

THE ROLE OF HIGHER EDUCATION IN MOULDING THE FUTURE WORKFORCE AND THE SIGNIFICANCE OF TECHNOLOGICAL ADAPTATION TO THE SERVICE SECTOR'S GROWTH

Dr. Manisha Manchanda

Associate Professor,
Department of Management Studies,
Deenbandhu Chhotu Ram University of Science and Technology,
Murthal (Sonapat), Haryana, India.
E-mail: manishaarora1492@gmail.com

Ms. Jyotsna

Research Scholar,
Deenbandhu Chhotu Ram University of
Science & Technology, Murthal
&
Assistant Professor
Faculty of Business Studies
PIET, Panipat, Haryana, India
Email: phd.jyotsna@gmail.com

Abstract

"Let's face it: in the age of Google and Wikipedia, the university and, most likely, secondary school business models will have to alter. We cannot make a life selling truth anymore. They are instantly accessible with the click of a mouse" (Firenstein, 2013).

Despite information technology's long history as a major field of study, the last decade has seen a dramatic shift in the field's focus due to the rise of the Internet. To account for the dramatic developments across both technologies and their settings, many researchers have investigated and presented models and theories of technology adoption to anticipate and explicate user behaviour with technology. Most of these theories and models were created in the United States, and each one proposes a unique collection of determinants and moderators. Thus, it is questioned if the models and theories of technology acceptance developed, adapted, and extended in the United States are applicable in other nations, particularly India. Additionally, it is speculated that other potential determinants and moderators may also play significant roles in this setting.

This paper (1) reviewed literature in regards to prominent theories and models; (2) reviewed previous literature about IT acceptance and usage within four contexts of study; and (3) concluded that using the Internet helps in improving academics' professional practices.

In the research model, there are five main factors that influence usage and up to nine others that moderate important associations.

Perceived utility, perceived ease of use, and self-efficacy were found to be the most important factors in determining usage behaviour in the classroom. Usefulness and self-efficacy were two primary characteristics that strongly predicted usage behaviour across different activities. In conclusion, usage patterns were a major factor in shaping future behaviour. Key drivers of using behaviour were also moderated by three factors: age, e-university plan, and reading and writing proficiency. There were just two moderators that affected the impact of usage behaviour on behaviour intention, and those were age and intended university research. Gender, degree of education, academic rank, years of experience, and fluency in India had no effect on the impact of the major determinants on usage behaviour, and usage behaviour had no effect on the impact of the intention to change. Practitioners may benefit from a deeper familiarity with the model in order to better understand the factors contributing to users' reluctance to adopt the technology and to develop more effective strategies for boosting its widespread adoption and use.

Keywords: Higher Education, Perceived Ease of Use, University, Disruptive Technology

1. INTRODUCTION

Glaser (1978) advocated that it is often important to do some preliminary thinking in a domain external to the research in order to put the study into context. In light of the current dilemma facing higher education in the United States (decreased state financing for higher education, university overspending), this study surveys and analyses the literature pertinent to the economic and business models of HE in the country. Following this, the study delves into the correlation between graduate unemployment and student population trends, graduation rates and unemployment, and students' market preparedness and skill mismatches. This section also discusses alternative university models and the forces of change affecting education in underdeveloped nations (African countries and India). This literature review fills a need for information about disruptive changes in education by focusing on the relationship between technology and online learning, especially how these changes have caused big changes and growth for individuals and communities.

Creswell (2003) argued that a literature review's success depends on its ability to evolve in parallel with data gathering. This means that the review's samples of literature should be chosen based on their logical relevance to the developing theory. It was decided that the inductive grounded theory approach would work well for this study. The hypothesised relationships were not derived from the background literature, nor were they heavily relied upon in the gathering or interpretation of the study's findings. The literature was considered useful because it informed the author about relevant factors in the subject of study, which in turn helped the author build a theory. According to Glaser (2004), grounded theory is not restricted to a specific type of data collection. The gathered documents served as yet another piece of evidence that was compared to other data and included in the growing theory. When associations were clear, new sources of information were uncovered, which benefited the model's investigation and development.

The review's limitations were determined after careful consideration of the research setting. The author searched six electronic databases for original books, research papers, reports, theses, and dissertations published between January 2019 and September 2022, as well as news articles published on higher education websites. Some examples of these resources are Scopus, Science Direct, JSTOR, Sage, and Google Scholar.

Prior to inclusion in the review, the titles, introductions, and conclusions of each publication and research paper were examined for relevance. Those articles and journals that didn't specifically address the search terms were discarded. The author acquired the full texts of papers that made it beyond the preliminary review and organised them by journal, location, impact, and qualitative methods used (e.g., interviews, surveys, case study).

The author conducted a thorough qualitative literature evaluation (Tranfield et al., 2003; Alasuutari et al., 2008) of experiential and peer-reviewed journals to find studies that satisfied the inclusion criteria, with the purpose of minimising bias and giving a reliable and repeatable assessment of the research issue.

1.1. The Forge of Higher Education

How beneficial is it to go to college? The question was originally posted by Selingo (2013) on the professional social networking platform LinkedIn. In today's dollars, how much are you able to gain from a university degree? Bethany College President Miller (2013) was astounded. For what reason do we have universities? While at the World Economic Forum in Davos, Switzerland, Tet (2013) of the Financial Times pondered the potential of online education.

