Navigating Tomorrow: Transforming Bhutan through Technology and Human Capital

Namgyal T Gyaltshen

Abstract

Since 2021, Bhutan has embarked on a transformative journey, reshaping its economic landscape and adopting technology as a key driver of progress. Significant efforts are now pushing the country towards new pathways for economic growth. This article will explore these efforts and their impact on the country's human capital trends.

Introduction

Bhutan is at a pivotal turning point. Since His Majesty the King granted kashos (royal charters) during the 2020 National Day celebrations, and later called for national-level reformation during the 2022 National Day celebrations, the country is seeing structural transformation in the education system, the civil service, and the tourism industry. These, in turn, have catalysed other sectors and institutions to follow suit.

In addition to institutional reform, there has also been a collective and concerted effort to adopt technology as part of the national priority. This transition in strategy has offered a paradigm shift, optimising new pathways for growth that will eventually drive economic development.

Despite this progress, there have been challenges in fostering public awareness and engagement in the process. This gap has often led to some of these reforms becoming topics of contention particularly in relation to the implementation of these initiatives. The best example of this is the period of speculative rumour-mongering that preceded the transformation in the Royal Civil Service, ultimately leading to resignations that many attributes to fear and lack of clear information.[1]

1 Wangchuk, Rinzin. "Why are civil servants resigning?" Kuensel, January 24, 2023

This article aims to navigate Bhutan's transformation through the lens of technology, and its impact on the economy, as reflected in recent human capital trends.

The Past Decade: Bhutan's Evolution

Historically, Bhutan has always had a very cautious relationship with technology. This largely stemmed from its interpretation of cultural preservation. However, in the face of globalisation and connectivity, development challenges, and its relationship with the external world, it began a gradual shift towards adopting technology.

A closer look at Bhutan's major technology milestones reflects the 1960s and 1970s when the country first introduced telecommunications technology and radio communication as first steps that provided the direction for its development. These foundational investments in technology infrastructure are also credited with having laid the groundwork for the advancements that followed in the decades after.

Similarly, as we explore the future of Bhutan and its economy, the country now stands at a juncture where it must leverage the transformational potential of technology. To do so, it is imperative that we understand the platform provided by efforts from the past decade.

The past decade has seen significant progress in Bhutan's technology landscape. Digital Drukyul stands as the largest initiative from the government in leveraging technology to provide equitable access to all services for citizens. The establishment of a Department of Innovation and Technology (InnoTech) under the traditionally investment-focused Druk Holding & Investments in 2019 signals the shift towards technology in the national strategy for economic development. InnoTech now has more than 15 diverse anchor projects in its portfolio, ranging from projects in Artificial Intelligence/Machine Learning, the Internet of Things (IoT), Drones, Carbon Credit Platform and other Blockchain-based solutions, Green Energy Technologies, to Assistive Technologies. Additionally, it houses the Jigme Namgyel Wangchuck Super Fab Lab, third of its kind in the world, through which the department frequently collaborates with the Massachusetts Institute of Technology, and other organisations and talent, both global and local.

Finally, the Gyalpozhing College of Information Technology (GCIT) was formally inaugurated in 2017. This was in addition to the rest of the already established STEM colleges like the College of Science and Technology (CST), and the Jigme Namgyel Engineering College (JNEC). The establishment is in line with the understanding that Bhutan cannot keep importing external talent and knowledge, and instead must aim to grow local education and local talent in emerging industries like technology.

The Bhutan Futures Workforce Report[2] analysed data from the Ministry of Labour and Human Resources, finding that, in 2019, less than five percent of digital positions were filled. This further points to the need to synergise and match industry expectations and availabilities to academic curriculum, and a comprehensive national strategy that considers not only the strategic technology projects but also the prioritisation of the relationship between industry and academia.

Bhutan Today: Transformation

While successful in navigating its size and inherent limitations, Bhutan has been unable to leverage previous human advancements to emerge as a central player in the international economy. Under Industry 4.0, in the current global landscape, Bhutan is presented with an opportunity, and stands to benefit from moving towards becoming a knowledge-based economy.

Such a shift would ensure the diversification of the Bhutanese economy, allowing the country to move away from its reliance on hydropower and agriculture. In the current global context, this would mean prioritising technology, innovation, and research and development, and the skills required to excel in these industries. Eventually, Bhutan could tap into new pathways of economic growth, further empowering local talent to thrive in industries that are constantly evolving, enabling global competitiveness.

