Amplifying Human Potential
Education and Skills for the Fourth Industrial Revolution
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Introduction: Listening to the Future

Amplifying Human Potential for the Fourth Industrial Revolution

The advent of the Fourth Industrial Revolution is leading us into a period of great transformation.

Infosys believes that the technologies that surround us will alter all aspects of life. We believe that through education there is an unassailable opportunity to prepare everyone for such a change. This, coupled with our human instinct to learn and apply creative thought, means we can adapt and overcome any future transition in our everyday lives.

Navigating the future often relies on the views, experiences and insights of leaders in business, politics and civil society. These groups are important, but alone do not provide the complete picture.

With this report, Infosys brings together the views of young people from around the world to the global debate about the importance of skills and education.

This research is focused specifically on the concerns, challenges and opportunities facing younger working professionals – namely the 16 to 25-year-old ‘millennial’ group – as they build their careers and respond to the skills demands of current or prospective employers.

The objective is to understand globally, as well as between developed and emerging markets, the employment, skills and education concerns of younger individuals. This report looks at whether young professionals feel the training and education opportunities they had were appropriate for their current work roles and career aspirations.

By providing new insights and a perspective from young people, we hope this report contributes toward important debates that political, business and civil society will have in preparing those who will truly master the Fourth Industrial Revolution.

Amplifying the voice of young people can only help amplify their potential.
An optimistic and pragmatic generation in the face of adversity

Young people today are an optimistic generation in the face of a challenging future. Across global markets two-thirds feel positive about their job prospects while a similar number recognize that global forces will continue to increase competition and complexity in the labor market.

Emerging countries are most confident in their readiness for the future

Young people in emerging markets are most confident that they have the skills necessary for a successful career. Across Brazil, India, China and South Africa, respondents show much greater confidence in their skill-set than their peers in developed markets. For example, while 60% in India agree they have the skills needed for a positive career, just 25% agree in France.

In emerging markets, technological skills underpin confidence

The level of confidence that young people have in their technological skills correlates with their level of confidence in their future careers. Moreover, young people in emerging markets – who are much more likely to rate themselves among those who have the strongest technology capabilities – are also most interested in improving their technological skills. In India, almost half fall within this elite group who have strong technology skills and a desire to enhance these skills further; this compares to less than 20% in all developed markets and just 12% in France.

Future appetite for technology is concentrated among the already highly-skilled

Across all markets, the young people who are interested in upgrading their digital and technological skills already have above-average abilities in such areas: the more knowledgeable a young person is in a particular digital and technological subject, the more likely he or she is to want to evolve such skills. With interest in a high-tech skill-set already far higher in emerging markets, these insights highlight the gap between emerging and developed nations in terms of their readiness for the future of work. Moreover, should such trends continue, this division between the ‘high-tech haves’ and ‘high-tech have-nots’ will widen across all markets.

Advanced markets show most significant gender gap in technological skills

In all markets, male respondents are more likely than their female counterparts to possess and be interested in technological and digital skills. This divide is more marked in developed markets, although less so in the US.
Education is failing to prepare many young people for working life

Despite a broadly positive view towards their education, significant numbers of young people across all markets question how well their academic experiences equipped them for their career. Half of young people in Germany, Australia and the US believe that their education did not prepare them for what to expect from working life.

Right-brain skills need nurturing

Young people recognize the importance of softer cognitive skills in the workplace. Across the globe, when considering the attributes that make the best employees, most prioritize the ability to work with others and communicate effectively over high academic achievement.

Employers fall short of employees' training expectations

Young people have high expectations of their employers in relation to training and skills acquisition. However, employers’ delivery of training falls well short of young employees’ aspirations.

Industry views on the future of skills and work closely align with those of young people

Parallel to this report, the World Economic Forum has conducted research into industry expectations around the future work and skills landscape. The findings of this research indicate close alignment between the beliefs of industry and young people towards the long-term disruptive forces facing the global labor market; both expect a dynamic future driven to a significant extent by technological advances. Moreover, the vital role of social, cognitive and technical skills as expressed by industry is in complete alignment with the attitudes of young people today.

Stable careers are most desirable

Pursuing an entrepreneurial career path is seen as aspirational. However, today’s risk averse younger generation are drawn to working for large or medium sized companies that can offer stability, training and progression. On average, less than one in ten want to work for a start up.

