show in Table 1, 4<sup>th</sup> IR skills include statistical analysis and data mining, data presentation, algorithm, machine learning, mathematics, and economics, among others. LinkedIn's top skills of 2016 across the global platform (see Figure 5) shows that 4<sup>th</sup> IR skills feature predominantly on the platform as a general trend beyond the four countries of focus here.<sup>29</sup> Specifically, cloud and data skills are in high-demand. Cloud and distributed computing skills have remained the top #1 skill for the past two years. Statistical analysis and data mining skills are also highly demanded in a data-driven world, at the #2 spot for the past two years.

Also, the demand for 4<sup>th</sup> IR skills is seen beyond the LinkedIn platform. According to Jobvite's Job Seeker Database<sup>30</sup>, since 2014, jobs posted with data science in the title have risen 64% and in the same period, jobs posted with phrases like artificial intelligence, machine learning, or deep learning grew 140%. According to Jobvite's analysis, two of the most in-demand jobs are data science and artificial intelligence-related jobs. These skills sets will likely remain relevant for some time to come given the trends toward big data, artificial intelligence, and cloud technologies. Related, soft skills such as problem solving, critical thinking, creativity, coordinating with others, and emotional intelligence will be important for the 4<sup>th</sup> IR economy, as shown in recent research from the World Economic Forum (WEF)<sup>31</sup>, as these skills are inherent to human beings and will be difficult to be replaced by machines or computers.

## Finding #2 – The nature of the skills gap varies per country and may not always be a critical concern.

When companies have a difficult time finding the right talent, they often face lowered productivity, higher recruitment and training costs, and in some cases, reduced growth prospects. The skills gap is also concerning from a youth perspective because it limits the employability prospects of young people who do not possess the right skills and profiles needed for available jobs.

One of the most readily available sources of information on assessing the skills gap is from demand-side surveys (e.g. employer or enterprise surveys) that reveal the skills and qualifications they believe to be crucial to their success; and the extent to which there are impediments to source and hire the talent and workers they need.

Across the four countries, we observe that there are varying opinions among employers by country on whether skills gap is a serious problem for them. Comparing data from two different enterprise surveys<sup>32</sup>, we see there is variation across and within the four countries on employer opinions about skills gap challenges as depicted in Figures 6 and 7. Interestingly, while companies in Brazil express difficulty in finding the right employees, the challenge there seems to be diminishing over time. At the same time, these surveys portray the skills gap to be an increasing challenge in South Africa and India. Importantly, however, by 2016, less than half of firms in all three countries

<sup>29</sup> Nearly 10 million of LinkedIn's more than 400 million members have one or more of the skills needed to be a Data Analyst or Data Scientist, and 600,000 of those have five or more of the skills needed to be a Data Analyst or Data Scientist, indicating that the supply of talent is starting to respond to the growing demand for data skills. See- Blue, Allen, "Farewell, Job Title. Hello, Skill Set," 2016. <https://medium.com/world-economic-forum/farewell-job-title-hello-skill-set-3e3dbff298ef#p4ex3gjzt>

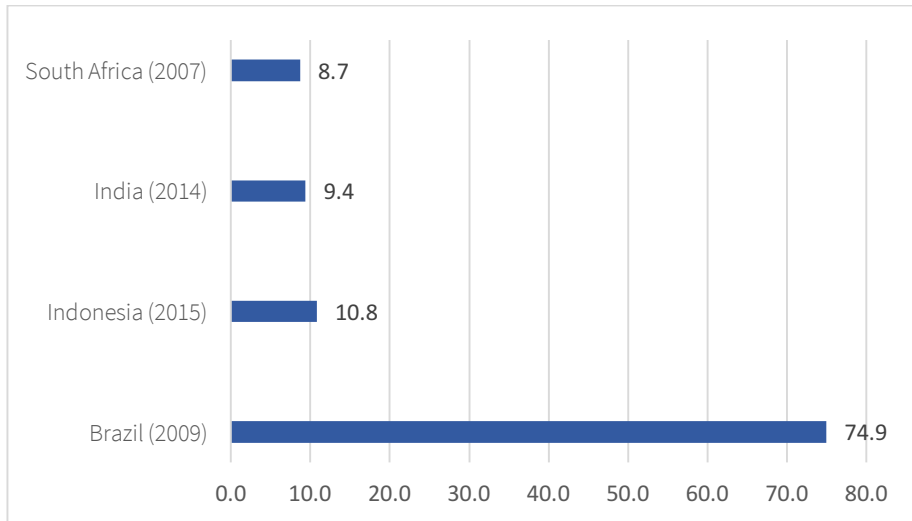
<sup>30</sup> Jobvite's Job Seeker Database includes company job postings for 47,000 positions and a repository of 64 million job seeker applications in 2016.

<sup>31</sup> WEF 2016

<sup>32</sup> This section draws on data from two enterprise surveys that are commonly used in the literature to cite skills gap topics – (1) the World Bank Enterprise Surveys and (2) ManpowerGroup Talent Shortage Surveys.

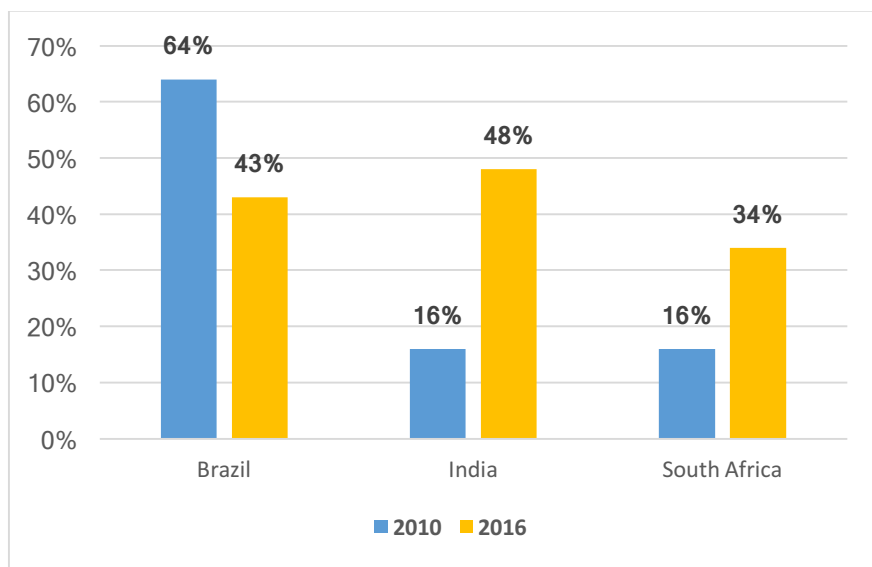
surveyed by Manpower expressed difficulty in filling vacancies. In comparing the results of enterprise surveys, we could conclude that the pace of change across labor markets and economies may vary, and that not all employers feel skills gap is a widespread problem across all countries.

**Figure 6: % of Firms Identifying an Inadequately Educated Workforce as Major Constraint: Brazil, India, Indonesia, and South Africa**



Source: World Bank Enterprise Surveys, showing available years for each country 2007-2015

**Figure 7: % of Employers Having Difficulty Filling Jobs Due to Lack of Available Talent: Brazil, India, & South Africa**



Source: ManpowerGroup Talent Shortage Survey, 2010 and 2016

### **Inconsistency among employer reports of skills gap may be reflective of the measurement challenges in assessing the nature of the skills gap.**

Much of the evidence used by policy-makers and practitioners in youth employment rely on subjective measures, namely reports from employers about difficulties filling vacancies due to lack of adequate workforce, as is the case with the two surveys discussed above. However, subjective perceptions of employers may face measurement and bias problems.<sup>33</sup> For example, challenges associated with drawing a sample that accurately reflects opinions of a wide ranging set of employers. The World Bank Enterprise Survey is a representative sample of an economy's private sector,<sup>34</sup> including manufacturing and services sectors. The sampling methodology for Manpower Group's Talent Shortage is not specified. Moreover, employer respondents may have different understandings of the terms "hard-to-fill vacancy" and "inadequately educated workforce," or even different interpretations of what constitutes a "major constraint." Employers are usually not presented with objective criteria of skills gap, and therefore, leaving their assessments disposed to their individual expectations and biases.<sup>35</sup>

Given these measurement limitations, it's important to corroborate employer reports of

skills gap with accompanying analysis of traditional labor market data (i.e., national labor force surveys or household survey) and big data on labor markets (i.e., online job portals) to better understand the big picture of employment outlook, jobs, and skills trends in the economy.