Numerous studies have highlighted how challenging it has become for firms to recruit competent individuals who are ready to work, including some by Arum & Roksa (2010) and Barber et al. (2013). Over forty percent of businesses surveyed by McKinsey said they had trouble filling entry-level positions, and seventy percent said a lack of training was to blame. Seventy percent of teachers also felt that their students were well-prepared for the workforce (Barton, 2012). In 2011, for instance, 25% of British graduates were unemployed (Osborne, 2012). The Georgetown Center on Learning and the Workforce estimates that by 2018, 62% of all U.S. employment will require at least some college education. However, it was expected that by 2018, the United States higher education system would have produced 3 million fewer university graduates than the needs of the labour market (Carnevale et al., 2010). Furthermore, by 2025, India's infrastructure sector will be short 103 million skilled workers, including approximately 35 million in the automobile sector and 34 million in the construction sector (Lakshmi, 2013). Research by the Center for College Affordability and Productivity (Vedder et al., 2013) found that nearly half of all Americans with a bachelor's degree were employed in fields that did not require a college degree. An economist at Northeastern University named Andrew Sum estimates that in 2012, the figure was roughly 52%. (Risberg, 2012). Ten percent of U.S. jobs do not require a four-year degree but do need skills in science, technology, engineering, and mathematics, according to data by the Brookings Institution (Rothwell, 2013).

Colleges have never faced greater difficulty, and the topic has rarely been more widely discussed around the world. Reforms to the higher education system are urgently needed.

What changes need to be made and is there another option besides the current one? These are the two primary concerns. Is it possible that technological innovations may make conventional business models obsolete? When it comes to higher education, can disruptive technologies serve as the "shock therapy" that's been recommended? (Klein, 2007)

Before attempting to address these concerns, it is critical to understand the history of university education in the United States and where the first major challenges to the current paradigm arose.

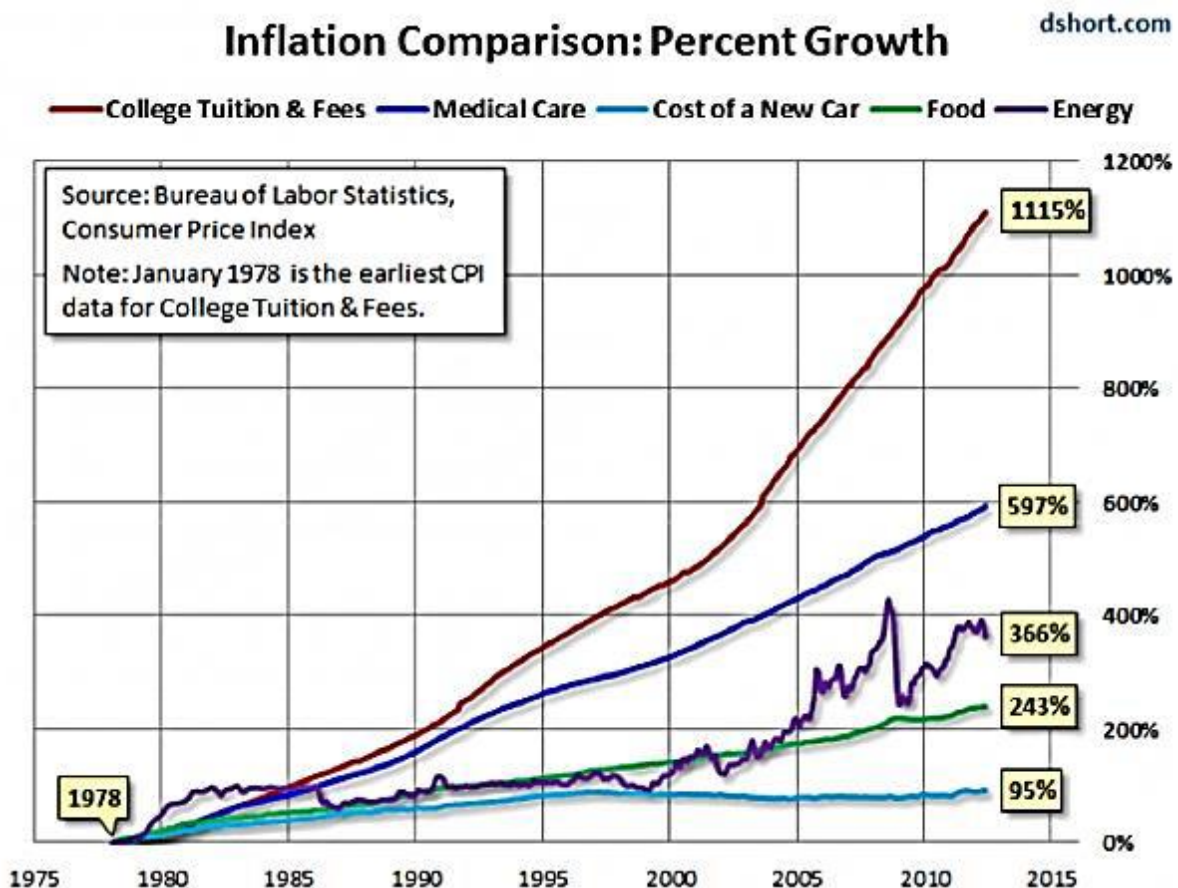
1.2 Is There Actually a Crisis in Indian Higher Education?