Liquid skills will be a pre-requisite for the future

Young people show a keen appetite for continuous learning and to develop a flexible skill-set that allows them to adapt in a fluid working landscape: liquid skills. Across all markets, at least 80% of respondents agree that their success will depend on gaining skills throughout their lives. What’s more, significant numbers believe that access to new, more flexible, digital tools will enable them to gain new skills far quicker than before. For example, 70% in South Africa, India and the US believe they can teach themselves anything they want using freely available online sources.

High awareness of radical changes on the horizon

Despite the conceptual nature of many of the future challenges facing young people – the growth of automation in the workplace for example – they demonstrate high awareness of the core disruptive forces that are likely to impact their career over the decades ahead. Across all markets, an average of four in 10 young people can envision their current job being replaced by a robot or Artificial Intelligence machine over the next decade.
Young people in education or entering the workforce in 2016 face the most turbulent, rapidly evolving labor market seen by any generation. The global economy is approaching a Fourth Industrial Revolution, driven by increasing automation of the labor market – enabled by rapid innovations in robotics, Artificial intelligence and smart technologies. These transformative forces will cause unprecedented disruption of global citizens’ lives over the coming decades, due to:

1. **Speed of change**: unlike previous industrial revolutions, the labor market and society will have insufficient time to adapt to the expected pace of change.

2. **Ubiquity of change**: the advances talked about under the umbrella of the Fourth Industrial Revolution – 3D printing, material sciences, automated smart systems – will impact almost all sectors and levels of jobs and qualifications.

In addition, there are further global drivers that will disrupt how we work.

Politically, globalization will continue to diminish the importance of national borders and create a globally competitive labor market. Across developed economies, national governments will have less scope to intervene in labor markets due to constrained public finances. The balance of economic power will also continue to shift towards emerging countries: Asia is expected to account for 60% of global middle-class consumption by 2030.1

At a societal level, an aging population and rising gender equality will have the most profound impacts. The OECD forecasts that 21% of the global population will be aged 60+ by 2050; and The Future of Jobs research report by the World Economic Forum shows that, globally, the female workforce has grown by a quarter of a billion between 2006 and 2015.3

The digital revolution will be the most significant force. Digitized production, using 3D printing and advanced manufacturing, is already evident across a growing number of sectors and markets, while widening use of robotics and smart systems will challenge ever more jobs and sectors with automation.

The onset of the Fourth Industrial Revolution is creating a dynamic landscape for young people to navigate. Consequently, understanding their perceptions and readiness for the challenges ahead is paramount.

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2 World Bank and OECD, 2015.
“Today, we are on the cusp of a Fourth Industrial Revolution. Developments in genetics, Artificial Intelligence, robotics, nanotechnology, 3D printing and biotechnology, to name just a few, are all building on and amplifying one another. This will lay the foundation for a revolution more comprehensive and all-encompassing than anything we have ever seen.”

Klaus Schwab, Founder and Executive Chairman, World Economic Forum
An embattled generation

Young people’s overall perceptions of the future job market are largely optimistic. However, they are also acutely aware of the challenges ahead.

Across all markets, strong majorities believe they face a more competitive job market due to increased globalization. The notion of having to compete for employment with both national and international peers is front of mind for young people – particularly in Australia, Germany and India where 75% agree. Women in the US and India are also more likely to agree than their male counterparts.

Young people also perceive their generation’s job prospects as less favorable than their parents. This sentiment is particularly strong in developed markets, suggesting greater confidence and optimism among young people in emerging markets. Indeed, three-quarters of French citizens aged 16-25 said their parents had better job prospects – rising to eight in 10 among women – compared to just half of young people in India.
While, in developed markets particularly, young people demonstrate broad pessimism towards their generation’s prospects, it should be noted that respondents are consistently more negative about the future at a societal rather than an individual level. Indeed, our research shows that young people are more positive about prospects for their personal careers than for their generation. Nevertheless, young people clearly feel that they have an uphill battle when facing the future of work.

**Views on Education**

**Opinions are largely positive, but more polarized in relation to value for future careers**

Overall, young people are very positive about their current or past educational and academic experiences. The vast majority – 72% – found their experiences inspiring. Conversely, in all markets, less than half said that their education was boring or old-fashioned, although this view is twice as likely among young people in advanced markets than emerging markets.

