Bhutan Workforce Futures

Stepping Stones to Industrial Strategic Propositions for the **Agriculture, Creative** and **Digital** Sectors

This report has been commissioned as part of UNDP's support to understand the emerging skill needs in the three sectors. Core team leads for this project include Jit Bahadur Bhandari (Sr. Program Officer, MoLHR), Pemma Lhaden Lhendup (Asst. Program Officer, MoLHR), Tshoki Zangmo (Head of Exploration, Accelerator lab, UNDP Bhutan) and Tshering Lhamo (Economist, UNDP Bhutan). Extensive support has been provided by Jigme Zangmo (Junior consultant, UNDP Bhutan) and Kuenley Lhaden Gyaltshen (Junior consultant, UNDP Bhutan).

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Ministry of Labour and Human Resources 2022

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Public institutions closely involved in producing the report are:
The Gross National Happiness Commission: The Commission provided long-term sustainable socioeconomic development and strategies, spearheaded five-year and annual planning, and guided public policy formulation.

The Ministry of Agriculture and Forests: The MoAF ensures the sustainable socioeconomic well-being of the Bhutanese people through adequate access to food and natural resources.

The Ministry of Information and Communications: The MoIC is responsible for promoting the development of reliable and sustainable information, communications, and transport networks and facilitating the provision of affordable and easy access to associated services, particularly in rural and far-flung communities.

The Ministry of Economic Affairs: The MoEA aims to create an enabling environment, including institutions and infrastructure, for the sustainable growth of the economy through public and private sector development.

The Ministry of Education: The MoE focuses on developing sound educational policies that enable the creation of a knowledge based GNH society and providing equitable, inclusive and quality education and lifelong learning opportunities to all children.

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Background

Rapidly evolving trends pose challenges for education and labour policies, directly contributing to skills mismatch and labour shortages. While some mismatch between the supply of and demand for skills is inevitable, the cost of persistent mismatch and shortages reduces labour productivity. A poorly adapted workforce has a wide-ranging impact. It slows down economic growth by increasing public expenditure and creating the need to compensate for unemployment. It has inherent social costs, including poverty, erosion of self-esteem, impairment of family wellbeing and mental illness. It brings about a higher risk of unemployment, lower wages, lower job satisfaction and poorer career prospects.

Bhutan is not immune to these adversities: youth unemployment stands at 20.9% in 2021 with the rate staggering at 32.6% in the capital where most of the youth are clustered, according to the 2021 Labour Force Survey Report. Despite the high unemployment rate, as per the report "Digital Jobs in Bhutan: Demand Creation and Future Skilling," many employers indicate the inability to find employees with the right skills. Many jobseekers face difficulties in finding job opportunities that match their qualifications. Another major challenge is the reluctance of the youth to take up available jobs due to skills mismatch. At the same time, we are offered a window of opportunity to leverage the demographic dividends to maximise labour productivity.

Responding to this situation means being aware of the changes in the future labour market. This will allow sectoral stakeholders to be prepared for a fast-changing environment. It calls for robust systematic anticipation of skills to not only prepare individuals, employers, enterprises, government, and training providers for future competencies but also enable timely strategic responses to fill the skills gap.

The future workforce study has been developed as a response to overcome the issue of skills mismatch in the labour market. The study also attempts to implement part of the recommendations stemming from the systems approach to youth employment work, further emphasised in the report "Digital Jobs in Bhutan: Demand Creation and Future Skilling". The report highlights the need to anticipate future skilling data in the country, particularly to invest in identifying future skills and linking them to the demand in the labour market.

While such studies are beneficial for every sector of the economy, the current proposition of mapping future skills only for selected sectors seems particularly well-suited given resource and time constraints. This study focuses on the creative and agriculture sectors with the digital sector as a cross-cutting emerging industry.

Globally, creative industries are a major driver of economic growth. Bhutan has a historically rich and distinctive cultural heritage in the form of music, art and cuisine. This heritage is attractive to global consumer audiences in search of cultural authenticity and high-skill crafts. There is a need for an ambitious plan of longer-term investment to support this. Within the creative industry, new technologies are having and will continue to have, a pervasive effect on the future of work in the creative economy.

Digital disruption is, therefore, a key trend influencing the future of the creative economy – an industry increasingly dependent on technology – especially in developing economies. If channelled positively, these disruptions can allow the creative economy to serve as a catalyst for change and economic development. The adoption of or adaptation to digital technologies thus holds great promise for developing sustainable economic activities appropriate for developing countries. The development of the Creative Industries Export Strategy also provides the required impetus for growth of this sector. The strategy includes a detailed five-year plan of action with a set of activities to provide a solid foundation for the growth of the film, music and graphic design, including the related software development sector.

In addition to the creative sector, the study also aims to map future skill needs in the agriculture sector which is the main source of employment for the bulk of the Bhutanese population who largely engage in subsistence farming. Historically, farming has been constrained by the mountainous topography. It is now facing environmental challenges such as the impact of climate change. Likewise, the sector faces challenges in addressing a skills gap in agricultural operations. The focus is on the skills and literacies needed to adapt to climate change while ensuring that farming takes full advantage of new technologies to increase food production and to meet the challenges of food security in the 21st century.

By and large, the study investigates how digital transformation can help put these sectors on a new growth trajectory. The disruption brought about by the Covid-19 pandemic has emphasised how critical digital skills building, and development is for the future of the economy. If well nurtured, the digital capabilities can stimulate innovation and job creation that can drive inclusively sustainable growth. As per the Digital Jobs Report, work in the digital sector also tends to foster an enabling environment for vulnerable groups compared to other sectors. Moreover, it provides a prime opportunity for the much needed and sought-after diversification of the economy away from a capital-intensive sector with a high potential for gainful employment for the substantial number of educated youth in the country.

Executive Summary

The report is the culmination of a four-month investigation into the workforce futures of Bhutan for three sectors: agriculture, creative, and digital. The objective of this research is to create a 15-year outlook for workforce demand for these sectors that can be used to generate response strategies, including for future workforce supply, job growth and capability building.

Two complementary scenarios for each of the three sectors that lead to specific industrial strategic propositions are presented. Together, these six core propositions are presented as the key ideas.

Overall, the report consists of four parts. Part 1 outlines the study objective as well as the methodological processes employed using both quantitative and foresight tools to gather data and intelligence for sensemaking. Drawing extensively from the employment data and qualitative insights, part 1 also explores workforce trends, both established and emerging, and uncovers dominant employment-related narratives and metaphors.

Part 2 focuses on the future of jobs, skills and workforce propositions in the agriculture sector across three time horizons. It first touches on global and regional megatrends, including technological disruptions and strategic drivers of change transforming the agriculture industry. This is followed by national trends and disruptions based on quantitative data sourced from relevant agencies. Next, it examines specific implications for a range of different trends and emerging issues based on data collected through structured interviews. It then explores a range of priority issues regarding the proposed workforce propositions for Bhutan while outlining required skill and capability needs. It concludes with a set of recommendations and interventions to help upgrade and strengthen the agriculture workforce.

Part 3 and 4 focus on the digital and creative sectors, respectively. Both are presented in a similar format to that of the agriculture sector and provide a range of industry-specific and country-specific employment trends and proposed interventions.

As with any study in strategic foresight, ideas about the future are built on assumptions. The report is **not meant to provide a foolproof or "future-proof" plan** for Bhutan's workforce futures as that cannot exist. Ideas and assumptions about the future are subject to change as new data emerge, as new ideas about the future are explored, and as strategic thinking changes. At best, strategies built on assumptions about the future represent hypotheses. These **"future hypotheses"** can only provide **"if, then"** answers. For example, if climate change will cause the melting of glaciers and subsequent access to water for farmers, then how should Bhutan's government and farmers begin to prepare? We cannot know, for certain, the effects of climate change. However, we do know it must be prepared for, meaning it is a critical issue.

The role of strategic foresight is not to predict the future as any credible practitioner will tell us that is not possible. Its role is to help us consider how the futures (plural intentional) may be different from the present and based on this to help us consider our options in the present.

The **six proposed industrial strategic propositions** presented in this report should therefore be seen as six hypotheses. They should not be considered infallible by any stretch of the imagination. Their value is provisional, requiring testing and experimentation, consultation and evaluation. The

propositions stimulate thinking and conversation and can only be validated if aspects of them work for Bhutan in the coming years.

For each sector, there are two industrial propositions. One of the two propositions is **inwardly focused,** strengthening core capabilities and building the internal economy and skills pathways within Bhutan. The second proposition is **outwardly focused,** promoting Bhutan to the world and generating economic growth and skills pathways through engagement with global markets.

The inward-looking propositions leverage the strength of Bhutan's cultural traditions and knowledge built over millennia. The outward-looking propositions leverage Brand Bhutan and its reputation as a country that prioritises well-being. Below is a summary description of the six strategic propositions.

Table 1: Proposed inward and outward focused industrial propositions for the three sectors

Sectors	Inward Focus	Outward Focus
Agriculture	**Rural Renaissance:** Extensive investments are made to boost productivity among subsistence farmers, create local economies, and connect farmers to the formal economy. Commitment to community support, simplicity, sufficiency and equity.	**Organic Brand Bhutan:** The agricultural sector gears towards commercial and organic farming to capitalise on the growing demand for organic produce. Commitment to advancing sustainable practices and integrating technology with a spiritual orientation to the land.
Creative	**Bhutan Creative Collaborative Community:** Bhutan supports the resilience of grassroots creative workers by supporting income generation, collaboration and the creation of safety nets. Commitment to traditions and supporting equitable livelihoods.	**Druk Pop Global:** Bhutan promotes its creative products to the world led by high production media, which open up export opportunities for the whole sector. Commitment to smart hybridity, bringing the gifts of Bhutanese culture to the world.
Digital	**Connected and Safe:** Bhutan connects to the Internet and digital literacy is widespread and inclusive across the entire population. Commitment to digital equipotentiality, safety and mindfulness.	**Bhutan Digital Living Lab:** Bhutan draws on the global digital expertise to innovate solutions to its practical problems across the economy. Commitment to using digital tech for global collaboration on applied problem-solving of Bhutan's grave challenges.

Picture 1 & 2: Study scoping exercise with taskforce members, April 2022

Stepping stones as an orienting metaphor for Bhutan's workforce

Human beings think in metaphors. We use them to explain complex ideas. And yet, use wrong metaphors and people can become confused or misled. Metaphors like "technology roadmaps" and "economic pathways" are popular, appealing to our desire for certainty and aversion to risk. They indicate economic development as fixed, predictable, or determined. A road or path is already built, we must just walk it. But these metaphors are misleading in the context of this report's findings.

The metaphor of stepping stone provides a way to consider the propositions presented in this report. Often, when we want to cross a stream or a river, we look for a suitable stretch to cross. There are often stones and rocks scattered throughout the stream or river that serve as stepping stones to cross without getting wet.

First, we will need to find a part of the river that we feel is safe to cross. Some parts of the river might look too deep, or the current is too fast, or it is too wide, and there are not enough stones to step across. **Secondly, once we find a suitable and safe place to cross,** stones are never lined up in a straight line but are scattered randomly from one side of the river to the other. Getting across will not be straightforward. We may have to adjust along the way, especially as we approach the stones and see them more clearly. **Thirdly, we will often only know if the way across** the river is viable as we try to cross. The stones may be slippery or wobbly. It is a process of testing and experimenting.

The metaphor tells us that getting from the present to the desired future requires us to shift our thinking according to the challenges that confront us. We cannot just force ourselves across any part of the river. Crossing safely requires humility and respect for natural forces at work and the challenge at hand. We can only do what is within our power and capability, and we must know that we will be safe enough on our journey.

The metaphor also tells us that the propositions we take will not be straight lines but will require non-linear adjustments. There will be experimentation. And as we learn from actions, adjustments will need to be made. Finally, it tells us that we will need to leap to get to where we want to go.

The six industrial strategic propositions should be seen as a conceptualisation of stepping stones for the sectors to **"leap"** into new workforce futures. They also feature intervention ideas developed by Bhutanese sector stakeholders that express the **"how"** dimensions of enacting these propositions.

Targeted and specific industrial proposition

One of the key ideas in this study is that a functioning and thriving workforce is not just dependent on supply-side reform, namely people with the right mix of skills and abilities, but also requires an economy that can absorb and use people with skill sets and abilities.

This point is emphasised in the "Digital Jobs in Bhutan: Demand Creation and Future Skilling" report, which argued that interventions need to be targeted at specific strategies to boost the demand side of the employment equation. This point is also underlined in the quantitative analysis conducted in this study. The data points to the need to improve skills and abilities and overall workforce capabilities from the supply side as well as the need to create an economy that is providing a demand for skills and abilities. There is no point in equipping people with skills, however high-tech or cutting-edge, that are not being called upon by the industry.

Workforce futures strategic propositions are related to both supply and demand and are, therefore, more comprehensive in their conceptualisation of what an intervention should be. This means what is required for each sector are targeted and specific industrial policy approaches that have a maximum chance of bearing fruit by matching Bhutanese strengths and competitive advantage with opportunities for productivity, economic growth and development.

Targeted and specific industrial policy has a rich tradition, both in economic and industrial theory as well as in practice. The high-performing Asian economies (HPAE) achieved high growth and industrial transformation through targeted and specific government intervention and leadership. As a World Bank policy research report argues:

In most of these economies, in one form or another, the government intervened systematically and through multiple channels – to foster development, and in some cases the development of specific industries. Policy interventions took many forms: targeting and subsidising credit to selected industries, keeping deposit rates low and maintaining ceilings on borrowing rates to increase profits and retained earnings, protecting domestic import substitutes, subsidising declining industries, establishing and financially supporting government banks, making public investments in applied research, establishing firm- and industry-specific export markets, developing export marketing institutions, and sharing information widely between public and private sectors. Some industries were promoted, while others were not. (p5-6)[1]

A report by the International Labour Organisation argues that not only is industrial policy vindicated historically, but it is also critical for transitioning into new economic, ecological and technological contexts, writing:

[1] Birdsall, N.M., Campos, J. E. L., Kim, C. S., Corden, W. M., MacDonald, L., Pack, H., ... & Stiglitz, J. E. (1993). The East Asian miracle: economic growth and public policy. World Bank. https://documents1.worldbank.org/curated/en/975081468244550798/pdf/multi-page.pdf

No country has made the arduous journey from widespread rural poverty to post-industrial wealth without employing targeted and selective government policies to modify its economic structure and boost its economic dynamism. Moreover, it is difficult to see how countries at all levels of development can respond constructively to contemporary challenges – from job creation and poverty reduction to participating in the technological revolution and global value chains, from promoting efficient and clean energy to mitigating climate change and greening the economy – without using some kind of targeted industrial policy. (p1) [2]

These authors emphasise specific lessons and principles from industrial policy, including the importance of the following key points:

- **Targeting** – Where to focus interventions within a nation's economy.

- **Macroeconomic and industrial policies** – the importance of synchronising macroeconomic policy with the industrial policy so that macroeconomic policy (often associated with the ministry of finance and central bank) supports industrial policy goals.

- **Trade and industrial policies** – the importance of using "smart combinations of trade opening export promotion, and support and protection of infant industries as part of a wider set of policies to stimulate structural transformation." (p24)

- **Learning and capabilities** – to make advances countries need to "acquire the capabilities required to adopt advanced technologies and shift into new industries." And this, in turn, means "building capabilities through learning; and accumulating productive capacities by investing in physical and human capital." (p26). This can be understood as the supply side of the industrial policy question.

- **Institutional and policy design** – this requires experimentation to find the right mix of organisations and policies that can work in the context that a country finds itself, including their horizons of change. As the authors write, "a readiness to embark on such experimentation and flexibility are essential to successful operation in an uncertain and rapidly changing world. Equally essential, to maximise the chances of success, are strong social dialogue institutions to discuss and manage difficult transitions." (p30)

The Industrial Strategy Council of the UK, arguing for a targeted approach, emphasises that goals, scale and longevity are fundamental. In other words, we must have a very clear and well-thought-through objective, commit sufficient resources to match the challenge, and be committed (but adaptive) for the long game. They write:

[2] Salazar-Xirinachs, J. M., Nübler, I., & Kozul-Wright, R. (2014). Industrial policy, productive transformation and jobs: theory, history and practice. Transforming Economies. Making industrial policy work for growth, jobs and development. https://www.ilo.org/wcmsp5/groups/public/---dgreports/---inst/documents/publication/wcms_315664.pdf

...good results depend on following specific policy design principles, of which a clearly defined purpose, sufficient scale, and longevity are fundamental... A well-articulated, meaningful, and realistic goal is possibly the most crucial principle of successful sectoral policy... considerable scale and scope, close integration of sectoral interventions with innovation and mission-oriented policies, and a significant degree of policy continuity coupled with their steady evolution. (p6-7) [3]

It would be presumptuous to believe that the six industrial propositions in this report should be or will be adopted as high-level industrial policy approaches as the ink dries. Developing a high-level industrial policy will require systems-based approaches and robust dialogue between many institutional stakeholders at multiple levels. Perhaps a more realistic and truthful way to see the value of this report, in the context of the need for industrial strategy, is as a stimulant and provocation for Bhutanese leaders to consider what they want to and need to do in the coming years – what might be the shape of the industrial policy they want to implement? Some of the propositions presented in the report may be useful to stimulate dialogue on such an industrial policy that can mobilise resources to achieve real transformation.

[3] Balawejder, F., & Monahan, E. (2020). Effective Policy Approaches to Sectoral Issues. Industrial Strategy Council Research Paper. https://industrialstrategycouncil.org/sites/default/files/2020-10/Effective%20Policy%20Approaches%20-%20Research%20Paper.pdf

Overview of Bhutan's labour force

This section provides a sketch of the current and evolving contours of employment in the country. Using the LFS data and insights from the strategic foresight workshops, some of the major employment trends and signals were identified and their implications on the labour market assessed.

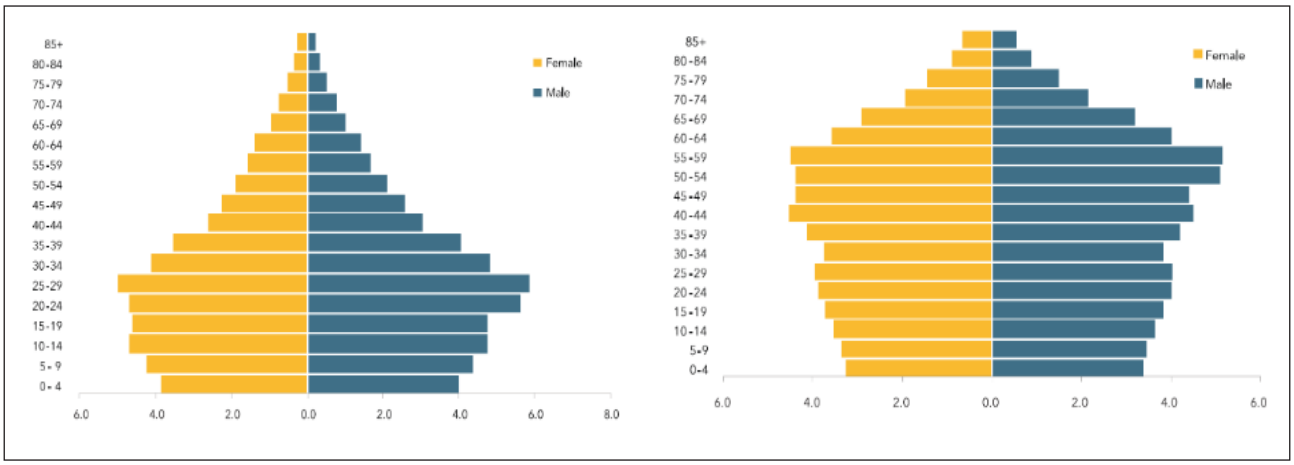
Picture 3: Sector focal scanning weak signals and trends in the workforce, September 2022

Major trends shaping Bhutan's labour force

To identify and collect trends and signals, time series data sourced from LFS, and related survey reports were analysed. The quantitative analysis was supplemented by several expert interviews along with environmental and media/literature scanning.

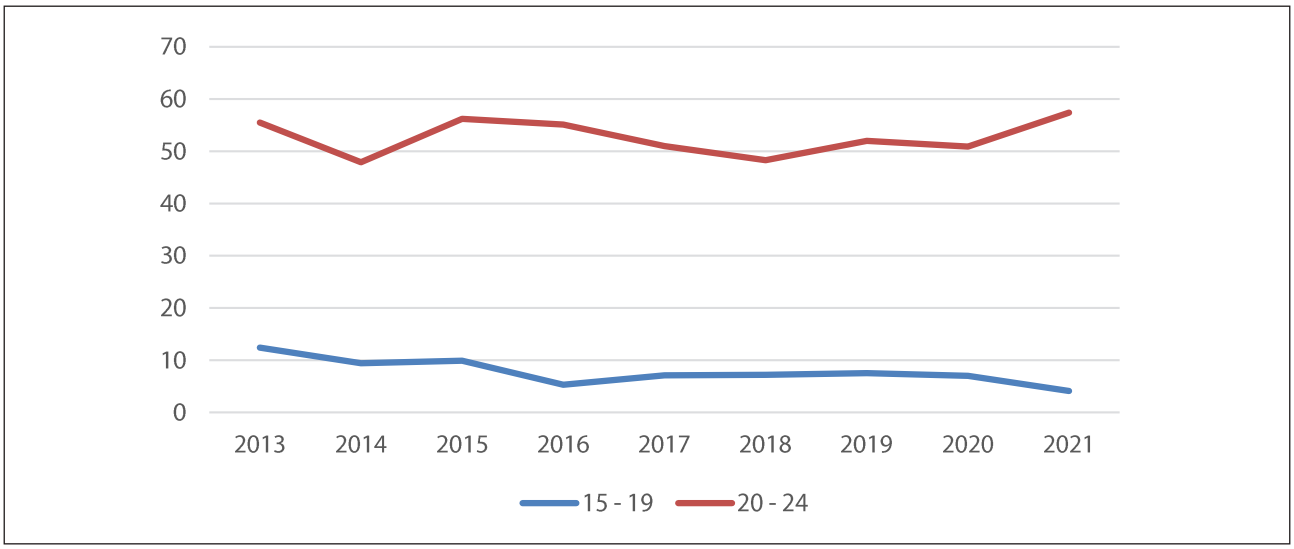
1. **Marginal increase in labour supply:** Labour supply developments are strongly affected by demographic changes in the various working-age cohorts. Like in most countries, prompted by the ageing of baby boomers, the population share of the old working-age group has been gradually increasing in Bhutan, resulting in the steady increase of the labour force participation rate for the older age cohort, 65+ year group. The same trend has been observed over the past decades among younger workers, particularly those in the 20 to 24 age groups, due to the demographic dividend.

Figure 1: Age-sex population pyramid, Bhutan 2017 and 2047



Source: National Statistics Bureau, Population Projection 2017-2047 (National Report). Thimphu

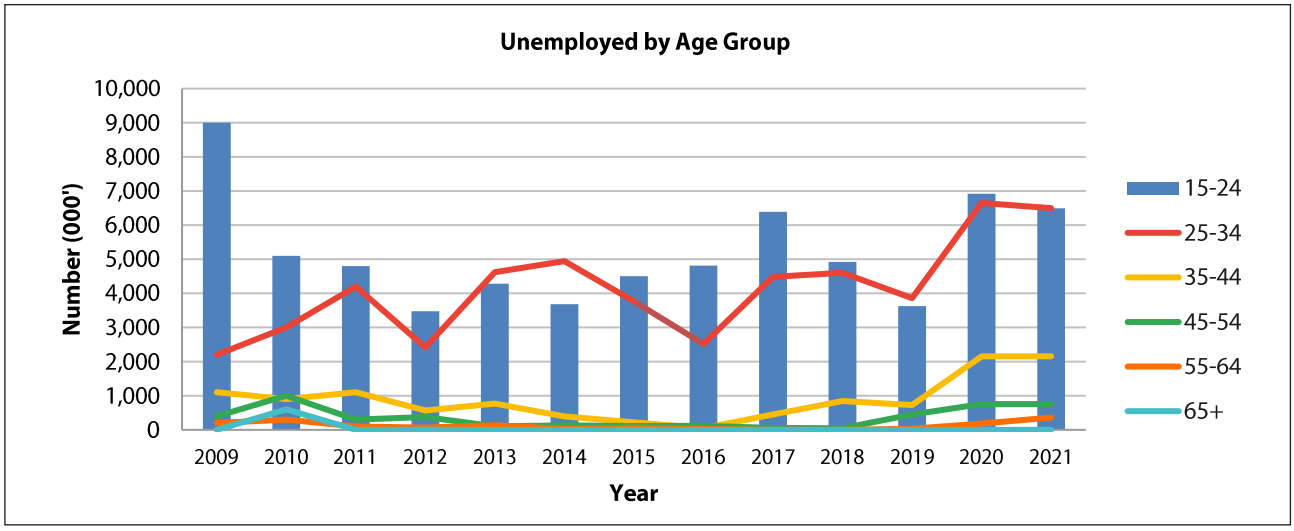
Figure 2: Labour force participation rate over time



Source: Labour Force Survey (2013-2021)

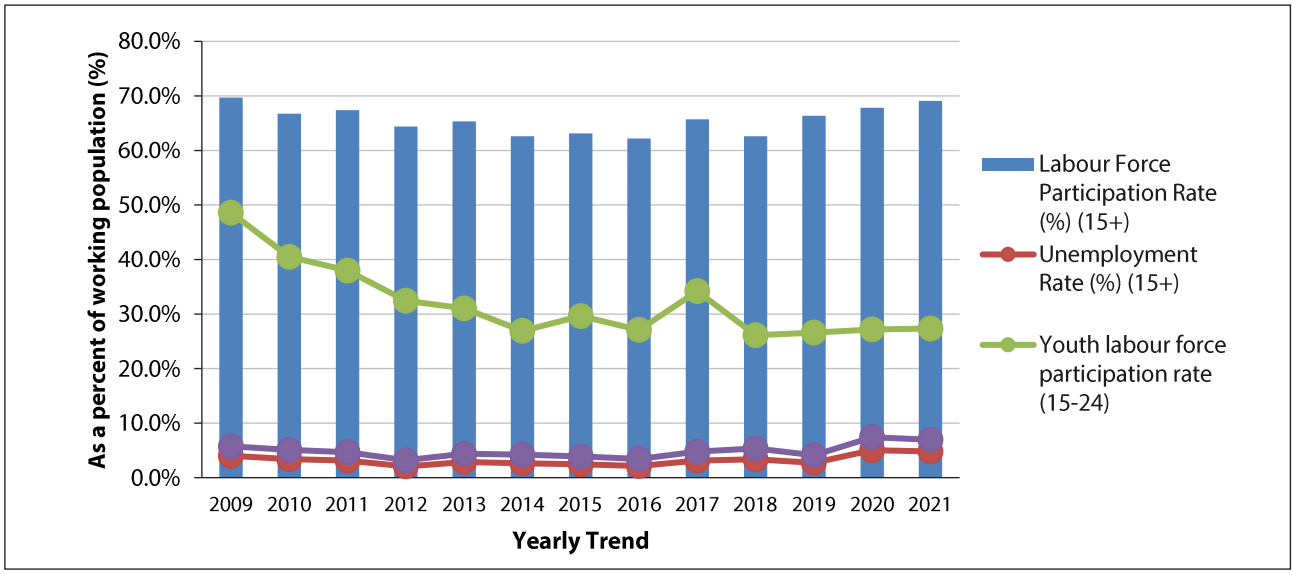
2. **Steady increase in youth unemployment:** Youth unemployment rates are generally much higher than unemployment rates for all ages, reflecting the difficulties young people face in finding jobs. According to the 'Statistical Yearbook of Bhutan 2022', the overall unemployment rate was 4.8% in 2021, while the youth unemployment rate was 20.9%. Youth unemployment has also been largely an urban phenomenon, with the rate being four times higher in urban areas as compared to the rural areas. The Covid-19 pandemic has exacerbated labour market problems for young people across Bhutan. According to a press release from the Druk Gyalpo's Relief Kidu (government-led relief cash transfer programme), more than 50% of the recipients were from the tourism sector falling in the 20-29 age group followed by 29% in the 30-39 age group.