The evidence (Cuban, 2012; Addo, 2013; Lawrence, 2013; Meacham, 2013; Selingo, 2013; Bowles, 2014) is mostly in agreement that the traditional model of higher education in the United States has been under severe strain for quite some time (Rubin, 2013). The university, now a pervasive institution, rose to prominence as the world's preeminent institution for disseminating knowledge and shaping the next generation in the twentieth century (Pew, 2012a). Attending college was the best path to personal growth, professional success, and financial security. Many graduates do find success after college (Pew, 2012b; AWP, 2013), although, as was previously said, a large number of degree holders have trouble finding employment or are underemployed. The question is whether or not the traditional model of higher education will survive into the next millennium.

The warning that Drucker sounded twenty years ago (1997), "Thirty years from now, the huge universities and colleges will be antiquities," rings more true every day. There will be a final extinction of universities. There will be no more traditional classrooms or college campuses in the future. The situation in higher education is critical (Drucker 1997, quoted in Lenzner and Johnson, 1997).

Barber stated categorically that the present academic method was inadequate to satisfy business requirements (Barber et al., 2013). Foreseeing the "end of the university as we know it," major and lasting shifts, and a huge "shakeup," Harden (2013) and Aoun (2012) predicted the end of higher education (Aoun, 2012). The author of The Chronicle of Higher Education, Jeffrey Selingo, claims that the decade between 1999 and 2009 was a "lost decade" for American higher education because of the sharp increase in student and institutional debt during that time (Selingo, 2013). Harden predicted that the majority of American institutions would fail and that many professors would be laid off. On top of that, he believed that tuition-free higher education was on the horizon (Harden, 2013). Daphne Koller, co-founder of Coursera, acknowledged that demand for university education surpassed supply and called for the transformational role of technology in giving an affordable choice to students (Cadwalladr, 2012). Figure 2-1 shows that the growth in the cost of higher education in the USA has outpaced the growth in the cost of healthcare. Figure 2-1 shows the impact of inflation on several U.S. expenditures from 1975 to 2015, including higher education, healthcare, transportation, groceries, and energy. Private, non-profit, four-year tuition and fees climbed by 24% over 10 years and by 66% over twenty years, as reported by The College Board's 2014 Trends in College Pricing research.

Fig:1.1 Comparison of Inflation (USA)



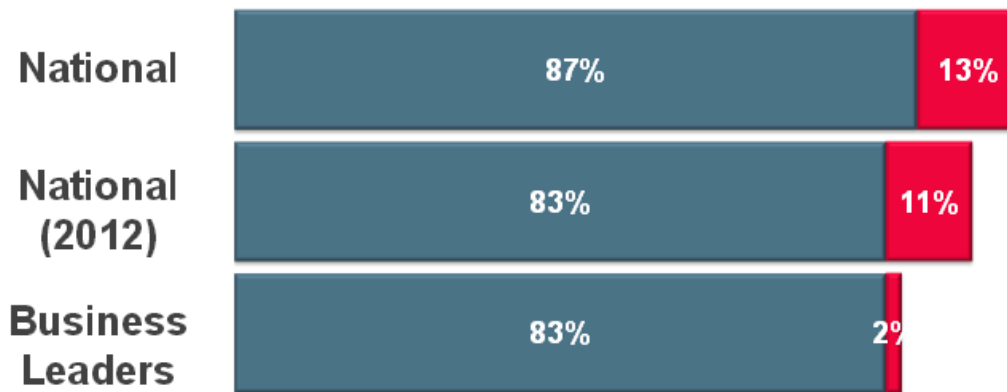
Source: dshort.com | Used with permission of Doug Short (13/10/2015)

1.3 Defining Moments and Personal Identity Crisis

Some people say that the whole idea of a university has reached a turning point, is going through an existential crisis (Lawrence, 2013), is outdated and on the verge of collapse (Cuban, 2012), and must be disrupted or reconstructed to avoid complete stagnation (Agarwal, 2013). Figure shows that most Americans agree that change is needed so the system can keep up with the rest of the business world.

AGREE / DISAGREE

The U.S. higher education system needs to change to retain a workforce that is competitive with other countries around the world



Source: Northeastern University, 2013: Innovation Imperative: Enhancing Higher Education Outcomes. <http://www.northeastern.edu/innovationsurvey/>. Used with permission of Michael Armini. (16/10/2015)

Taylor (2009) drew parallels between universities and Detroit. He argued that the city's economy would crash if higher education wasn't closely monitored, regulated, and reformed. Taylor argued that a crisis in higher education might be averted with rigorous regulation and a complete rebuild. What we have here is the process of bubble formation and bursting (Reynolds, 2013).

This raises the question: Is higher education in a bubble right now? If so, what might happen if it bursts?

In contrast to Forbes contributor John Tamny's prediction that online education will be the next bubble (Tamny, 2013), venture capitalist and entrepreneur Peter Thiel is sure that the cost of higher education has become unsustainable (Lacy, 2011).