Considering the relevance of education for future careers, views are more varied. In Brazil and Germany 70% agree that their formal education is useful for their current job, but this falls to 50% in the US, UK and Australia. American and Australian females are least likely to agree.
“In the past there was an idea that companies which recruit in universities would take the first year to turn a student into a productive member of the workforce and to a certain extent that will not go away. But the notion that our education system shouldn’t be concerned with producing graduates who have the beginning of those traits – leadership, responsibility, collaboration – is a fallacy.”

Dr Peter Hirst (MBE), Associate Dean for Executive Education, MIT Sloan School of Management
At the same time, across all markets, an average of 42% maintain that their education did not prepare them for what to expect from working life – with Britons, Australian men and American women were most likely to agree.

Figure 4  |  “Education did not prepare me for what to expect from working life”  |  % who agree strongly or agree

<table>
<thead>
<tr>
<th>Discipline</th>
<th>43%</th>
<th>49%</th>
<th>30%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design</td>
<td>47</td>
<td>46</td>
<td>46</td>
</tr>
<tr>
<td>Computer Sciences</td>
<td>46</td>
<td>45</td>
<td>43</td>
</tr>
<tr>
<td>Humanities and Arts</td>
<td>46</td>
<td>45</td>
<td>43</td>
</tr>
<tr>
<td>Mathematics</td>
<td>45</td>
<td>46</td>
<td>43</td>
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<tr>
<td>Business and Management</td>
<td>43</td>
<td>43</td>
<td>43</td>
</tr>
<tr>
<td>Natural Sciences</td>
<td>43</td>
<td>42</td>
<td>40</td>
</tr>
<tr>
<td>Social Sciences</td>
<td>42</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>Other</td>
<td>40</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>Vocational Degree</td>
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</tbody>
</table>

Figure 5  |  “Education did not prepare me for what to expect from working life”  by subject studied  |  % who agree strongly or agree  | 2015 global average

Similar levels of agreement among respondents who have studied different subjects suggests that rather than certain disciplines preparing students better than others, education generally is not equipping today's young people for the fast-paced, changeable nature of working life. A commitment to train employees on the job is needed to fill this gap between education and new employment. This will be a key challenge in the years ahead.
“We think training is very important because we believe in general in universities; even graduate school is absolutely too focused on cognitive skills. We will have many young people entering employment and there has been almost no appreciation or development of non-cognitive skills.”

Rick Goings, Chairman & CEO, Tupperware Brands Corporation
Strong optimism about future job prospects, despite challenging circumstances

In general, young people today are optimistic about their future careers. On average, almost two-thirds across global markets feel positive about their job prospects. However, optimism is more widespread in emerging markets, especially when considering those who are ‘very optimistic.’ In Brazil, three-quarters are positive about their future. In India and China it is over 60%, with a third of these feeling ‘very optimistic.’ In developed markets – particularly Australia – less than half feel the same, although the younger (16-19 rather than 20-25), the more positive.

Most have had to learn new skills after entering the workforce

Such optimism is striking given the range of challenges that young people are expected to face. Young people entering employment already report having to retrain to meet the demands of the current workplace, and yet employers are not meeting expectations in the support they provide for personal development. Over two-thirds in all markets claim they have had to learn new skills for their current job, rising to almost 80% in the UK, US and Australia.
Soft skills are a universal priority – although men and women differ in their view of other key skills

When it comes to the specifics of the most important skills for success in the workplace, women are much more likely than men to prioritize verbal communication, critical thinking, active listening and active learning. Men are more likely to focus on ICT, problem solving and mathematical reasoning. However both genders are focused on the need for a mix of ‘right’ and ‘left’ brain skills.

<table>
<thead>
<tr>
<th>Soft skills</th>
<th>% who chose the following in their top 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time management</td>
<td>45</td>
</tr>
<tr>
<td>Verbal communication</td>
<td>44</td>
</tr>
<tr>
<td>Coordinating with others</td>
<td>39</td>
</tr>
<tr>
<td>Critical thinking</td>
<td>37</td>
</tr>
<tr>
<td>Technical skills related to my studies/job</td>
<td>35</td>
</tr>
<tr>
<td>Mathematical reasoning</td>
<td>15</td>
</tr>
<tr>
<td>Written expression</td>
<td>14</td>
</tr>
<tr>
<td>ICT literacy</td>
<td>13</td>
</tr>
<tr>
<td>Reading comprehension</td>
<td>13</td>
</tr>
<tr>
<td>Visualization producing images, turning non visual data / information into visuals</td>
<td>10</td>
</tr>
</tbody>
</table>