Figure 3: Number of unemployed labour force by age in Bhutan



Source: Labour Force Survey (2009-2021)

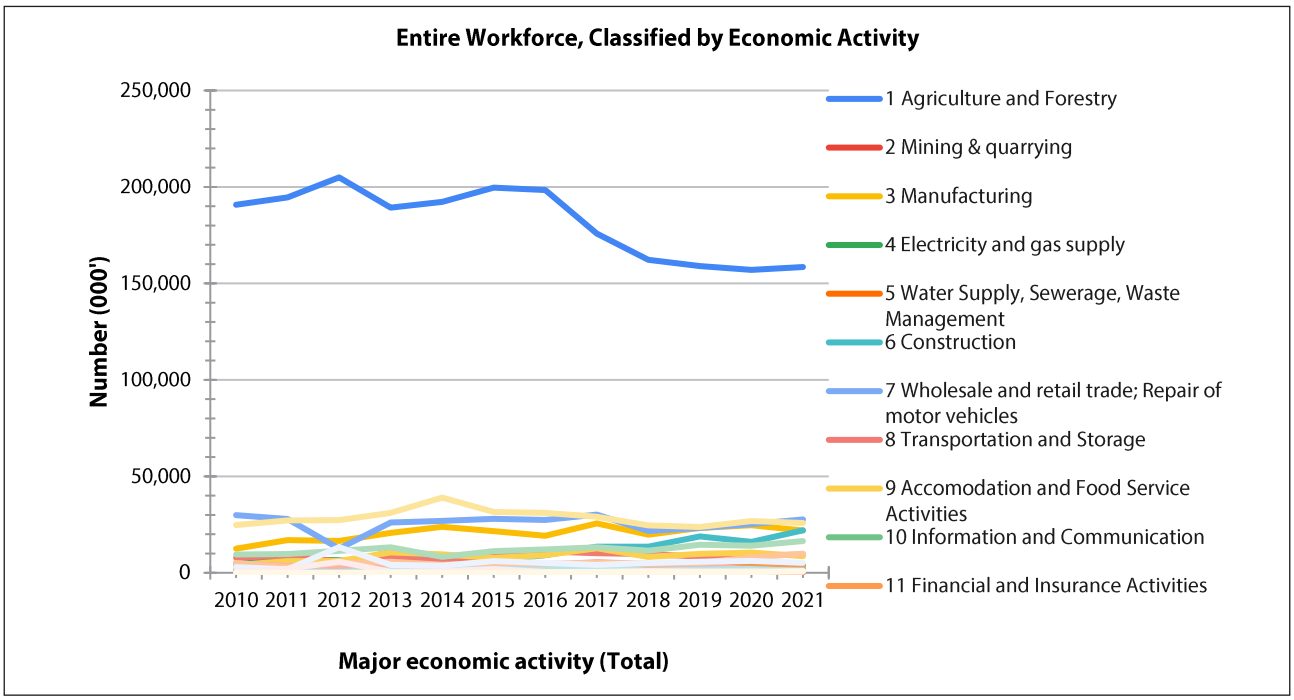
Figure 4: Youth employment, 2009-2021



Source: Labour Force Survey (2009-2021)

3. **A gradual decrease in the share of the agriculture workforce:** A look at the entire workforce by economic activity and employment in key sectors of interest shows that the workforce is dominated by the agricultural sector. Agriculture remains the largest employer in the country. However, the proportion of the agriculture workforce has witnessed a steady decline over time as indicated in the graph below.

Figure 5: Proportion of employment workforce by key economic activity

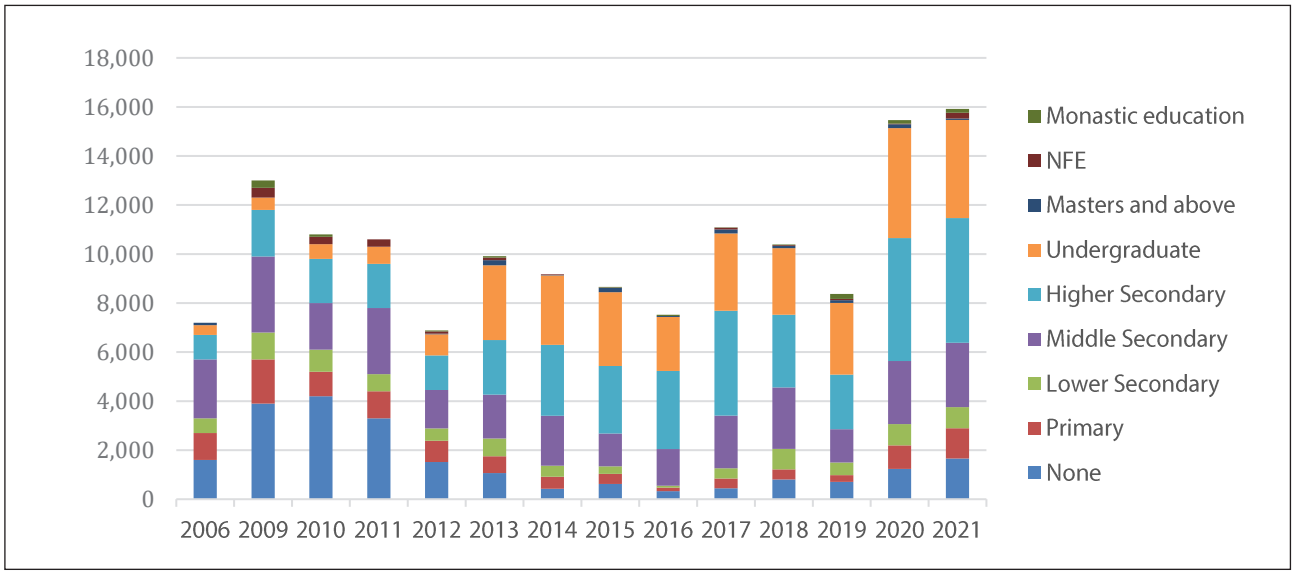


Source: Labour Force Survey (2010-2021)

Even though agriculture provides the bulk of employment in Bhutan, it is not proportionately productive. As per the "National Accounts Statistics 2022" report, the GDP growth contribution by agriculture sector has not improved significantly.

4. **Limited labour market opportunities for educated labour force:** When looking at unemployment by the level of education, what stands out is a high proportion of individuals that have completed higher secondary and graduate level education. The jump in 2020-21 should be seen in the context of the Covid-19 pandemic. But even considering the impact of Covid-19, this high proportion of unemployment among individuals with higher secondary and graduate level education is equivalent to that of 2013. Higher secondary and undergraduate cohorts may be unemployed due to a disconnect or mismatch between their skills and job/ market demand. This may be because there is not enough market demand to absorb these cohorts into the job market, or it could be because their skills are not marketable, or both. These cohorts (secondary and undergraduate) urgently need strategies for job placement, job creation, and skills that will help grow the economy.

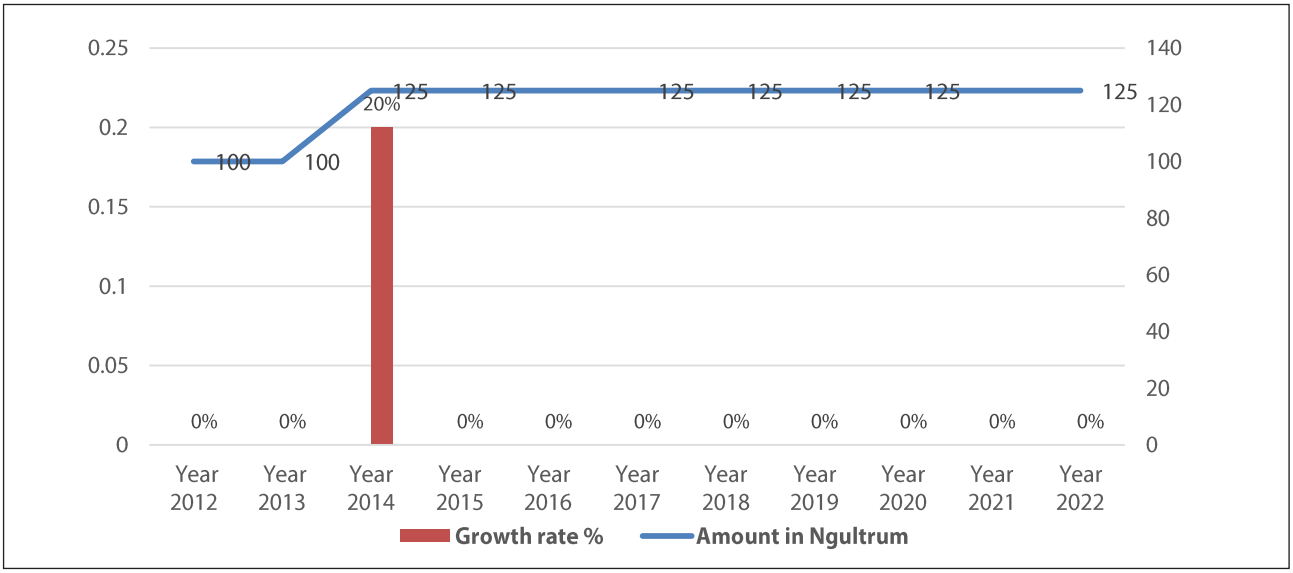
Figure 6: Number of unemployed workforce by the level of education



Source: Labour Force Survey (2006-2021)

5. **Stagnant minimum wage:** While there are no concrete data on real wages in the country, participants from collective intelligence workshops highlighted that there are issues related to wage stagnation, particularly in low-skilled jobs. As observed in the figure below, there has been no increase in the minimum wage since 2014. The minimum wage establishes the wage levels of the bottom fifth of wage earners.

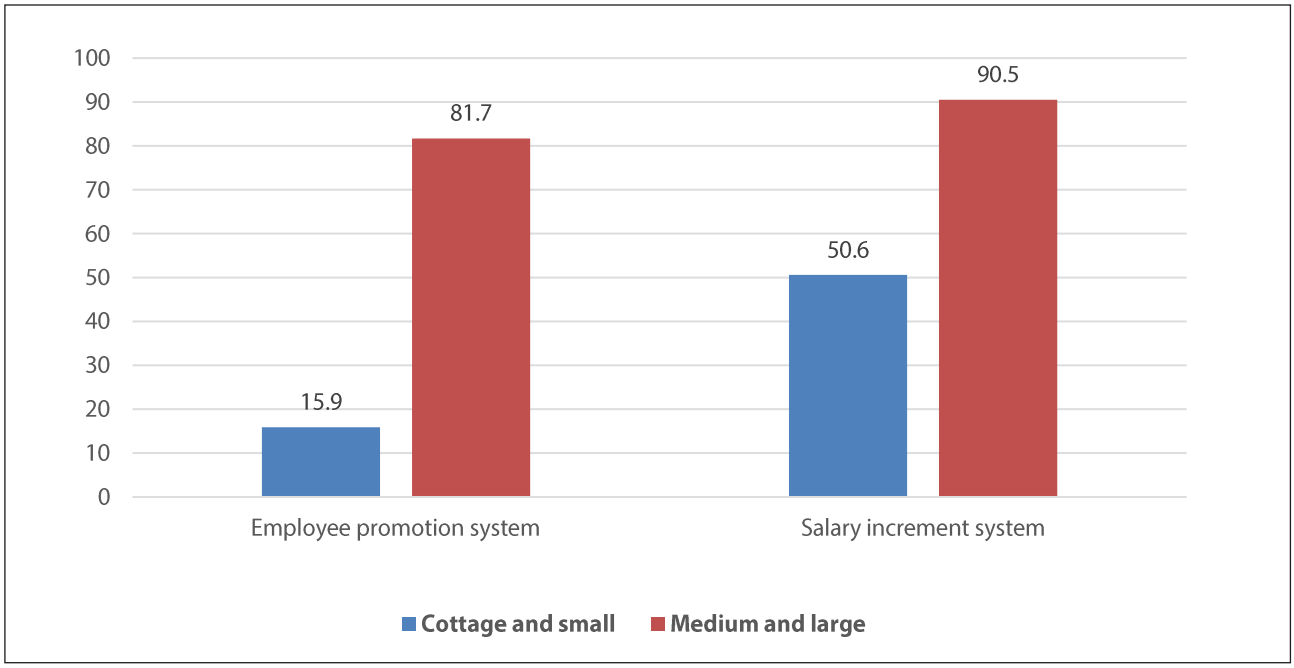
Figure 7: National minimum wage (2012-2022)



Source: Ministry of Labour and Human Resources, Circular (2013)

However, according to the establishment and employee survey MoLHR carried out in 2022, workers reported an increase in income on the ground. The report also highlighted that only 50% of those working in the cottage and small industries receive a salary increment. The limited wage growth for some workers may have contributed to underemployment. Labour compensation as a share of income has also remained constant over time.

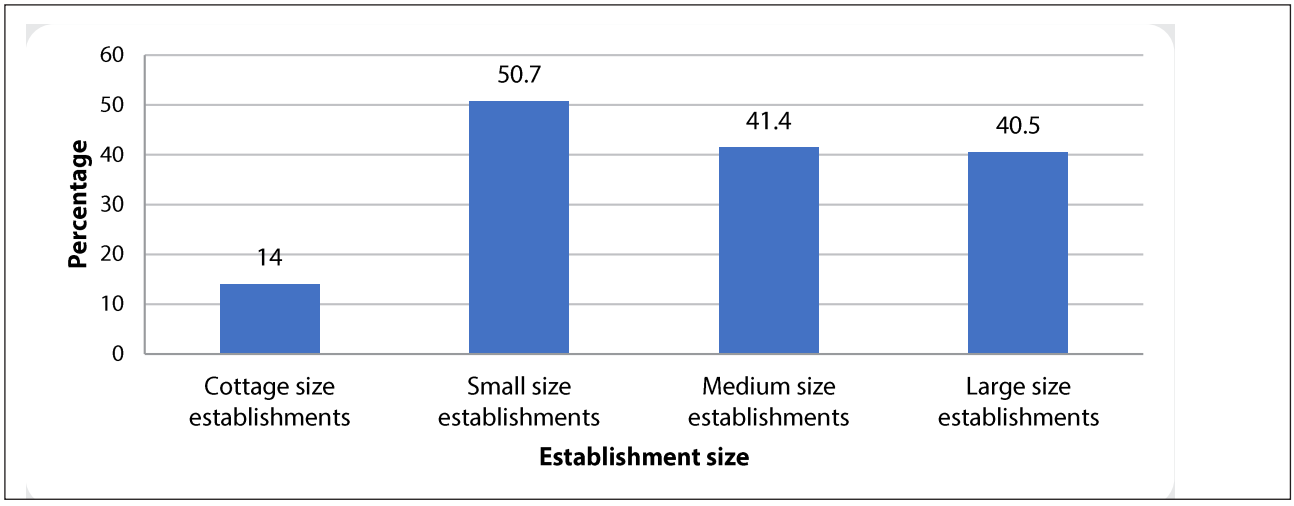
Figure 8: Percentage of establishments with employee promotion and a salary increment system



Source: Ministry of Labour and Human Resources, National HRD Advisory 2022: Establishment Survey and Employee Survey Report

6. **Continued labour shortages in major sectors:** The private sector has often reported labour shortages in major sectors. The recent establishment and employee survey report states that labour shortage is one of the key barriers facing establishments, particularly large-scale establishments comprising construction, manufacturing and service industries.

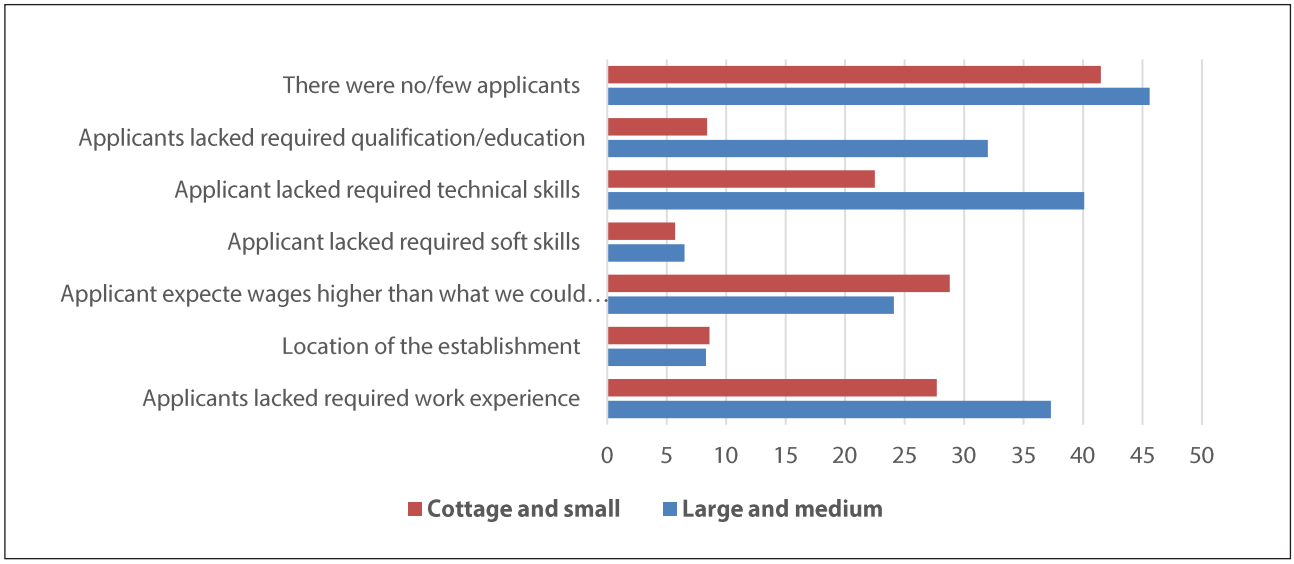
Figure 9: Percentage of labour shortage by establishment type



Source: Ministry of Labour and Human Resources, National HRD Advisory 2022: Establishment Survey and Employee Survey Report

The report indicates that establishments are not able to attract an adequate number of applicants for recruitment. For example, the high number of respondents who said there were "No/few applicants" (between 41-45%) seems to indicate that there are not enough qualified people to apply for many jobs. If this remains unchanged, it could widen the gap between market needs and local skills/capabilities. The participants of the collective intelligence workshops revealed that available jobs do not appeal to jobseekers as they are either low paid or require manual work, or both. In general, it was cited that jobseekers' perception of blue-collar jobs is poor.

Figure 10: Challenges facing establishments when hiring new recruits

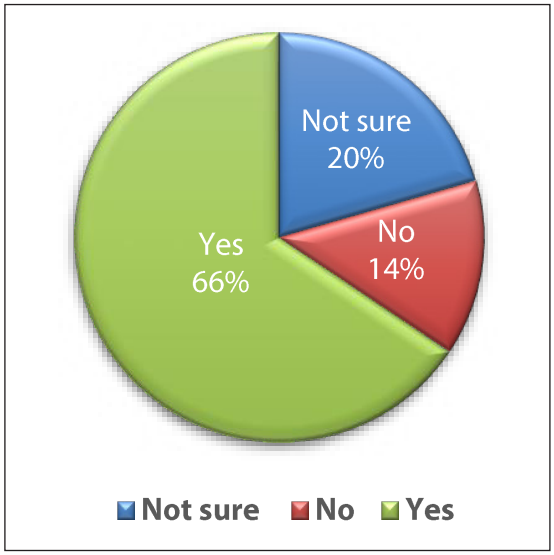


Source: Ministry of Labour and Human Resources, National HRD Advisory 2022: Establishment Survey and Employee Survey Report

7. **Emigration of productive age population:** The media have reported on the ever-increasing number of Bhutanese leaving for Australia to seek employment. It has been observed that both highly qualified and lowly skilled individuals are emigrating. Emigrants include both public sector officials who have resigned as well as jobseekers.

   According to a jobseekers survey, around 70% of this group actively seek overseas employment. A continuous emigration of working-age population from Bhutan may be both an opportunity and a challenge. For instance, emigration of low skilled workers could contribute to poverty reduction and economic growth through inflows of remittances. The Royal Monetary Authority recorded Bhutan's remittance inflow of Nu. 8.062 billion in 2021. In general, low skilled migrants tend to remit more money. On the other hand, emigration of high skilled workforce may serve as a critical impediment to long term economic growth through loss of human capital and innovative capabilities. High skilled migrants have a lower propensity to remit from a given flow of earnings. This calls for appropriate policy adjustments to maximise gains through channelling diaspora investments and minimize risks of losing the country's most educated and talented workforce.

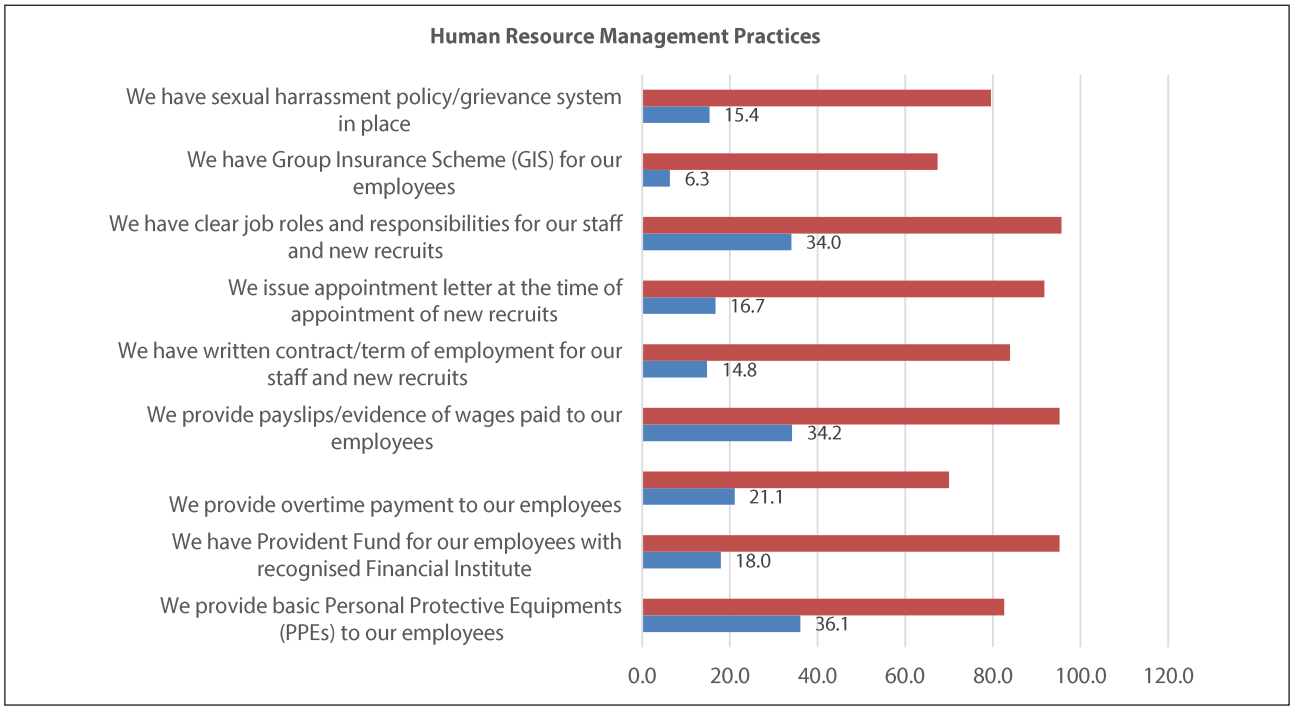
Figure 11: Proportion of jobseekers actively pursuing overseas employment



Source: Ministry of Labour and Human Resources, Jobseekers Survey Report, 2022

8. **Weak social protection in the private sector:** Social protection schemes are mostly limited to employees of public sector agencies. As per the 'Establishment Survey and Employee Survey' report, there is a general lack of social protection schemes for the employees. As observed in the figure below, the current firms particularly in CSIs do not have well established social protection systems. For instance, only 6.3% of the CSI firms reported to have social protection coverage and spending in the form of Group Insurance Schemes (GIS).

Figure 12: Percentage of establishments with basic Human Resource Management practices



Source: Ministry of Labour and Human Resources, National HRD Advisory 2022: Establishment Survey and Employee Survey Report

9. **Lack of data on skill and educational mismatches:** Obtaining reliable and consistent estimates of the incidence of various forms of educational and skills mismatch is the first step to informing policy debate in this area. However, there is limited data on specific forms of mismatches across sectors and demographics. Difficulties also arise from the use of multiple data sets to make cross-sectoral comparisons. Gaining a clear understanding of these issues is an important prerequisite for education or skill matching policy design. To this end, efforts need to be made on the measurement, including those to overcome any potential drawbacks in understanding trends and drivers of mismatches.