1.4 The Implications of the Butterfly

The globalisation and interconnectivity of economies have proven the veracity and durability of the butterfly effect (Dowes, 2013). The term "butterfly effect," often called the "ripple effect," was first used by meteorologist Edward Lorenz in 1972. The idea originates from chaos theory, which states that it is exceedingly difficult to predict future outcomes and consequences when initial conditions vary even slightly. That is to say, if one thing were to change, it could have knock-on effects on other things, which in turn could impact other things, and so forth, raising doubts on the entire situation. The term is highly relevant to our investigation because it describes the hopes and expectations that were held for each new disruptive technology or innovation and the ways in which early adopters made subtle changes that could have had far-reaching consequences.

Higher education has not been immune to the ripple effects of the economic crisis, which have hit every industry and countless people directly (Altundemir, 2012). Denhart (2013) uses the term "crippling" to describe the effect that the liquidity crisis has had on students, parents, and the economy as a whole. This is especially true because the world economy is going through one of its worst crises in recent memory, which has had a big effect on college education (Denneen and Dretler, 2012).

To compete for a larger share of the student population, universities have made significant investments in cutting-edge facilities. As public, state, and private funding shrank as a consequence of the financial crisis, universities had to reduce their staff and programmes and raise tuition to make up the difference, leading to rising levels of debt for both undergraduate and graduate students (Fearnow, 2014).

The status of the system can vary dramatically on a large scale as a result of even small differences from the original conditions. The phrase "butterfly effect" is well named because past events have shown that technical advancements often have unintended and negative results. Lastly, it is important to this study because it is hard to predict the long-term effects of MOOCs (the incubation period). This is because

universities and corporations have launched and will launch many different kinds of MOOCs, and universities, academics, and students will experience them in many different ways.

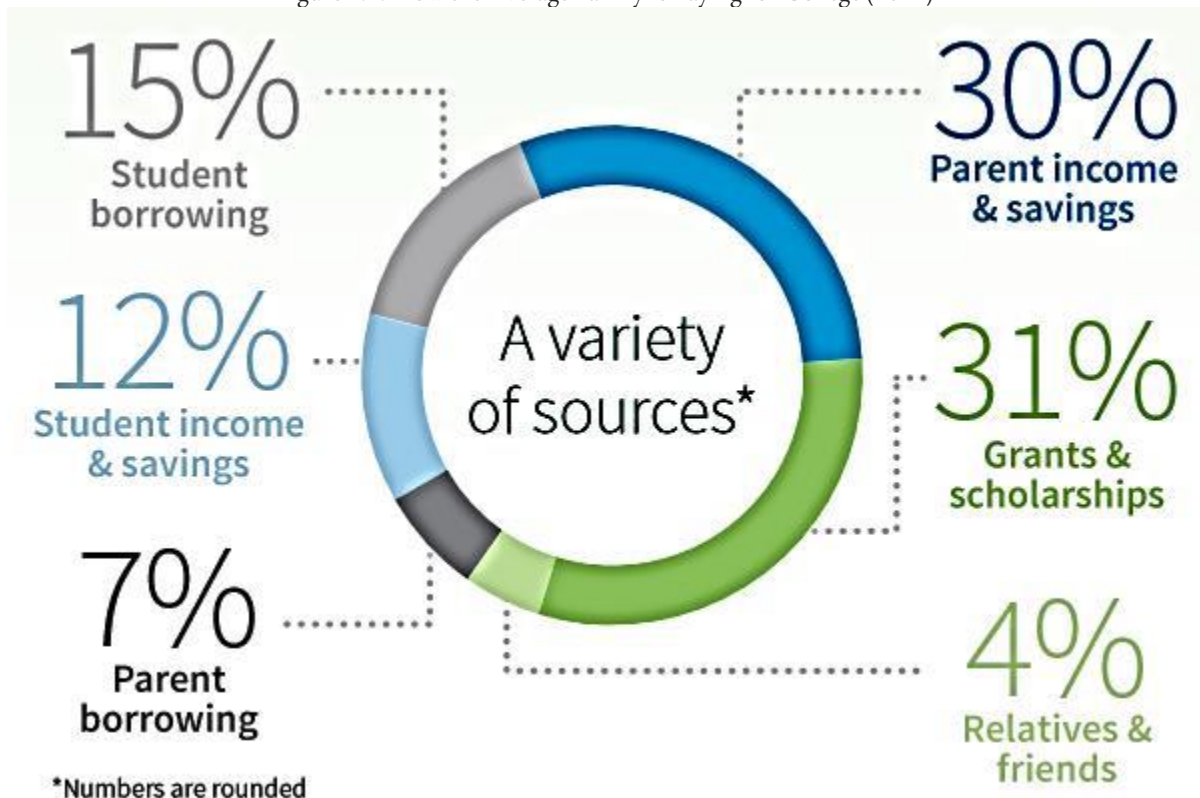
1.5 The Indispensable Nature of Change

Australian universities face imminent extinction unless their current income models are drastically rethought (Ernst & Young, 2012). This includes providing new courses, integrating with other universities, catering to new student populations, etc. (Ernst & Young, 2012). Calls for change can be heard just about everywhere, and the search for a new paradigm of innovation that can shake things up continues (Bower and Christensen, 1995; Bush and Hunt, 2011; Christensen and Eyring, 2011). Assistant Vice President of Moody's, Eva Bogaty, shared this view. It was a pivotal moment for the business paradigm of US higher education (Moody, 2013).