Figure 7 | “I had to learn new skills to do my job that I did not learn at school/university” | % who agree
Figure 8 | What do you think are the top 5 most important skills you will need to have a successful career? | % who chose the following in their top 5
“Millennials want to have their own businesses but when you look at how prepared many of them are, many have cognitive skills but many do not have non-cognitive skills. Few schools are teaching leadership. Few are teaching enthusiasm, courage, reliability and motivation. They don’t know about developing inter-personal skills; they don’t know about teamwork.”

Rick Goings, Chairman & CEO, Tupperware Brands Corporation
Moreover, when asked what attributes make a good employee, across all markets most young people prioritize the ability to work with others and to communicate effectively ahead of high academic achievement. It is these core skills that young people consider to be most valuable to the workplace.

**High expectations of employers are not being met**

Young people have high expectations of employer commitment in relation to their personal development. In all markets, at least seven in 10 agree that employers should be prepared to train employees throughout their careers. However, at the early stage in their working life, there is already a gap between young people’s training expectations and the reality of what employers have delivered. Indeed, only small minorities of people who expected training have received it so far; and it is mostly those who did not expect training who have been supported.

In terms of development provided, it is significant that respondents mostly report receiving training associated with the left brain – logical thinking, etc – rather than softer, creative skills associated with the right brain.

| 19% | ICT Literacy |
| 21% | Critical Thinking |
| 17% | Reading Comprehension |
| 18% | Negotiation |
| 18% | Mathematical Reasoning |
| 18% | Visualisation |
| 17% | Written Expression |
| 20% | Logical Reasoning |

| Left | Right |
| Time Management 29% | People Management 34% |
| Coordinating with Others 28% | Technical Skills relating to my Studies/my Job 29% |
| Complex Problem Solving 31% | Active Learning 33% |
| Training and Teaching Others 29% | Verbal Communication 28% |
| Active Listening 25% | Creativity 28% |
| Persuasion 25% | |
“Emerging technologies in Artificial Intelligence, deep neural networking, and machine learning enable us to reimagine the possibilities of human creativity, innovation and productivity. As technology continues its rise, absorbing our mundane and routinized tasks, we must understand our calling to something greater – to be better, something more. This is the promise of our great human potential – that we are more than the sum of our knowledge of the past: it is precisely our learnability, on the things we don’t know, that will open a new future for all of us.”

Dr. Vishal Sikka, Chief Executive Officer, Infosys
Young people will choose stability and progression over start ups

Young people today are often perceived as being attracted to more entrepreneurial career paths, and the idea of being a self-starter is certainly attractive to this generation: at least half in all markets say they would like to start their own business one day.

However, when considering their personal situation in the here and now, a stronger aversion to risk emerges. Working for a large business is more attractive for young people than working for themselves; less than one in 10 want to work for a start up. At a global level, the prospect of working for a large business over other types of employer particularly appeals to men.

Exploring underlying motivations, the greater stability, training opportunities, good salary and progression that large businesses can offer underpin their appeal. Despite the high profile of many of the most successful global entrepreneurs today – some of whom are not much older than the respondents in this research – fast-paced change and the prospect of future disruption in the labor market are encouraging a more conservative workplace mindset among young people.
The research findings also reveal that, to some degree, differing need profiles influence aspirations regarding different types of employer or workplace. The few who are interested in working for themselves show a stronger desire for personal wealth. Those who want to work for a start up are also strongly motivated by wealth accumulation, but it is their need for creativity that dominates. Responsibility in the workplace is the strongest aspiration among those attracted to working for large corporations.

Overall the research highlights a broadly optimistic generation, despite early disappointments in the workplace and the prospect of future challenges. Those who have begun work have had to adapt and learn new skills quickly, while only a few have received the training they anticipated from employers.