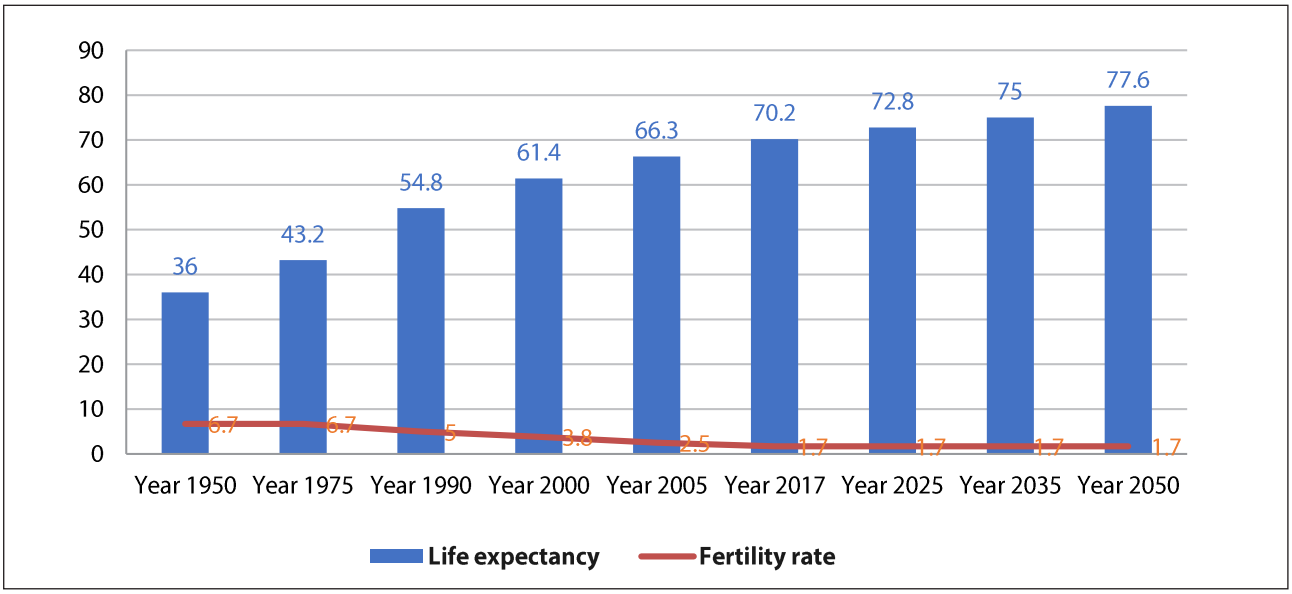
Picture 4 and 5: Foresight exercise with officials from key sectors, August 2022

Emerging developments shaping Bhutan's labour force

The following are some emerging developments that may influence the labour force trajectory in the country.

1. **Decline in demographic dividend:** The opportunities presented by Bhutan's demographics will not last long and repeat itself. For Bhutan, the window of opportunity begins to close in the next 10 to 20[4] years. In fact, the fertility rate already dropped below the replacement level (1.7) in 2017. It means Bhutan is in the post-demographic dividend phase with a shrinking working-age population. Hence, Bhutan must prepare with enabling policy responses and programmes to overcome the depressing effect of demographic tax on growth and productivity. Strengthening old age support and health system, incentivising personal savings, and promoting a favourable working environment for women are some interventions to respond to the changing demographic structure effectively.

Figure 13: Life expectancy and fertility rate

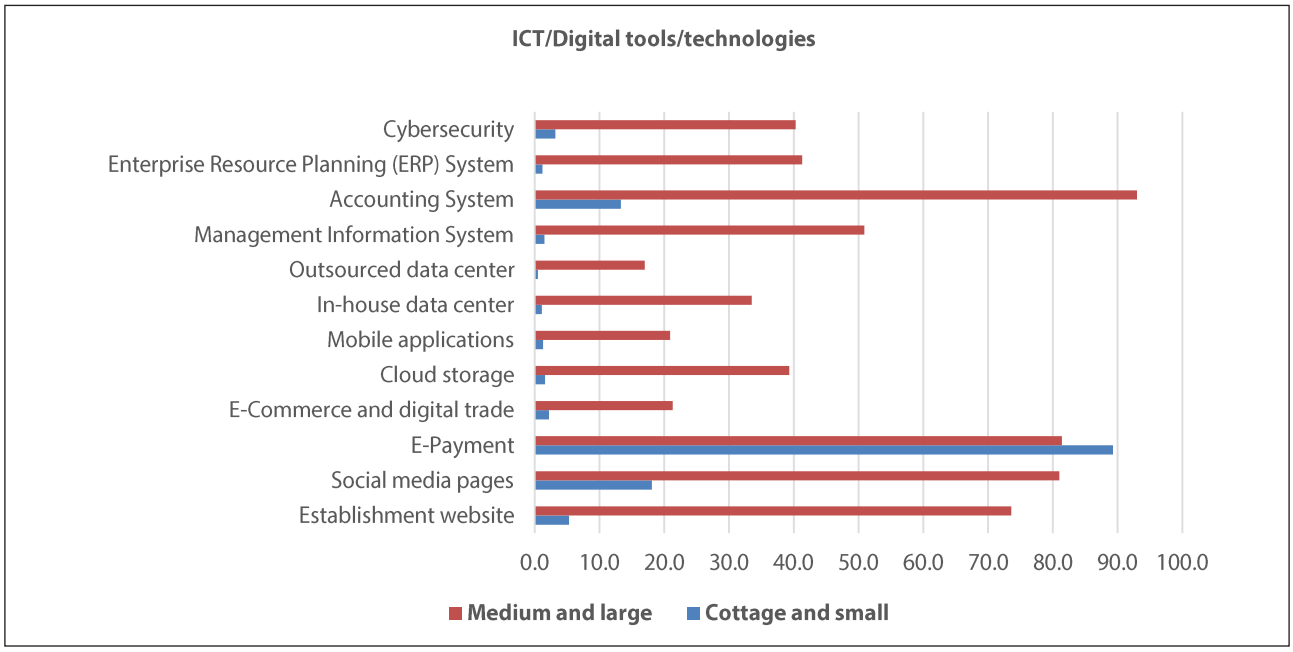


Source: National Statistics Bureau, Population Projections Bhutan 2017-2047

2. **Rise in demand for digital skills:** Surveys and interviews carried out in the study reveal the need to develop highly specialised digital skills if we are to fulfil national and regional demands. According to the 2022 establishment survey, the majority of medium- and large-scale companies across sectors have either digitalised or planning to digitalise their operations and processes as shown in the figure below.

[4]The Demographic Dividend in Bhutan: Taking Advantage of Transition, ADB

Figure 14: Enterprise use of ICT, digital tools and technologies

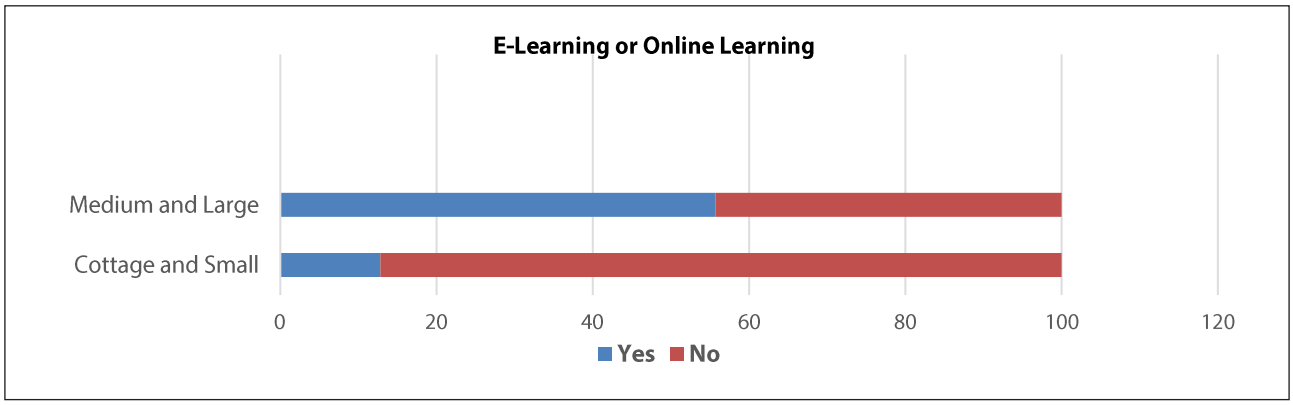


Source: Ministry of Labour and Human Resources, National HRD Advisory 2022: Establishment Survey and Employee Survey Report

As a result, today's jobseekers require specialised skills to be employable. But to understand the effect of digital transformation on changes in digital skills demand and supply, digital skills must be properly measured first. In Bhutan, there is still a lack of digital skill conceptualisation and measurements.

3. **Rise in demand for certified online learning:** According to the 2022 Establishment Survey Report, firms are using e-learning platforms to upskill and reskill their employees. This reflects the growing demand for and acceptance of online learning as a formal channel for training in the country. Around 10,000 applicants applied for the courses offered by the MoLHR through its in-service human resource development programme in 2020. Likewise, the Skillshare programme initiated by MoLHR in 2021 received more than 1,000 applicants. Both these programmes indicated that certification upon the completion of courses was critical to attracting online learners.

Figure 15: Proportion of establishments using e-learning platforms



Source: Ministry of Labour and Human Resources, National HRD Advisory 2022: Establishment Survey and Employee Survey Report

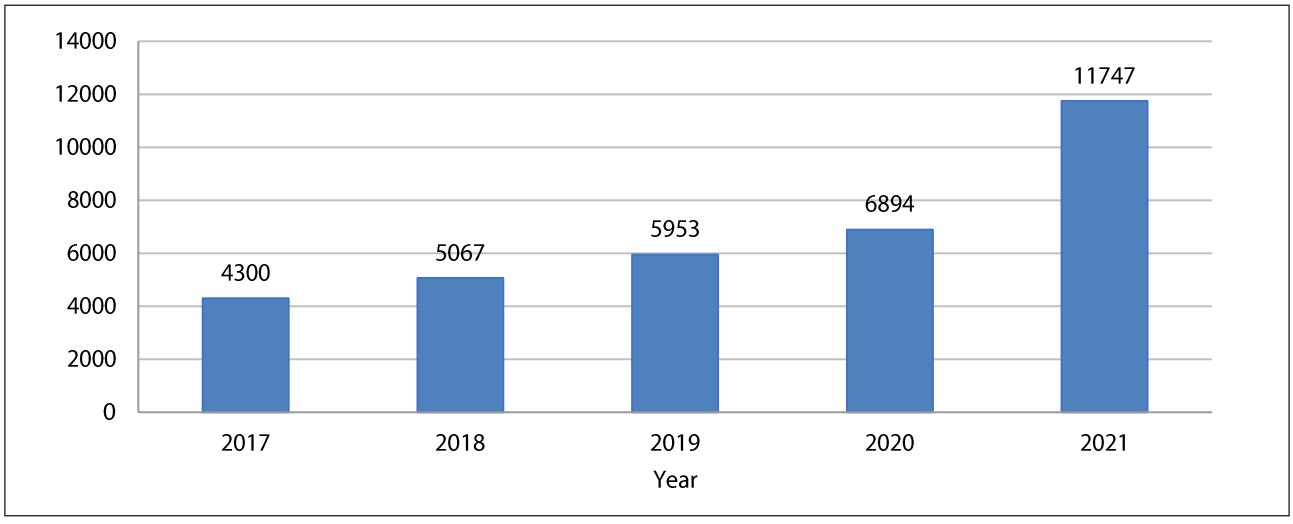
4. **Increase in demand for soft skills:** According to the 2019 Global Talent Trends report, 92% of professionals agree that soft skills matter as much or more than hard skills. While there are no hard data to corroborate this finding in Bhutan, consultations with key firms and employers from the three sectors revealed that technical skills are no longer adequate for workers to compete in the 21st-century. Interpersonal competencies were highlighted as critical in facilitating collaboration and driving performance. Furthermore, the recent establishment survey identified soft skills as one of the top skills for employees.

   While targeted soft skills training strategies might help, the education system plays a central role in undertaking the challenging task of training students and graduates in critical soft skills and knowledge to navigate emerging labour markets. There is, hence, an urgent need for appropriate educational reform to integrate various competencies, including critical thinking, leadership, communication, collaboration, management, networking, systemic analysis, adaptability, negotiation, problem-solving skills, and self-directed learning abilities, among others.

5. **Emergence of hybrid work culture:** Against the backdrop of the Covid-19 pandemic, work culture in different sectors has undergone a sea change, both in terms of the kind of work available and where and how it is performed. As per the insights gathered from the foresight workshops and interviews with sector experts, the younger generation preferred the availability of a hybrid work environment as it offered greater flexibility. This is particularly true for the digital and creative industries.

6. **Rise in mental health issues:** Lack of reliable mental health data is a major barrier to assessing unmet mental health needs in the workplace. There are no disaggregated data on mental illnesses, hence it is difficult to know how it is impacting the overall productivity in the country. Over the past two decades, the JDWNRH in Thimphu has recorded an increasing case of mental illness every year. Mental illnesses have tripled since 2017. The number of mental illness cases hit a record high of over 11,000 in 2021. Likewise, according to the 2015 Gross National Happiness Survey Report, around 10% of the population reported having suffered from at least some level of mental distress.

Figure 16: Number of people reported with mental disorders



Source: Ministry of Health, Annual Health Bulletin 2021

Beyond the 'Used Futures' of Bhutan's labour force

Our thinking about the future is influenced and shaped by our culture, our institutions and our histories. We inherit patterns of thinking that have been passed down to us. This capacity to preserve knowledge, understanding and tradition is one of the primary strengths of the human species. And yet, in times of rapid change such as these, holding onto old patterns of thinking does not necessarily serve our best interests.[5]

Ideas and visions for what the future can be and should be will come and go. There are times when the force of an idea reaches its apex, its full potential, such as socialism in the 1960s and capitalism in the 1990s. But ideas and ideologies ultimately need to be negotiated within the world of practice and experience. What works in one place and geography may not work in another. **What works at one point in time may become less viable and relevant at another.**

Just 50 years ago, western nations celebrated the luxury of oversized and grandiose petrol-powered vehicles and the possibility of limitless transport that came with cheap oil. Today, we are trying to make petrol-powered vehicles a thing of the past. Invariably, contexts shift as the vision or good ideas of yesterday become the bad ideas of today and the terrible ideas of tomorrow.

"Used futures" are patterns of thinking about the future that does not serve our interests anymore.[6] They may have been useful at one point in time, but they have outlived their relevance or, even worse, they have become an active impediment.

The trends described in the previous section are based on certain "used futures" adopted by the education and labour force system since the start of modern development in the 1960s. When looking at the labour force futures of Bhutan, there are legacy patterns of thinking that may have been useful in the past but will be less useful from now on. To provide an understanding of and to map out these used futures, a workshop was organised to unveil and explore common narratives around the labour force ecosystem.

- **Conventional educational models and strategies:** The participants agreed that curricula for tertiary education might need to be reviewed. With unemployment high among graduates in general, curricula for tertiary educational institutes may be based on used futures, and old patterns of thinking that propagate skills that are not future-relevant. In this regard, the overall vision of the education system needs to be re-examined. With so much change in the delivery of education brought about by digitisation and with an array of emerging skill sets required for the 21st century, the time is right to reconsider the vision of the education system as a whole. The 21st century is bringing a host of challenges that require critical thinking skills, higher order "connect the dots" type of thinking and the capacity for flexibility and experimentation. This is not what rote learning inculcates in the learner.
- **Rigid public sector skills:** The skill set held by public servants may well fall into used futures thinking. The challenges of the emerging century, many of which are wicked problems, demand

[5] Candy, S., & Dunagan, J. (2017). Designing an experiential scenario: The people who vanished. Futures, 86, 136-153.

[6] Inayatullah, S. (2008). Six pillars: futures thinking for transforming. Foresight, 10(1).

a whole new set of abilities among public servants. The ability to think across portfolio areas, collaborate with public and private sector organisations to achieve systemic change, and think in multiple horizons, is a new set of abilities that will need to be deliberately nurtured and advanced. If the public sector is to play a leadership role in targeted industrial policies, the right mix of abilities and skills will need to be developed.

- **Traditional labour force planning processes:** With the world changing rapidly and unpredictably, the era of the five-year plans may also be used future. Even as targeted industrial policy shows a long-term commitment, it must also be flexible and adaptive to changing contexts and circumstances. Fixed plans doggedly defended by bureaucrats are a liability in a world typified by dynamic change. The labour dynamics which typified economic globalisation also display a variety of problems. This can include the race to the bottom exploitation of workers, for example, the labour dynamics in the gig economy. It can include an unhealthy dependence on foreign workers. And it can also include migration that leads to brain drain. A new vision of labour flows that serve Bhutan's workers and guests seems to be the need of the hour.
- **Marginal investment in data production and analysis:** We now live in a world where data collection and analysis have become a central pillar for understanding the behaviour of people and the systems we use and formulating solutions based on them. The era of ad-hoc approaches to data collection and analysis is over. As the research teams experienced in this study, this can lead to knowledge gaps and deprive analysts of the resources needed to understand the complexity of a problem. Robust and technically sophisticated approaches to data collection and measuring what matters are needed.

In the meanwhile, we need to celebrate and nurture what is working and emerging in Bhutan.

- **A blossoming creative industry:** The creative sector, especially film, music, artisans, and design, has seen healthy growth. There is an emerging class of self-employed entrepreneurs and small and medium enterprises.
- **Realising smart and organic local produce:** New opportunities are emerging for niche agriculture.
- **Increasing digital skills:** Bhutan is witnessing an increasing number of skilled youth in the digital industry.
- **Existence of strong spiritual heritage:** Monastic education, which is a repository of Bhutan's great wisdom tradition, is strong and vibrant.
- **Pioneering environment conservation:** Bhutan has been able to preserve its environment better than most countries.
- **Leading alternative development paradigm of Gross National Happiness:** Bhutan's commitment to intangibles such as Gross National Happiness (GNH) and social fundamentals has yielded high social capital, rich relationships, a sense of belonging and interconnectedness, social safety nets, better mental health and resilience. This has been one of the primary reasons for the emergence of the "brand Bhutan" with many around the world looking up to Bhutan for leadership and inspiration.
- **Increasing number of educated and skilled labour force entering the labour market:** Bhutan's labour market, is witnessing an increasing number of labour force skilled mostly with basic levels of information and technology and accounting
- **High number of educated females entering the labour market:** As compared to the past, higher proportion of educated females are entering the labour market.

Narrative foresight analysis of Bhutan's labour force capabilities

Too many developing countries have looked outward for development vision and strategies. Historically, the West was the primary model for development, espousing an evolutionist narrative that positioned non-industrial societies behind the industrialised ones, although the true cost for such "development" was never fully tallied. After World War II, the US took up the mantle of the West to drive an agenda centred on economic growth and globalisation.[7]

Today, as we look back at this legacy, our global report card is, at best, mixed. Green revolutions increased crop yields, but they also increased our dependence on pesticides. Industrialisation increased the standards of living, but it also drove urban malaise, unnecessary levels of consumption, and fostered ecological externalities (waste, carbon emissions) that are yet to be contained.[8]

The world, which is now facing a climate emergency, is scrambling to find a way back to safety and stability. How can we serve societies with low carbon emission approaches? How might we tackle extreme levels of waste? How will we prevent screen addiction from becoming a mental health epidemic? The list goes on and on.

Bhutan famously chose a different path. In championing Gross National Happiness, it has become a global icon for espousing an alternative development pathway. Bhutan has not only exuded self-confidence where other countries have not, it has ultimately defined what success means for the nation and the world. In many respects, this self-confidence and "following our own path" mentality is exactly what has led to the Brand Bhutan phenomenon.

Considering Bhutan's pioneering initiatives on alternative pathways, this project employed advanced narrative foresight analytic tools to understand the cultural dimensions of current and futures (plural intentional) workforce capabilities. Using such methods, particularly Causal Layered Analysis (CLA), indeed aligned with Bhutan's assertive stance on having a culturally rooted and truly sustainable pathway in a world where increasingly the unthinkable becomes unavoidable. CLA moves across layers of understanding to deepen our awareness of the factors and forces that shape not only how we perceive the future to be but also how we conceive our place within a range of futures and our preferred future. Employing myth and metaphor to see what is unseen, CLA creates a space to talk not only about merely solving problems but also about the deep-rooted challenges that give rise to the problems we encounter daily.[9]

Framing the challenges of today and those that lie ahead in mythic and narrative terms, CLA created a space for the participants to give voice to things in relatable ways while providing richness and depth that draws on the cultural dynamics of myth and metaphor. Such stories are not merely qualitative methods but transformative spaces where new ways of seeing oneself and others can and might emerge.

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[7] Galbraith, J. K. (1994). The World Economy Since the Wars. London Sinclair-Stevenson.

[8] Cavanagh, J., Mander, J. (2003). Alternatives to Economic Globalisation. San Francisco: Berrett-Koehler.

[9] Inayatullah, S. (1998). Causal Layered Analysis: Post-Structuralism as Method. Futures, 30(8), 815-829; Inayatullah, S. (2004). The Causal Layered Analysis (CLA) Reader: Theory and Case Studies of an Integrative and Transformative Methodology. Taipei: Tamkang University Press.

In the CLA session, the pathology of seeking power outside of the people manifested in relation to Bhutan's future workforce capabilities.

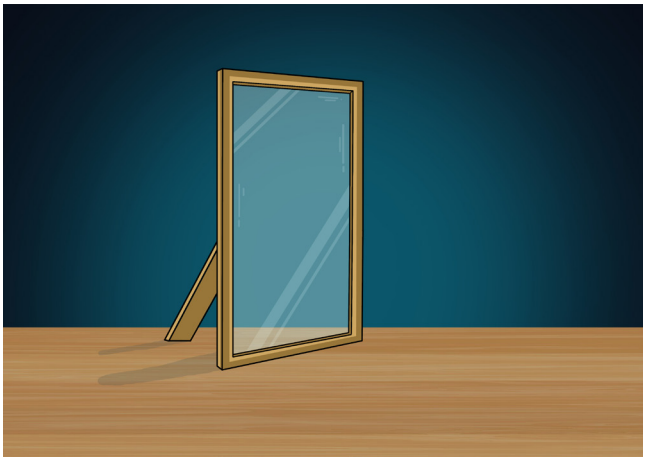
The participants described how a **stigma is attached to manual labour** and **"minap"**, which correlates to a desire to get a public sector job.[10] There is also the desire to leave Bhutan, or what is commonly known as the **"go to Australia" syndrome.** This dynamic, which is endemic across a range of contexts, is rooted in seeking "opportunities" abroad for a better lifestyle and income, but **"brain drain"** creates a self-fulfilling prophecy that guts the economy from within, which leaves those abroad dreaming of life back home.

In addition to this dynamic, the participants described a serious **deficiency in "self-learning"** indicating a need for mentorship and guidance, and **an over-dependence on an in-class teaching-learning** system. The ultimate power of **"things from outside"** is also manifested through contemporary, popular, social media influences, specifically **youthful desires rooted in western values, consumer capitalism, and identities detached from the Bhutanese culture.**

Finally, this pathology is manifest in financial means, particularly Bhutan's inability to be seen as a player on the global economic stage with a specific focus on its inability to raise income levels and foreign investment according to the usual metrics and measures. This stems from l**ow financial literacy, grant dependency,** and a **"follow-the-money" mentality.** All are rooted in uncertainty about the direction of economic pursuit in Bhutan. Does it have a future playing the same game as everyone else?

In the CLA process, the participants create an alternative myth or metaphor that they feel would make the situation better, or even transform it. After some reflection, the participants came up with two images.

Picture 6: Bodhi Tree



Picture 7: Mirror of Reflection

The myths and metaphors offered by the participants to ameliorate the above challenges were the "mirror of reflection" and "the Bodhi tree", which were derived from the country's Buddhist heritage. For the participants, both speak to having the means to discover "one's inner power and humility born of wisdom". Commonly invoked in early Buddhist writings, the mirror is a metaphor for consciousness, which should not collect dust.

[10] An aversion to manual labour can be seen as a rejection of the power of one's own body to shape and transform the world.

Additionally, the mirror points back to oneself. It is not just where we see ourselves but actually discover our truer nature. The Bodhi tree is a classical Buddhist image depicting wisdom attained through contemplation. The Buddha attained enlightenment sitting under a bodhi tree and vowed not to stand until he reached a new state of being and self-awareness. These myths and metaphors point to a desire not only to honour cultural wisdom traditions but also to find new states of being rooted in raising the consciousness of all Bhutanese. If one dwells on these images, how one might conceive, and ultimately model Bhutan's future workforce is quite clear.

Specifically, when asked directly **what cultural changes were needed to create a better future for Bhutan's workforce, the participants said they wanted to become entrepreneurial and solution-oriented people, who give dignity and respect to all types of jobs and labour based on the capabilities of self-learning and self-teaching.** There was also a desire to focus more strongly on Bhutan's unique development pathway by "exporting Gross National Happiness" and showing the country's strengths.

These cultural changes also **included an integrative direction.** Bhutan has an identity as a spiritual country keen to preserve its vibrant traditions. Bhutan embodies respect for ecological health and well-being. At the same time, there was a strong sense that modernisation was needed – an infusion of new technologies, mechanisation, and even aspects of globalisation. But these elements can and must be guided by a **"Wisdom Revolution"** so that these forces do not colonise, dominate, and overwhelm as they have done elsewhere. To sustain the foundational traditions that make Bhutan, there is a practical need to integrate modernity with tradition, which centres on finding a balance between spirituality, technology, enterprise, globalisation, and ecological health.

Too often in development discourse, development paths are offered as either-or situations. You can have "X" but you will need to accept "Y". According to this logic, China's lakes and rivers were poisoned through industrialisation, the green revolution made the Global South dependent on falling commodity prices, and a whole generation of young people suffers from screen addiction because "everyone must be connected all the time". These are not inevitable "growing pains" of development or even choices but are reflective of a lack of critical and creative thinking and imagination.

The participants also offered a "leap frog" development idea that usefully expresses this need for integration. Bhutan today has an opportunity for modernisation but this is in the context of a booming organic food movement, a climate emergency, screen addiction, and a new economic precarity for creative workers. Bhutan can leap over the excesses of modernisation and globalisation, build on the opportunities of the present and chart a path that integrates its rich traditions with the emerging potentials of advanced technologies and opportunities afforded by a global marketplace. Charting such integration requires a critical and imaginative capacity, nuance and wisdom.