### **Alignment between job seekers and employers at the industry level can also inform the extent to which skills gaps might exist.**

We researched the relation between supply-and demand-side alignment or mismatch on the LinkedIn platform in these four countries.<sup>36</sup> On the demand-side, we looked at industries with high levels of youth employment and recruitment activity for entry-level talent on LinkedIn; and on the supply-side, we looked at young peoples' college majors (i.e., field of study) to see if they are relevant to these same industries. Appendix 2 & 3 include a detailed listing of the top industries recruiting youth talent, the top industries of employment among young members, and the top college majors of youth. As shown in Figure 8,<sup>37</sup> the results reveal that the information technology field has the greatest supply and demand alignment on LinkedIn; whereas, this alignment is not apparent in other industries.

<sup>33</sup> Cappelli 2015

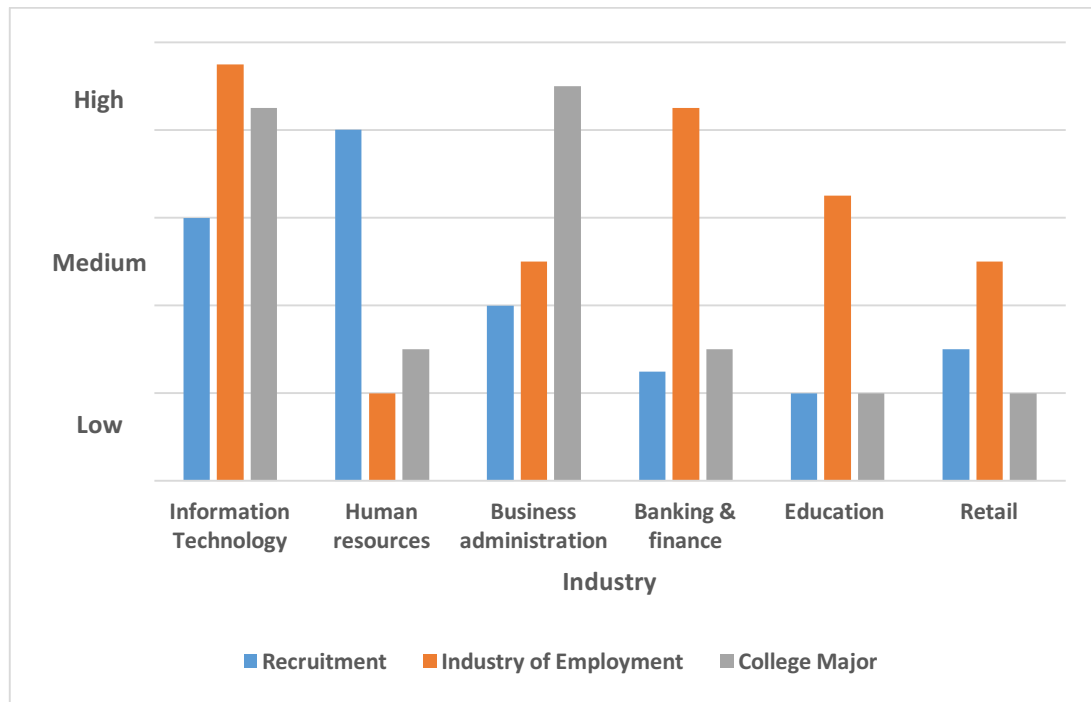
<sup>34</sup> Sampling methodology for Enterprise Surveys is stratified random sampling.

<sup>35</sup> Employers in the same country surveyed by different sources may have varying interpretations and opinions of skills gap. For instance, in India in 2014, 64% of employers surveyed by Manpower Talent Shortage Survey reported skills gap, whereas only 9% of employers surveyed by World Bank Enterprise Survey in the same year reported skills gap.

<sup>36</sup> We used a scoring methodology to assess the relation between supply-and demand-side alignment on LinkedIn platform, assigning a score from 1 to 5, on a 5-point scale, to each of the following: (i) recruitment activity by industry (top five industries), (ii) industry of employment for LinkedIn members (top 10 industries); and (iii) college majors of LinkedIn members (top 10 college majors). The scoring points were based on the following. If the industry

or college major was less than 1% of the total share, it received a score of 1. If the industry or college major was greater than 1% but less than 5%, it received a score of 2. If the industry or college major was greater than 5% but less than 10%, it received a score of 3. If the industry or college major was greater than 10% but less than 25%, it received a score of 4. And, if the industry or college major was greater than 25% of the total share, it received a score of 5. Finally, for each of (i), (ii) and (iii) above, we averaged out across all four countries (Bra, Indo, India & SA).

<sup>37</sup> As noted in Section Two (methodology), "Top industry recruiting entry-level talent" is based on number of job postings per industries. "Top industry of employment among young members" is based on the industry of the current company a young LinkedIn member works at. "Top field of study" is based on the major/concentration at the most recent education institution listed in young member profiles.

**Figure 8: Industry Alignment on LinkedIn: Recruitment, Employment & College Majors**

Information technology is one of the largest industries represented on LinkedIn, and thus, we could expect robust recruiting activity in such fast-growing industry. On LinkedIn, employers are posting job openings for information technology fields – including computer software, information technology and services, and Internet - in India and Brazil. In fact, in India, it is 70% of job postings for entry-level positions among the most frequently listed industries. Also, information technology is the top industry in which young LinkedIn members are working across Brazil, India, and Indonesia, and the number two industry in South Africa. On the supply-side, unsurprisingly, information technology-related majors such as computer science, information science and technology, and informatics are among the most popular college majors of young LinkedIn members across all four countries.

When comparing which industries are hiring through the LinkedIn platform against which

industries young professional LinkedIn members are working in - also alongside the majors of graduates- the following other patterns emerge:

- Business related majors (i.e., business administration, marketing, accounting) are the most popular majors with young people. While business administration related fields such as marketing & advertising, accounting, and management consulting appear among the top industries of employment among young members, the share employment among the top ten industries is less predominant compared to most other industries depicted in Figure 8. Business industries appear among the top three industries recruiting youth talent on the platform.
- Banking and finance, education, retail follow after information technology as industries of top employment. Yet they rank lower in terms of recruitment

activity on LinkedIn, and popularity of college major among youth.

- Human resources is one of the top industries recruiting entry-level jobs on LinkedIn. This likely reflects higher adoption of LinkedIn for recruitment needs among human resources industry. However, compared to the other industries depicted in Figure 8, it is not an industry of high employment among youth, nor is it a popular college major.

While these big data insights from LinkedIn are an important piece of the puzzle in better understanding skills gap trends, it's important to remember that this may not be fully reflective of broader industry composition and trends in these countries, as noted in Section Two. For instance, despite the strong alignment on LinkedIn among recruitment, employment and college majors for information technology, it is still possible that the industry could be experiencing talent shortages in some of these countries. In Brazil, industry representatives report a shortage of skilled tech talent and computer science graduates,<sup>38</sup> and in South Africa, industry leader Cisco estimates that South Africa needs 30,000 to 70,000 skilled information technology workers to boost its economy and position it to compete internationally.<sup>39</sup> Globally, IT industry leaders report that technology skills shortages are growing.<sup>40</sup> In order to get a more comprehensive measure of skills gap at an industry level in these countries, there is a need to combine big data, national labor statistics, and industry and employer-level surveys. See Recommendation Five which speaks to this need.

**Finding #3** – While the skills gap challenge receives a lot of attention, the skills signaling gap is often neglected.

Youth often face an information gap in labor markets and are not always aware of what skills employers are looking for. As a result, they may not be knowledgeable about which relevant skill sets to signal to potential employers.

On the demand-side, employers look for signals of desired skills from entry-level job candidates during the recruitment process. Typically, they use educational background (i.e., high school diploma, university degree, etc.), college major, academic performance, and/or prior work experience (including internships in the case of youth) as a proxy for cognitive (i.e., reading, numeracy, etc.) and job-specific technical skills. Proxies for soft skills are more difficult to detect, and employers generally assess soft skills during job interviews and through professional references.