1.6 Cost effectiveness should be a primary concern

The cost of college seems to have been the most talked-about topic in academia during the past decade. TIME and the Carnegie Corporation of New York commissioned a survey in 2012 that found 89% of American adults and 96% of administrators at universities and colleges agreed that university education was in crisis, with the lack of financial resources among low-income families being cited as the primary cause. Bowdish (2013) estimated that during the past half-century, about 60 million Americans have used some form of student loan to fund their higher education. Only 5% of working-age Americans in 1950 had completed a bachelor's degree programme. Presently, the percentage has increased to 31%. (Bowdish,2013). According to Gellman (2013), the total amount of student loans has nearly tripled since 2004 and now accounts for about 9% of all personal debt, up from 3% a decade ago. The Pew Economic Mobility Project found that only 32% of Americans rate their financial state as "excellent" or "good," suggesting that rising economic inequality may be contributing to rising levels of financial anxiety (2013). Yet, despite severe budget restrictions, families were willing to stretch to enroll their children in college, according to a study by Sallie Mae (2013) (58% in 2013, compared with 53% in 2012). Figures 2–3 show the typical cost of higher education in the United States for a household of four in 2014.

Figure 1.2: How the Average Family Is Paying for College (2014)



Source: Sallie Mae (2014) | Used with permission of Sallie Mae (16/10/2015)

Despite the fact that 98% of families agree college is still a smart investment, 90% of Americans say colleges aren't doing enough to lower costs. (Sallie Mae, 2014) A 2013 report by the Lumina Foundation and Gallup (USA) found that 74% of respondents who were interested in pursuing postsecondary education but were unable to do so due to financial constraints worried about the quality of secondary and higher education. A study conducted by the Pell Institute and the Alliance for Higher Education and Democracy at the University of

Pennsylvania in 2015 found that 77% of adults in the upper income quarter earned bachelor's degrees by the age of 24, while only 9% of adults in the lowest income quartile did so (Korn, 2015).

Fewer than half of the students who took the SAT in 2013 were equipped to participate in postsecondary education, according to a report by the College Board (2013). (Doubleday, 2013). In addition, 54% completed their bachelor's degree in four years, whereas only 27% of those who did not meet the benchmark managed to do so (SAT report, 2013).

One of the most important ways for an American family to improve their standard of living and economic prospects is for a member to graduate from a top university (Rampell, 2013a). Employers now view a bachelor's degree as the bare minimum needed for entry-level positions because they know their incoming hires will perform adequately (Rampell, 2013b). A 2014 Sallie Mae study found that 83% of parents believed the "American Dream" required a college education, and 98% of parents strongly agreed or accepted that an university education was an opportunity to invest in their child's future. Nearly 50% of Americans who registered in four-year universities did not graduate, according to research by the Organization for Economic Development and Cooperation (Wells, 2013). Despite this, a degree still offers many families the chance to enter the middle class and secure a better financial future.

2. INVESTING IN YOUR FUTURE: HOW A BACHELOR'S DEGREE IMPACTS YOUR SALARY

According to Google's Executive Chairman Eric Schmidt, going to college is essential for boosting future financial potential (Nisen, 2013). Higher education, according to Oklahoma Governor Mary Fallin, is essential for being economically competitive. The one and only way for any country to be competitive, she underscored, is by doing just that (Alter, 2013). According to Alter (2013), a high school diploma was required for 75% of jobs in the US 50 years ago. He asserted that the percentage had dropped to 40% and that 30% of those professions paid less than \$25,000 USD annually (Alter, 2013). According to Pew Research, four-year college graduates fared better than two-year college graduates during the recession, even though the United States still has a job shortage (Shierholz, 2014). Nine out of ten MBA graduates from the class of 2013 were employed in October 2013, just a few months after graduation, according to a survey by the Graduate Management Admission Council (2013). In all, 92% of two-year postgraduates got employment, up from 90% in 2012 and 85% in 2009 (Byrne, 2013). Although a degree seems to be the path to better work prospects, it still has a significant price tag that many people cannot pay without taking out loans.

3. NEED OF DISRUPTIVE TECHNOLOGIES IN HIGHER EDUCATION

The most crucial links for the system's viability are those between HEI, students, teachers, and technology businesses. By strengthening the ties between higher education and the labour market as well as between teachers and students, technology skills will be more effectively used (Goulart, 2019). The secret to fixing problems is for stakeholders to connect with one another (Blackler and Orbone, 2003). The issue is not with technology per se but with the context-related phenomena of digital change (Liboni et al., 2019).

An HEI is identified as the primary stakeholder with the ability to alter the dynamics of this system, emphasising the significance of their interdependence with the other stakeholders. The solution to the qualification gap (difficult circumstance), according to the system method, entails reuniting the stakeholders in fresh, dynamic relationships. In this way, the declaration of all concerned parties will result in the desired dynamism.

The proposed adjustments range in implementation difficulty. We believe it is simple to put those top managers' less complex actions into practice. Budget constraints are obviously essential in classifying the degree of difficulty in putting such changes into practise. We also determined their level of difficulty with reference to the use of time and resources. Some HEIs are better than others at developing certain modifications. Changeability varies from one HEI to another depending on factors like culture and departmental flexibility. Various levels of difficulty are also represented by some abundant things, such as available capital or full-time professors. The less resistance to change there is, and consequently, the less acts will be categorised as being difficult to achieve, more the dynamic the administration of the HEI. The main goal of education should be to create links between professional growth and the labour market by equipping learners and future professionals with the perfect technical skills and a range of socioemotional competencies that will allow them to manage their lives and career planning from a humanistic perspective that is predicated on responsibility and ethics.