Table 2: Summary of Causal Layered Analysis

CLA Summary	Old Narrative	New Narrative
Litany	• Norm to move out of Bhutan • Societal preference for living/ working abroad (comfort, recreation and rate of return) • Empty Bhutan/those leaving will not return • Desire for white-collar jobs	**Key Performance Indicators** • Develop a set of performance indicators that align with how Bhutanese want to thrive and grow in each sector.
Systemic causes	• Brain drain • Investment & financial challenges • Lack of mentorship/guidance • Depended on teaching modality in class to learn • Value erosion through an influx of western values (commercialisation)	**Policies and Structures** • Leap Frog Development • Targeted Industrial Policy • Sector-specific strategies
Worldviews and culture	• View of manual labour as unworthy (stigma) • Strong sigma against minap • Challenge of modern cultural influences • Financial literacy is low/no savings mentality	**Desired Culture** • Integrating spirituality, technology and ecology • Exporting GNH (GNH as a discourse) • Entrepreneurial and solution-oriented people • Dignity and respect for all jobs and labour (no stigma for blue-collar jobs) • Ability to teach ourselves/ self-learning
Myth/ Metaphor	• Power is seen outside of oneself	• Mirror of reflection and Bodhi Tree

Synergy between strategy and culture

Peter Drucker was famously known for saying: “Culture eats strategy for breakfast”. By this, he meant that it does not matter if an organisation has a great set of strategies, if that organisation’s culture is not aligned with these strategies (the culture will not implicitly accept them), then they will likely not work.

The strategic propositions presented in this report thus stem from a cultural analysis of Bhutan and a desire to align new strategies with what is culturally palatable and desirable for Bhutanese. Bhutanese need not contort themselves and their culture to create robust and effective workforce futures strategies. Indeed, workforce futures strategies need to start with the culture as an intangible, yet fundamental, dimension of reality, that empowers collectives to be who they really are and want to be.

Therefore, conceptualisation of the strategic propositions in this report is informed by this Causal Layered Analysis as well as the extensive and honest workshop feedback. The "leap" metaphor was considered to understand how Bhutan conducts its workforce development in each sector. "Leap" means different for each of the three sectors in this study.

I. **For the agricultural sector, it means a "green leap".** This means the focus is on organic and regenerative (soil sustaining) agriculture. Bhutan has the opportunity to bypass the destructive nature of industrial agriculture, incorporate the latest technologies and build a brand that produces the best organic products in the world. It also means leaping over the idea that subsistence agriculture is outdated and valuing the experimentation and resilience displayed by Bhutan's rugged farmers, who survive and thrive day in and day out. Indeed, with the right support, they can be the backbone of Bhutan's climate resilience and adaptation and the building of a new and sustainable agricultural economy.

II. **For the creative sector, it means an "equity leap".** While expressing a new resurgence of entrepreneurial freedom and potential, the creative economy throughout the world is "ground zero" for precarity, exploitation and cultural appropriation. Bhutan has an opportunity to leap over the hyperbole this sector is often subjected to and develop a creative workforce which expresses the unique voice of Bhutanese and their vision and values in a variety of ways. This leap will ultimately boost Bhutanese self-confidence in promoting its own creative industry to the world.

III. **For the digital sector, it means both a "literacy and knowledge leap".** This means that, given the advent of satellite-based internet technology, Bhutanese will soon have universal access to the internet. But this technological leap should only be seen as a starting point. The internet and digital technologies bring both opportunities and dangers. To leap over the dangers of e-waste, screen addiction, misinformation, online scams, and the extractive logic of tech platforms, Bhutan will require its citizens to build basic literacy, digital literacy, media literacy, data literacy, and technological literacy. Likewise, digital technologies provide an opportunity to convene global expertise through Living Labs where in open innovation ecosystems are establish to ideate and prototype solutions to Bhutan's most pressing challenges in many sectors of its economy, leaping over the notion that Bhutan must travel alone.

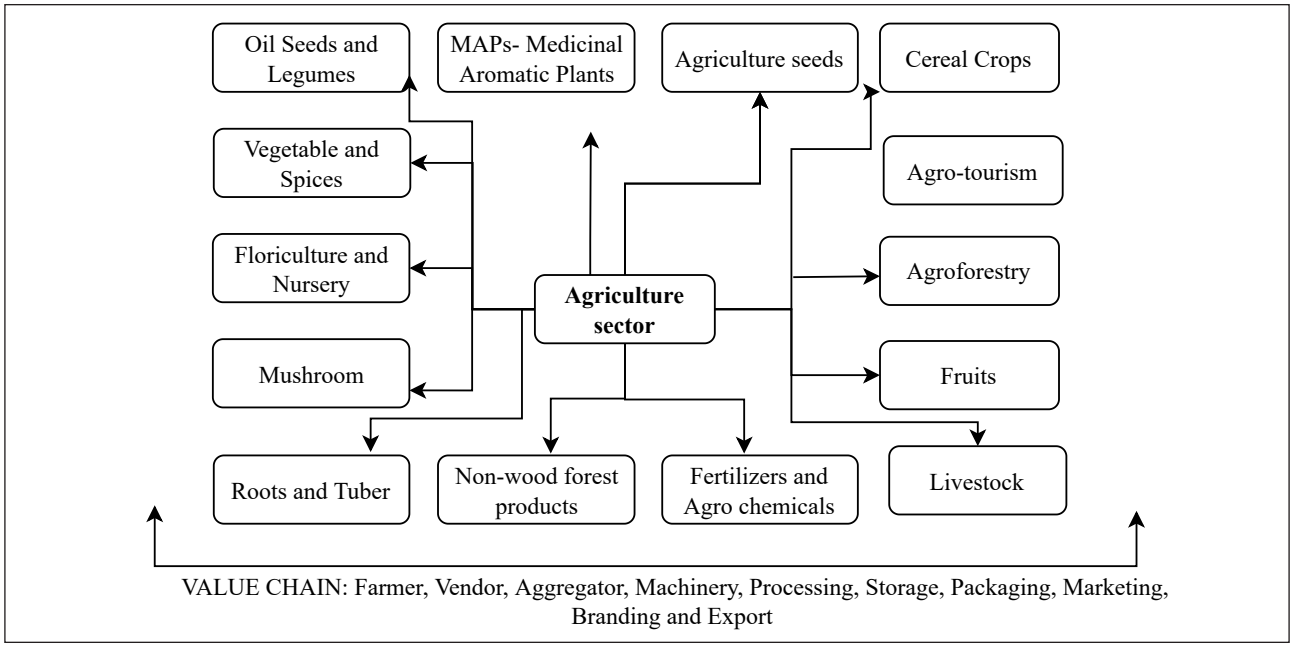
AGRICULTURE
SECTOR

Agriculture sector

This section provides the analysis of trends, both established and emerging, plausible scenarios and industrial strategic propositions for Bhutan's agriculture sector. It draws on quantitative trend analysis, ethnographic fieldwork, foresight analysis and an implications survey analysis. It presents two industrial propositions: **Rural Renaissance** and **Brand Organic Bhutan** based on the scenarios created for the sector. Based on these proposals, insights on skilling, capability and knowledge needs are elaborated over three-time horizons, 5, 10 and 15 years. This sector report concludes with intervention ideas and a discussion. In summary, some of the key points to consider include the following:

- Bhutanese agriculture is potentially at a crossroads, given the extreme nature of the megatrends like climate change, the world is experiencing.
- The most pressing challenge for Bhutanese agriculture is productivity, and emphasis should be put on building the fundamental supports and capabilities for driving productivity gains while balancing and integrating this with strategies for sustainable agriculture.
- Climate-induced threats to agriculture need to be tackled with utmost seriousness, and climate resilience and adaptation strategies need to be underlined.
- New technologies bring great opportunities for boosting productivity and improving livelihoods. Technological options need to be evaluated and applied.
- Literacy is one of the most important factors for transforming the rural economy and supporting subsistence farmers to contribute to the formal economy. Literacy includes a variety of different knowledge bases.
- Bhutan has an opportunity to leverage its brand and target organic food markets as an opportunity for commercialisation.
- Bhutan's subsistence farmers represent a "sleeping giant", which can awaken to transform Bhutan's agricultural economy.

Figure 17: Existing Agriculture ecosystem as deliberated during the foresight workshops



Part 1: Megatrends shaping the sector

The global community faces several negative long-term trends and processes that are converging into complex crises with unprecedented impacts on human development. The following are some megatrends observed globally in the agriculture sector.

1. **Global food demand:** The last 200 years have seen **an explosion of the human population** driven by industrial agriculture, which has increased farm productivity, and biomedical science which has reduced disease and illness. The same processes, industrialisation, and science, which have driven population growth, have also been the primary culprits in the contemporary crisis of soils. Neoclassical economic orthodoxy would say that if each country is free to pursue its comparative advantage, then we have the benefit of a world in which countries specialise in food production to create both abundance and choice. All boats should rise. However, **as food security becomes an issue,** there will be great temptations to restrict the exports of many food commodities. The era of neoliberal globalisation of food can only be maintained if countries do not face extreme food scarcity or precarity. Fear will be the enemy of openness.

2. **Soil degradation:** In almost all countries, **soils are being depleted** due to intensive industrial agriculture, a productivity-obsessed view of the land. As per UN Food and Agriculture Organization, around 90% of earth's topsoil is likely to be at risk by 2050.

3. **Climate change:** We are now living in a world of future precarity in terms of climatic patterns. Across the world, **glaciers are melting, polar regions are warming, and extreme weather events** are becoming more frequent. The world must now navigate this crisis as climate becomes less predictable and regions warmer.

In the context of these grave challenges, several responses have emerged.

4. **Organic food movement:** Integrated pest management,[11] now understood as **organic food production,** has become a global movement. Organic foods are foods grown without the use of pesticides and synthetic fertilisers. However, organic foods can still "mine" soils by following the logic of large-scale monocrop plantation and harvest. **Permaculture** emerged as a body of theory and practice in response to the extractive nature of modern agriculture.[12] Permaculture uses systems theories of design, nutrient cycles, and human adaptability to create farm systems that build the overall health of soils.

5. **Regenerative Agriculture:** Another response has been Holistic Resource Management, also known as **Regenerative Agriculture,** which focuses on the use of grazing animals and poultry to stimulate and drive soil biology and complexity.[13] This approach uses bovines, chickens and ducks, and other animals in tandem with crop plantation.

   It is important to recognise that many of these so-called responses or "alternatives" to industrial agriculture are based on **indigenous knowledge systems** from the Global South. In general, pre-industrial societies had to maintain the viability of their land over long periods and developed various ways to do that.

[11] Rogers, E. (1995). Diffusion of Innovations (4th ed.). New York: The Free Press.
[12] Holmgren, D. (2020). Essence of permaculture. Melliodora Publishing.
[13] Savory, A. (1983). The Savory grazing method or holistic resource management. Rangelands Archives, 5(4), 155-159.

The trade-off that we usually face today is between productivity and sustainability. On one end of the spectrum are **hyper-destructive approaches to productivity,** such as clearing the Amazon rainforest for meat production or clearing Southeast Asia's jungles for palm oil. These approaches sacrifice our living systems for often short-term gains. On the other end of the spectrum are approaches to sustainable farming that struggle to meet the demands of our economies and basic needs. The challenge is to find a way to integrate productivity and sustainability.

6. **Agriculture technology:** New technologies may hold some of the answers to this challenge of integrating productivity and sustainability. The **open-source movement** has given birth to many communities that practise sharing and prototyping designs. **Farm communities** can mutualise knowledge and resources to design and build machines that are specifically designed for organic and regenerative food production. Farm Hack in the US and Le atelier paysans in France are communities that use open-source hardware and farm machine development for organic food production.[14]

   Digitisation is driving new possibilities in agriculture as well. **Sensor-based technology** can now continuously sense various conditions, from humidity to salinity, pests and moisture levels, and feed these back into automated systems. **Robotic farming technologies** have even reached do-it-yourself scales, for instance, through communities like farmbot.[15] Drone reconnaissance is now able to survey land and use machine learning algorithms to analyse the quality of terrain.[16]

7. **Agrisolar or agrivoltaic farming methods** combine the use of solar arrays, which produce energy and provide shade cover for plants, together with crop planting.[17] Desalinated hydroponics uses solar and renewable energy sources to desalinate water to grow hydroponic crops. Sundrop Farms in Australia has established both proof of concept and profitability for desalinated hydroponically grown tomatoes.[18] These approaches are providing new strategies for regions suffering from water scarcity.

   A review of technology would only be complete with discussing the role of biotechnology. Humans have been altering the genetic makeup of plants and animals for thousands of years. Today's large-size horses and the sweetness of an apple are testaments to thousands of years of selective breeding of plants and animals. This capability, however, has been boosted exponentially with the breakthrough in understanding biological genomes. Recent breakthroughs in protein mapping will dramatically enhance the scientific capabilities for creating designer crops. The question is whether biotechnology will follow a purely industrial view of the world, which continues to create problems, or whether it can address the challenge of integrating productivity and sustainability.

[14] Ramos, J., Ede, S., Bauwens, M., & Wong, J. G. (2021). The Cosmolocal Reader. FuturesLab.

[15] See: https://farm.bot/pages/open-source

[16] See: https://www.ordermentum.com/blog/how-drones-computer-vision-and-ai-are-transforming-the-agricultural-industry

[17] See: https://agrovoltaic.org/

[18] See: https://www.sundropfarms.com/

> Indigenous people as well as traditional cultures that practise perennial farming often embodied a view of the world that sees living systems as interconnected and conscious. Many of these people, unfairly regarded as backward by the West, understood that humans existed in a web of conscious life. When we break this web, there are consequences.[19]
>
> Today, we are just waking up to the realisation that we are fundamentally interdependent, on the air we breathe, the amenability of our climate, the soils that grow our foods, and the insects that pollinate our plants. We are also learning that trees communicate with one another and behave like families.[20] The most fundamental shift happening today is how we see our place in relationship to the world. It is, in fact, perennial farmers who have held the wisdom of how to exist in a web of life while eking out an existence through subsistence farming. The knowledge of these types of farmers, combined with new technologies, may bring this integration of productivity and sustainability, climate resilience and adaptability.

The challenges faced as a global community will require a new level of agility, experimentation and adaptation. It is critical to respond to a rapidly changing world with creativity, openness and spontaneity. This is the context of agriculture and farming that Bhutan finds itself in today as we move into an uncertain future.

Part 2: Understanding Bhutan's agricultural sector

Using both quantitative and qualitative research methods, insights are drawn to assess the trends, both established and emerging, in the agriculture sector. Further, the quantitative insights are supplemented using the findings of the agriculture trend implications survey and foresight exercises carried out with key agricultural entrepreneurs to map out emerging risks and opportunities in the sector.

While there are challenges in accessing comprehensive and consumable multi-year agriculture data, efforts here are directed towards analysing the available data mainly from the national trade and agriculture statistics. Farm data revolution has not reached the agriculture sector yet. The following data sets give a snapshot of the dimensions of workforce dynamics in the sector.

[19] Witte, F. X. P., & Xué, F. (2018). Living the Law of Origin: The Cosmological, Ontological, Epistemological, and Ecological Framework of Kogi Environmental Politics (Doctoral dissertation, University of Cambridge).

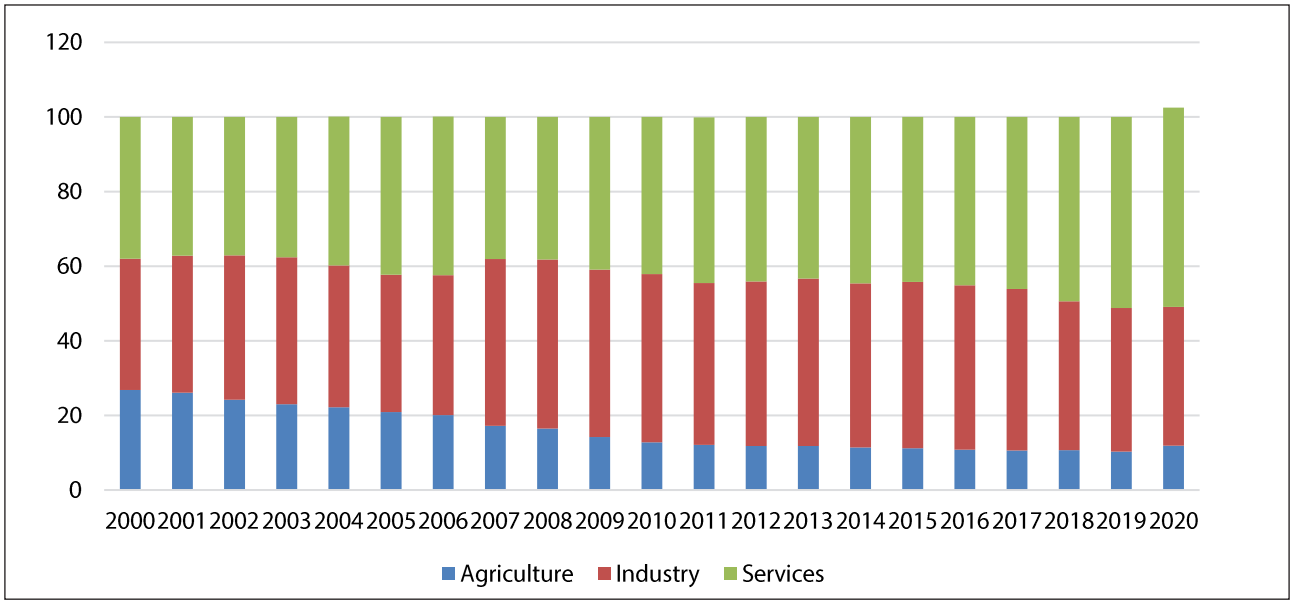
[20] Wohlleben, P. (2016). The hidden life of trees: What they feel, how they communicate—Discoveries from a secret world (Vol. 1). Greystone Books.

Picture 8: Collective intelligence session with farmers from Tsirang, August 2022

Major trends and drivers in the agriculture sector

1. **Low contribution of the agriculture sector to GDP:** The chart below provides a snapshot of the share of agriculture as a percentage of GDP in Bhutan. Compared to industry and service sectors, agriculture's contribution to GDP is one of the least. Over time, there is a slow and a gradual decrease in agriculture's contribution to GDP. This would indicate that the agriculture sector is a disproportionate negligible contributor to the broader formal economy, given the size of the agriculture workforce. This is consistent with what was already understood about Bhutan's agriculture sector, where most farmers are subsistence-based. This should be seen as a great source of potential for economic transformation as a large group of farmers have yet to enter the formal economy and contribute.

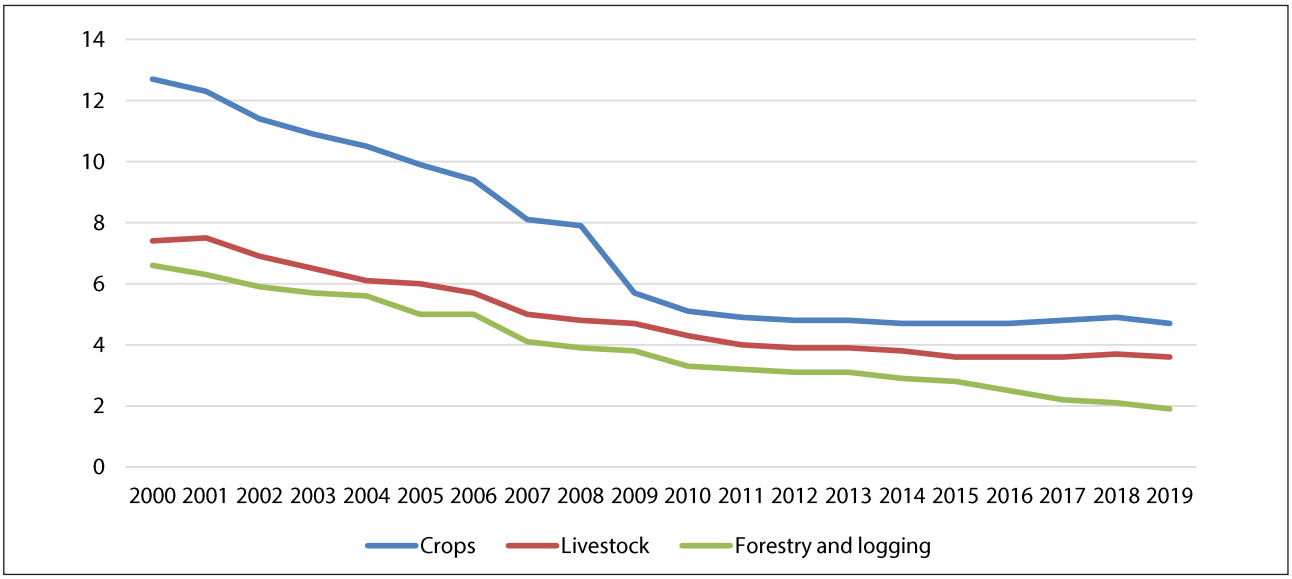
Figure 18: Share of total GDP in constant prices



Source: National Statistics Bureau. National Accounts Report 2022

The following chart shows the proportion of agricultural GDP from crops, livestock and forest and logging. Looking at the changes over 20 years, there is a **steady decrease in the contribution of crops and livestock** as a proportion of agricultural GDP. However in recent years, there has been a slight increase in the contribution made by crops and livestock. This may indicate a gradual increase in crop farmers entering the formal economy but not enough to make a significant impact on the overall GDP.

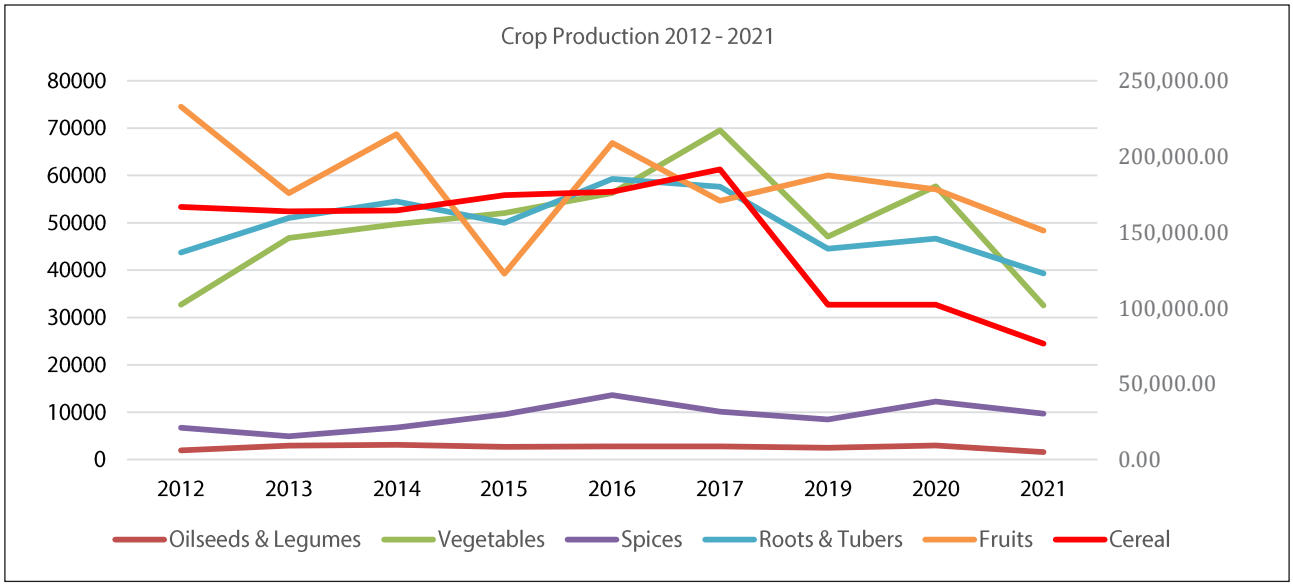
Figure 19: Share of total GDP by agriculture type in constant prices



Source: National Statistics Bureau. National Accounts Report 2022

2. **A decline in crop production:** The graph below provides a dissection of the agriculture sector by product types over 11 years. There is a **decrease in harvests across all product types.** This indicates "agricultural decay", reduced productivity over time.

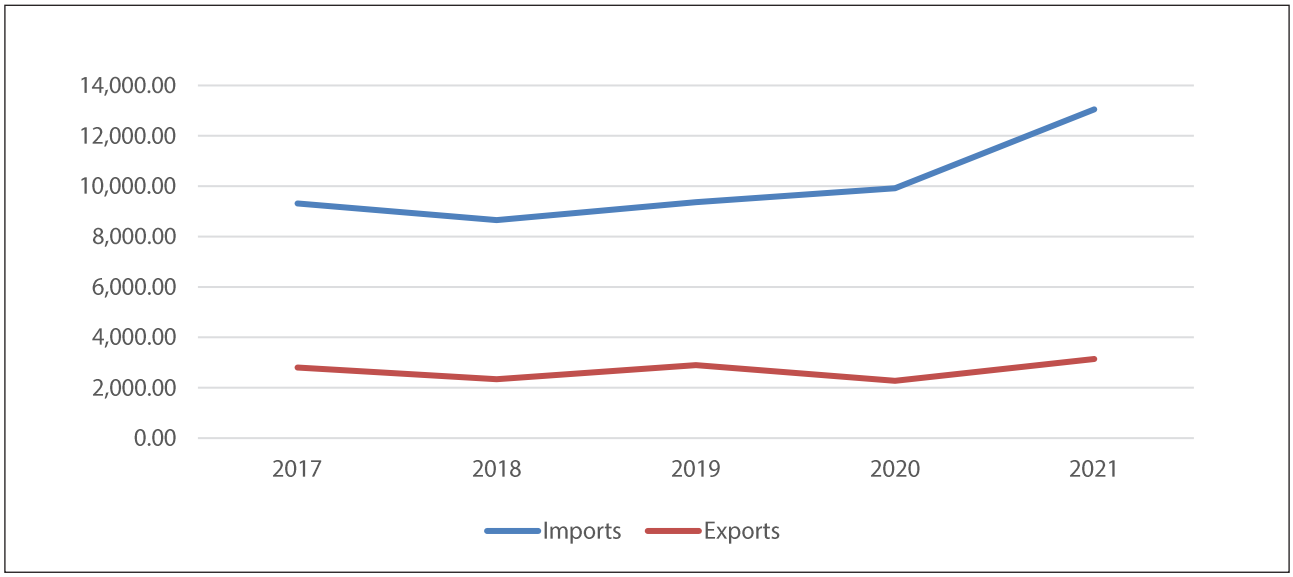
Figure 20: Crop production in metric tonnes



Source: National Statistics Bureau. Agriculture Survey Report (2012-2021)

3. **Negative balance of payments on agriculture commodities:** A snapshot of agricultural commodity balance of payment with India and countries other than India (COTI) indicates challenges surrounding harnessing domestic agricultural capacity. Bhutan is disproportionately relying on imports of agricultural commodities rather than domestic supply. The graph below shows a **significant imbalance between Bhutanese agricultural exports and imports from India and COTI,** clearly indicating an over reliance on Indian commercial exports rather than relying on domestic supply, further highlighting the need to bring the farming population into the formal economy.