The findings presented here reinforce wider trend research which highlights a conservative mindset and risk aversion among young people today. Despite public hype and discourse around start ups and a generation of successful self-starting entrepreneurs, the reality is that young people gravitate towards larger companies that are perceived to offer greater stability, opportunities for development and structured progression.
Skills gap is more evident in developed markets

Globally, far more young people claim that they have the skills necessary for future success in the world of work than not. Yet there are notable differences by market with greater confidence apparent in emerging rather than developed markets. Young people in Brazil and India are most bullish: over 75% rate their level of confidence at seven to 10 out of 10. This falls to around 65% in China and the US and lower – to just over 50% – in the other developed markets.

Further analysis shows that, on average, people regard a skill to be important by 10% more if they perceive themselves to be strong in that skill. Put bluntly, young people tend to believe that the skills they already possess are also the most important for the workplace.

Taken together, these findings demonstrate considerable variation across markets in young people’s confidence that they have the skills necessary for a successful career, with not only the perceived skills gap being felt most significantly in advanced economies, but also the importance of young people, employers and educators being aligned in terms of the most valuable skill-sets for the future of work.
An Industry Perception

The findings of The Future of Jobs research report by the World Economic Forum indicate a close alignment between the attitudes and expectations of industry and young people.

Agreement on the future dynamism of the work and labor landscape

The industry-focused research indicates a range of drivers expected to impact working environments over the coming decade. From the evolving nature of work, to more flexible working patterns, to the emerging middle classes in emerging markets, a spectrum of expected changes were identified as likely to impact business models and modes of operation. The changing nature of work in particular was widely seen as being of growing significance, demonstrating the utility of the emerging liquid skills mindset among young people.

The disruptive impact of technological developments were also highlighted, with the rise of big data and mobile internet most prominent. Roughly a third of young people selected the mobile internet and the rise of big data as one of the top three most significant drivers they expect to impact future working life, demonstrating a strong alignment between the emerging challenges expected by both industry and young people.

Key skills deemed crucial by industry align with skills expectations of young people

Industry representatives surveyed were asked to identify the core skills that will be most in demand in the future. Across all sectors covered, a consensus emerged that social skills and cognitive abilities will be the most vital, followed by technical skills. Such opinions mirror the views of young people, who rank cognitive or social skills such as time management, verbal communication, critical thinking and ‘cooperating with others’ above all other skills, in terms of being required to support a successful career. As with the industry perspective, technical skills also rank high – just below these four core skills.

The symmetry between the business and public research in demonstrating the critical importance of both “soft” and cognitive skills, as well as an acknowledgement of the significance of technical abilities, shows no notable gap between the aspirations of young people and demands of industry.
Businesses recognize the ongoing challenge of gender inequality in the global workforce

The research conducted for The Future of Jobs research report by the World Economic Forum confirms the extent of gender inequality within the current global workforce. For example, there are no female CEOs across any of the energy sector businesses surveyed and for all other sectors females do not represent more than 15% of CEOs. While some improvement is expected over the next five years by industry, gender parity will remain distant. Such findings reinforce the concerns of young people that the current gender gap in technological skills will become an even more important factor and prevent the closure of the broader gender divide.

“Young students need to understand that education alone should not be expected to secure their success. This will depend on their ability to learn and they must have a mindset of learning for life.”

Vandana Sikka, Chairperson, Infosys Foundation US
Future Skills Landscape

Young people show a strong degree of confidence and optimism about their future careers, despite the unprecedented landscape they face with the onset of the Fourth Industrial Revolution.

The final part of this report examines young people’s readiness for their expected challenges.

For context, it is worth noting that young people demonstrate surprisingly high awareness of the longer term trends likely to shape the labor market.

The research asked young people to rank the top three drivers that they expect to impact most on their working lives from now until 2020. Given the relatively short time horizons and the conceptual nature of many of these drivers, the fact that over 20% ranked most drivers in their top three shows a firm grasp of future challenges.
Moreover, focusing on the threat of one particular driver, there is significant agreement among young people that a computer program, robot or Artificial Intelligence system could do their job in 10 years’ time. On average 40% agree with this statement, rising to 52% in India; although in Germany, Brazil and South Africa it is less – a third – who agree.

**Liquid Skills**

To meet the challenges of the Fourth Industrial Revolution, it will become increasingly important for young people to have a flexible skill-set that enables them to adapt to the volatility anticipated in the labor market.

The core trend for the future of work will be a shift towards less linear and more erratic career paths. The concept of a job for life will be accepted even less than it is today. Instead, young people face a future in which they will have to re-train and re-skill in a fluid manner throughout working life. They will need to commit to liquid skills, whether that is to respond to the demands of a changing job or sector, or to switch to a new career path.