This transition and focus on technology are also at the heart of the transformation interventions. In both the Royal Kasho on Education Reform and the Royal Kasho on Civil Service Reform, technology is a central theme:

2 "Bhutan Workforce Futures." Bhutan: Ministry of Labour and Human Resources; Bhutan: UNDP, 2022

Education

> *"In preparing our youth for the future, we must take advantage of available technologies, adopt global best practices, and engineer a teaching-learning environment suited to our needs. Technology is the argument of our time and a major indicator of social progress…"*[3]

Civil Service

> *The 21st-century economy will be driven by artificial intelligence, robotics, automation, big data, and blockchain, while digital currency, digital wallet, digital banking, and quantum computing will define the financial landscape.*[4].

This willingness to embrace technology has led to multiple interventions through the transformation that builds upon past efforts and strives to provide infrastructural support to future efforts.

The Department for Economic and Technology Diplomacy was established under the Ministry of Foreign Affairs and External Trade to promote collaboration in science and technology through financing mechanisms, skill development, and technological advancement opportunities.

The restructuring of the Department of Information Technology and Telecom into GovTech in 2022 to prioritise the creation of a safe and thriving digital economy demonstrates the nation's commitment to the Digital Drukyul initiative and its goals of using technology to improve governance. Under this initiative, the Bhutan National Digital Identity, launched in 2023, is envisioned to be a foundational and infrastructural investment with wide-reaching implications for future technology development.

The recent emphasis on technology has also played a role in shaping human capital development. To keep up with global trends and local demand, the Royal University of Bhutan restructured many of its STEM courses in 2022 to focus on emerging technologies and align with the requirements

3 "Royal Kashos on Education Reform and Civil Service Reform." Bhutan Broadcasting Service, February 2, 2021

4 "Royal Kashos on Education Reform and Civil Service Reform." Bhutan Broadcasting Service, 2021

of the job market. Even before this, many organisations began to recognise the need to help develop digital literacy skills among the work force.

The growth of the technology sector, although initially in web and app development, and in content freelancers, has now slowly grown to include technology startups that are interested in solving local issues with emerging technology.

However, with access to and attempts at integrating technology in education[5], the gap between the quality of primary and secondary education received in rural areas and that in urban areas can only be expected to widen. Students who live in rural areas are less likely to have access to the internet and technology than students who live in urban areas. This disparity only increases for rural areas that lack access to the internet, leaving students with no alternative for learning outside of school.

International Perspectives

Even though contextual differences mean that identical reforms are not applicable universally, it is essential to examine successful implementations and policy changes for insights and key takeaways. Globally, technology comprises common themes:

Development of Industry Clusters[6]

Singapore saw success with its experience in accelerating the development of its knowledge-based industrial clusters (notably, offshore marine engineering and biomedical sciences) through innovation and effective public policy.[7]

More recently, in 2018, Canada launched its Group Innovation Clusters programme[8] that aims to drive economic growth by investing in technology-focused industries like advanced manufacturing, scale

5 Sharma KP. "Digital Learning Materials to enhance technology-based learning in Bhutan" Kuensel, March 6, 2023

6 Areas of intense business activity made up of companies, academic institutions and not-for-profit organisations that boost innovation and growth in a particular industry

7 Lim, Hank. "Innovation Policy in Singapore." Singapore: Singapore Institute of International Affairs, Chapter 7, 2018.

8 "About Canada's Innovation Clusters Initiative." Canada: ISED-ISDE

AI, digital technology, and ocean and protein industries.

Investments in Digital Infrastructure

India's Digital India Initiative aims to transform India into a knowledge-based economy by ensuring digital access, digital inclusion, and digital infrastructure[9]. It includes projects like Aadhar, a unique 12-digit biometric identity system. Additionally, India also runs BharaNet[10], a project dedicated to providing broadband connectivity to rural areas to digitally empower them.

The United Arab Emirates (UAE) launched the National Artificial Intelligence Strategy in 2017 with the goal of becoming a global leader by 2031.[11]

Easing Access to Resources for Technology Startups

According to the Estonian Startup Database[12] there are 1,500 startups founded in Estonia. Atomico's State of European Tech 2022[13]reports Estonia as the most entrepreneurial European country for tech startups. Much of this has to do with policies supporting entrepreneurship, access to capital, and infrastructure development. The Estonian Startup Visa scheme allows startup founders to relocate to Estonia and for existing Estonian firms to hire foreign talent.