4. CONCLUSION

The qualification gap is a significant social issue that slows down economic growth in developing nations and calls for an immediate response. This work has led to the ideation of systemic organisational solutions that incorporate all stakeholders in the difficult setting of higher technological education in Brazil. The systemic analysis provided a fresh perspective on the issue, encouraging talks about how to coordinate the stakeholders and identifying three important axes (HEI-students, HEI-teachers, and HEI-businesses) capable of fostering change toward an appropriate education, as demanded by the marketplace and society.

We followed the path that let us identify the problem's underlying causes and comprehend the HE system in order to arrive at this conclusion. By incorporating the distinctive stakeholder perceptions—each with its own worldview and value judgments—we constructed our study.

The findings presented in-depth discussions concerning one of the most important topics for a nation's development, particularly in the setting of a developing country, and they showed ways to rebuild the analysed system while maintaining its fundamental definition. We are curiously focusing on human creation during a period of tremendous technological advancement, which is characterised by modern electronic paradigms and artificial intelligence. Many jobs will disappear in the next few years, and many duties will change. What is certain is that the guy will be able to manage his emotions and social obstacles in order to have a successful profession, despite the changes brought on by digital and technical advancements.

The theoretical contribution of this study is based on a novel systems approach application to suggest solutions involving various stakeholders, their salience, and their perceptions. The application of SSM to examine complicated issues from the viewpoints of stakeholders showed how the stakeholder theory could be strengthened by a system approach when tackling significant societal issues.

Additionally, the study advances knowledge in professional technological qualifications and may open up new avenues for features that have not yet been explored in other previous research, assisting in the direction of studies about emerging technologies and occupations in the future. Because it advances the academic achievement of a profession that is constantly expanding, enhances conditions for students and teachers, and helps other ecosystem players, the activity has social value.

Additionally, it advances the conversation about enhancing the accessibility of technology professionals, assisting in their integration into the labour force, and turning the years of work and study into financial gain and increased professional output.

As a management contribution, the work aids in advancing policies, new planning, and course improvements in higher technological education, resulting in programmes and educational models that are better suited to the needs of the market today. When this approach emphasises the necessity of adaptable organisational assessments to the particulars of courses, locations, and professions, it also has an impact on public policy orientations.

We used the SSM to explain how a HEI is unable to handle this difficult qualification gap, offering a structure that can offer options for this problem-solving, accompanied by the stakeholders' theory and system approach. Through the perception of stakeholders, the article illustrates the shortcomings of higher technical education in developing nations. The key issues are the lack of active approaches, the humanistic soft-skill formation gap, and the separation between real-world tasks and lectures. Systematic analysis showed that the following principles should direct the efforts to tackle this issue: investing in social and emotional education, promoting education and employability through collaborations with stakeholders.

Brazil is used as a research study to discuss issues facing growing economies. Although these industrialised nations are frequently criticised for their higher education institutions, regardless of the nation, they can also share common issues with HEIs. Although unemployment is a problem in many Latin American countries, the rapid expansion of startups and the rise in job opportunities in the technology sector are more comparable to Asian rising economies compared to other Southern economies. This study can serve as a foundation for further research to identify new patterns among developing nations and to identify new differences between the labour market profiles and the gaps in HE in technological contexts.

We conducted extensive interviews with key figures in education (teachers, students, businesses, managers, HEI managers, and trade association managers). The proposed path and the barriers to state-of-the-art progression in field research are clarified by suggesting a multi-case study of HEI for future research.

5. REFERENCES

- Backes-Gellner, U. and Tuor, S.N. (2010), "Avoiding labor shortages by employer signaling: on the importance of good work climate and labor relations", *Industrial and Labor Relations Review*, Vol. 63 No. 2, pp. 271-286, doi: [10.1177/001979391006300205](https://doi.org/10.1177/001979391006300205).
- B_ahn_areanu, C. (2019), "World economic forum 2019: globalization 4.0–A better version", *Strategic Impact*, Nos 1-2, pp. 79-82.
- Ball, R. and Halwachi, J. (1987), "Performance indicators in higher education", *Higher Education*, Vol. 16 No. 4, pp. 393-405.
- Barbosa, A. (Ed.) (2014), *ICT Homes and Businesses 2011: Research on the Use of Information and Communication Technologies in Brazil*, Internet Management Committee in Brazil.
- Bashir, S. (2007), *Trends in International Trade in Higher Education: Implications and Options for Developing Countries*. Education Working Paper Series, World Bank Working Papers, number 6. The World Bank, March, Washington, DC.
- Blackler, F. and Orbone, D. (2003), *Information Technology and People: Designing for the Future*, (MIT Press) Paperback – March 17.
- Boaventura, J.M.G., Cardoso, F.R., da Silva, E.S. and da Silva, R.S. (2009), "Stakeholder theory and firm theory: a study on the hierarchization of objective functions in Brazilian firms", *Revista Brasileira de Gest~ao de Neg~ocios-RBGN*, Vol. 11 No. 32, pp. 289-307.
- Bollini, L. (2016), "The challenge of a hybrid education between computer science and design competences in Italian university. Courses and degrees", *Proceedings of EDULEARN16 Conference*, 4th-6th July.