Such trends have been gaining momentum since the onset of the computer and digital age. However, in the context of forthcoming disruption, adopting a liquid skills mindset will be a litmus test for how prepared young people are to meet the challenges of the next industrial revolution.

**Young people today are closely aligned with a liquid skills mindset**

Across all markets, young people show a clear appreciation and understanding of the importance of a flexible, ongoing approach to skills accumulation.

The vast majority of young people across global markets recognize that success in their career will depend on learning new skills continuously throughout their working lives. On average 84% agree (with women slightly more inclined to agree), rising to 87% in Australia and only falling to 77% in India. Despite many young people’s view (highlighted earlier in this report) that their education could have equipped them more effectively for working life, they do not expect that formal education alone will provide the skills necessary for a successful career or that there will be a cut-off point when the need to re-skill ends. Gaining new skills and training is now viewed as a lifelong pursuit.
“What we are seeing is the pace of change is getting faster and faster so the ultimate skill people need is the ability to learn throughout their professional lives, to keep learning things and in some cases un-learn things, for example, lots of ideas which might have been regarded as completely fundamental to business strategy are being turned on their head or superseded.”

Dr Peter Hirst (MBE), Associate Dean for Executive Education, MIT Sloan School of Management
Moreover, today’s ‘first-jobbers’ are fully prepared to learn an entirely new skill-set to secure work. Over two-thirds in all markets are willing to do so, with over three-quarters agreeing in Brazil and South Africa. A desire from most, in all markets, for a varied career and to work in different sectors and industries also heightens the potential need for re-training.

Significantly, the data reveals that it is those people who are most optimistic about their career prospects who are the most prepared to re-skill in order to find work; suggesting that their open mindedness boosts their career confidence and, conversely, those who are less willing to adapt see less opportunity.

In terms of readiness for the future of work, most young people globally admit that their education has helped them to prepare for a liquid skills mindset. On average 65% agree that their education has equipped them to better adapt to change. However, this view is more marked in emerging economies: around 70% agree in South Africa, China and Brazil – compared with the lower figure of 51% in France.

The pace of change defines the future working landscape. Indeed, it is this that makes the potential impact of the Fourth Industrial Revolution unprecedented. Consequently, adapting to dramatic change will be a core requirement of this generation. Overall, young people are confident in this regard – but the apparent gap between advanced and emerging markets is significant.
“Exam grades do not automatically translate into skills. They also do not encourage continuous improvement and capability. Traditional education is heavily focused on static assessment and not on fostering the culture of ongoing learning and development that our younger generation needs.”

Vandana Sikka, Chairperson, Infosys Foundation US
The vast majority in all markets – reaching 76% in China and falling to 67% in France – claim to like engaging in activities in their spare time that enable them to learn new skills. Moreover, around two-thirds globally now consider learning a new skill to be a form of entertainment.

The notion of skills accumulation becoming entwined into everyday life and leisure clearly resonates with many young people today – there is strong alignment with liquid learning. It is a resourceful and focused approach to personal development that will enable young people to respond to the demands of a changing labor market.

The critical question that arises is whether the required learning structures and systems will be put in place to enable this generation to nurture such attitudes and convert them into practical use.
The ongoing shift towards more specialized and technology-led economies will increase demand for a highly tech-enabled and digitally skilled workforce. Indeed, the long term drivers that will shape the future of work all indicate that those markets that are geared for a technological and more automated future will be best placed to thrive in a changing world.

**The vital role of technology in education**

In most markets, young people agree overwhelmingly that technology has positively influenced their development thus far. On average, two-thirds agree that technology has helped democratize educational opportunities for young people. This rises to 73% in China and India and only falls below 60% in Germany.

Not only is the learning of technology skills seen as vital but technological innovations are also seen as critical in the educational process itself.
“We are entering a period when I believe the technologies and the educational opportunities around us will alter all aspects of life once again, especially the way we work. Our educational systems must modernize to embrace this new reality. By familiarizing students with technology at a young age, we take away their fear or timidity. Undoubtedly, the next industrial revolution will amplify our humanity, but we must also bring a new context, to make it as adaptable, curious, collaborative, engaging and powerful as our own minds.”