Meanwhile, South Korea's Tech Incubator Programme for Startup (TIPS) was established as a public-private matching grant programme to provide financial support and mentorship to early-stage technology startups. [14]

Promotion of Research and Development, Technology and Innovation

In 2013, South Korea launched the "Creative Economy" Initiative

9 "Press Release." India: Press Information Bureau, Government of India, 2024

10 "BharatNet Project." India: Universal Service Obligation Fund, Government of India,

11 "UAE National Strategy for Artificial Intelligence 2031." UAE: National Program for Artificial Intelligence, 2018

12 "Startups and Support Organizations." Estonia: Startup Estonia

13 "State of European Tech." Atomico, 2022.

14 Aridi, Anwar; Kim, Wonjoon; Kibum Kim; Shin,Kyeyoung; Kim, Taekyun; Kim, Daehyun. "The Effects of Matching Grants on Technology Startups : The Case of Korea's TIPS (English)." Washington, D.C. : World Bank Group, 2024.

which included reforms that would leverage science and technology for innovation and growth, boost productivity through the digital economy, easing regulatory burden, and promoting entrepreneurship and venture capital.[15]

Promotion of Life-Long Learning

In education, instead of redesigning and pushing curriculum around trends in the ever-evolving job market, policies were aimed at integrating technology and introducing curriculum that enabled "lifelong learning". In 2005, Singapore launched the "Teach Less, Learn More" inspired education system that nurtures creativity, critical thinking, and a passion for lifelong learning[16].

The National Education Policy in India underwent reform in 2020 aiming to integrate technology and create an education system that emphasises holistic development.[17] These policies were enhanced by support for skill development programmes for workers and a focus on digital literacy.

Bhutan Tomorrow: Vision for the Evolving Digital Landscape

Against this background and perspective, Bhutan must consider its approach to succeeding in the ever-evolving global landscape. Strategic technology sectors for growth, while also continuing to make investments into education, research and development, innovation, knowledge creation, and infrastructure, could unlock opportunities and ensure inclusive growth. Additionally, collaborations, both local and global, knowledge sharing and creating an enabling environment are vital to the vision of a successful Bhutanese future.

Given this, there is an imperative for a strong national strategy to ensure that all these priorities are aligned across industries. Within the strategy, the impact from each topic of priority would interact with another, multiplying the impact on the economy. For example, in the case of knowledge creation,

15 "Korea: Policy Priorities for a Dynamic, Inclusive, and Creative Economy." Korea: OECD, 2015.

16 "Engaging Our Learners: Teach Less, Learn More" Singapore: Ministry of Education, 2013, 3–5.

17 About National Education Policy." India: Ministry of Education, Government of India, 2023.

to ensure focused success and in following with international perspective, Bhutan must first identify key sectors in the national strategy that could prove transformational for its economy. Once identified, clear educational programmes designed especially for these sectors must be introduced to grow local talent and knowledge in these industries. Government investments and support are vital to ensure that these talents are mapped to projects that will employ them in the future. There is also value in international collaborations to either create jobs and opportunities for local talent or to invite international talent and solutions to fill the gaps in the economy.

Within the education system, in addition to the change in curriculum to reflect current trends, an intentional inclusion of courses and projects that allow holistic development and skills and qualities that would enable lifelong learning must be prioritised. Prioritising STEM courses and only focusing on employees and students that have received formal STEM training, would only exacerbate any gaps caused by technology and isolate a subsection of the population.

Instead, there needs to be efforts to design inclusive policies for marginalised communities in the transition, to ensure that Bhutanese citizens are educated in and exposed to technology and its potential, whether through technology integration in the classroom, capacity development programmes, or through providing opportunities for students to explore technology as a tool to solve problems in their own fields of study. This is particularly significant and would require government investments in infrastructure.

Finally, creating an enabling environment and a supportive policy framework is of paramount importance. In encouraging research and development, innovation and knowledge creation, there must be resources available in the form of mentorships, venture capital funds, and opportunities to prototype and scale up. In addition, policies around technology need to evolve to ensure not only that the system is open for technological advancements to develop without being stifled, but also that only the positive impact of technology is imparted on society.

In transitioning to a knowledge-based economy, a niche and contextual set of challenges and lessons present themselves:

Infrastructure and Connectivity

Limited connectivity and the lack of infrastructure hinder the access and safe leverage of digital technologies. To overcome this, it is vital to improve digital public infrastructure through investments in robust infrastructure or innovations towards goals like reducing internet and computing cost, ensuring reliable energy supply and increased connectivity.