On the supply-side, youth can pro-actively self-report and signal the specific skills they have developed through education, training, prior work experience, sports and extra-curricular activities, and volunteering in their resumes and cover letters as they apply to jobs. With the rise of professional networking platforms like LinkedIn, youth can also signal their skills through online professional profiles. As noted earlier, LinkedIn members can list up to 50 skills from a pool of 50,000 available skills (including soft skills) in their profiles in the “skills and endorsement” section. In some cases, youth may be rationally and thoughtfully self-assessing

<sup>38</sup> Chao, Loretta. “Tech-Talent Shortage Crimps Brazil,” The Wall Street Journal, 2015. See <https://www.wsj.com/articles/tech-talent-shortage-crimps-brazils-outlook-1420248531>

<sup>39</sup> Hamid, Alfie, “How to Fix South Africa’s Networking Skills Gap,” Cisco. See [http://www.cisco.com/c/en\\_za/about/blog-south-africa/fix-skills-gap.html](http://www.cisco.com/c/en_za/about/blog-south-africa/fix-skills-gap.html)

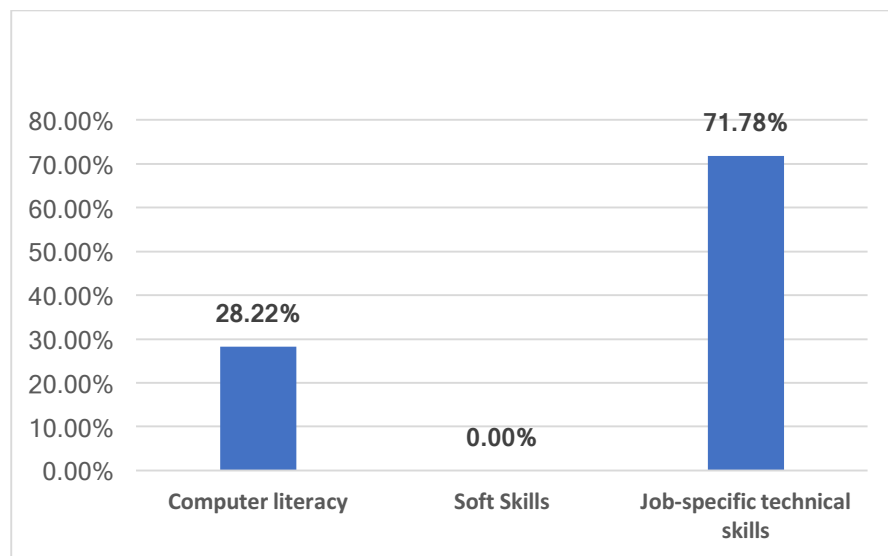
<sup>40</sup> Harvey Nash / KPMG CIO Survey 2016

or aided in listing their skills in their LinkedIn profiles; and in other cases, youth may be creating their skills profiles quickly, instinctively, and/or with little guidance on which skills to prioritize.

In this research, as described in Section Two, we were able to draw out the top 10 most frequently listed skills in the professional profiles of young LinkedIn members in the four focus countries.

Appendix 4 presents the detailed listing of top 10 skills per country. Figure 9 shows the results of the top in-supply skills classified by skills grouping, based on proportion of frequency of skills count in the LinkedIn profiles; and Figure 10 shows the results of the in-demand skills classified by skills grouping, based on proportion of frequency of skills count in job postings. Comparing the two, a few patterns emerge.

**Figure 9<sup>41</sup>: Commonly Listed Skills in Youths’ LinkedIn Profiles across Brazil, India, Indonesia, and South Africa, Classified by Skills Groupings (% Share among Top 10 Skills)**

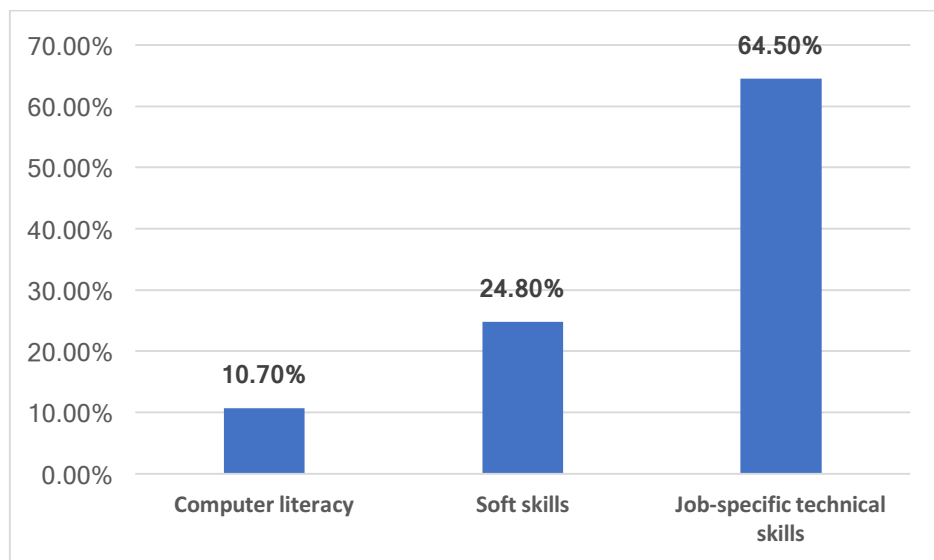


<sup>41</sup> LinkedIn classifies Microsoft Office, email, presentations, spreadsheets, Internet, and business writing as “Microsoft Office and general business productivity” skills. For

consistency, we have classified these as computer literacy, particularly as a significant portion of these pertain to Microsoft Office and other computer-related skills.



**Figure 10: In-Demand Skills across India, Indonesia, & South Africa, Classified by Skills Grouping (% Share among Top 20 Skills)**



**The mismatch in skills signaling is most pronounced for soft skills.**

The comparison of commonly listed skills in youth's LinkedIn profiles and required skills in entry-level job postings on LinkedIn reveals a skills signaling mismatch around soft skills such as teamwork and communications. Soft skills represent 25% of the top 20 skills that feature most commonly in entry-level job postings. Yet, young people fail to highlight soft skills in their LinkedIn profiles. It's striking that across all four countries, soft skills do not appear among any of the top 10 most commonly featured skills in young peoples' LinkedIn profiles. Instead, young people are predominantly listing job-specific technical skills such as IT infrastructure and system management or teaching in their online profiles.

**The patterns across profiles and postings leads to the question of do youth lack these skills or are they simply not signaling these skills, or a combination of both?** Employers generally lament that young professionals lack soft skills.

For instance, 59 percent of 291 U.S. hiring managers surveyed by LinkedIn said that soft skills are difficult to find.<sup>42</sup> However, it's not entirely clear that the only explanation is that all young people completely lack these skills. It's also possible that young people have varying levels of soft skills, but may lack awareness that they need to explicitly signal them to prospective employers through their resumes and online professional profiles. It's possible that youth are not signaling soft skills because they think technical or industry skills are more important, and might not be aware that employers are looking for entry-level job candidates with soft skills like communications, teamwork, and time management. Related, young people may not know how to identify and self-assess the soft skills they've acquired from various educational and life experiences. Students may not realize they can present their responsibilities, leadership roles, and skills from these experiences, despite the fact that 41% of hiring managers consider volunteering as valuable experience.<sup>43</sup> Young

<sup>42</sup> Berger 2016

<sup>43</sup> Lewis 2011

people are not alone in this. LinkedIn has found that 89% of surveyed professionals had volunteer experience, but only 45% included it in their resume.<sup>44</sup>

Of the 6.4 million young members of LinkedIn included in this analysis, most have completed high school and the majority have a university-level education, ranging from 56% of young members in South Africa to 69% in Indonesia. These young people have likely gained varying levels of soft skills throughout their educational experiences, noting that the quality can greatly differ by educational and training institutions. For instance, youth can form soft skills through classroom discussions and debates; team-based projects; and other applied learning programs. These experiences teach students how to write, reason, and communicate; how to manage their time among competing class assignments and other family, social, or work commitments; and how to work in teams. Beyond the classroom, young people may form leadership and interpersonal skills through life experiences such as internships /apprenticeships, extra-curricular activities, sports teams, community volunteering, family responsibilities, and other life roles.

Yet, these 6.4 million youth consistently failed to list soft skills in their profiles. Research shows that career guidance and counseling services and programs are typically missing or less-developed in emerging and developing country settings.<sup>45</sup> One possible explanation is that youth are likely lacking adequate career guidance and counseling support that could help them learn

how to assess the soft skills they acquire from education and life experiences and more clearly signal them through their professional profiles.

**Moreover, the findings show that overall there is better signaling for job-specific technical skills.** As shown in Figures 9 and 10, employers and young LinkedIn members are both signaling technical skills. These types of skills represent roughly 72% of the top 10 skills youth feature in their profiles, and about 65% of the top 20 skills in entry-level job postings. More specifically, both employers and youth are signaling programming, education, marketing, and graphic design skills, among others. Yet, youth are also listing finance, accounting, healthcare management, and manufacturing which do not appear among in-demand skills in job postings. On the employer side, they are looking for consulting, engineering, public relations, and human resource skills which do not feature among the skills youth are signaling. Another notable difference is that employers are also requiring technical skills that are transferrable across job functions in different industries – such as research, customer service, and project management – but, these skills are absent among the top 10 skills in youth profiles. Finally, the findings show that signaling of computer literacy skills is less of a signal mismatch. These skills feature in greater proportion among top skills in youth profiles compared to top skills in job postings, which may in part reflect the younger generations' fluency with computer skills.