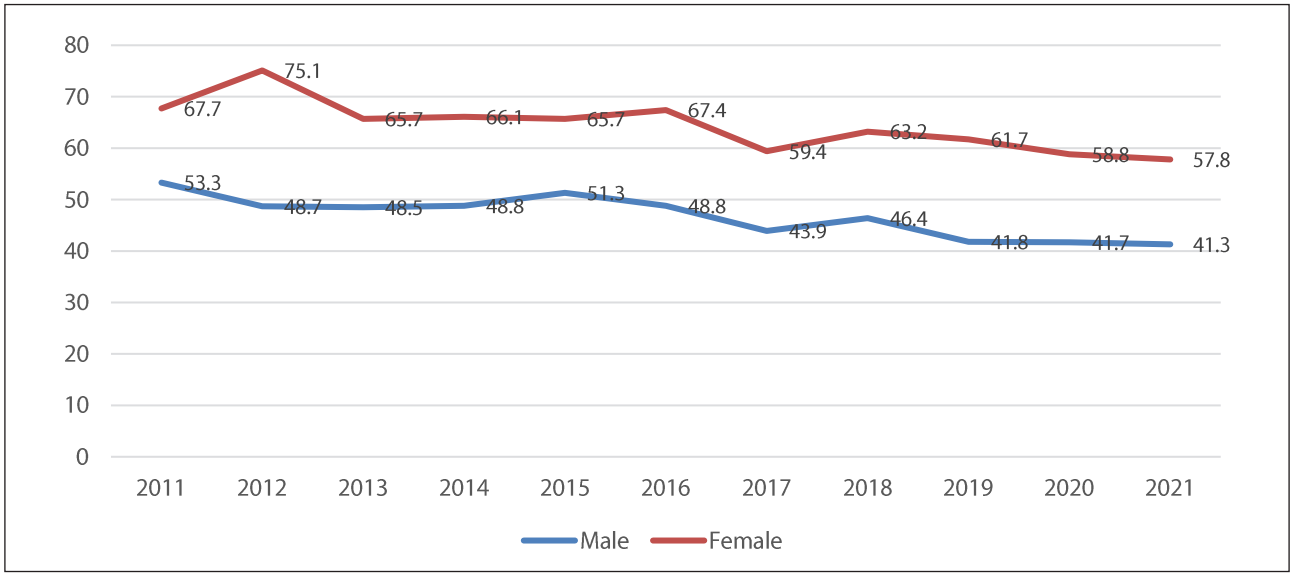
Figure 21: Import and export of food commodities in metric tonnes



Source: Ministry of Finance. Bhutan Trade Statistics (2017-2021)

4. **Feminisation of the agricultural workforce:** An increase in women's participation has been observed in the agriculture sector, either as self-employed or agricultural wage workers. As per the "National Labour Force Survey" reports, the agriculture sector is consistently dominated by female farmers as indicated in the graph below. Women's work in agriculture has become more visible over the past few years, broadening and deepening their involvement as they increasingly shoulder household responsibilities and respond to economic opportunities in commercial agriculture. In smallholder agriculture, the traditional gender segregation of tasks in agricultural and livestock production is becoming blurred. Women are taking over more agricultural tasks, such as land preparation, once done only by men. They are investing more work in cash crop production.

Figure 22: Proportion of workforce employed in agriculture sector by sex



Source: Labour Force Survey (2011-2021)

5. **Increase in land fragmentation:** Consultations with key sector officials and participants of the foresight workshops revealed an increase in land fragmentation. Land fragmentation is believed to have a significant effect on farming efficiency because continuous sub-division of land leads to unsuitable small landholdings. Small landholdings are not suitable for commercial farming.

Picture 9: Paddy field in Wangdiphodrang, August 2022

Ethnographic research: User personas for the agriculture sector

To complement the study, additional fieldwork was carried out to assess first-hand the emerging signals of change, including the farming styles and related skills needs in the agriculture workforce. Given the increasing representation of women in the agricultural workforce, it was critical to understand the gender-related barriers woman farmers face. In-depth narrative inquiry and focused group discussions were carried out to uncover valuable insights and to find out "the real story" from the field. A total of 37 farmers were interviewed from Tsirang and Wangdiphodrang. The sample incorporated three cohorts of participants, including woman farmers, youth farmers, and farming cooperatives. The following provides a glimpse into the lives of people who we might encounter in this sector. This can help sensitise us to their needs.

Established trend: A 54-year-old small landholder farmer using conventional farming methods

Figure 23: Persona illustration of Karma

Karma was born into a farming family in a small village in Tsirang in 1968. She is the eldest of six siblings. She dropped out of school in the 2nd grade to help her parents run the household. She was sad to leave school and friends behind but had no choice since she was the eldest, and her parents needed help. She is interested in enrolling in non-formal education but has not found the time for it.

Her younger siblings completed their education and moved to urban areas to settle down. She lives in her village with her husband. She is a mother to three children. Her youngest son is enrolled at a VTI and her eldest daughter is married to a police constable and lives in Phuntsholing. Her middle daughter dropped out after class 12 and is currently looking for work. She lives with her elder sister.

Karma inherited a small farmland from her parents on which she grows vegetables. She has not been able to fully utilise the land she inherited as she does not have enough financial resources to develop the land. She remains unaware of and unconnected to financing opportunities.

She once tried to sell her vegetables at the closest market but could not continue doing it as she did not have an easy way of getting to the market. She also found it difficult to manage financial transactions as she did not know how to use mobile transaction apps which are most prevalent in the market. She now farms to feed her family and trade with neighbours for day-to-day essentials.

She once tried to apply for hybrid seeds and machines through the agriculture extension officers but could not make it through the required training. She found it difficult to understand and could not commit time. She thinks that it would have been easier if she had been more educated or younger. She wonders if it is worth investing in new seeds since she lost more than half of her yield to wildlife in the previous year.

Her children are not interested in taking over the farm, so she must do it on her own. Her husband prefers to work as a daily wage construction worker as it brings in more money. His income is needed to meet the day-to-day expenses of the household. So, on most days, Karma works on the farm by herself, which is exhausting for a woman her age. She contemplated buying machines but was not sure if she would be able to operate them.

Karma does not want her children to return to the village and work on the farm. She hopes they will be able to build their lives in Phuntsholing or in Thimphu. She does not think she will be able to continue farming for much longer and hopes her children will be able to support her and her husband. She is willing to sell her farmland so that she can live with her children in urban areas.

Emerging signal: A young tech-savvy agripreneur introducing smart farming methods

Figure 24: Persona illustration of Kalden

Kalden was born in 1989 and grew up in Paro, where both his parents worked as civil servants. As a child, he would visit his grandparents often and help them on the farm. Kalden graduated with a degree in business management from a university in India. After returning home after graduation, he moved to the capital Thimphu in search of a job. He and many of his friends struggled to find a job, so he explored other options. It was at that time that he recognised the prospect of commercial farming. His friends did not think it was a viable option for a graduate but Kalden decided to go ahead with it, being a risk taker.

With the guidance of some friends and relatives, he was able to apply for a loan and get trained in integrated farming practices that leverage digital technology. He then went back to his village to pursue a career in digitally-enabled commercial farming.

Kalden's family collectively owns 10 acres of farmland. He owns four acres of land. He and his siblings now work together and have started a burgeoning commercial farming business. Kalden's sister Sonam finds it more challenging to work on the farm than her brothers, so Kalden has invested in mechanised tools to ease her workload. This has been very helpful so far.

Kalden's background in business management has been very useful as he can now gauge the market value of his products. Kalden and his siblings hope to expand their business by investing in more land and capital. His next big investment will be in greenhouses so that he can grow vegetables and fruits all year round. He has found that there is a better rate of return from fruits. So, fruits will be his primary focus.

Kalden feels proud of his work which he finds very rewarding. He says that young farmers are highly looked up to. He is interested in exploring organic farming practices and thinks he can eventually export his products. To do this, he wants to specialise in marketing and packaging but the government provides limited training in this area. Perhaps he will check out what resources are available on the internet.

Kalden spends several hours researching new business opportunities and technologies he can use to scale up his farming business. He has learnt a lot on his own and is grateful for enhanced internet coverage and stability. He just wishes it was cheaper.

As his farming business grows and he starts harvesting more vegetables and producing more produce, Kalden is concerned about his products going bad. Currently, he finds cold storage quite expensive and thinks government subsidies would be helpful in this area.

He is hopeful of the prospects of farming and excited to try new things. He has found other young farmers who share his passion and has suggested working together and forming a cooperative venture.

Insights from the implications survey

A comprehensive online survey was conducted among sector stakeholders to examine the importance and implications of emerging issues, trends and factors for the sector. The survey asked the participants to rank critical factors in order of importance and share why they made this ranking.

Implications analysis

For implications analysis, emerging issues and trends were identified, ranked and analysed using a three-step process. A workshop was conducted for each sector with key stakeholders to examine emerging issues and trends impacting their sector. Secondly, a ranking exercise was conducted to identify emerging issues the stakeholders considered the most important. Then multiple teams double-checked the issues to ensure that the most important issues were included. Finally, a survey was conducted among sector stakeholders to identify the implications of the emerging issues or trends in the sector.

This table details the implications of emerging issues and trends which the sector stakeholders considered were of primary importance.

Table 3: Emerging issues and trends in the agriculture landscape

Issue/trend	Description	Implications	Timeframe
Human-wildlife conflict	The incidence of animals encroaching upon farms and disrupting farm activity or destroying crops and livestock (e.g. warthog, porcupine, deer, monkey, etc).	If not addressed, it will lead to loss of productivity and increase in fallow land, habitat and reputational risk as farmers resort to animal killing, and ultimately in some cases abandonment of farms.	1-5 years
Mechanisation	Use of farm machinery to aid in crop cultivation and food production, including storage.	Requires machinery uniquely adapted to Bhutan's mountainous terrain and useability by farmers. This could reduce labour requirements, boost productivity and complement commercial farming. This could leverage distributed production technologies to maximise customisation.	5 years
Greenhouses for year-round production	Enclosed housing which captures radiant heat and preserves moisture while protecting crops from pests.	Increased production of crops, commercialisation of crops with sensitive conditions and complements automated systems and Ag 4.0.	5 years
Rural-urban migration	The incidence of people migrating from farms and rural regions to cities.	Loss of agricultural workforce and production capacity, ageing and feminisation of agricultural workforce, increase in fallow land, loss of rural economic dynamism and the overall threat to national food security.	5-7 years
Data-based decision-making	The practice of making food production decisions based on soil and land data, supply chain data, as well as demand side market data.	Enhanced productivity, marketability and precision farming. It can also support climate resilience.	5-10 years
Digital marketing for regional and global markets	The ability of farmers to market their products online, access both regional and global markets.	Increased revenue through low-volume/high-value products. Requires mature supply chains from production to storage, transport, packaging and marketing. It could increase prices for Bhutanese buyers.	5-10 years
Commercial farming	Larger-scale farming dedicated to production and sale for commercial markets both domestic consumption and export.	Increased economies of scale, increased production and competitiveness of Bhutanese products, better marketability of produce, better youth involvement and less reliance on imports. Threats to traditional farming practices noted.	5-15 years
Climate change	Impacts of anthropogenic climate change on farming in Bhutan. Increased climate variability, glacial melting and risks of inundation and drought.	Crop adaptation challenges, pest and disease threats, threats of crop failure, fast changes in cropping strategies, need for agile farming strategies, climate resilience strategies for farm communities (literacy) and cropping strategies.	10-15 years

Agriculture 4.0	High tech precision agriculture using automation, data analytics, housing and robotics to plant and cultivate based on the best knowledge of growth potential and markets.	Increased productivity, commercialisation and targeted marketing, better disease and pest mitigation. It can make farming more attractive to youth and businesses. It will require significant improvements in literacy (basic, data, tech, etc).	10-15 years
Digital technologies 4.0	Analysis capabilities and machine learning to solve multiple farm-related challenges. Use of sensor technologies, drones, cameras, soil sensors, nutrient sensors, etc. as inputs to analysis.	Better analysis and understanding of usable farming land, pest and disease control, and mitigation. Improve farm efficiency, management, planning and decision-making. Supports precision farming and Agriculture 4.0.	15 years

This table details a **secondary list** of emerging issues and trends the participants ranked by importance.

Table 4: Secondary list of emerging issues and trends ranked by importance

Rank	Issue/trend	Choice by % of respondents
1.	Organic food movement	19.05%
2.	International markets for organic products	17.46%
3.	Localised production using modern technologies (eg. 3-D printing)	12.7%
4.	Soil degradation	12.7%
5.	Glamourisation of farming, lifestyle shift	7.94%
6.	Agricultural feminisation	7.94%
7.	Regenerative farming	7.94%
8.	Hydroponics	6.35%
9.	Plant-based vegan meat	3.17%
10.	Carbon and biodiversity markets/C02-neutral accreditation migration	3.17%
11.	Urban farming	1.59%

Almost two-thirds of secondary responses are about the four issues of the organic food movement, international markets for organic products, localised production using modern technologies (e.g. 3-D printing), and soil degradation. The responses point **to the importance of leveraging the organic food movement and the opportunities emerging organics markets offer to develop a commercial organics industry.**

This aligns with the industrial proposition Brand Organic Bhutan presented in the following sections of this report. Organic food production focuses on sustainability. The respondents also considered soil degradation important, underlining the general importance of sustainable food production. Finally, localised production using modern technologies, distributed production technologies (3-D printers, CNC machines, laser cutters and associated microcontroller technologies – Arduino and raspberry pi) was also indicated as important with the potential to provide new ways of solving problems and improving the lives of Bhutan's majority subsistence farmers.

Picture 10: Aum Badhum from Tsirang, August 2022

Critical factor analysis

The survey asked the participants to rank critical factors identified by stakeholders by importance, "Rank the factors in order of importance in enabling a workforce which is prepared for the future". The following results were obtained that point to some of the critical factors that need to be addressed as a priority.

Cultural factors

Table 5: Cultural factors in order of importance that enable a workforce which is prepared for the future

Rank	Enabling factors
1.	Perception of farming (stigma or glamour attached to farming and farmers)
2.	Interest (or lack of it) in farming among the youth
3.	Farming skills (operating machinery, sowing, tilling, harvesting, post-production)
4.	Fallow land and land fragmentation
5.	Farming knowledge about climate adaptation

The survey confirmed an earlier factor in the research – the issue of stigma attached to manual and farming work. The CLA analysis identified a cultural aversion towards labourers or blue-collar work. The CLA analysis indicated that the narrative of farmers being "ignorant" needs to be changed into one in which farmers are respected for their know-how and farming is esteemed.

"Farming has always been looked down upon by society. For decades, it has been seen as a life of drudgery and hard work with neither prestige nor influence. None of the parents would consider farming as a career choice for their kids." A 75-year-old farmer from Tsirang

The issue of youth employment, which is critical, can be seen as being intertwined with the issue of stigma. If farming is treated with contempt, the youth will be less likely to take it up. The youth can be seen as critical to enabling the next generation of farmers. If equipped and supported, they can bring new skills, thinking and entrepreneurial spirit to Bhutanese farming.

Technological factors

Table 6: Technological factors enabling a workforce which is prepared for the future

Rank	Enabling factors
1.	Quality farm inputs that lead to higher production
2.	Equipment to mechanise farming
3.	Product-specific market research and development (i.e. market infrastructure)
4.	Support for R&D and translation of research to development
5.	Farming technology adoption (internet, digital technologies)

Interestingly, the internet and digital technologies rank last when considering technological issues. What feature high in the ranking are some basic technologies associated with farming. This indicates a need to address the fundamentals. Farmers are struggling with productivity issues. Inputs and farm machinery are direct means to address them. These are not attractive and futuristic issues, but this study shows that for Bhutan to take advantage of the benefits of advanced technologies, it will need to start with the fundamentals.

"We still need more support to access diverse farm machinery, including those for harvesting and weeding." A 30-year-old farmer from Wangdiphodrang

Besides, how inputs and mechanisation are provided will be critical to Bhutanese farmers' long-term success. Bhutanese farmers will need to be able to integrate a farm inputs strategy into the broader goal of creating a brand for Bhutanese organic foods. An incoherent or contradictory farm inputs strategy will make this broader goal harder to achieve. Bhutanese farmers will also need a lot of support to prototype farm machines useful for the mountainous terrain. Investments will be needed for adapting and procuring machines and skills to make them work.

Political/policy factors

Table 7: Political/policy factors enabling a workforce which is prepared for the future

Rank	Enabling factors
1.	Government interventions to strengthen access to the market
2.	Coordination across key actors in the agriculture sector (public and private)
3.	Agriculture and livestock extension services
4.	Restrictions and regulations
5.	Standards and certification
6.	Geopolitical factors

Political/policy factors are thought to have several possible interpretations. One view is that commercialisation is a critical pathway to make farming profitable, which, in turn, can drive bigger investment. But this requires strong and strategic government involvement to realise the potential. This point is emphasised in the overall framing of this report as the need for targeted and specific industrial propositions. Strategy 2 (Brand Organic Bhutan) in this sector can be seen as an example of this. Another possible view is that the majority of Bhutanese farmers, who are engaged in subsistence farming, do not have any access to markets, which eliminates the possibility of farm incomes increasing through a formal economy. Both strategies for this sector address this.

Economic factors

In terms of economic factors enabling a workforce prepared for the future, the survey respondents emphasised infrastructure, followed by specialisation and value-addition skills.

Table 8: Economic factors enabling a workforce which is prepared for the future

Rank	Enabling factors
1.	Water source and irrigation facilities
2.	Supply chain logistics – food perishability/proper facilities, packaging
3.	Crop/fruit vegetable/livestock specialisation skills
4.	Marketing of farm products – value addition, produce for export (high-value crops)
5.	Human resources – labour supply
6.	Market size – small domestic market, regional and international market access
7.	Road connectivity and condition
8.	Prices of the agricultural produce compared to those imported
9.	Investment and support – access to finance, FDI (foreign investment) and private sector participation, public investment, credit access
10.	Insurance schemes for crop and livestock loss
11.	Inflation

Access to water sources and irrigation rank the highest. One respondent said, "Lack of water and irrigation facilities is the key to agricultural production. Erratic rainfall, climate change and rising temperature are causing damage and loss of agricultural production." The respondents discussed, among others, the need for smart irrigation, adapting crops, identification of permanent irrigation water sources, water harvesting technologies and the use of pumps for irrigation.

Supply chain logistics also factor heavily. Being a mountainous and geographically expansive country, transportation of goods is challenging, which requires strategies for food perishability, better facilities, better processing and packaging. This also requires better road connectivity and conditions, and alternative transportation options.

Then comes the issue of crop and livestock specialisation skills. Specialist skills are seen as key to increasing production and produce at a commercial scale. This can also be seen in conjunction with the ability to market value-added products for export.

Digital factors

Table 9: Digital factors enabling a workforce which is prepared for the future

Rank	Enabling factors
1.	New ways of working/products/skills/compliance
2.	Fast and low-cost internet
3.	Digital market access
4.	Businesses with overseas clients
5.	Digital literacy
6.	Big data-based decision-making
7.	Satellite-based internet
8.	Cyber security
9.	Mental health issues, e.g. digital/screen addiction
10.	Digital divide
11.	Cyberbullying

Fast and low-cost internet, digital market access and digital literacy factor high on the list. There is a need not only for access to the internet but also literacy on its use, the challenges and risks involved and opportunities, all of which can open market opportunities.

Part 3: Industrial proposition for Bhutan's agricultural workforce futures

This section presents two industrial strategic propositions for the agriculture sector that emerged from the study. As described earlier, the study identified and analysed the implications of several emerging issues and trends, which provided the basis for two industrial proposals for the sector.

These propositions are based on scenarios in a **5-15-year timeframe.** These scenarios show the Bhutanese agriculture sector advancing and achieving milestones within this timeframe. Each of these scenarios describes the fulfilment of an industrial policy direction and provides the critical assumptions to extrapolate workforce capabilities within the timeframe.

The first proposition, **Rural Renaissance,** highlights Bhutan's subsistence farmers as a source of transformation, the potential to build a new economy through their farming knowledge for climate resilience and bringing them into the formal economy. Rural Renaissance is an inward strategy to support the Bhutanese subsistence farmers to boost productivity and generate economic dynamism.

The second proposition, **Brand Organic Bhutan,** highlights Bhutan's position to take advantage of the global organics movement and become a commercial producer and exporter. Brand Organic Bhutan is an outward-looking proposal to build Bhutan's commercial organics sector and use it to bring new technologies into the whole sector.

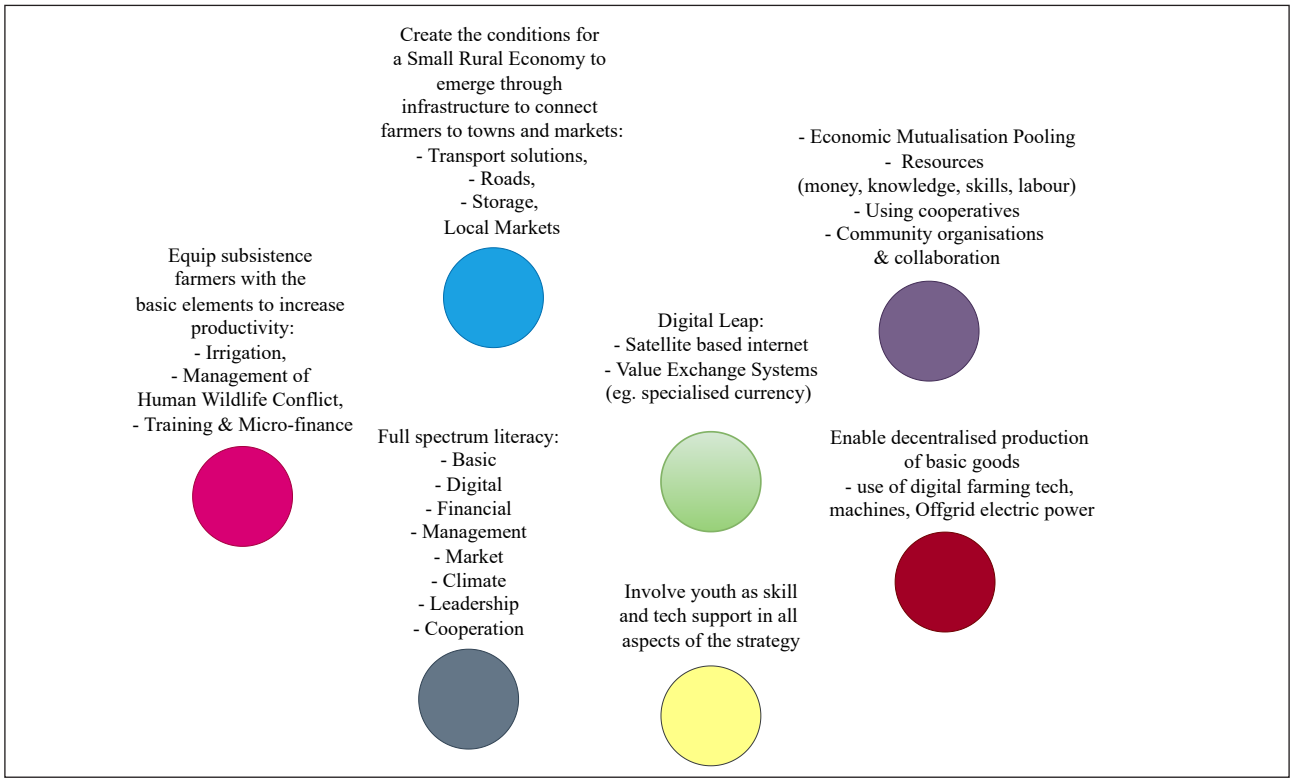
The two proposals are complementary because they target the aspects of economic development that support each other. The first proposal offers the possibility of enabling subsistence farmers to enter the formal economy, thereby supporting commercialisation. The second offers the possibility of building a commercial agriculture sector using new technologies that will have flow-on effects on the rest of Bhutan's subsistence farmers.

Industrial proposition 1: Rural renaissance

This proposition recognises that the majority of Bhutanese farmers who are illiterate and primarily practise subsistence farming should not only be important beneficiaries of efforts to advance workforce capabilities but are, in fact, the largest drivers of economic transformation. Far from being ignorant, this large segment of the Bhutanese population is skilled, having evolved and adapted to agricultural practices over thousands of years. If given proper support, this segment of the population can create a dynamic economy, especially with the addition of new digital tools. This requires a unique leapfrog strategy, combining targeted infrastructure, community-based (full stack) literacy, digital access, renewable technologies, economic exchange platforms, and distributed production technologies. They have the potential to transform the lives of this group of people for the better and support Bhutan in becoming a more productive and climate-adaptive agricultural economy.

High-level goal: *Create a resilient internal economy for the majority of Bhutan's subsistence farmers using infrastructure, literacy, renewable energy, digital knowledge and exchange, and distributed production technologies that boost productivity and connect people.*

Figure 25: Identified stepping stones for Rural Renaissance



Agriculture sector scenario 1: 5-year horizon

Bhutan has invested heavily to boost productivity among subsistence farmers and created basic investment schemes suitable for subsistence farmers. They include financing building blocks, infrastructure improvement, road access, crop protection from wildlife and processing and storage of farm produce. Farm literacy is helping small-scale farmers solve many of their basic problems – soil degradation, improved irrigation and protecting crops against wildlife. The collective problem-solving capabilities of farmers are being harnessed. Young people with educational and organising skills are being engaged to support the effort.

Farmer cooperatives are scaling up to undertake problem-solving to address infrastructure and other challenges. More markets are being created to allow farmers to sell their surplus produce. Machines are being prototyped for Bhutan's unique topography and land. New digital technologies and mobile/cellular connection that uses satellite-based internet have become more accessible. Peer-to-peer knowledge platforms and community education and problem-solving foster a sense of entrepreneurialism and uptake of basic business practices (basic accounting and finance) to plan and improve production. Renewable energy options, off-grid cheap and accessible solar and wind systems, and battery storage allow flexible electrical power in very remote locations and open up opportunities for machine-intensive farming.

Agriculture sector scenario 1: 10-year horizon

Satellite-based internet has made cheap and fast internet widespread. Computers, tablets and phones are affordable and accessible. The young people from the countryside are connected with some support. Farm literacy has evolved into digital literacy. Sharing farm information and knowledge on IT

platforms is common, creating awareness among farmers on climate risks, soil sustainability, supply and demand, pricing, marketing and many more. A few communities use new digital currencies and transfer systems that allow easier trade in addition to traditional currency. There is a great demand for organic food from small-scale farmers and villages, which can be processed in cities. Farmers only need to sell a small percentage of their produce to wholesalers at local markets to make a good income. This has boosted local economies, resulting in the growth of an internal economy and the integration of small farmers into the larger formal economy.