Dr. Vishal Sikka, Chief Executive Officer, Infosys
Technological skills are seen as crucial to future careers

Across all markets, young people are largely united in their view that those who are not skilled in technology will find it increasingly difficult to secure a job in future. On average, two-thirds agree with this position – particularly in China, Brazil, Australia, UK and the US. Conversely, just half in Germany share this view.

At the same time, a growing number of young people are aware of the importance of technological and digital skills. For example, most expect that people who are more skilled in computer science are more likely to have successful careers – reaching 68% in China and falling to 58% in Australia.

Strongest appetite for learning new technologies in emerging markets

Despite the proportion of young people who prioritize technological skills for future career success, appetite for gaining such skills varies across markets. It is in emerging economies where interest in learning new technological and digital skills is strongest.

This research tested the appetite for learning a range of skills that are expected to be of growing importance in the workplace as the Fourth Industrial Revolution takes hold – from cyber security and computer networking to coding and big data analytics. In each case, the same pattern emerged: young people in emerging markets are more primed and ready to gain these skills.

For example, whereas 75% of young people in India and China are interested in developing skills in data science and analytics, this falls to just 47% in France and Germany. Indeed, the number of young people who show a strong interest in learning these skills is 40% in India, compared to 15% in Germany.

A similar picture emerges for appetite to learn to build a mobile app. Over three-quarters are interested in India, Brazil and China, whereas this drops to 65% in the US and the UK. In Germany, just half have an interest.
Segmentation: views towards ability and interest in learning new technological/digital skills

A segmentation of young people’s attitudes towards their current technological ability and interest in learning new digital skills provides further insights into this vital gap between developed and emerging markets.

From this analysis, five broad segments emerge:

1. **Tech Illiterate:**
   have almost no confidence in their IT ability and minimal interest in developing related skills. Most pessimistic about their preparedness for work.

2. **Office Only:**
   have a strong knowledge of Microsoft Office and high interest in learning more about this software. Effectively little or no interest in other areas.

3. **IT Basics:**
   similar to the Office Only group, but with slightly higher competency and more basic IT management skills. For example, this group feels more confident about tasks such as troubleshooting or visualising data.

4. **Helping Hand:**
   a slightly less extreme version of the Tech Guru – they rate themselves fairly highly in tech and IT skills and have some interest in advancing their knowledge/ability.

5. **Tech Guru:**
   rate themselves highest across most tech skills and have highest levels of interest in improving their knowledge/ability. Of those in the group with tertiary education almost all have studied computer science. They are most optimistic about their preparedness for work.

When looking at the proportion of each of these segments by market, a clear division emerges in developed vs. developing. The Tech Gurus – the most highly tech-skilled and interested segment – are more prominent in emerging markets. In India, 45% of young people can be classified as ‘Tech Gurus’, and 35% and 27% for Brazil and China respectively. Yet, at most, ‘Tech Gurus’ represent 1 in 5 young people in developed economies, falling to just 1 in 8 in France.

Conversely the Tech Illiterate, the segment with the least digital skills and interest, are represented much more strongly among young people in developed markets. Over 10% of all young people in the advanced economies are classified as ‘Tech Illiterate’, rising to 28% in France – compared to less than 10% in all emerging markets and just 2% in India.
“If you bring programming to a girl in 10th grade she would be much less likely to try it even if she has the potential to excel in it which is why we must bring computer science into the curriculum earlier.”

Vandana Sikka, Chairperson, Infosys Foundation US
Gender divide is more pronounced in developed markets

Not only is the level of ability and interest in tech skills lower in developed markets but these economies also show a more marked gender divide. Figure 26, below, shows the proportion of young people in each market who are classified in the two most able and interested segments (‘Tech Gurus’ and ‘Helping Hands’) by gender. In developed markets young men are significantly more engaged with these skills than young women. In the UK the gap is almost double, while in Germany and Australia the divide is 20% or more. In India, China and Brazil there is comparatively less gender difference. The US also has less of a gender divide than other developed markets.

Such findings reinforce the conclusion that a ‘readiness-gap’ is emerging between young people in emerging and developed markets. Young people of both genders in China, India and Brazil seem more primed to embrace the skills necessary for success in the future workplace than their counterparts in Europe, the US and Australia.