---

<sup>44</sup> Ibid.

<sup>45</sup> Watts and Fretwell 2004; Watts and Sultana 2004; World Bank 2012

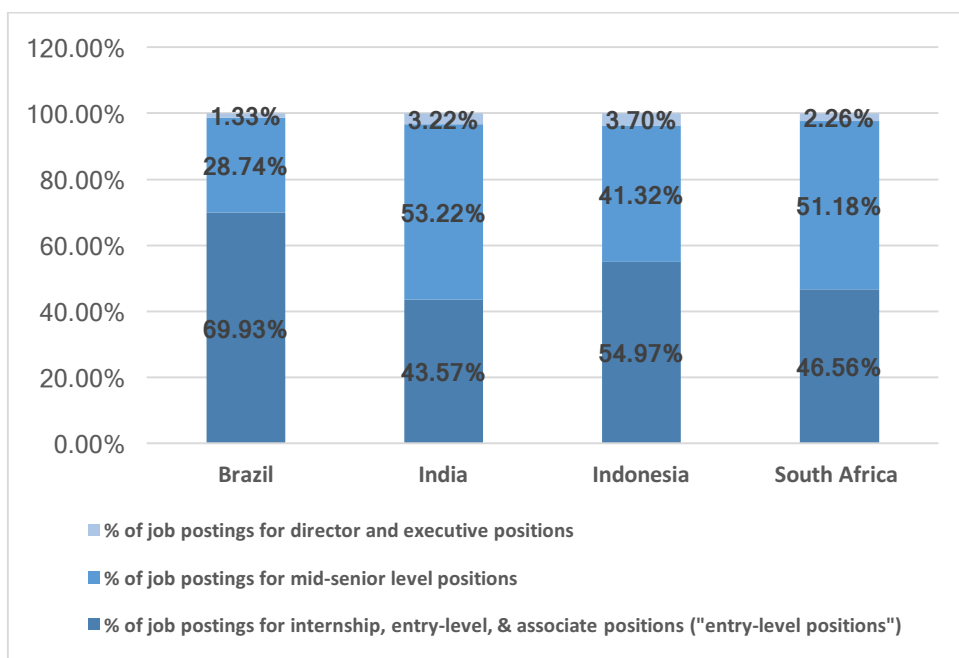
**Finding #4** – Contrary to popular perception about the young being digitally savvy, youth in Brazil, India, Indonesia, and South Africa underutilize LinkedIn.

**While companies are recruiting for entry-level talent on LinkedIn, younger professionals in the four focus countries are less likely to be using the platform.** Our analysis shows for example that employers who are posting job openings through the LinkedIn platform are recruiting for entry-level positions<sup>46</sup>

in higher volume compared to mid-level or senior-level positions.

Jobs categorized as entry-level are likely aimed at individuals 29 or younger. Across these four countries, on average 53% of job postings are for entry-level positions (including internships, entry-level, and associate). As shown in Figure 11, in Brazil, close to 70% of job advertisements are for entry-level positions, and in Indonesia, close to 55% of job postings seek entry-level talent. In the cases of South Africa and India, close to half of job postings are recruiting for entry-level positions.

**Figure 11: Job Postings on LinkedIn by Experience Level**



Yet, surprisingly, there are fewer young members on LinkedIn compared to older professionals in these four countries. Young professionals on LinkedIn make up less than 10% of overall members. However, students and recent college

graduates are one of LinkedIn’s fastest-growing demographics, so the share of young people is expected to grow over the future. In today’s digital economy, it’s becoming increasingly important for job-seekers and workers to have a

<sup>46</sup> There is limited research available to indicate if this is a trend unique to LinkedIn, or if entry-level jobs are in general in higher proportion on online job portals. As one point of comparison, a substantial share of jobs listed on the Indian

job portal Babajob are entry-level, which includes both professional and non-professional jobs in formal and informal economy. See Nomura et al. 2017.

digital professional footprint and brand, such as LinkedIn or other online profiles. The lower levels of participation of young people is concerning because online professional networking platforms like LinkedIn could offer job search and career tools for the demographic that needs it the most. Compared to adults, youth have less work experience and fewer professional contacts. They also have less information channels and know-how to navigate the world of work and cultivate networks.

**One reason youth may underutilize LinkedIn is that they underestimate the value of online job portals and professional platforms for job searching, getting labor market information, and creating online profiles.** Young adults and graduates may be less knowledgeable about the benefits of joining online job portals and professional platforms to search and apply for jobs, to see which industries and occupations are hiring, and to learn about skills requirements for available jobs. They are probably less aware that a high share of job postings on the platform are for entry-level positions as noted above, or that human resource professionals are increasingly turning to social media to look for recruit candidates.<sup>47</sup> Similarly, youth may not be aware that online job portals can also be good sources of labor market information such as industries with growing number of jobs, wage information, and career pathways.

Moreover, young people may believe they need more work experiences before joining digital professional networking sites like LinkedIn in order to be able to showcase their job history and professional competencies publicly. Students recently graduating from college might not have

had jobs or internships while they were studying. However, they may have, for example, volunteered in their communities or participated in extra-curricular activities at school.

**Young people may also be less knowledgeable about the role of professional networking in the job search process.** Youth often lack awareness of the importance of contacts and networking to learn about vacancies and getting referrals for jobs. For example, in a recent survey to 19,000 millennials across 25 countries (including Brazil and India), ManpowerGroup found that only 5% of surveyed young people believed that having contacts to help them find employment is an important aspect of job security.<sup>48</sup> Yet, research suggests that professional contacts/networks and referrals play a critical role in the hiring process. For example, human resources industry studies show that job applicants referred by a professional contact are five times more likely to be hired, and 15 times more likely to be hired than applicants from a job board.<sup>49</sup> In the U.S. LinkedIn data showed that job seekers who grew their networks were 30% more likely to find jobs than other job seekers whose networks remained static.<sup>50</sup> Interestingly, studies also reveal referrals from first-degree connections on LinkedIn (like a former boss or co-worker) are not the most important ones. Rather, second- and third-degree connections (like an acquaintance or friend of a former colleague) seem to be more prevalent channels for job referrals. “So, it turns out, it’s not who you know, but who you know knows.”<sup>51</sup>

<sup>47</sup> For example, 95% of recruiters use LinkedIn to find candidates in the U.S.; this information is not available for the four countries of study. Pratt, Siofra, “How Recruiters and Job Seekers Use Social Media in 2015 (Infographic),” SocialTalent. 2015.

<sup>48</sup> Manpower Group 2016

<sup>49</sup> VanNuys 2017

<sup>50</sup> Sharma 2012

<sup>51</sup> Berger 2016

**Youth could be using other online job portals available that are localized to country context.**

It's possible that contextualized, country-specific platforms – such as Catho in Brazil, Babajobs in India, Jobindo in Indonesia, or PNet in South Africa - may be better known among young people and local populations.<sup>52</sup> For example, local platforms might have greater penetration into local labor markets and domestic employers which could be an attraction for local populations.

In India a recent World Bank study<sup>53</sup>, found that there are about 20 job search portals, many focusing solely on the Indian labor market. It also shows that as of 2017, overall there are 7 million registered job seekers on Babajob, compared to 40 million members on LinkedIn's India platform. Comparing youth activity, the proportion of youth (aged 21-29) using Babajob is about 70% of users; the main users of Babajob are recent university graduates. One of the distinctions with Babajob is that it has informal sector jobs and more low-skilled individuals are using the platform.

Beyond this specific Babajob example, it's not possible to determine the number of youth users of these local online job portals in general as these statistics are not available publicly, and there is limited literature on the topic. Given the rise of online job portals, more research is needed to better understand whether or not, why and how, young people are using online job portals in developing countries and emerging markets.

**However, once on LinkedIn, young people seem to be more successful than older cohorts in adding professional contacts and growing their networks.**

Given that young people have less-developed professional networks in real-life, one might expect this same pattern to extend to social networks on LinkedIn. Surprisingly, that is not the case. Youth members are more connected on LinkedIn compared to the broader populations. Across the four emerging market countries, as shown in Table 2, youth on average have in between 128 to 220 connections whereas all members on average have in between 76 to 90 connections. The case is similar in the United States where youth have on average 162 connections compared to 109 connections of all members.

**Table 2: Average Number of Connections of Young LinkedIn Members Compared to All Members**

Country	Youth	All Members
Brazil	128	77
India	220	90
Indonesia	154	76
South Africa	133	82
United States	162	109

It's not entirely clear why we see this pattern play out. One possibility is that youth have more advanced digital skills and natural comfort in navigating social networks and forming numerous online connections. It's also possible that young people are connecting with peers and friends for social goals on LinkedIn rather than connecting with professional colleagues and industry contacts for networking purposes. Further research with members could help us better understand what is at play.