Digital Divide and Socio-Economic Gaps

Disparities caused by wealth, gender, geographical location, gaps in digital literacy, and the lack of understanding of and access to technology could limit opportunities for marginalised populations to be engaged in the knowledge economy. This would require targeted interventions and the creation of intentional spaces to foster equitable participation.

Gaps in Human Capital Requirements

There is an immediate mismatch in the workforce skillset and the skills required in a knowledge-based economy. In bridging this gap, prioritising education and skills in research and development, strengthening the applications of STEM in education, investments in professional development and investments in research are crucial. In the short run, introducing frameworks through which international talent and companies can work to impart their knowledge to local students and employees through flexible visa policies, advisory commitments, startup programmes, and collaborative research projects, would also help efficiently guide Bhutan through its transformation. An interesting example is the United Kingdom's Global Talent Visa which allows tech talents from across the world to work in the UK's technology sector.

The New Era

As Bhutan moves towards profound transformation and growth in the coming years, this point in time will mark one of the most significant periods in Bhutanese history. The success of the narrative, efforts, and vision will contribute towards and multiply the impact of the transformation. As such, while it is vital that we embrace the opportunities presented by technology,

it is also equally crucial to ensure that our vision for that success is guided by our goals of resilience, adaptability, and continuous learning.

References

Aridi, Anwar; Kim, Wonjoon; Kibum Kim; Shin,Kyeyoung; Kim, Taekyun; Kim, Daehyun."The Effects of Matching Grants on Technology Startups : The Case of Korea's TIPS (English)." Washington, D.C. : World Bank Group, 2024,http://documents.worldbank.org/curated/en/099522101172436756/IDU1fd10b128162ba146981b 5451f8c8e1523006

"About Canada's Innovation Clusters Initiative." Canada: ISED-ISDE, https://ised-isde.canada.ca/site/global-innovation-clusters/en/about-canadas-innovation-clusters-initiative

"About National Education Policy."India: Ministry of Education, Government of India, 2023, https://www.education.gov.in/nep/about-nep#:~:text=National%20Education%20Policy%2C%20 2020%20(NEP,quality%20education%20to%20all%2C%20thereby)

"BharatNet Project." India: Universal Service Obligation Fund, Government of India, https://usof.gov.in/en/bharatnet-project

"Bhutan Workforce Futures." Bhutan: Ministry of Labour and Human Resources; Bhutan: United Nations Development Programme, 2022, https://www.undp.org/sites/g/files/zskgke326/files/2022-12/Bhutan%20Futures%20Workforce% 20Report-%20Dec-2022.pdf

"Engaging Our Learners: Teach Less, Learn More" Singapore: Ministry of Education, 2013, 3–5.

"Korea: Policy Priorities for a Dynamic, Inclusive, and Creative Economy." Korea: OECD, 2015, https://www.oecd.org/korea/korea-policy-priorities-for-a-dynamic-inclusive-and-creative-economy-EN.pdf

Lim, Hank. "Innovation Policy in Singapore." Singapore: Singapore Institute of International Affairs, Chapter 7, 2018.

"Press Release." India: Press Information Bureau, Government of India, 2024, https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1885962

"Royal Kashos on Education Reform and Civil Service Reform." Bhutan Broadcasting Service, February 2, 2021, https://www.bbs.bt/news/?p=143221

Sharma KP. "Digital Learning Materials to enhance technology-based learning in Bhutan" Kuensel, March 6, 2023, https://kuenselonline.com/digital-learning-materials-to-enhance-technology-based-learning-in-bhutan/

"Startups and Support Organizations."Estonia: Startup Estonia, https://startupestonia.ee/startupdatabase/#:~:text=The%20concentration%20of%20such%20diversity,startups%20and%20120%20support%20organizations.

"State of European Tech." Atomico, 2022, https://2022.stateofeuropeantech.com/

"UAE National Strategy for Artificial Intelligence 2031." UAE: National Program for Artificial Intelligence, 2018, https://ai.gov.ae/wp-content/uploads/2021/07/UAE-National-Strategy-for-Artificial-Intelligence-2031.pdf

Wangchuk, Rinzin. "Why are civil servants resigning?" Kuensel, January 24, 2023, https://kuenselonline.com/why-are-civil-servants-resigning/