Based on the perceptions of young people today in terms of the skill-set and mind-set that is critical to thriving in the future workforce, in the face of the Fourth Industrial Revolution, emerging economies are getting a head start.
Recommendations & Implications

**Political**

**Emerging markets are more prepared for the future**
Young people in emerging markets have more confidence, interest and ability in the core technological and digital skills expected to become crucial in the next industrial revolution. Governments of advanced economies need to respond to this imbalance to achieve a future labor force that is optimized for the challenges ahead and supports national competitiveness.

**Address the risk of a growing skills divide**
A significant proportion of young people disagree that their education was useful for finding and securing a job. There is real potential for a growing divide between ‘haves’ and ‘have-nots’ in terms of skills requirements. The Fourth Industrial Revolution already brings severe risk of rising inequality, so efforts should be made to pre-emptively create a more equal sense of confidence among young people in their readiness for work.

**Nurture and advance the liquid skills mindset**
Today’s young people are already aligned with a liquid skills mentality. Governments and policy makers must ensure that the necessary learning structures and systems are put in place to enable this generation to build on such attitudes and convert them into practical use for the future economy. Investment in new technology, and digital avenues to learning that enable skills acquisition to become part of the fabric of everyday life and leisure will be increasingly critical.

**Economic / Business**

**Businesses need to meet young people’s expectations**
The gap between the expectations of young people entering work and the training they actually receive is too wide. Moreover, this gap is even wider for soft, ‘right-brain’ skills: the very skills that will become more vital in a growing age of automation. Global businesses must begin to reduce this gap between expectation and reality.

**Industry needs to offer structured opportunities for development**
While young people may admire the entrepreneurially-minded, in reality they are risk averse and more likely to seek stable employment. Therefore they will be most attracted to businesses that offer structured, supported development and scope for entrepreneurialism from within.
Talent management eco-systems can provide security with fluidity

Businesses need to acknowledge that while young people are seeking stability from their employers this does not necessarily translate into a desire for long term employment with one employer. Indeed, young people’s increasingly fluid approach to career building means they are still very much prepared to change and switch between jobs. To combat this, businesses will need to adopt training and employment practices that allow young people to vary their development more holistically.

A collaborative approach between businesses that creates a talent ecosytem, allowing for movement between positions and learning programs but within an overarching business network could help to address both young people’s expectations and businesses’ need to retain talent.

Soft skills training does not have to be led by digital learning solutions

Businesses, as part of their training commitments, need to support young people in developing their soft skills, which they regard as crucial to success in the future working landscape. Communication, creativity and other soft skills need to be carefully nurtured through people-led training and experiences that digital learning tools may not be able to deliver as effectively. Even as Artificial Intelligence progressively improves in its ability to express human-like emotions, human and face-to-face learning will continue to remain crucial to employee training.

Social

More equal dialogue with a confident, mature generation

This is clearly a pragmatic generation, aware of the challenges it faces and is prepared to take responsibility for pursuit of its own success. Government and organizations will need to communicate with this generation as equals, having an up-front and two-way dialogue.

Changes to this generation’s mindset must not be over-hyped

Despite all the talk of a new start up, go-it-alone generation, this research highlights a conservative, risk-shy mindset that mirrors the hopes and aims of previous generations. The world around them may be changing, but young people are driven by motivations similar to any generation before them. Talk of a ‘new way of thinking’ is over-hyped and policy makers must keep this reality in mind.

Technology

Address the gender divide in technology skills across all markets, but especially in developed economies, young women have far less confidence and ability in relation to technological skills. This must be addressed if both sexes are to benefit jointly from the shifts expected in the global labor market. If not, a new driver of gender inequality could emerge where young men are better prepared for the industries of the future.
Methodology

The research was conducted via a 20 minute online survey among 1,000 16- to 25-year-olds in each market surveyed (except for South Africa where the sample was 700).

Quotas were applied to ensure a near 50/50 split between gender and between the 16-18 and 19-25 age bands in each market.

Data was weighted to be representative of the gender and age profile of the 16-25 population in each market.

Markets surveyed were Australia, Brazil, China, France, Germany, India, South Africa, UK and US.

The survey was designed by Future Foundation in collaboration with Infosys and carried out by ICM Unlimited.

Adjusted data addresses natural variation in the strength of response in individual markets using an algorithm produced by Future Foundation. It offers a simple but rigorous way of visualising the relative level of endorsement for attitudinal, aspirational and interest-based statements, providing a more robust and insightful method of comparing responses between countries.
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