<sup>52</sup> The LinkedIn platform is available in 24 languages including Portuguese and Indonesian (Bahasa), so native

tongue is likely not a barrier for young people joining LinkedIn in Brazil or Indonesia.

<sup>53</sup> Nomura et al. 2017





## V. RECOMMENDATIONS

## V. RECOMMENDATIONS

Based on these findings and our knowledge of the youth employment landscape, we offer five recommendations on how education and training institutions, youth employment programs, funders, young job-seekers, and managers of online job portals can use these findings to address skills gap challenges (where it is a problem), help young people improve signaling of their skills, and get more youth connected to the world of digital job networking. While these recommendations are primarily addressed to audiences working to support youth Brazil, India, Indonesia, and South Africa, they can be applicable to youth employment programs and policies in emerging markets and developing countries more broadly.

### Box 3: Summary of Recommendations

1. Increase investment in comprehensive youth employment programs that support market-clearing and labor intermediation interventions.
2. Include career counseling and mentoring as part of youth employment programs to provide youth strategies to self-assess their skills and signal in-demand skills to employers.
3. Conduct targeted information campaigns to get more youth to join digital platforms that can connect them to job information, employers, and networks.
4. Integrate and encourage soft, advanced ICT, service industry, and “4<sup>th</sup> IR” skills training to respond to rising employer demand.
5. Create digital one-stop shops on labor market information, combining big data and traditional data, to track skills trends in real-time.

### 1. Increase investment in comprehensive youth employment programs that support market-clearing and labor intermediation interventions.

While addressing skills gap is important it may not be enough. Often, the default option for responding to the youth unemployment crisis is designing more skills training programs for young people. This type of program intervention is the most common labor market intervention for young people worldwide. For example, S4YE has found that World Bank and International Labor Organization (ILO) investments in youth employment initiatives have been dominated by supply-side interventions - to 52% of investment portfolios - especially investments focused on skills training interventions, 48% of supply-side

investments.<sup>54</sup> In addition, a recently published systematic review of youth employment programs over the last 20 years found that over half of the 107 youth employment interventions included in the review were focused on skills training as the main category of intervention, and 64% of interventions included a skills training component.<sup>55</sup>

Beyond skills training, more resources are needed for labor market intermediation programs such as career guidance counseling, mentoring on skills signaling, job matching and

<sup>54</sup> S4YE (Goldin, Hobson et al.) 2015

<sup>55</sup> Kluge et al. 2016



job placement, and other forms of labor market intermediation functions. Microsoft and Silatech offer a good example from the S4YE Impact Portfolio<sup>56</sup> of market-clearing intervention in the Middle East and North Africa (MENA). The [Ta3mal digital platform](#) provides Arab youth with free career guidance tools, online job search engine, and virtual advising with career counselors to

help young people determine the career path that best matches their life aspirations and attitudes. Abdul Latif Jameel Poverty Action Lab (J-PAL) researchers are currently conducting an impact evaluation to assess whether this web-based employment tool is helping MENA youth better match with jobs.<sup>57</sup>

## 2. Include career counseling and mentoring as part of youth employment programs to provide youth strategies to self-assess their skills and signal in-demand skills to employers.

Expanding career guidance services, in-person and online, could potentially make a big difference in increasing mentoring for youth in how to develop resumes and online professional profiles that better match the language of employers. Mentors and counselors can help

youth translate their experiences, skills, and competencies into similar language that employers use in their job advertisements and recruitment activity, making skills signaling to prospective employers more clearly aligned to the requisite skills for entry-level jobs.

### Box 4: Innovative Approaches to Self-Assessing & Signaling Soft Skills in S4YE Impact Portfolio

- [Accenture's Skills to Succeed Academy](#) in the Ireland, South Africa, and the United Kingdom is an online interactive platform that takes young people through the journey of understanding careers, finding a job, and navigating the workplace experiences. One of the most popular modules helps youth understand what skills they have that they might not be aware of, and guides young people in conducting self-awareness exercises to assess their strengths and aptitudes. For example, it helps them realize that they use time management skills day-to-day, or that they have teamwork skills if they play in team sports.
- [Harambee Youth Employment Accelerator](#) in South Africa works with employers to change their interview practices and ask behavioral questions that youth can relate to and that can better elicit examples of youths' soft skills like conflict management. Rather than ask youth, "tell me about a time you have had a conflict with your manager at work," employers can reframe the question to "tell me about a time you had a conflict on a sports team, at school, or in your community."

<sup>56</sup> The S4YE Impact Portfolio is a group of 19 diverse and high-potential youth employment projects representing 15 developing countries, in which S4YE is learning from, showcasing, and supporting innovative youth employment interventions.

<sup>57</sup> See <https://www.povertyactionlab.org/evaluation/improving-job-matching-among-youth-iraq> (Forthcoming)

Soft skills training should include mentoring to youth on how to self-assess their existing soft skills, and how to better signal these skills to employers. More emphasis should be placed on helping youth develop self-awareness and self-reflection of their strengths and weaknesses of soft skills pertinent for entry-level success in the workplace. In addition to existing training activities helping youth develop new soft skills, efforts should also focus on helping youth self-identify soft skills they may already have – for example, soft skills gained from classroom hands-on projects, community volunteering,

household responsibilities, and life experiences - and learning how to list these soft skills in their resumes and LinkedIn and other online profiles. Youth should be encouraged to join the other 10 million LinkedIn users globally who are highlighting their volunteering experiences on their profiles. In parallel, more awareness-raising is needed to help youth understand how much weight employers place on soft skills, and that it is equally important to signal these skills in addition to their academic knowledge and technical/vocational skills.

### **3. Conduct targeted information campaigns to get more youth to join digital platforms that can connect them to job information, employers, and networks.**

Young adults and new graduates are arguably the people who need online job portals and professional networking platforms the most to search for job openings, get active job matching, and access tools to help them start their careers. Other countries and regions have online job portals and career guidance platforms that are designed specifically for youth audiences that can serve as an interesting model; for example, [ta3mal for Arab youth](#) in the Middle East and North Africa (MENA) region or the [JOVEN360 platform](#) for youth in El Salvador. Youth employment programs can really help to “get-out-the-word” and even run social marketing campaigns to persuade larger numbers of youth

to use online job portals and to get connected in the digital professional networking world.

To help bridge access to technology gaps, youth employment programs could provide access to computers and ICT skills training when working with the most disadvantaged youth. An interesting example of this can be found in South Africa with Accenture’s Skills to Succeed Academy where the program uses Raspberry Pi devices<sup>58</sup> to open access to the technology platform with training partners who operate in regions with poor internet connectivity such as townships in South Africa.

---

<sup>58</sup> A Raspberry Pi device is a small handheld device that can store platform content and be plugged into a central computer that other computers can be connected.

### Box 5: LinkedIn Training Curriculum

Youth training programs could begin integrating “LinkedIn 101” training into their work readiness and career counseling programs. LinkedIn for Good’s [LinkedIn 101 training materials for young adults](#) and accompanying [Instructor’s Guide](#) can be used by organizations to educate and coach youth job-seekers on how to use LinkedIn for job search, find job openings and tips for getting hired, explore career paths, build professional connections and networks, and build a professional brand.

Also, [“LinkedIn for disconnected youth” curriculum created by RTI International and Harambee in South Africa](#) provides youth employment programs in developing country contexts with resources for short training courses. This curriculum introduces young people to LinkedIn and other digital professional networks to help them understand the value of signaling, networking and exploring labor market information. RTI and Duke University researchers are [conducting a Randomized Control Trial evaluation to test the impact of the LinkedIn intervention](#) on young people’s employment outcomes through the pilot in South Africa.

Peer-to-peer “nudging” could be one effective strategy for helping persuade youth to join digital professional platforms. Research suggests that peer-to-peer channels and peer pressure are an effective strategy for adopting new behaviors.<sup>59</sup> Peer testimonials of how platforms like LinkedIn helped them learn where to find jobs and made it easy to apply, land their first internship, and/or got job referrals through second or third degree connections could be powerful stories to help young people see first-hand the benefits of getting connected. In addition, teachers, trainers, career counselors, and other youth mentors could help shape youth decisions in this area. Key messaging could emphasize that participation in digital professional networks is

increasingly important for job searching, career networking, and professional development. Youth should also be aware that LinkedIn may be a “social networks equalizer,” in the sense that in real life, youth tend to have less-developed professional networks compared to adults, but on LinkedIn, youth have a greater number of professional contacts.