- BRASSCOM (2019), Industrial Report: Trends of 2019. Brazilian Association of Technology, Information and Communication Industry, available at: <https://brasscom.org.br/wp-content/uploads/2020/04/P-2020-04-09-Coletiva-de-Imprensa-Relat%C3%B3rio-Setorial-2019-v15.pdf> (accessed 12, 2019).
- Brazil Tech (2019), "Report of Brazilian technology market", available at: <https://brazilian.report/tech/> (accessed 12 December 2019).
- Cackler, G.J., Gu, E. and Rodgers, M. (2008), "Technology in developing economies", CS 201: Computers, Ethics, and Social Responsibility.
- Carnoy, M. and Samoff, J. (2014), Education and Social Transition in the Third World, Princeton University Press, Vol. 1044.
- Caplan, B. (2018), The Case Against Education: Why the Education System is a Waste of Time and Money, 3rd ed., Hardcover, p. 416.
- Castelli, L., Ragazzi, S. and Crescentini, A. (2012), "Equity in education: a general overview", Procedia- Social and Behavioral Sciences, Vol. 69, pp. 2243-2250.
- CENSUP - Censo da Educaç~ao Superior (2016), Dispon_ivel Em, available at: <http://portal.inep.gov.br/web/guest/microdados> (accessed 28 February 2018).
- Cezarino, L.O., Liboni, L.B., Stefanelli, N.O., Oliveira, B.G. and Stocco, L.C. (2019), "Diving into emerging economies bottleneck: Industry 4.0 and implications for circular economy", Management Decision.
- Checkland, P. and Poulter, J. (2006), Learning for Action: A Short Definitive Account of Soft Systems Methodology and Its Use, for Practitioners, Teachers and Students, John Wiley and Sons.
- Checkland, P.B. (2000), "Soft systems methodology: a thirty year retrospective", Systems Research and Behavioural Science, Vol. 17 No. S1, pp. S11-S58.
- Choudaha, R. (2014), "Redefining value in international higher education", The Global Window on Higher Education, No. 302.
- Dias Sobrinho, J. (2005), "Higher education, globalization and democratization: which university?", Brazilian Journal of Education, No. 28, pp. 164-173.
- Donaires, O.S. (2012), "Uso combinado de metodologias sist^emicas: uma abordagem para lidar com situaç~oes-problema em cen_arios complexos de gerenciamento de organizaç~oes", Revista Gest~ao and Conhecimento, pp. 1808-6594.
- Ehrenberg, R.G. (2012), "American higher education in transition", Journal of Economic Perspectives, Vol. 26 No. 1, pp. 193-216, pg 208.
- Fleming, D. and Søborg, H. (2014), "Are emerging south-east asian economies caught in a middleincome trap? case: Malaysia. paradoxes in provision of higher skilled labour", Forum for Development Studies, Vol. 41 No. 1, pp. 115-133, doi: [10.1080/08039410.2014.889035](https://doi.org/10.1080/08039410.2014.889035).
- Fosu, A.K. (2017), "Growth, inequality, and poverty reduction in developing countries: recent global evidence", Research in Economics, Vol. 71 No. 2, pp. 306-336.
- Furnell, S. (2021), "The cybersecurity workforce and skills", Computers and Security, Vol. 100, doi: [10.1016/j.cose.2020.102080](https://doi.org/10.1016/j.cose.2020.102080).
- Goulart, A.R. (2019), The Failure of the Current Model of Higher Education in Information Technology (IT), Doctoral dissertation, University of Sao Paulo.
- Hanushek, E.A. and Woßmann, L. (2007), The Role of Education Quality for Economic Growth, Policy Research Working Paper; No. 4122, World Bank.
- INEP, National Institute of Educational Studies and Research An_ísio Teixeira (2018), "Education Reports Brazil", available at: <http://portal.inep.gov.br/> (accessed 1 October 2020).
- J_auregui, I. (2018), "Characterization and evaluation of the working life project and authentic leadership", available at: http://dspace.uces.edu.ar:8180/jspui/bitstream/123456789/4411/1/RI_15_16_P%C3%A9rez-J%C3%A1uregui.pdf (accessed 2 February 2020).
- Jedwab, R., Christiaensen, L. and Gindelsky, M. (2017), "Demography, urbanization and development: rural push, urban pull and urban push?", Journal of Urban Economics, Vol. 98, pp. 6-16.
- Kittur, A., Nickerson, J.V., Bernstein, M.S., Gerber, E.M., Shaw, A., Zimmerman, J., and Horton, J.J. (2013), "The future of crowd work", Paper presented at the Proceedings of the ACM Conference on Computer Supported Cooperative Work, CSCW, pp. 1301-1317, doi: [10.1145/2441776.2441923](https://doi.org/10.1145/2441776.2441923), available at: www.scopus.com.
- K€uller, A.L.M. (2010), Inovaç~ao na Educaç~ao Superior: Reflex~oes sobre a transformaç~ao de uma proposta curricular. 2010, (Dissertaç~ao - Mestrado em Educaç~ao), Faculdade de Educaç~ao, Universidade de S~ao Paulo, S~ao Paulo, p. 172.
- Liboni, L.B. and Cezarino, L.O. (2012), "A Vis~ao Sist^emica e a Estrat_egia para a Sustentabilidade: um estudo de caso no setor sucroenerg_ético brasileiro", 8 Congresso Brasileiro de Sistemas, Poços de Caldas. Anais do 8 Congresso Brasileiro de Sistemas.
- Liboni, L.B., Cezarino, L.O., Jabbour, C.J.C., Oliveira, B.G. and Stefanelli, N.O. (2019), "Smart industry and the pathways to HRM 4.0: implications for SCM", Supply Chain Management: An International Journal.
- L_opez, J.E., de la Guardia, J.J.R., Olmos-G_omez, M.C., Chac_on-Cuberos, R. and Olmedo-Moreno, E.M. (2019), "Enhancing skills for employment in the workplace of the future 2020 using the theory of connectivity: shared and adaptive personal learning environments in a Spanish context", Sustainability (Switzerland), Vol. 11 No. 15, doi: [10.3390/su11154219](https://doi.org/10.3390/su11154219).