To address the impact of climate change, subsistence farmers respond swiftly to fast changing condition. Collaborations between farmers, climate adaptation specialists, soil scientists and regenerative farming practitioners allow agility in crop plantation and harvesting. Community leaders employ creativity and problem-solving to support farm communities to adapt. Many young people in Bhutan dedicate years to support the push to build a new economy for Bhutan's farmers.

Agriculture sector scenario 1: 15-year horizon

Farm productivity of most of Bhutan's small-scale subsistence farmers is dependent on fully-fledged distributed production technologies (DPTs). Farmers are increasingly involved in designing and producing their own farm equipment, systems and energy systems (e.g. thin film 3-D printed solar arrays) based on open-source software and hardware. Woodwork and welding are commonly used apart from high-tech production methods such as laser cutters, 3-D printers, CNC machines and microcontrollers. DPTs require scaling up and corporatisation of community enterprises. This allows small-scale manufacturing for farmers, significantly increasing productivity. This new productivity afforded by DPTs is amplified by connection to sophisticated communication and exchange/trade systems – robust local to non-local value exchange. This builds a robust "post-informal" economic dynamism that allows thousands of productive farmers to sell and buy goods and services within farm networks. This is aided by better transport and logistics systems and the use of drones. Young support workers with new skills and energy are critical to this transformation.

The pace of climatic variability has increased, and small-scale farmers employ new strategies to adapt to climate change. Climate resilience literacy is a top priority for farming communities. Bhutanese farmers are connected to many communities of farmers around the world that must also adapt to changing climatic conditions. There is global mutual learning happening for climate adaptation and production. The isolation that Bhutanese farmers have historically experienced is over. They now experience a lively internal economy of knowledge sharing, material production and exchange of goods and services.

Labour force capabilities for agriculture sector scenario 1

This scenario describes a productivity leap for Bhutan's subsistence farmers. This leap brings together various elements, infrastructure, literacy across range of areas, renewable energy and distributed production technologies. This productivity leap is built into local economic development strategies, supporting dynamic economic exchange, collaboration, and sharing and pooling of resources. The result can be a renewed rural economic dynamism that enhances productivity, improves livelihoods, and connects people, generating economic and social resilience in the face of rapid change. This scenario and accompanying industrial policy proposal will require the development of various skills, knowledge and capabilities. These skills, knowledge and capabilities are listed in the following table.

Table 10: Capacity needs for scenario 1 (Rural Renaissance)

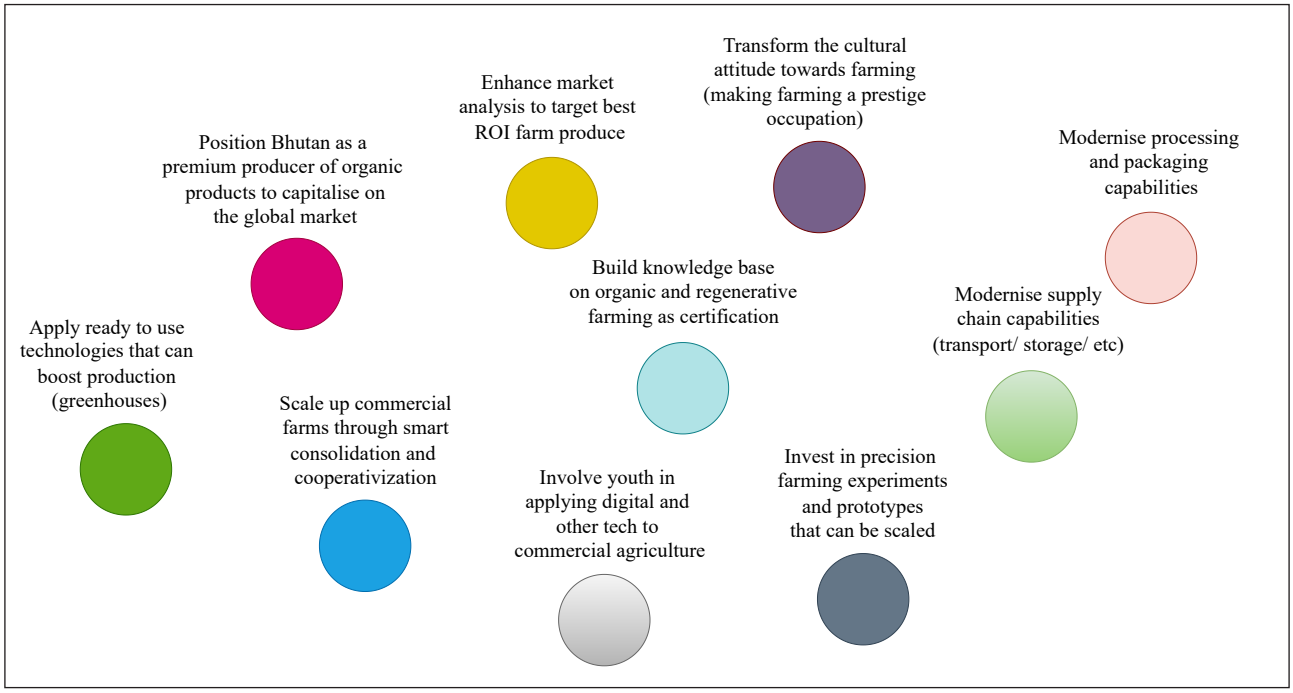
5-year horizon		10-year horizon		15-year horizon	
Areas	**Capabilities/knowledge/ skills**	**Areas**	**Capabilities/knowledge/skills**	**Areas**	**Capabilities/knowledge/skills**
Literacy	Digital literacy	Hardware/ infrastructure	Satellite internet	Hardware/ infrastructure	Drone-based topography field mapping
	Financial literacy		Manufacturing of biogas plant materials		Drone-based wildlife deterrent systems
Hardware/ infrastructure	Broadband and mobile coverage		Agrovoltaic farming		Drone-based cargo delivery
	Smart irrigation		Satellite imagery for precision farming		3-D printed solar arrays
	Renewable energy systems: wind and solar		Agricultural FabLab		Laser machines
	Efficient battery storage solutions		Advanced storage and processing		Drone maintenance and repair
	Flexible electrical power		3-D printing of machinery		Smart water management
	Cold storage and processing	Sustainable Land Management (SLM)	Regenerative agriculture		Computerised Numerical Control farming machines (CNC)
	Farm machinery operation and repair		Resilient seedlings		Micro-controller-based farming
Sustainable Land Management (SLM)	Pest and disease management		Climate-adaptive harvesting	Sustainable Land Management (SLM)	Climate resilient land management
	Seed quality		Climate-adaptive cropping		Regenerative agriculture
	Soil health management		Climate-resilient land management	Business management	Global marketing
	Irrigation water management	Business management	Innovative packaging	Digital	Distributed Production Technology (DPT)/ Distributive Manufacturing
	Land terracing		Regional marketing		Cloud computing
	Post-harvest management		Agriculture value chain (demand and supply)		Open-source software
	Sustainable mixed cropping	Digital	Cloud computing	Soft skills	Problem-solving
Business management	Bookkeeping and accounting		Drone developer		Critical thinking
	Cooperative farming		Data interoperability		Effective communication
	Packaging		Digital Agricultural Platforms (DAP)		
	Project management		Weather-based satellite monitoring		
	Marketing and promotion		Digital currency		
Digital	Digital marketing	Soft skills	Problem-solving		
	Digital Agricultural Platform (DAP)		Critical thinking		
	Digital transaction		Effective communication		
Soft skills	Problem-solving				
	Effective communication				

Industrial proposition 2: Brand Organic Bhutan

This proposition envisages the development of a profitable commercial organic farming sector. Initially driven by largely educated farmers, entrepreneurs and high-skill support workers, it leverages the regional and global demand for clean and green agricultural products. Bhutan proactively builds a global brand, leveraging its reputation for cultural and ecological integrity. Farms have consolidated into larger co-ops with greater scale and capacity for growth. Export markets become well-known.

High-level goal: *The goal of this proposal is to create a thriving commercial organic food production industry that can capitalise on the global demand for organics, which can lift the whole sector through the application of new technologies, supply chain infrastructure, and new capabilities in food production, marketing and promotion.*

Figure 26: Identified stepping stones for Brand Organic Bhutan



Agriculture sector scenario 2: 5-year horizon

In this scenario, within the five-year horizon, a national framework for building the brand Bhutan as a premier organic producer is spearheaded by a coalition of organisations (government, businesses, farms) for global organic food production and promotion. Bhutan's farmers will have increased their commercial organic food production. This is done through investments and knowledge in infrastructure, including road, irrigation and storage facilities. In addition, supply chain management will have improved, creating better access through Bhutan's complex topography. New technologies are deployed. Greenhouses and specialised farm mechanisation are in greater use by farmers. The youth are targeted for engagement through education, training and opportunities to apply specialised skills and farm-hand opportunities. There is a push to establish certification for organics for international markets. Importantly, to improve economies of scale, corporatisation is required, allowing farms to combine to leverage scale in investment, technology adaptation, marketing and distribution. Causes of soil degradation are identified and efforts made to address them, with plans to position Bhutanese agriculture as the best practice in sustainable farming.

Agriculture sector scenario 2: 10-year horizon

Within the 10-year horizon, Bhutan will have branded itself as a premier organic food producer worldwide. Bhutan employs a variety of marketing and promotional strategies – digital, tourism, woofing – to increase global demand and to source expertise and human resource. This international demand drives the growth of commercial farms and foreign investment in the sector. Significant machinery innovation is customised to Bhutan's topography, and various innovative farming practices (e.g. greenhouses and hydroponics) are commonplace. In addition, farm businesses practise new forms of data-intensive farming. There is a new level of data literacy among farmers that allows them to access useful information and helps them make better decisions on planting, land use, supply and logistics, marketing, seasonality and use of technology. Commercial farms pioneer the use of data systems to do precision agriculture within the complex topography of Bhutan. New farm IT platforms connect farmers across Bhutan to learn, share and make better decisions.

Agriculture sector scenario 2: 15-year horizon

Bhutan reaps the benefits of a booming international market for organic products and large demand for Bhutanese organic produce. This brings problems as local producers cannot compete with international pricing, with quotas and price protections introduced for Bhutanese buyers. To service the global demand for organic produce, new technologies feature prominently in optimising farms. Drones use artificial intelligence to map topography and find new places suitable for planting and irrigation. "Agriculture 4.0" is applied to enable food traceability. The Internet of Things (IoT), Big Data, Artificial Intelligence and automation are increasingly used to track production and supply chains, from crop yields to harvesting, sales, distribution and transportation. Bhutan is able to earn a competitive edge through pricing strategies and provision of niche agriculture products. People's perception of farming shift completely. People used to consider farming pure drudgery and they used to look down on farmers. Farmers now become one of the most respected groups, admired for their hard work, knowledge and contribution to the country.

Labour force capabilities for agriculture sector scenario 2

This scenario describes a productivity leap for Bhutan's subsistence farmers. This leap requires a variety of elements to come together: infrastructure, various literacies, renewable energy, and distributed production technologies. This productivity leap can be synthesised into local economic development strategies, supporting dynamic economic exchange, collaboration, and sharing and pooling of resources. The result can be a renewed rural economic dynamism that boosts productivity, improves livelihoods, and connects people, generating economic and social resilience in the face of rapid change. This scenario and accompanying industrial policy proposal would require developing various skills, knowledge and capabilities. In the following table, these skills, knowledge and capabilities are listed.

Table 11: Capacity needs for scenario 2 (Brand Organic Bhutan)

5-year horizon		10-year horizon		15-year horizon	
What are the areas?	**What kind of capabilities/knowledges/skills are needed?**	**What are the areas?**	**What kind of capabilities/knowledge/skills are needed?**	**What are the areas?**	**What kind of capabilities/knowledge/skills are needed?**
Literacy	Digital literacy	Hardware/ Infrastructure	Advanced hydroponics	Hardware/ Infrastructure	Sensors for pest and disease scanning
	Financial literacy		Smart greenhouses		Drone-based topography field mapping
	Organic food literacy		Vertical farming		Drone-based wildlife deterrent systems
Hardware/ Infrastructure	Organic farm branding and certification		Peri-urban farming		Drone-based cargo delivery
	Supply chain logistics		Drone mapping for precision farming		Agriculture 4.0
	Climate Smart Agriculture investments (CSA)		Automated seeding	Sustainable Land Management (LMS)	Advanced climate resilience and readiness methods
Sustainable Land Management (SLM)	Land terracing		Automated harvesting		Climate-adaptive harvesting
	Soil health management		Automated packaging		Climate-adaptive cropping
	Pest and disease management		Ultrasonic animal and pest repeller		Climate-resilient land management
	Seed quality	Sustainable Land Management (SLM)	Regenerative agriculture		Soil biology
	Irrigation water management		Resilient seedlings		Agricultural hydrology
	Post-harvest management		Climate-adaptive harvesting	Business management	International marketing and pricing awareness
	Operation and maintenance of cold storage		Climate-adaptive cropping		Branding Organic Bhutan to the world
	Greenhouse farming		Climate-resilient land management		Competition law

Sustainable Land Management (SLM)	Biofertilizer/biopesticides	Business management	International marketing	Digital	Internet of Things
	Hydroponics		International organic certification		Advanced data-based farming (precision farming)
Business management	Cooperative farming		Organic commercial farming		Cloud computing
	Bookkeeping and accounting	Digital	Digital Agricultural Platforms (DAP)		Open-source software
	Marketing and promotion		Drone developer		Digital Agricultural Platforms (DAP)
Soft skills	Problem-solving		Cloud computing	Soft skills	Problem-solving
	Effective communication		Digital platform system to track demand and supply of products		Critical thinking
	Problem-solving		Digital marketing and promotion		Effective communication
	Team building		Data interoperability		Corporate decision-making
	Effective communication	Soft skills	Adaptability		
			Negotiation		
			Effective communication		
			Corporate decision-making		

Part 4: Discussion and proposed interventions

Building foundations

In light of the quantitative analysis, qualitative implications analysis, and ethnographic fieldwork, any long-term outlook and vision need to start with building basic foundations. These are detailed in strategy one in this section.

The foundations that need to be developed can be summarised as follows:

- **Shift in societal mindset towards farming:** Farming needs to be made attractive to the youth. The youth are expected to provide new skills, expertise, and support to farming. This requires changing the cultural narrative of farming, even **retelling the national story of farming.** The mindset towards labour needs "culture hacking".[21] While no one should struggle with basic subsistence, a "farm success and productivity" mindset would boost morale and endurance while supporting productivity.

- **Targeted support to women farmers:** Agricultural feminisation, which puts an unequal burden on women to provide livelihoods on farms, needs to be addressed with greater awareness of equity issues and targeted policies that can reverse the trend and provide greater support to women.

- **Targeted interventions to support basic digital literacy:** The internet is a game-changing enabler, but its benefits can be fully reaped with digital literacy. And even more fundamental to this is basic literacy. Guidance is required in using new and emerging technologies, from conceptual to deployment.

- **Targeted interventions for illiterate farmers:** Breaking the vicious cycle of illiteracy, poverty and subsistence farming depicted in the story of Karma requires holistic and comprehensive support strategies. Improvement is needed in financial literacy and understanding profit and loss. Access to financing, especially infrastructure financing, needs to be improved.

- **Support for quality farm inputs:** Farmers require basic support systems to boost productivity, including effective approaches to deal with pests and wildlife, irrigation, processing and transportation of agricultural products, and access to markets. There are fundamentals that should be tested for their return on investment to boost productivity. The most basic technologies need to be applied to boost farm productivity, such as high-quality inputs and custom-designed machines for Bhutan's terrain.

- **Targeted support on climate-resilient farming:** The impacts of climate change are already felt, which calls for urgent scaling up of climate literacy and climate-resilient strategies

[21] Bussey, M. (2009). Six shamanic concepts: charting the between in futures work. Foresight.

- **Targeted interventions to strengthen access to market:** Improve understanding of domestic and global markets and requirements. Supply chain and logistics challenges need to be eased to enable commercial farming. Learn simplified best practices in critical areas such as storage, supply chain and market access. Scaling, mutualisation and financing strategies need to be brought together to support the economy of scale enterprises. Improving road transport is critical for connecting farmers, scaling the economy and enabling the commercialisation of surplus products.

Picture 11 & 12: Ideation jam session with stakeholders from the agriculture sector, August 2022

Proposed interventions

As part of the research, the participants in the ideation workshop were presented with various scenarios and asked to generate ideas based on these. The following are intervention ideas that can respond to the scenarios and operationalise the industrial propositions.

Table 12: Proposed interventions for the agriculture sector

Sl. No.	Goal	Intervention(s)	Good practice(s)	Proposed lead agency (Existing)	Proposed lead agency (New)	Time frame
1	Develop business acumen	• Provide agripreneurship skills (farm specific) to farmers	There is a need to integrate agricultural training with entrepreneurship training to help smallholders manage and market their farm production more effectively. In Uganda, a programme titled Skilling in Agripreneurship for increased Youth Employment (SAY) focuses on entrepreneurship and other soft skills required to grow a successful agribusiness in addition to practical agricultural training courses. Participants learn to identify new business opportunities, develop products, and create viable enterprises.	MoAF	Ministry of Agriculture and Livestock (MoAL)	2023
2	Facilitate knowledge sharing on social networking sites	• Pilot the use of WeChat for an agricultural advisory service • Map existing farmers' networks and strengthen them	Given that there is a significant mobile penetration rate and the usage of WeChat among farmers, a pilot agricultural advisory service could be initiated to assess the impact of providing advisory, including up-to-date and full climate and weather information to farmers, among other services.	MoAF	MoAL	2023
3	Improve farmers' access to market-related information	• Experiment the use of an information platform to channel information on prices and pricing structures	Like the weather forecast systems, Info trade in Uganda shares aggregate market price information on major district agricultural products, trends, and price movements. Price data are collected three times a week, analysed, and disseminated to the farmers. Likewise, Lima Links in Zambia provides a sort of 'live' market price information on horticulture and connections to markets for smallholder farmers. M-Farm in Kenya and Ghana provides farmers current prices of goods across the country.	MoAF	MoAL	2023
4	Address the needs of woman farmers	• Assess the skill needs of woman farmers • Incorporate training needs of woman farmers	Considering the high percentage of woman farmers, there is a need to identify the needs of women smallholders and transfer them into effective training programmes.	MoAF	MoAL	2023

5	Build digital marketing capacities	• Build online marketing capacities of farmers' groups and cooperatives	Farming groups and cooperatives need to build their capacities on the use of digital services such as online groups to market goods, and to enable product marketing and branding through online platforms to maximise their customer base.	MoAF and MoEA	MoAL and Ministry of Industry, Commerce and Employment (MoICE)	2023
6	Recognise the role of farmers in nation building	• Institute annual farmer innovation fair and/or harvest festivals and national farmers' day	Such events with rotating venues could bring together young and old, small-scale and commercial farmers to recognise their efforts and to showcase their innovations in farming, build local agricultural economies, and advocate for local produce. Likewise, National Farmers' Day or Agriculture Day is a means to recognise and honour farmers for their contributions to society.	MoAF and MoEA	MoAL and MoICE	2023
7	Assess skill needs and workforce demand	• Maintain a standardised agriculture workforce information database	A census data could be maintained on the agriculture workforce, including the profiles of farmers, their basic demographics, assets owned in terms of farm machinery and landholdings, financing support accessed, and the types of skilling and training undergone, among others. The Agriculture Routine Data System in Tanzania allows data collection, reporting and analysis by extension officers at regular intervals for decision-making purposes. The information is then fed into a larger database managed by the central agency.	MoAF	MoAL	2023-2024
8	Enhance knowledge and skills of extension officers	• Develop an integrated 21st century ready local contextualised training module for agriculture extension officers	There is a need for a central agency to coordinate and streamline multiple training being provided via the agriculture extension officers to match the skill needs of modern farming. Some prominent skills besides the technical ones include digital literacy, regional and global trends in farming technology, research skills, communication, and interpersonal skills. Furthermore, training needs to be designed to suit Bhutan's cultural, geographical and economic contexts.	MoAF and College of Natural Resources (CNR)	MoAL and CNR	2023-2024

9	Strengthen and expand the hydroponic farming system	• Experiment end-to-end support for hydroponic farming project with a youth farming group	Considering climate change, increasing urbanisation, and the depletion of natural resources, hydroponic farming has strong potential to mitigate the threats these issues pose to agricultural system. An experiment could be carried out with a group of farmers by providing hand-holding support to offering hands-on training and experiential learning in hydroponics equipment installation. India's hydroponic farming subsidy provides a few learnings.	MoAF and MoLHR	MoAL and MoESD	2023-2024
10	Support the stabilisation of farm incomes	• Experiment a yield/crop specific national agriculture insurance scheme	With unpredictable weather patterns, increasing human-wildlife conflicts, pest infestation, irrigation issues stemming from climate change and market inefficiencies, Bhutan's agriculture sector has become highly vulnerable. A transparent, quick and robust insurance system with affordable premiums is necessary. Based on the best practices, a pilot national insurance scheme could be tested for viability. A weather index-based insurance plan in Kenya and a public-private voucher-based insurance scheme dependent on satellite data to validate claims and facilitate crop damage is practised in India.	MoAF (MoAL)	MoAL	2023 - 2025
11	Facilitate and strengthen accessibility to new export and international market opportunities	• Pilot a project on international organic certification cost-sharing programme • Pilot a nation-wide campaign to create domestic demand for local produce	While the third-party certification service provided by Bhutan Agriculture and Food Regulatory Authority (BAFRA) is a step ahead in connecting organic produce with the international market, farmers continue to face challenges in terms of recognition of the certification. Internationally reputed certification is costly and the process cumbersome for smallholders. A cost-sharing programme could be piloted to receive reimbursement for a portion of their international organic certification fees for the first few years.	BAFRA, MoAF and MoEA	MoAL, MoFAET (Ministry of Foreign Affairs and External Trade) and MoICE	2023-2025

12	Promote innovative agricultural financing models	• Develop agricultural value chain innovative financing strategy • Initiate a cross-country financial literacy camp for woman farmers • Experiment a programme to provide financial (e.g., tax holidays) and/or non-financial (e.g., procurement marks) incentives to firms that source locally • Pilot contract farming projects in partnership with tourism companies as a form of a public-private partnership with a uniform entity connecting farmers directly with consumers (hotels and resorts) Partnership with existing agripreneurs	Agriculture value chain financing strategy will help understand the financial needs of actors in the chain and how best to provide financing to those involved. Financial instruments such as product financing, contract farming, warehouse receipts, financial leasing and crowdfunding, amongst others, could be explored. But first, it is critical to understand the benefits and risks of these financial instruments to assess whether adequate mechanisms are in place to permit and govern their application. Examples include the Coffee Initiative for East Africa operated by TechnoServe and funded by a grant from the Bill and Melinda Gates Foundation, which sought to increase farmers' productivity, strengthen farmers' cooperatives and the value they provide to farmers, and improve the overall value chain functioning. Likewise, contract farming projects could be initiated between women farmers in each value chain and hotels and restaurants in the region while providing the necessary inputs and training for quality assurance. Farmers' cooperatives could be instrumental in this process to help woman farmers gain a competitive advantage by pooling resources and selling in larger quantities to tourism companies.	MoAF and MoF	MoAL	2023 - 2026
13	Promote innovative farming practices	• Establish an Agriculture Innovation Lab	An Agriculture Innovation Lab (AIL) is proposed for prototyping technologies and farming methods specifically suited to Bhutan's unique circumstances, both sociocultural and geographic. Feed the Future innovation labs draw from the expertise of relevant universities to advance novel solutions in the agriculture sector. For example, Austria's agro-innovation lab plays a critical role in shaping agricultural solutions.	MoAF	MoAL	2024-2027

Conclusion

Developing the fundamental support structures and strategies for productivity is of the highest importance. This applies to both the emerging commercial sector described in industrial proposition 2 and subsistence farmers in industrial proposition 1. Bhutan, like all nations, is facing the uncertainty of climate change. The intensity and unpredictability of the impacts of climate change on agriculture will likely increase. The challenge will be to develop climate-resilient strategies while practising sustainable farming.

Agility and adaptation are the central themes. Changes in the population, climate, technology and markets will likely be unpredictable. This will require an unprecedented level of agility, experimentation, innovation and leadership at all levels of the agricultural system. Bhutan's agriculture sector will need skills in rapid prototyping, pilot testing and experimentation across farming communities, food systems logistics, machinery, human resource and policy-making. How to build this agility and adaptive capacity is of central importance.

Bhutan has a number of powerful advantages from the perspective of long-term sustainability. Today, there is a booming organic and regenerative farming movement transforming the thinking and practices related to agriculture around the world. Bhutan has an opportunity to leap over the many problems and excesses of industrial farming and take advantage of its brand and status as a country which has protected its environment to partner with and establish itself as a productive and sustainable agricultural nation. There will be trade-offs between idealism and productivity/pragmatism. However, these are solvable challenges within the broader commitment to national well-being. And the long-term benefits and profits of sustainable farming outweigh short-term industrial commodity farming.

In our age of high technologies, it is easy to look down upon subsistence farmers, many of whom are illiterate and struggle to earn a livelihood. However, when viewed from a different point of view, subsistence farmers are the sleeping giants of Bhutan. First, they have farmed for generations, hundreds of years, and are a reservoir of knowledge of farming in Bhutan's unique and challenging topography. This knowledge should not be underestimated. It can be argued that supporting this group of people will be the critical pillar of agricultural climate resilience. Secondly, because this group is mostly subsistence farmers, they are yet to tap into a source of economic dynamism and contribute to a formal economy. Once this group of farmers is provided with the tools, literacy support and opportunities to build localised economies, the impact would be felt across the entire nation, as productivity surpluses spill over into the larger formal economy.

The world is simultaneously experiencing great crises and a technological revolution. Young people are at the forefront of this revolution as they quickly adopt new technologies in creative ways. The 4th Industrial Revolution is as much about grassroots experimentation to solve practical problems as it is about large-scale enterprises. As outlined in the digital section, there is an opportunity for digital transformation to be directly applied to increasing farm productivity and problem-solving across a number of domains. Bhutan can grow a digital sector that specialises in solving the practical problems that its citizens and farmers face. At a basic level, there will be issues like access to the internet. But there will be many more perks, such as supply chain management to the use of drones for surveying and reducing human-wildlife conflicts. Bhutan's prototyping and problem-solving capabilities need a strong application domain. The living lab strategy outlined in the digital sector is directly applicable to the agriculture sector. This gives a maximum opportunity for the digital sector to support productivity in agriculture and improve livelihoods.