As this is a relatively new area in the youth field, more research is needed to build the evidence base on better understanding if and how these digital platforms are helping better match youth to jobs and providing more direction to young people for their career paths.

---

<sup>59</sup> Conniff 2009; Brooks 2003; Stock et al. 2007

## 4. Integrate and encourage soft, service industry, advanced ICT, and “4<sup>th</sup> IR” skills training to respond to rising employer demand.

To respond to the diversity of employer demand for skills across industries, skills training programs should increasingly prepare young people with soft skills, services, advanced ICT, and “4<sup>th</sup> IR” skills.

[Generation](#) and [Harambee](#)’s youth employment training programs – members of S4YE’s impact portfolio – offer good models of how to prepare youth for entry-level jobs in sales, retail, customer service, healthcare, hospitality, and other services-related industries, blending skills. For example, in training youth for cashier jobs, training programs should teach the technical aspects of the job – such as how to work cash registers, scan goods, and collect payments – and at the same time, training youth how to have a good client-service attitude. As another example, S4YE’s partner International Youth Foundation (IYF) has internationally-recognized soft skills curriculum ([Passport to Success](#)) – tested in 50 countries and translated in 20 languages- that can be adapted and replicated for a variety of in-school and out-of-school settings in skills training programs.

Moreover, the rise of fast-paced technology training

programs – for example, coding boot camps that typically run 9-12 weeks – potentially offer an innovative model for equipping young people with skills needed for the future of the digital economy. Programs such as [General Assembly](#) in the U.S., [World Tech Makers](#) or [Laboratoria](#) (training young girls as coders) in Latin America, or [Ace Hacker](#) in India teach people tech skills such as running Javascript code, designing mobile apps, and building websites. The International Telecommunication Union (ITU) has developed specific recommendations for this area through its [Coding Bootcamps: A Strategy for Youth Employment](#), and similarly, a current impact evaluation being conducted by the World Bank is assessing the impact of these types of coding bootcamps on young job-seekers in Lebanon, Kenya, and Colombia and their ability to secure quick employment and income generation opportunities as result of their ICT-intensive training.<sup>60</sup>

Young professionals also have a shared responsibility in their skills development and should be encouraged to undertake independent learning to stay current in industry knowledge and up-grade one’s skill sets. For example, youth can take free or low-cost courses in a wide range of topics – courses on web programming, data analytics and visualization, and complex problem solving with relevance to 4<sup>th</sup> IR and

### Box 6: Preparing Youth for Future Work in the 4<sup>th</sup> IR

- India’s industry association National Association of Software and Service Companies (NASSCOM) provides a good model of how private sector can partner with education institutions to upgrade curriculum for 4<sup>th</sup> IR-relevant skills. [In India, they are creating new courses on data science and analytics, automation, and internet of things \(IOT\).](#)
- The Moldova Competitiveness Project (MCP), funded by USAID and implemented by Chemonics, is showing how projects can train youth in 4<sup>th</sup> IR skills. MCP is introducing STEM in Moldova’s classrooms through educational robotics. [Youth assemble robotics sets as part of their curriculum](#), enabling students to build, program, and test real-life robotics technology and exposing them to the field of robotics as possible career interest.

<sup>60</sup> See <http://www.decodingbootcamps.org/about/>

digital economy – through various platforms such as LinkedIn Learning (courses that teach you the Top Skills from LinkedIn), ALISON, and MOOC platforms such as Class Central, Coursera, edX, and others.

Moreover, the world’s economy will likely look drastically different in next 20 years, making it hard to predict which industries will grow and innovate and which new technologies will create new jobs and opportunities. Ongoing research will be important to understand and keep up with the trends. For example, the International Labor Organization (ILO) has launched [the Future of Work Initiative](#) to better understand demographic shifts, technological innovation, and changing character of production and employment, in order to develop more effective policy responses. The World’s Economic Forum has highlighted that perhaps 60% of children entering primary school today might ultimately work in jobs that currently don’t yet exist. It’s important for educational institutions to equip youth with the foundational ability for self-directed learning - as well as foundational skills in numeracy, literacy, and computer literacy - that will help them continuously learn and adapt in a fast-changing economy.

## 5. Create digital one-stop shops on labor market information, combing big data and traditional data, to track skills trends in real-time.

Beyond the four countries studied in this paper, many developing countries lack provision of real-time labor market information (LMI) that makes it challenging to monitor changing trends for in-demand skills and identify skills shortages or gaps. Policy-makers should invest – and this could be done with public private partnerships with technology companies managing online job portals – in creating digital “one-stop shops” on LMI to combine big data with traditional data.

These platforms could collect and aggregate LMI from national statistical offices (for instance, national labor force surveys, household surveys) and online job portals (for example, LinkedIn, Monster.com, and country-specific job boards like India’s Babajob). Countries often have multiple online job portals and through big data technology, these websites could be scraped to identify trends from online job postings. Scraping data from multiple job portals and combining it with data from labor force, household, and employer surveys could be a powerful and innovative tool in LMI tracking. And, it would help address some of the representativeness limitations of relying solely on online job portal big data, or the time lag and access challenges of traditional LMI.

### Box 7: Examples of LMI Platforms & Initiatives

[DataViva](#) is an open data, open source information visualization data engine about Brazilian economy: exports, industries, locations, and occupations. Students and professionals can find information about available jobs, income per occupation, and courses.

[Babajob](#) is India’s largest online job portal. In 2017, it has 450,000 registered employers, seven million registered job-seekers, and one million job advertisements. It matches job-seekers to potential employers in both the formal and informal sectors.

[LinkedIn’s Economic Graph Research Program](#) seeks to use LinkedIn’s data to digitally map the global economy. It is a research initiative to encourage researchers, academics, and data-driven thinkers to propose how they would use data from the LinkedIn Economic Graph to solve some of the challenging economic problems of our times. One area of focus is leveraging big data analytics and data science to estimate the talent supply and demand gap globally, by geography, by country, and by industry.

Such “one-stop shop” digital platforms could visually display LMI to tell a compelling story of what is happening in a country’s economy and labor markets. They could help show information on which industries are growing, which jobs are growing or which jobs are in decline, and which industries are employing entry-level talent. It can also aggregate information on which skills are in high demand in job postings, which skills are in supply based on profiles of job seekers, and which university majors have high enrollments. These platforms could track the changing nature of the skills gap and pinpoint which industries and which jobs might be experiencing skill problems such as skills gap, skills shortages, and/or skills mismatches. Given the real-time capabilities of big data, LMI platforms could help

monitor the dynamic nature of labor markets and track emerging occupations and rapidly changing technologies and skills requirements.

Equally important, data visualization tools such as the ones found in Brazil’s DataViva can help bring this information to life. They can make it easier for education and training institutions and youth employment programs to see if and where there is a skills gap, and adjust their training curriculum accordingly in a more targeted manner. Youth and their families could also benefit from this type of platform to have easier access to information about which jobs are in demand as they make important decisions about education and careers.



# APPENDIX

## Appendix 1: Description of LinkedIn Data Variables

Source of variable	Variables	Sample size	Description of variables
<b>Online job postings:</b> job descriptions posted by employers on LinkedIn (includes job summary, job roles & responsibilities, and qualifications.)	All job postings, by experience level	740,000 job postings for all experience levels	Job postings on LinkedIn are categorized by one of the following experience levels: executive, director, mid-senior level, and entry-level (combination of associate, entry-level, and internship). Data is extracted from LinkedIn's database.
	Entry-level job posting, by industry	390,000 entry-level job postings	Job postings are based on the industry code of the company with the job vacancy. Each company is categorized into one of LinkedIn's industry codes (out of 145 industry codes). Data is extracted from LinkedIn's database.
	Entry-level job titles	390,000 entry-level job postings	Job titles are extracted and standardized from both paid and scraped job postings. A machine learning algorithm standardizes the titles into the most likely title.
	Skills in-demand, based on entry-level job postings	220,000 entry-level job postings (Brazil is excluded as information is in Portuguese)	Skills are scrapped from entry-level job postings and then standardized. A machine learning algorithm was applied to the text that was scraped from the job postings in order to extract skills. Skills were clustered into common buckets.
<b>Online profiles of LinkedIn members</b>	Young LinkedIn members, total number and proportion of all members	78,900,000 member profiles on LinkedIn; Of these, 6,400,000 are young member profiles	<p>Youth are defined using 3 metrics: (1) Age: inferred birth year is between 1987 and 1995 (between ages 21-29); (2) Education: Year that education ends is greater than or equal to 2009; (3) Work Experience: Year that career begins is greater than or equal to 2009. Members who meet 2 out of 3 of these criteria are considered youth.</p> <p>We are able to expand the number of individuals we are including by also using education and work experience metrics since there are a number of people who are missing age information. For instance, if there is an individual that has the appropriate work experience or graduation year, we will include them even if age information is missing.</p>
	Average # of connections	78,900,000 member profiles on LinkedIn; and 6,400,000 young member profiles	LinkedIn members have "connections" on the platform that are typically personal or professional contacts. Once they are "connected" on LinkedIn, they are considered a 1 <sup>st</sup> -degree connection. Data on the average number of connections per LinkedIn member (all members and youth members) is extracted from LinkedIn's database.