- Luthra, S. and Mangla, S.K. (2018), "Evaluating challenges to Industry 4.0 initiatives for supply chain sustainability in emerging economies", *Process Safety and Environmental Protection*, Vol. 117, pp. 168-179.
- Marris, P. (2018), *The Experience of Higher Education*, Routledge.
- Mello, S.L.D.M., Ludolf, N.V.E., Quelhas, O.L.G. and Meiri~no, M.J. (2020), "Inovaç~ao na era digital: novo mercado de trabalho e mudan~as educacionais", *Ensaio: Avaliaç~ao e Pol_iticas P_ublicas em Educaç~ao*, Vol. 28 No. 106, pp. 66-87.
- Molderez, I. and Ceulemans, K. (2018), "The power of art to foster systems thinking, one of the key competencies of education for sustainable development", *Journal of Cleaner Production*, Vol. 186, pp. 758-770.
- Panayotou, T. (2016), "Economic growth and the environment", *The Environment in Anthropology*, pp. 140-148.
- Phan, L.K. (2021), *Solutions to Improve the Quality of Higher Education in Vietnam in the Context of Plecher, H. (2020), Brazil: Unemployment Rate From 1999 to 2020, Statistical Digital Trend Report*, available at: <https://www.statista.com/statistics/263711/unemployment-rate-in-brazil/> (accessed 05 2020).
- Porto, C. and R_egnier, K. (2003), *O Ensino Superior no Mundo e no Brasil – Condicionantes, Tend^encias e Cen_arios para o Horizonte 2003-2025 - Uma Abordagem Explorat_oria*, Macroplan, dezembro, 177p, Cap_titulo 1, pp. 11-18.
- Ramsden, P. (1991), "A performance indicator of teaching quality in higher education: the Course Experience Questionnaire", *Studies in Higher Education*, Vol. 16 No. 2, pp. 129-150.
- Saviani, D. (2007), "O Plano de Desenvolvimento da Educaç~ao: an_alise do projeto do MEC", *Educaç~ao and Sociedade*, Vol. 28 No. 100, pp. 1231-1255.
- Sevilla, M. and Far_ias, M. (2020), "Labour market mismatch in emerging countries: the case of Chile", *Compare*, Vol. 50 No. 2, pp. 276-293, doi: [10.1080/03057925.2019.1675495](https://doi.org/10.1080/03057925.2019.1675495).
- Simonova, M., Lyachenkov, Y. and Kostikova, E. (2021), *Regional Labor Market: Supply and Demand in the Context of Digitalization*. doi: [10.1007/978-3-030-47458-4_93](https://doi.org/10.1007/978-3-030-47458-4_93), available at: www.scopus.com.
- Teichler, U. (2008), *Diversification? Trends and Explanations of the Shape and Size of Higher Education*, Published online: 18 April 2008, Springer Science Business Media B.V, Vol. 56, pp. 349-379, 2008. High Educ, doi: [10.1007/s10734-008-9122-8](https://doi.org/10.1007/s10734-008-9122-8) pp. 349-379.
- Vaganova, O.I., Odarich, I.N., Popkova, A.A., Smirnova, Z.V. and Lebedeva, A.A. (2019), "Independent work of students in professional educational institutions", *Amazonia Investiga*, Vol. 8 No. 22, pp. 295-304.
- World Bank (2019), "Higher education for development: an evaluation of the world bank group's support", available at: <http://documents1.worldbank.org/curated/en/729101493052924041/pdf/Higher-education-for-development-an-evaluation-of-the-World-Bank-Group-s-support.pdf>, (accessed 26 March 2019).
- Zexian, Y. and Xuhui, Y. (2010), "A revolution in the field of systems thinking—a review of Checkland's system thinking", *Systems Research and Behavioral Science: The Official Journal of the International Federation for Systems Research*, Vol. 27 No. 2, pp. 140-155.
- Ziankova, I., Lisichonak, A. and Yemialyanau, A. (2019), *Development of an Inclusive Society with the Instruments of "Green" Economy and Education*, Paper Presented at the Vide. Tehnologija, Resursi - Environment, Technology, Resources, Vol. 1, pp. 353-358, doi: [10.17770/etr2019vol1](https://doi.org/10.17770/etr2019vol1)