This will require investment in new ways of thinking about agriculture, drawing on notions of agility and adaptation and targeted training and educational foundations that equip the next generation of young people to make contributions. Young people are known for their open-mindedness, willingness to experiment and sense of adventure. Bhutan should tap into this energy to give young people an opportunity to contribute to the agriculture sector. Their contribution can add a layer of capacity to the transformation of agriculture, new digital and technological literacies, the ability to experiment and prototype solutions, community development and building local economies.

Both the industrial policy proposals have been conceived to consider what it means to grow the economic sector that will require new roles and jobs as well as consider what the skills, abilities and workforce capabilities will be within each strategy. Bhutanese leaders will need to consider integrating the traditional culture and the commitment to Gross National Happiness with the opportunities of modernity, new technologies and globalisation. These elements should not simply be seen as trade-offs. Too often, large development banks and consultancies have simply recommended the application of policies and technologies that sweep away tradition and radically restructure how people live and work. Pathologies of industrialisation, globalisation and digitisation wreak havoc on many people. Integration is a way to consider how modernity and tradition can work in synergy. In this way, Bhutan's world-leading commitment to its well-being and happiness will not be traded off for economic growth but becomes a platform for a new agricultural transformation that leads the world through a different type of leadership.

CREATIVE SECTOR

Creative sector

Creative industries cover a wide range of activities, products and services. From handicrafts to media and storytelling to cutting-edge digital productions, creative industries lie at the heart of economies seeking to leverage unique cultural offerings. In Bhutan, a dynamic array of activities, products and services constitute the creative economy, but the sector faces significant obstacles and barriers. Drawing from emerging signals, ethnographic fieldwork and foresight and implication survey analysis, the report presents two industrial propositions: **Bhutan Creative Collaborative Community and Druk Pop Global** based on scenarios created for the sector.

Stakeholders from the industries expressed a desire for Bhutan to build an entrepreneurial and solution-oriented culture with dignity and respect for all types of labour, and practises self-learning. This desire has profound implications for Bhutan's creative sector. As online learning and online marketing are proving to be transformative elements for creative industries, the sector requires a large dose of the "get up and go" do-it-yourself attitude. Bhutan's traditional creative arts are unique. There is a potential to leverage and use Bhutan's brand, cultural authenticity and rusticity. However, this does not just mean turning against modernity or creating a façade of tradition. Bhutan's creative sector will need to navigate the tension and dynamic between tradition and modernity and the influence of globalisation. This sector report discusses these issues and presents targeted industrial policy proposals that address these core challenges.

This report argues that Bhutan's creative sector specifically needs the following:

- Workforce employment-related data in the creative sector (number of businesses, exports, creative employment share, current creative economic value etc.)
- Formal classification for the creative sector
- Address challenges around creative recognition and/or intellectual property rights
- Access to finance/resources/production spaces/materials for creative work
- Affordable high-speed internet and relevant technologies
- Access to the international market (communication and exchange)
- Investor's knowledge of creative industry opportunities
- Large firms in the creative sector/growth are driven by start-ups
- Better coordination among industry stakeholders

As with most emerging contexts, access to payment and financial services is key to ensuring that creators get paid in timely and equitable ways for their work. Bhutan's challenges surrounding digital connectivity and digital literacy create a significant barrier for entrepreneurs. Additionally, there is little support for entrepreneurs seeking to break into the creative sector.

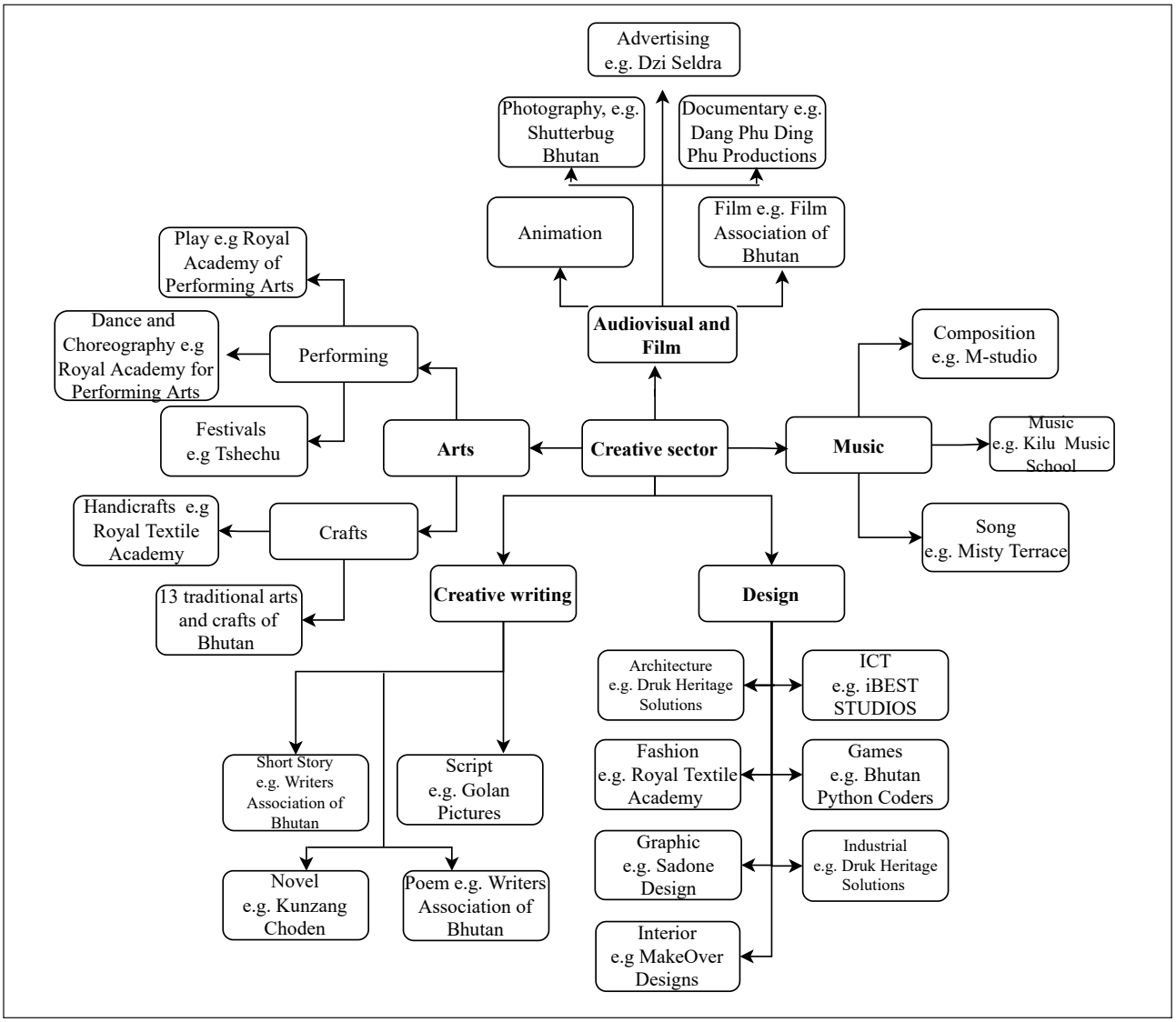
Despite these challenges, there is a growing preference for self-employment or freelancing as opposed to traditional "9-to-5" jobs. The increasing popularity of Bhutanese music across the region, more youth engagement in the creative sector and expanding interest in e-sports are positive signs.

In 2020, the International Trade Centre published a report titled “Creative Industries: Export Strategy of Bhutan 2021-2025”. In the report, the Minister of Economic Affairs observes the following:

The Gross National Happiness principles uphold the promotion of the country’s rich arts in a dynamic and development-oriented way so that it remains relevant as a source of values and sustainable inspiration for a society in transformation. The Constitution enshrines that the State shall endeavour to preserve, protect and promote the cultural heritage and arts to enrich society and the cultural life of the citizens. The Economic Development Policy, the Cottage and Small Industry (CSI) Policy and the Intellectual Property Policy all support the creative industries through their relevant angles. However, the creative industries needed a particu*lar focus to comprehensively tackle the very specific constraints that the sector is facing.*

This report highlights the disparity between “tradition and modernity” in Bhutan’s creative sector. TVET and entrepreneurship are strategic areas of investment. Furthermore, the report looks at the global context for creative industries, which calls for attention to a range of factors and forces that are shaping the future.

Figure 27: Existing creative ecosystem as deliberated during the foresight workshops



Part 1: Megatrends driving change in the sector

There are distinct and dramatic changes afoot in the domain of creativity.[22] Some of them relate to digitisation, but others relate to how people are changing due to interrelated systemic challenges and influences.[23] The following shifts are a useful starting point to consider some of these changes.

1. **Seamless connectedness:** Around the world, more people are connecting from anywhere and everywhere as mobile internet connections continue to become widespread. Having a "seamless connection" is driving new forms of creative activities and products.

2. **Digitisation of creative industries:** The digitisation of culture and creative industries has transformed how creative products are developed, distributed and consumed. It has, over the years, significantly affected the profitability, particularly of traditional creative products and businesses. Creative artists have leveraged technology to lower production and marketing costs, consequently reducing the barriers to production for artists and creators. This has led to an increase in artistic production, and more creative works are produced, distributed and published than before.

3. **Influencer culture:** It never happens if a photo or video does not get uploaded. Influencers are not merely driving "clicks" and "likes" but also rearranging marketing principles and practices as legacy industries and sectors seek to leverage "viral" content. Initially accessible to celebrities, trend-setting avenues are now open for any person as long as he or she has the skills to develop creative content. Entrepreneurs and businesses in Bhutan have recognised this and they rely on social media influencers to endorse their brands and to promote new products. As effective communicators, public sector agencies are also increasingly using social media influencers to communicate messages for common good and to bring about behavioural changes.

4. **Covid creativity:** Across a range of contexts, the Covid-19 pandemic spurred interest in shifting work habits and patterns, but the creative sector faced challenges as tourism declined, consumption patterns shifted, and funding decreased.

5. **Stream a little stream:** The growth of streaming platforms, from TikTok to Netflix, has created new opportunities for creators to showcase their activities and products to the world.

6. **Mixed realities:** Investment in AR/VR and the emergent metaverse continues to grow, and many are seeking to establish a foothold within the new digital spaces where people will live, work and play.

[22] Sonobe, T., Buchoud, N. J., Tan Ghee Tiong, J., Baek, S., Hendriyetty, N., & Sioson, E. P. (2022). Creative Economy 2030: Imagining and Delivering a Robust, Creative, Inclusive, and Sustainable Recovery. https://www.adb.org/publications/creative-economy-2030-imagining-and-delivering-a-robust-creative-inclusive-and-sustainable-recovery

[23] Lang, T., & Whittington, R. (2022). The best strategies don't just take a long view: they take a broad view. Harvard Business Review. https://hbr.org/2022/05/the-best-strategies-dont-just-take-a-long-view-they-take-a-broad-view

7. **Nonhuman creativity:** As machine learning and artificial intelligence advance, creators are turning to new algorithm-enabled tools to create content.

8. **Growth of virtual content:** With the onset of the Covid-19 pandemic, the world took a radical shift towards virtual content. It has become evident that the shift towards virtual modality is here to stay.

9. **Rise in collaborative content creation:** With the growth of social media platform engagement, the line between content creators and consumers has become increasingly blurred. Collaborative content creation sites such as Dropbox and Microsoft Office Cloud encourage consumers to play a bigger role in content creation.

10. **Shift in content distribution models:** Consumers worldwide prefer instantaneous and universal distribution of creative content, often using social media.

Significant short-term and long-term opportunities were observed for the Bhutanese creative sector. In the short term, the "low-hanging fruit" was the opportunity to empower Bhutanese creative producers with ground-level digital literacy and access. This will unlock creative producers' ability to market and sell their products to local, regional and global audiences. In the long term, Bhutan's strength and comparative advantage is in its uniqueness, folk arts and maintenance of tradition. As the world increasingly saturated with digital content seeks meaningful experiences and mindfulness, Bhutan will be able to offer itself as an oasis of equilibrium and wisdom.

This will require policymakers and leaders to contemplate integrating modernity and globalisation into Bhutanese creative culture. It is a fair guess to say that Bhutanese would not want their creative traditions to be swept away by the tide of globalisation and digitisation. This sector report offers two industrial propositions that engage this question of integrating tradition and modernity in both short-term and long-term horizons. First, let us turn to the creative sector today.

Part 2: Understanding Bhutan's creative sector today

The 2020 study into Bhutan's creative sector used the International Trade Centre (ITC) classification. The sector included: arts, audio-visuals, creative writing, design, and music. Creative industries in Bhutan are classified under cottage and small industries. However, as the ITC Creative Industries study notes, "the share of creative industries SMEs in the total number of enterprises in the country and more detailed information regarding the breakdown of the sub-sectors are not available."[24] There is not yet a formal classification for the creative sector in Bhutan. Therefore, tracking the sector with consistent data sets will require the formalisation of the sector into clear categories and subcategories within policy frameworks. These can then be translated into instruments and measurements for this sector's performance.

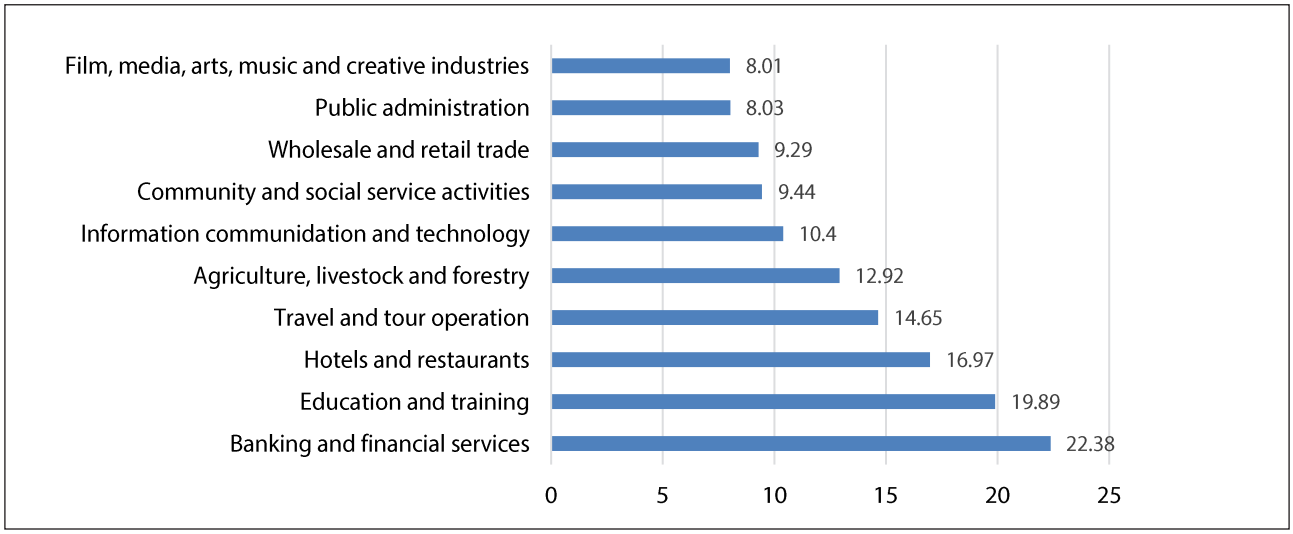
Studying trends in the creative industries is also challenged by a lack of sufficient and reliable data. There are no appropriate data systems nor adequate institutional arrangements and related experts to maintain and analyse information, causing the creative industry to be overlooked during policy-making and planning. This lack of data also limits the creative workforce's capacity, in particular, that of SMEs, to secure funding from investors and institutions to scale up its efforts.

[24] Creative report ibid (p.11).

Micro trends in the creative sector

1. **Growing preference of jobseekers to work in the creative industry:** According to the 2022 Jobseeker Survey Report, which interviewed 5018 jobseekers, creative industries were among the top 10 industries chosen by jobseekers as the most preferred for employment.

Figure 28: Percentage of jobseekers by employment preference



Source: Ministry of Labour and Human Resources. Jobseeker Survey Report 2022

2. **Slow but steady growth of the creative economy:** While there are significant creative trade data gaps, a few reports show steady growth in some of the sub-sectors. For instance, the film industry has witnessed steady growth while film production has witnessed a significant decline after 2019 due to the Covid-19 pandemic. Overall, insights from the collective intelligence workshops indicated an increase in creative services, including content creation, music, handicrafts and contemporary arts. This can be corroborated by the national trade statistics.

   Looking exclusively at handcrafted creative products, such as sculptures, paintings and other decorative items, an increase in export can be seen over time in the last 11 years. The year with the largest sale was 2019, before the Covid-19 pandemic. Bhutanese crafts should certainly be seen as unique strengths of Bhutanese culture, as many of these skills have been lost or are being lost in other parts of the world.

Table 13: Creative products exported by year in Ngultrum

Year	Original sculptures and statues made of anymaterial	Handicrafts not classified according to kind	Paintings, drawings and pastels, executed entirely by hand, other than drawings of heading 49.06 and other than hand-painted or hand-decorated manufactured articles; collages, mosaics and similar decorative plaques.
2010	-	1,885,939	8,440
2011	-	200,150	137,000
2012	-	288,100	88,080
2013	-	1,153,706	258,420
2014	87,760	1,437,110	1,528,639
2015	-	2,807,948	465,653
2016	-	1,206,744	123,467
2017	247,000	-	392,600
2018	195,000	5,655,045	108,100
2019	177,169	3,450,280	783,370
2020	-	2,814,038	2,908,754
2021	150,182	4,198,221	473,257

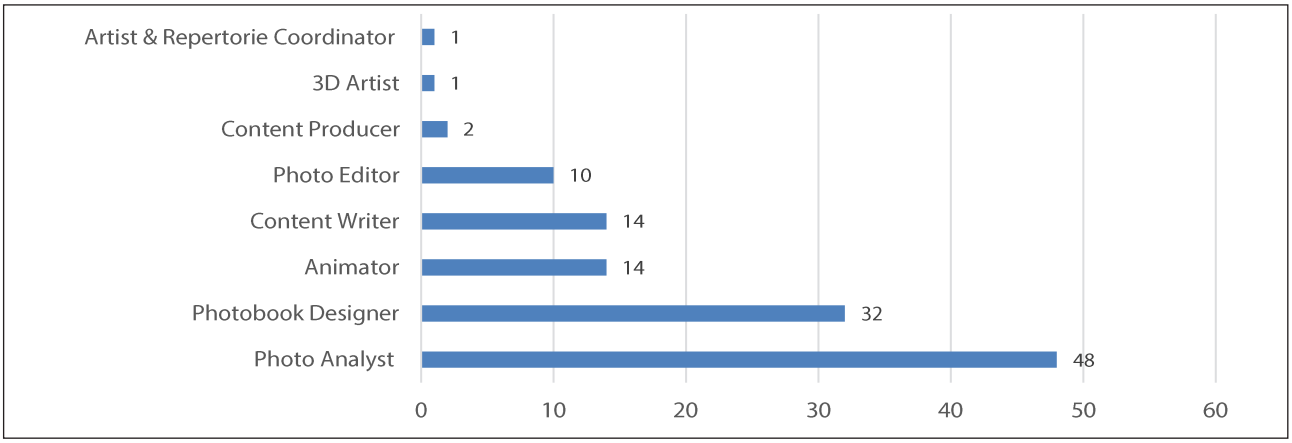
Source: Ministry of Finance. Bhutan Trade Statistics 2022

Emerging signals in the creative sector

1. **Demand for live streaming services:** There has been a widespread increase in demand for livestreamed content and a rise in popularity of video game streaming devices across all age groups, according to the insights gathered from the expert interviews and workshops. Freelancers here are mostly occupied in modernising conferences, seminars, policy dialogues and product advertisements, among others. However, limitation of bandwidth is one of the key issues restraining the growth of the market. Furthermore, there is a surge in need for advanced technologies in video platforms to improve the quality of videos.

   While there is a lack of comprehensive vacancy data in the creative sector, data from the YELP initiative indicate that there was a demand for creative skills as reflected below.

Figure 29: Number of participants in Youth Engagement and Livelihood Programme (YELP) 2021 by key sub-sectors



Source: Ministry of Labour and Human Resources. YELP vacancies in selected key creative sub-sectors, 2021

2. Rise of social media influencers: Due to the power of social media, there has been a surge in the number of social media influencers. Initially accessible to celebrities, trend-setting avenues are now open for any person as long as he or she has the skills to develop creative content. Entrepreneurs and businesses in Bhutan have recognised this, and they rely on social media influencers to endorse their brands and promote new products. As effective communicators, public sector agencies are also increasingly using social media influencers to communicate messages for common good and to bring about behavioural changes.

3. Non-Fungible Token (NFT): NFTs use blockchain technology to assign a token to a digital artefact. Non-fungibility gives a digital artefact a unique identity and cannot be interchanged like most digital assets. This allows a single digital artefact to be owned. In 2022, Kuensel recently reported on how a few Bhutanese created a centralised NFT collection using a smart contract to help Bhutanese artists sell their artworks. These NFT markets have provided a platform for Bhutanese artists to share their creativity and artworks while earning an income. It must be added, however, that NFTs have also been subject to a number of scams, hacking and theft. The domain, like cryptocurrencies, is a "wild west" with few established rules and regulations, with many looking to get rich quickly. The NFT phenomenon is still nascent at the time of writing this report and should be considered very high risk.

4. Demand for digital marketing: There has been widespread adoption of digital marketing strategies as opposed to offline marketing by various enterprises to help integrate digital advertising into their business models and to recognise the usefulness of social media marketing over traditional advertising strategies.

5. Demand for creative courses: Courses offered by the MoLHR under the Critical Skills Training and Skills Development Program (SDP) from 2020 to 2022 showed that a total of 296 applicants had completed the course. Of these, 190 learners were female. This again demonstrates organic demand for what is being offered. Course duration for SDP only ranged from one to four months. To ensure effective and adequate learning, there is a need to significantly increase the course duration. Further, workshop participants expressed the need for On Job Training (OJT) to gain industry experience.

Table 14: Number of applications for the online creative courses offered under SDP

Industry	Male	Female	Total
Creative	106	190	296

Source: Ministry of Labour and Human Resources. Administrative data 2020 - 2022

There is a lack of comprehensive information on the skilling and training initiatives carried out for various creative sub-sectors. The following table shows the number of students who graduated from the Institute of Zorig Chusum with various arts and crafts skills.

Table 15: Number of students who graduated from the Institute of Zorig Chusum (13 arts and crafts)

Course	2019	2020	2021
	Total	Total	Total
Tshemdrup	45	0	27
Jimzo	29	22	13
Lhadri	29	42	77
Patra	44	24	49
Shazo	4	0	0
Tshemzo	69	12	46
Trezo	21	9	10
Shingzo	3	0	1
Shingtshen	40	27	0
Total	**284**	**136**	**223**

Source: Ministry of Labour and Human Resources. Administrative data (2019 - 2021)

In this snapshot of students who received scholarships to pursue degree courses in the creative sector, the numbers are modest. They could be considered small in view of the organic demand for skills and online courses.

Table 16: Students studying overseas for creative qualification

Year	Male	Female	Total
2018	11	7	18
2019	8	6	14
2020	2	1	3
Total	**21**	**14**	**35**

Source: Ministry of Education, Department of Adult and Higher Education. Administrative Data (2018 – 2020)

Ethnographic research: User personas for the creative sector

The following two persons are archetypical users whose experiences represent the needs of a larger group of creative workforces. Based on several in-depth interviews with actors in the creative sector, the descriptions capture their goals, skills, attitudes and the environment in which they operate.

Emerging trend: 40-year-old weaver and wannabe digital marketeer

Figure 30: Persona illustration of Lhamo

Lhamo was born and raised in a rural village in Lhuntse. Her mother, a skilled weaver, taught her weaving at a very young age. She started weaving kiras and ghos by the age of 12. She is now 40 years old. Lhamo dropped out of school after completing class 10 to stay home and help take care of her family.

To earn some income, Lhamo started to weave and sell ghos and kiras. But since her village was small and not well connected to the urban areas, she could not make a lot of money. However, since she grew up weaving and had a genuine interest in weaving, she continued to weave a few pieces despite poor access to the market. She tried to weave special kishutharas, but was deterred by the high cost of yarn and dyes.

In the meantime, she came to learn about the Royal Textile Academy's National Design and Art competition from social media. She was interested in submitting an entry but she had to find a way to pay for the expensive yarn and dyes. Luckily, she could avail herself of microcredit because her uncle was an extension officer with an agency that provided microcredit. Not many girls in her village knew about that opportunity.

With that money, she could submit an entry to the competition after a year or so of tireless labour. She won the second prize and appeared in several newspapers and magazines. Her story was also covered by the national television channel. A few weeks later, a designer in Thimphu who supplies kiras contacted her and recruited her as a weaver.

She now specialises in kishutharas that the vendor turns into jackets, bags and other items for tourists. The vendor has told her about a competition in Europe that she is keen to participate, but she lacks the funds.

Lhamo considers herself lucky. She could connect with the vendor and designer, which opened up her world. Many of her friends have stopped weaving because they could not access the market. She is a creative person and likes experimenting with new designs. But every time she creates a new design, she finds people copying that. She finds this very frustrating and wonders if there is anything that can be done about it.

Weak signal: 28-year-old content creator and video editor

Figure 31: Persona illustration of Tshering

Tshering was born in 1994 to civil servant parents and grew up in capital Thimphu. He was interested in movies from a very young age. When he turned 15, he got his first camera phone. He would spend hours recording his friends. Using the in-built editing apps, he made short videos. They would recreate movie scenes and lip-sync music videos. He wanted to pursue this passion and study filmmaking in college. But there were no such courses offered in Bhutan and his family was not willing to send him abroad to study film. They wanted him to study a more traditional subject and work towards a 9-5 desk job.

He went to Sherubtse College in Kanglung and studied commerce. He continued to make short videos while in college. His parents got him his first smartphone while he was in college, which enabled him to explore his passion even more. He even made a video for teachers' day, which was featured during the college celebration.