	Education level: Highest degree received	3,900,000 young member profiles have degree listed in their profiles. (Not all members include this information.)	The highest degree received is calculated by ranking all young member's education listings as follows: Other, High School, Diploma, Associate, Bachelor's, Master's, and Doctorate. Data is extracted from LinkedIn's database.
	Field of study	2,200,000 young member profiles have field of study listed in their profiles. (Not all members include this information.)	The field of study looks at the concentration/major at the most recent education institution listed in young member profiles. This information is not well populated or standardized. Data is extracted through web scraping.
	Industry of employment	2,700,000 young member profiles have industry of employment listed in their profiles. (Not all members include this information.)	Industry of employment is based on the current company that a youth member works at. Data is extracted from LinkedIn's database.
	Skills in-supply	6,400,000 young member profiles	Skills in-supply are the most commonly listed skills in young members' profiles. Members can list up to 50 skills (from a pool of 50,000 skills on LinkedIn platform) in their profiles in the "Skills and Endorsement" section. Data is extracted from LinkedIn's database.
	Job-switching of young LinkedIn members	6,40,000 young member profiles	Skill demand is an estimation of how sought after an individual with a particular skill set is by employers. Job switching in the past 12 months can be used to proxy for skill demand. A high share of people with a particular skill set who have switched jobs is indicative of high demand for that skill set.

## Appendix 2: Top Industries of Recruitment and Employment on LinkedIn

### Top 5 Industries with Entry-level Job Postings on LinkedIn in Brazil, India, Indonesia, and South Africa

<b>Brazil</b>	<b>India</b>	<b>Indonesia</b>	<b>South Africa</b>
1. Marketing & Advertising	1. Information technology & services	1. Consumer Goods	1. Staffing & recruiting
2. Staffing & recruiting	2. Computer Software	2. Real Estate	2. Construction
3. Human Resources	3. Staffing & recruiting	3. Retail	3. Financial Services
4. Information technology & services	4. Internet	4. Hospitality	4. Information technology & services
5. Internet	5. Human Resources	5. Pharmaceuticals	5. Hospitality

### Top 10 Industries of Employment of Young LinkedIn Members in Brazil, India, Indonesia, and South Africa

<b>Brazil</b>	<b>India</b>	<b>Indonesia</b>	<b>South Africa</b>
1. Information technology & services	1. Information technology & services	1. Banking	1. Financial services
2. Higher education	2. Computer software	2. Information technology & services	2. Higher education
3. Retail	3. Financial services	3. Oil & energy	3. Information technology & services
4. Banking	4. Internet	4. Hospitality	4. Marketing & advertising
5. Education management	5. Telecommunications	5. Telecommunications	5. Retail
6. Oil & energy	6. Banking	6. Financial services	6. Accounting
7. Automotive	7. Education management	7. Consumer goods	7. Banking
8. Telecommunications	8. Automotive	8. Education management	8. Mining & metals
9. Marketing & advertising	9. Management consulting	9. Internet	9. Government administration
10. Food & beverages	10. Pharmaceuticals	10. Retail	10. Telecommunications

## Appendix 3: Top College Majors of Young LinkedIn Members

### Top 10 College Majors of Young LinkedIn Members in Brazil, India, Indonesia, and South Africa

<b>Brazil</b>	<b>India</b>	<b>Indonesia</b>	<b>South Africa</b>
1. Administration	1. Computer science	1. Accounting	1. Accounting
2. Law	2. Information science and technology	2. Information science and technology	2. Information science and technology
3. Marketing	3. Electrical engineering	3. Informatics	3. Law
4. Psychology	4. Electronics	4. Psychology	4. Psychology
5. Computer science	5. Mechanical engineering	5. Computer science	5. Civil engineering
6. Communication science	6. Marketing	6. Industrial engineering	6. Marketing
7. Economics	7. Banking and finance	7. Economics	7. Economics
8. Industrial engineering	8. Accounting	8. Civil engineering	8. Business management and administration
9. Business management and administration	9. Human resource	9. Law	9. Mechanical engineering
10. Unknown	10. Unknown	10. Unknown	10. Unknown

## Appendix 4: Detailed Listing of In-Demand and In-Supply Skills

<b>Top 20 In-Demand Skills by Country, based on Entry-Level Job Postings in India, Indonesia &amp; South Africa</b>		
<b>India</b>	<b>Indonesia</b>	<b>South Africa</b>
<ol style="list-style-type: none"> <li>1. Communication</li> <li>2. Management</li> <li>3. Human resources</li> <li>4. Java</li> <li>5. Recruiting</li> <li>6. SQL</li> <li>7. HTML</li> <li>8. JavaScript</li> <li>9. Customer relationship management (CRM)</li> <li>10. Education</li> <li>11. Teamwork</li> <li>12. Interviewing</li> <li>13. Networking</li> <li>14. Training</li> <li>15. Customer service</li> <li>16. C++</li> <li>17. Windows</li> <li>18. English</li> <li>19. Cascading Style Sheets (CSS)</li> <li>20. Design</li> </ol>	<ol style="list-style-type: none"> <li>1. English</li> <li>2. Teamwork</li> <li>3. Microsoft Office</li> <li>4. Microsoft Excel</li> <li>5. Communication</li> <li>6. Marketing</li> <li>7. Microsoft Word</li> <li>8. PowerPoint</li> <li>9. Leadership</li> <li>10. Management</li> <li>11. Project management</li> <li>12. Time management</li> <li>13. Presentations</li> <li>14. Social media</li> <li>15. Research</li> <li>16. Public relations</li> <li>17. Presentation Skills</li> <li>18. Customer service</li> <li>19. International relations</li> <li>20. Human resources</li> </ol>	<ol style="list-style-type: none"> <li>1. Management</li> <li>2. Recruiting</li> <li>3. Microsoft Word</li> <li>4. Human resources</li> <li>5. Customer service</li> <li>6. Microsoft Office</li> <li>7. Interviewing</li> <li>8. Training</li> <li>9. Project management</li> <li>10. Time management</li> <li>11. Microsoft Excel</li> <li>12. Communication</li> <li>13. Consulting</li> <li>14. Business development</li> <li>15. Research</li> <li>16. Negotiation</li> <li>17. Engineering</li> <li>18. Sales</li> <li>19. Email</li> <li>20. Leadership</li> </ol>

<b>Top 10 Most Commonly Listed Skills in Youths' LinkedIn Profiles, By Country</b>			
<b>Brazil</b>	<b>India</b>	<b>Indonesia</b>	<b>South Africa</b>
<ol style="list-style-type: none"> <li>1. Microsoft Office &amp; general business productivity</li> <li>2. IT infrastructure &amp; system management</li> <li>3. Graphical design</li> <li>4. Web programming</li> <li>5. Healthcare management</li> <li>6. Multilingual</li> <li>7. Lean manufacturing &amp; quality management</li> <li>8. C/C++</li> <li>9. Microsoft Windows Systems</li> <li>10. Education &amp; teaching</li> </ol>	<ol style="list-style-type: none"> <li>1. C/C++</li> <li>2. Microsoft Office &amp; general business productivity</li> <li>3. Web programming</li> <li>4. IT infrastructure &amp; system management</li> <li>5. Java development</li> <li>6. General finance</li> <li>7. Graphical design</li> <li>8. Healthcare management</li> <li>9. HR recruiting</li> <li>10. Business development &amp; relationship management</li> </ol>	<ol style="list-style-type: none"> <li>1. Microsoft Office &amp; general business productivity</li> <li>2. Graphical design</li> <li>3. IT infrastructure &amp; system management</li> <li>4. Web programming</li> <li>5. General finance</li> <li>6. Marketing event management</li> <li>7. Accounting</li> <li>8. Healthcare management</li> <li>9. C/C++</li> <li>10. Education &amp; teaching</li> </ol>	<ol style="list-style-type: none"> <li>1. Microsoft Office &amp; general business productivity</li> <li>2. IT infrastructure &amp; system management</li> <li>3. Graphical design</li> <li>4. Accounting</li> <li>5. General finance</li> <li>6. Web programming</li> <li>7. Healthcare management</li> <li>8. Education &amp; teaching</li> <li>9. Marketing event management</li> <li>10. C/C++</li> </ol>

# REFERENCES

- Alfie, Hamid, “How to Fix South Africa’s Networking Skills Gap,” Cisco. Available at [http://www.cisco.com/c/en\\_zs/about/blog-south-africa/fix-skills-gap.html](http://www.cisco.com/c/en_zs/about/blog-south-africa/fix-skills-gap.html)
- Berger, Guy. 2016. “Soft Skills Crucial To Landing Your Dream Job.” Blog. LinkedIn.
- . 2016. “Your Second- And Third-Degree Connections Will Help You Get Your Next Job,” Blog. LinkedIn.
- Blue, Allen. 2016. “Farewell, Job Title. Hello, Skill Set.” The World Economic Forum.
- Brooks, Rachel. 2003 “Young People’s Higher Education Choices: The Role of Family and Friends.” British Journal of Sociology of Education. 24 (3): 283–297.
- Cappelli, Peter. 2015. “Skills Gaps, Skills Shortages, and Skill Mismatches: Evidence and Arguments for the United States,” ILR Review, Cornell University.
- Chao, Loretta. 2015. “Tech-Talent Shortage Crimps Brazil,” The Wall Street Journal. Available at <https://www.wsj.com/articles/tech-talent-shortage-crimps-brazils-outlook-1420248531>
- Conniff, Richard. 2009. “Using Peer Pressure as a Tool to Promote Greener Choices,” YaleEnvironment360.
- Cunningham, Wendy and Paula Villaseñor. 2016. “Employer Voices, Employer Demands, and Implications for Public Skills Development Policy Connecting the Labor and Education Sectors.” World Bank Research Observer 31 (1): 102-134.
- Dalberg & The Rockefeller Foundation. 2013. “Digital Jobs in Africa: Catalyzing Inclusive Opportunities for Youth.”
- Fisher, Catherine. 2016. “LinkedIn Unveils the Top Skills That You Can Get Hired In 2017, Offers Free Courses for a Week,” Blog. LinkedIn. 2016. Available at <https://blog.linkedin.com/2016/10/20/top-skills-2016-week-of-learning-linkedin>
- Goyal, Malini, “India’s Problem is to Find Jobs for 10-12 Million Workers Every Year: Akshay Kothari, LinkedIn India,” The Economic Times. 2016.
- Harvey Nash / KPMG CIO Survey 2016, “The Creative CIO.” Available at [http://www.harveynash.com/group/mediacentre/HarveyNashKPMG\\_CIOSurvey2016.pdf](http://www.harveynash.com/group/mediacentre/HarveyNashKPMG_CIOSurvey2016.pdf)
- International Labour Office (ILO). 2016. “World Employment and Social Outlook 2016: Trends for youth,” International Labour Office, Geneva, Switzerland.
- 2015. “World Employment and Social Outlook 2015: Trends 2015,” International Labour Office, Geneva, Switzerland.
- International Monetary Fund (IMF). World Economic Outlook Update, 2016. “Subdued Demand, Diminished Prospects.” International Monetary Fund, Washington, DC.
- Johnson, Eric. 2016. “Can Big Data Save Labor Market Information Systems?” RTI Press Policy Brief No.

PB-0010-1608. Research Triangle Park, NC: RTI Press.

Kluve, Jochen, Susana Puerto, David Robalino, Jose Manuel Romero, Friederike Rother, Jonathan Stöterau, Felix Weidenkaff, and Marc Witte. 2016. "Do Youth Employment Programs Improve Labor Market Outcomes? A Systematic Review." IZA Discussion Paper 10263, Bonn, Germany.

Kureková, Lucia Mýtna, Miroslav Beblavý, and Anna Thum-Thysen. 2015. "Using Online Vacancies and Web Surveys to Analyse the Labour Market: A Methodological Inquiry." IZA Journal of Labor Economics, 4(1): 1-20.

Lagarde, Christine. 2016. "The Role of Emerging Markets in a New Global Partnership for Growth." Speech, University of Maryland. Available at <http://www.imf.org/external/np/speeches/2016/020416.htm>

Lewis, Katherine Reynolds, "Should You Include Volunteer Work on a Resume?" Fortune. 2011.

Lippman, Laura H., Renee Ryberg, Rachel Carney, and Kristin A. Moore. 2015. "Workforce Connections: Key "Soft Skills" That Foster Youth Workforce Success: Toward A Consensus Across Fields" Child Trends.

Maloney, William M., and Carlos Molina. 2016. "Are Automation and Trade Polarizing Developing Country Labor Markets, Too?" Policy Research Working Paper No. 7922, World Bank, Washington DC.

ManpowerGroup. 2016. "Millennial Careers: 2020 Vision: Facts, Figures and Practical Advice from Workforce Experts."

———. 2015. "Talent Shortage Survey."

Nomura, Shinsaku, Saori Imaizumi, Ana Carolina Areias, and Futoshi Yamauchi. 2017. "Toward Labor Market Policy 2.0: The Potential for Using Online Job-Portal Big Data to Inform Labor Market Policies in India." World Bank Policy Research Working Paper 7966, Washington, DC.

Organisation for Economic Co-operation and Development (OECD). 2014. "Investing in Youth: Brazil." Organisation for Economic Co-operation and Development, Paris.

Pierre, Gaëlle, Maria Laura Sanchez Puerta, Alexandria Valerio, and Tania Rajadel. 2014. "STEP Skills Measurement Surveys: Innovative Tools for Assessing Skills." Social Protection and Labor, World Bank, Washington, DC

Pratt, Siofra. 2015. "How Recruiters and Job Seekers Use Social Media in 2015 (Infographic)," SocialTalent.

PricewaterhouseCoopers (PwC). 2011. "Millennials at Work, Reshaping the Workplace."

Raftree, Linda. "ICT Opportunities and Barriers for Youth in Developing Countries." UNICEF Office of Research-Innocenti.

S4YE (Goldin, Nicole & Matthew Hobson with Peter Glick, Mattias Lundberg, Susana Puerto). 2015. "Toward Solutions for Youth Employment: A Baseline for 2015." Solutions for Youth Employment, Washington DC.

Sanchez Puerta, M.L., A. Valerio, M. Hoftijzer, A. Rizvi, and J. Avato. 2016. "Employer Survey Snapshot 2016: Highlights from Six Low and Middle Income Countries." World Bank, Washington, DC.

Sharma, Manu. 2012. "I to the We—What Is the True Reach of Your LinkedIn Network?" Blog. LinkedIn. 2012.

Sparreboom, T., and A. Staneva. 2014. "Is Education the Solution to Decent Work for Youth in Developing Economies." Work4Youth Publication Series 23, International Labour Organization, Geneva.

Statistics South Africa, "National and Provincial Labor Market: Youth" 2008-2015.

Stock, Suzanne, Charmaine Miranda, Stacey Evans, Suzanne Plessis, Julia Ridley, Sophia Yeh, and Jean-Pierre Chanoine. 2007. "Healthy Buddies: a Novel, Peer-led Health Promotion Program for the Prevention of Obesity and Eating Disorders in Children in Elementary School," *Pediatrics* 120 (4): e1059-e1068.

United Nations Development Programme (UNDP). 2015. "Human Development Report 2015," United Nations Development Programme, New York, NY.

VanNuys, Amanda. 2017. "New Year, New Job: What Job Seekers Need to Know in 2017," Jobvite.

Watts, A. G., and David H. Fretwell. 2004. "Case Studies and Emerging Issues for Designing Career Information and Guidance Systems in Developing and Transition Economies," Working Paper 28598, World Bank, Washington DC.

Watts, A. G., and Ronald G. Sultana. 2004. "Career Guidance Policies in 37 Countries: Contrasts and Common Themes," *International Journal Educational Vocational Guidance*. 4 (2): 105-122.

Wihardja, Maria Monica. 2016. "Indonesia Structural Transformation Offers Clues on Where to Find Good Jobs." Blog. World Bank, Washington, DC.

World Bank. 2013. *World Development Report 2013: Jobs*. World Bank, Washington, DC.

———. 2012. "Kingdom of Morocco: Promoting Youth Opportunities and Participation," Policy Note 68731, World Bank, Washington, DC.

———. 2010. *Enterprise Surveys: What Businesses Experience*. World Bank, Washington, DC. Available at <http://www.enterprisesurveys.org/data/exploretopics/workforce#--7>.

World Economic Forum (WEF), "The Future of Jobs: Employment, Skills and Workforce Strategy for the Fourth Industrial Revolution," *Global Challenge Insight Report*. 2016.