Upon graduation, he took the civil service entrance exam and was recruited as a human resources officer. However, he did not enjoy his job even after remaining in it for a few years. So, he started taking free classes online and watching hours of YouTube tutorials to refine his

filmmaking skills. He eventually got an opportunity to make a pro-bono HR training video for his office. It took many tries to achieve the quality that met the expectations of his managers. That was when he learnt that making something for oneself was very different from making something for a client. Despite the struggle, he enjoyed pursuing his passion. And to do it earnestly and full-time, he quit his civil service job and started his own production company.

He faced many challenges, as equipment and software were expensive. Since he lacked formal training, he depended on online research to settle for the best tools. Since there were no financing opportunities in that field, he fell back on his savings and loans from family members. He enjoyed his new-found freedom at first, but quickly became stressed as he could not secure projects and struggled financially. At the same time, he had to put up with criticism on social media, which started to impact his confidence. It was only his true passion that kept him going. Many people he met in the industry gave up and moved on.

He recently discovered that there were better prospects with regional clients. He has been able to secure a few but the payment gateway remains a real issue. He has also found that there are issues with IP and copyrights as he always finds people using his content without authorisation.

Insights from implications survey

A comprehensive survey was conducted with sector stakeholders to examine the importance and implications of emerging issues, trends and factors for the sector. The first part of the survey asked the participants to discuss the implications of emerging issues, trends and the possible timeframe of the impact. It asked the participants to rank critical factors in order of importance and discuss why they made this ranking.

Implications survey

Emerging issues and trends were identified, ranked and analysed using a three-step process. A workshop was conducted with key stakeholders to identify emerging issues and trends impacting their sector. Secondly, a ranking exercise was conducted to identify what stakeholders considered the most important emerging issues. Issues were double-checked by multiple teams to ensure that the most important issues were included.

This table details the emerging issues and trends of **primary importance.**

Table 17: Emerging issues and trends of primary importance

Issues/trends	Description	Implications	Time frame
OTT platforms	Streaming services and online platforms are replacing TV as more people turn to the internet for content.	Opens opportunities for small- to large-scale Bhutanese content creators. Allows Bhutanese media products to more easily target global markets.	1-5 years
Rise of self-employment	Working from home for oneself or freelancing is becoming more common as online portals make working from anywhere feasible and efficient.	It will increase the dynamism and size of the creative sector, and its ability to market and sell globally. Robust internet infrastructure is needed to support this rising trend. And without a stable and affordable connection, workers will have to look elsewhere to earn their livelihood. Furthermore, other sectors could suffer losses of workers should freelancing become more common. Freelancing can also increase precarity and will require social safety nets.	1-5 years
Increasing youth interest in pursuing art through digital skills	Seeking to create content in new ways, the youth are using digital tools to generate new works, including some that draw on traditional approaches.	As the youth age, digital skills will become everyday and necessary aspects of creative production and marketing. The potential transformation of traditional practices by digital means could create social tension, and creators, especially those not interested in maintaining traditional ways, could lead to dramatic changes in Bhutanese art, especially if outside and modern influences are felt. This will require integration strategies.	1-5 years
Innovative funding schemes for the creative sector	Facing a lack of funding options, some are turning to more creative ways to raise money for new ventures, including using platforms and processes to raise money from anyone from anywhere.	Increases opportunities for financing creative projects, especially from non-Bhutanese contributors. It will drive the proliferation of specialised and divergent creativity. Without financial and digital literacy, some could be left behind as these approaches become more common.	1-5 years
Increased creative worker solidarity (unionisation, corporatisation, association)	Implementing a “stronger together” mentality, workers in the creative sector form cooperative structures designed to benefit all the members.	Better working conditions. Better income security, less precarity. More incentive to formalize, thus increasing the sector size. Ability to up-scale production capabilities through improved social organisations. Improvement in the quality of work.	1-5 years
Development of the Bhutanese pop industry (music, film, TV, etc.)	The influence of K-pop has led to the emergence of a local B-pop movement that blends traditional and modern elements.	Increase Bhutanese media profile in the world. The rising popularity of B-pop can bring younger generations into creative sectors, but it might also create social tensions as older generations might be weary of social change. Increase global marketability and revenue from sales.	5-7 years
Rapid innovation in online media platforms	The next generation of social media will be more immersive and leverage new technologies, such as augmented and virtual reality to create environments that allow one to live, work and play online.	This will allow the world to experience and learn from Bhutan and Bhutanese content in these new ways. It can also improve learning modalities. Internet addiction and the disappearing line between the virtual and physical worlds, especially among younger generations. E-waste could also present a significant issue. Requires robust platforms and business models to generate revenue.	10-15 years

Critical factor analysis

The survey asked the participants to rank critical factors identified by stakeholders by importance: "Rank the following factors in order of importance in enabling a workforce which is prepared for the future". The following results were obtained that point to some of the critical factors that need to be addressed as a priority.

Cultural factors

Table 18: Cultural factors in enabling a creative sector workforce which is prepared for the future

Rank	Enabling factors
1.	Payment gateways (creating options for digital creators/international payment) and addressing payment difficulties for online work (addressing credit card restrictions, difficulty in purchasing software, plugins and renewing subscriptions)
2.	The ability of Bhutanese creative workers to monetise their creativity
3.	Access to finance/funds to showcase creativity
4.	Wages and working conditions for creative workers (including labour laws and unionisation)
5.	Government policies for emerging media
6.	Copyright in Bhutan in the context of changing online tech/IP rights/infringement issues (e.g. copycat issue – people using each other's work without permission)
7.	The authenticity of Bhutanese products – the rustic touch
8.	Opportunities for artists and creative workers (e.g. stages for musical artists)
9.	Ability to do storytelling with products (value additions that customers seek)
10.	The informality of the creative industry in Bhutan
11.	Ageism (dismissal of youth creativity)
12.	Carbon footprint of productions (big budget productions often lead to carbon footprint and sustainability problems)

Significantly, the first four issues ranked the highest are related to providing income or securing livelihoods for Bhutanese creative workers. The first is the importance of payment gateways, platforms for digital creators to make money from local and international sources. The second factor, closely related to the first, is the ability of Bhutanese workers to monetise their creativity. This is not just about payment gateways but related to normalising copyright and intellectual property laws to address the copycat problem and reward creativity. The third factor is access to funds to showcase creativity. The fourth factor concerns fair wages and working conditions for creative workers, which include labour laws and unionisation/associations.

The fact that these four issues were ranked the highest would indicate that income security, equitable wages and opportunities for income generation are central concerns. They suggest a need to comprehensively build workforce capabilities that support the livelihoods of Bhutanese creative workers. The two strategies that are offered are approaches to this.

Other factors relate to government policies for emerging media and the informality of the creative industry in Bhutan. Informal employment is usually characterized by low or lack of access to social protection coverage, low renumeration and productivity. As a result informal workers experience higher levels of decent work deficits and working poverty than those in formal employment. This points to the need for the government to provide leadership in creating policies and programmes to

develop the sector, formal classification, funding schemes and support for creative workers to earn a livelihood. In particular it is critical to address the challenges faced by informal workers in the creative sector by strengthening social protection and removing entry level barriers to former employment.

Asked to pick just one factor, copyright was picked more than others, especially in the context of changing online technology. This was followed by the ability of Bhutanese creative workers to monetise their creativity. Both issues are, of course, interlinked, especially in the age of digital creative production. The digital age requires new frameworks and understanding for the monetisation of cultural products, for example, what counts as cultural appropriation, what should be illegal, and what should be considered legitimate creativity and cultural production protected by intellectual property laws. Ensuring copyright protections requires leadership from policy sources to send clear signals and offer clear frameworks for creative workers to work within.

Digital factors

Similar to the agricultural sector, fast and low-cost internet and digital literacy ranked highest, pointing toward the need to universalise access and opportunities to the internet as the most critical digital factors. As with other sectors, the most basic insight in this report is that fundamentals need to be established, before the fruits of more advanced accomplishments can be reached.

Table 19: Digital factors enabling a creative sector workforce that is prepared for the future

Rank	Digital factor
1.	Fast and low-cost internet
2.	Digital literacy
3.	Digital market access
4.	Cyber security
5.	Businesses with overseas clients
6.	New ways of working/products/skills/compliance
7.	Big data-based decision-making
8.	Satellite-based internet
9.	Digital divide
10.	Cyberbullying
11.	Mental health issues, e.g. digital/screen addiction

Part 3: Industrial proposition for Bhutan's creative workforce futures

This section presents two strategic propositions that are stepping stones for an industrial policy for the creative sector in Bhutan. As described in part 2 of this report, the research identified and analysed the implications of several emerging issues and trends. They provide the basis for constructing scenarios for the creative sector.

As discussed in the Causal Layered Analysis in the overview section, Bhutanese want to forge the future by relying on their own creative strengths and wisdom, rather than "copy-pasting" other

countries' models. The desire to make Bhutan's workforce self-learning, entrepreneurial and problem-solving is even more critical in the creative sector – a sector increasingly typified by online learning opportunities, online marketing opportunities and freelance work. Dignity and respect for many types of work will be fundamental to this sector, much of which is artisanal and based on hand-work or refined digital content creation skills and labour. Bhutan can leverage its brand by promoting its unique cultural traits and strengths, and traditional crafts. More importantly, this sector will need to navigate Bhutanese cultural expectations across tradition and modernity, and its appetite for economic globalisation, global media ecosystem and cultural hybridity.

The first proposition, **Bhutan Creative Collaborative Community,** which is **inward-looking,** emphasises supporting small-scale creative producers to strengthen livelihoods and income security through universalising digital literacy and access and fostering collaborative and associational strength.

The second proposition, **Druk Pop Global,** which is **outward-looking,** emphasises bringing Bhutanese creativity to the world, first through its larger-scale arts enterprises, films and music. Establishing a presence in the global media ecosystem and digital markets acts as a "vanguard", which other smaller creative arts can follow.

Both propositions focus on driving a creative sector that is forward-looking, innovative and highly entrepreneurial. This requires not only "content creation" skills, but also a range of entrepreneurial skills, from advanced digital literacy to next-generation financial and payment systems. Rather than following familiar paths, these propositions outline a set of actions that enable a leap, specifically focusing on local content production hubs, international promotion and marketing, by forging pathways for creative entrepreneurs, and promoting a "learning-to-learn" mindset and practice.

Overall, the creative sector can benefit significantly from the following meta-skills:

- Advanced Project Management
- Systems Thinking
- Customer focus
- Multiculturalism
- Cross-industry/sectoral Communication
- Foresight
- Uncertainty navigation

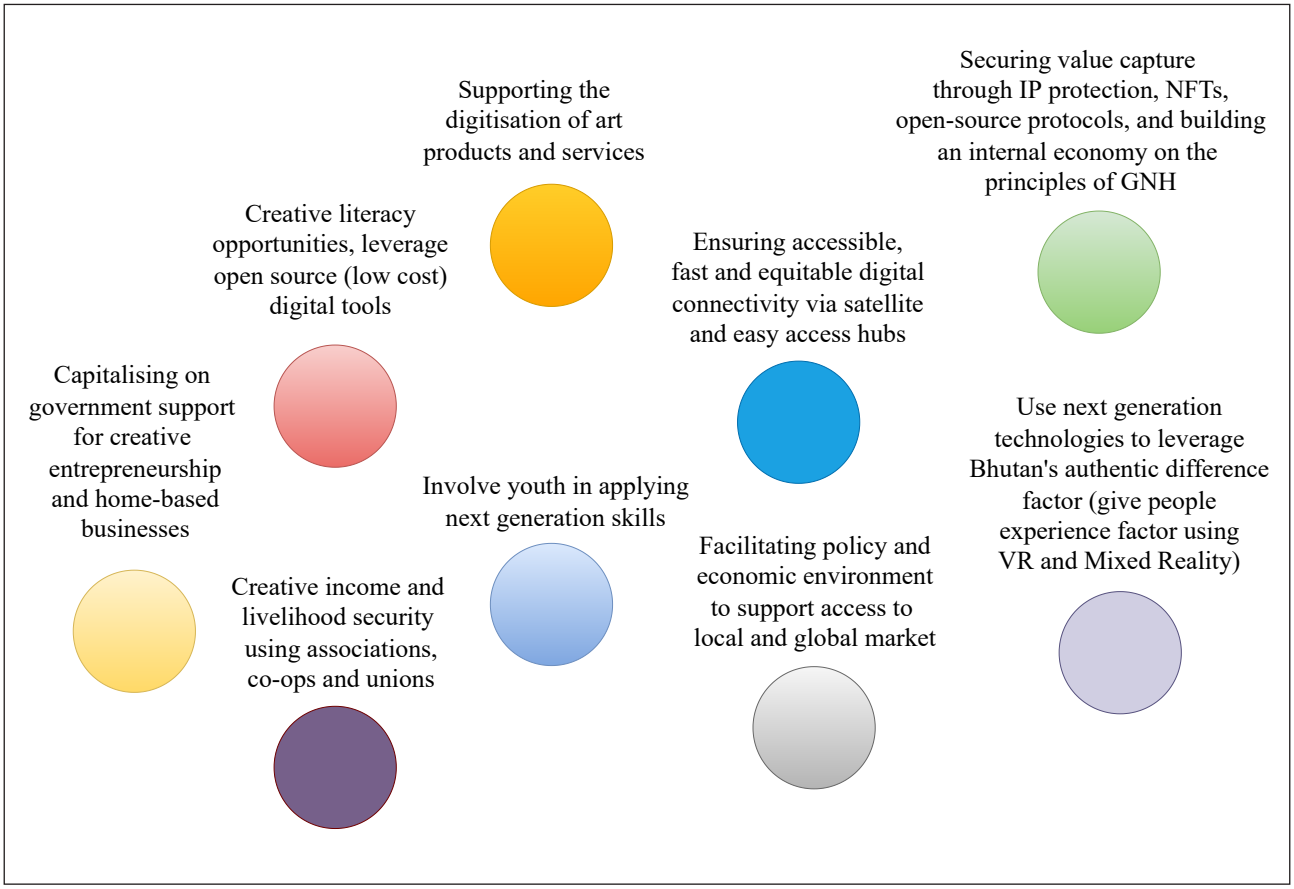
Industrial proposition 1: Bhutan Creative Collaborative Community

Turning inward during times of crisis is a means to maintain health and well-being. Facing a world of radical uncertainty, Bhutan may choose to look deeper within as a means of forging a creative economy that operates on its own terms. Using cutting-edge digital tools, Bhutan leverages online spaces to foster both digital and physical products and services that can be distributed around the world. It may also help build equity and security, by focusing on supporting creatives to monetise and market their work locally and globally, advocating for the rights of creative workers, and norm copyright protection.

High-level goal: *This strategy aims to focus on preserving and promoting traditional and authentic Bhutanese creative works. It focuses on building internal capacity among creative workers which is livelihood- and security-oriented. This is done through building freelance capabilities and resilient*

networks, developing socialised and cooperative work cultures and environments which avoid the precarity trap (e.g. using associations, unions, cooperatives and collaboration).

Figure 32: Identified stepping stones for Bhutan Creative Collaborative Community



Creative sector scenario 1: 5-year horizon

Worried that traditional artists might lose their livelihood, Bhutanese create new learning opportunities focused on meeting the demands of the growing global creative economy. All citizens have access to a "creative course credit" that can be used to strengthen digital skills, storytelling and content development.

Rising digital literacy cuts across urban and rural communities as creatives seek to collaborate with "diamonds in the rough" outside urban centres. New payment platforms make getting paid easier with more affordable fees, and improved accessibility.

To support the sector, the government constantly monitors key metrics and provides updates to networks and targeted funding opportunities to meet demand in specific sub-sectors. Creatives have access to new locally-developed platforms that provide real-time information about the growing economy and opportunities.

New copyright legislation is enacted to protect creators and ensure that "copycats" are held liable, and many more are encouraged to use new technologies.

Creative Sector Scenario 1: 10-year horizon

The Digital Dragon Network is born to provide a stable and secure platform for creatives to share and sell their work to the world.

At the heart of the network is a drive to shift all creative content to net zero, and there is a movement across content creators to imbibe sustainable production principles. Programmes focusing on developing youth and providing opportunities for women are integrated into the Digital Dragon Network's mentoring programme supported by profits from the network itself, which runs solely off local payment systems.

The creative sector is diversified, and many young people are finding niche opportunities. Bhutan has sourced cutting-edge skills from around the world through digital means, allowing even more citizens to build entrepreneurship skills in the creative sector.

3-D digital rendering means that people are 3-D printing Bhutanese craft products all around the world. Likewise, fab labs in Bhutan are 3-D printing designs from all around the world in Bhutan for the local market. These new interpersonal, digital, partnership, and content design skills and systems allow Bhutanese to market their considerable creative talents around the world, generating new income streams through various markets.

Creative sector scenario 1: 15-year horizon

A cultural shift has transformed Bhutanese creatives. Bhutanese, once known to be unassuming and self-effacing, have become skilled at self-promotion and branding. They have achieved this by not abandoning their values. Bhutanese can confidently promote themselves while remaining humble and "down to earth".

The Digital Dragon Network has expanded into a global marketplace through an innovative system that provides "creative passports" for non-locals who want access and are willing to pay fees and taxes. Collaboration with locals is a requirement for all non-Bhutanese creators, so there is a rise in hybrid content that blends local and global elements.

New start-ups emerge around the network. They grow from selling products into a knowledge exchange platform that delivers masterclasses on a range of topics, such as storytelling, music, traditional arts and cooking.

Bhutanese are connected to a global community of consumers and collaborators through the metaverse: virtual reality, augmented reality and other experience platforms. People can experience Bhutanese creative works as if they are in Bhutan! People develop a new appreciation for Bhutanese creativity through these experience platforms. Bhutan is considered a world leader in low-carbon and high-tech cultural and creative experiences, earning good income and providing people around the world with inspiring content.

Labour force capabilities for creative sector scenario 1

This scenario and accompanying industrial proposal will require various skills, knowledge and capabilities. These skills, knowledge and capabilities are listed in the following table.

Table 20: Capacity needs for scenario 1 (Bhutan Creative Collaborative Community)

5-year horizon		10-year horizon		15-year horizon	
Areas	**Capability/knowledge/skill needs**	**Areas**	**Capability/knowledge/skill needs**	**Areas**	**Capability/knowledge/skill needs**
Literacy	Intellectual copyright protection	Digital	3-D printing	Digital	VR environment architecture
	Media literacy		Knowledge platform management		Immersive audio engineering
	Financial literacy		AR/VR/metaverse production		4D printer programming
	Social media literacy		Co-operative design and operation		Hybrid adaptive technology operation
	Digital literacy		Advanced cybersecurity		Advanced cybersecurity
	Cybersecurity literacy/data literacy		Advanced creative computing		Advanced creative computing
Digital	Digital collaboration	Hardware/ Infrastructure	Creative design lab	Soft skills	Effective communication/story-telling
	Digital marketing		Specialised instrument design and maintenance		Emotional intelligence
	Creative online platforms		Creative satellite hub		Empathy
	Audio-visual and video production	Business management	Global branding and promotion		Time management
Business management	Software development		Innovative funding solutions	Hardware/ Infrastructure	AR/VR maintenance
	Marketing		Global partnerships		Hardware upcycling
	Networking (partnership working)		Networking		
	Project management and organisation	Creative & Design	Content creation		
	Fundraising (crowdfunding)		Design thinking		
Soft skills	Effective communication/ storytelling	Soft skills	Emotional intelligence		
	Cultural awareness		Time management		
	Time management				
	Flexibility and adaptability				
Creative & design	Content creation				
	Design thinking				
	Creative writing				
	Mentoring for creative workers				

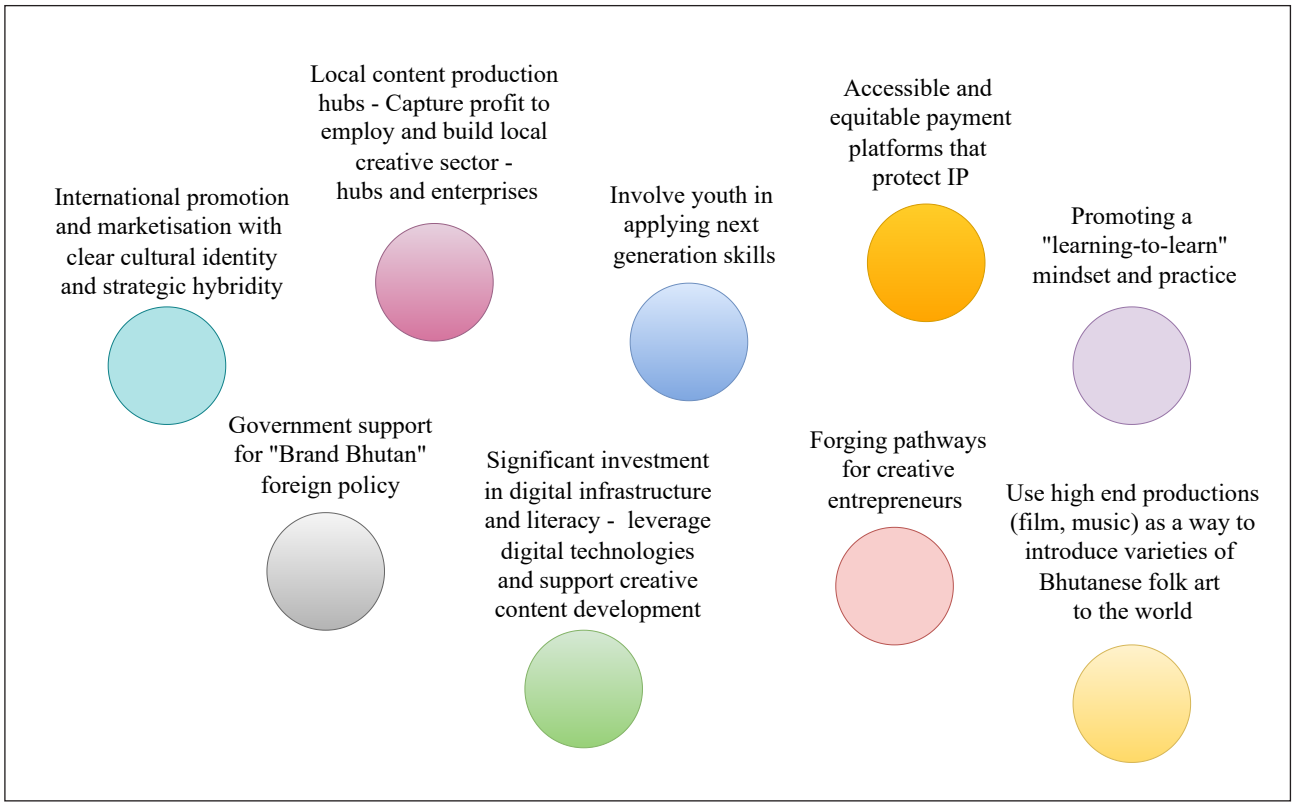
Industrial proposition 2: Druk Pop Global

Inspired by the global rise of K-pop, the B-pop movement grows in intensity and power fuelled by the government's aggressive support. A "Brand Bhutan" foreign policy leads to the rise of a new generation of entrepreneurs seeking to capitalise on the increasing attention on Bhutanese creative industries. Locally owned and operated, digital platforms meet the demand for new content creators, and the whole creative sector emphasises digital engagement enabled by blockchain-based payment systems.

High-level goal:

- Promote Bhutan's creative sector to the international market.
- Put Bhutan on the global creative "radar", promote via digital globalisation, markets and embrace "smart" hybridity, a deliberate mix between Bhutanese tradition and modernity.
- Target niche international markets to promote Bhutanese cultural products and experiences. Create a virtuous cycle between global marketisation and building local capacity.
- Use high-end productions (film, music) to introduce varieties of Bhutanese folk art to the world.

Figure 33: Identified stepping stone for Druk Pop Global



Creative sector scenario 2: 5-year horizon

Across Bhutan, smartphone penetration is growing, and the consumption of global media continues to rise. K-pop and other global pop movements are having a major influence on the Bhutanese youth. Over time, there is a fusion between K-pop, other influences (e.g. Chinese, Indian, Western) and local artists. The trend extends to film and other forms of the arts.

To take advantage of the artistic fusion, new Bhutanese digital platforms are developed with open payment gateways that market this new stream of fusion art. These platforms act as a pioneer of new copyright enforcement, allowing artists to have their work protected locally and internationally and improving royalties from digital works.

As this sector of small independent artists grows, and as people see its potential, people develop new financial resources, production spaces and materials for creative work.

As digitisation becomes a norm, and independent artists find niche opportunities, there is an increase in networks in the creative sector and a new generation of creative workers (designers, craft artisans, film and music specialists, and entrepreneurs across the value chain) collaborate on projects. This combination of fusion art between traditional and global/digital influences, and diversity and financial and resource support for these workers begins to yield a "creative dividend": in reputation, social capital and new livelihoods.

Creative sector scenario 2: 10-year horizon

Anticipating an opportunity, many people and organisations from the sector decide to develop and market Bhutan's unique pop art to the world. The Druk Pop Foreign Policy has been formulated, promoting and marketing Bhutanese pop art. Druk Pop is unique. It lacks the "glam" of the other pop genres (e.g. K-pop) and reflects Bhutan's distinctive culture that stresses humility and a down-to-earth sensibility.

On the other end, there is a great interest in traditional Bhutanese crafts, handicrafts, traditional designs, and fabrics, which are becoming known through social media and streaming channels that promote them. Along with this, diverse payment systems, from established systems like Stripe and Paypal and new ones using blockchain, facilitate revenue flow into the sector. With the establishment of new products linked to niche international markets, urban and satellite creative hubs emerge as centres of creative production.

Creative sector scenario 2: 15-year horizon

B-pop has spurred similar movements in other countries, and the global pop landscape has been transformed. As Bhutan's creative economy grows in size and strength, more people focus on content creation, specifically sharing designs and digital content through global networks. All the youth have a "side hustle" as the government's Druk Pop Foreign Policy makes funding available to support creative content development.

Bhutanese influencers collaborate with leading digital developers to build AI creatives. These "artificial creatives" generate works that blend the old and the new. Some, however, are worried that local content creators might be replaced as technology continues to develop. Increased opportunities bring highly trained creatives back to Bhutan, and Thimphu grows into a global hub for the creative economy. Across the city, neighbourhoods begin to transform as creatives take over. Established networks for the exchange of learnings and joint projects grow in some of the sub-sectors under the creative sector.

Labour force capabilities for creative sector scenario 2

The creative labour force would require specific skills, knowledge and capabilities to realise the objectives and aspirations described in the scenario above. It has significant implications on how we think about the creative labour market. The following table highlights some critical skills, knowledge and capabilities to transition successfully into the scenarios.

Table 21:Capacity needs for scenario 2 (Druk Pop Global)

5-Year Horizon		10-Year Horizon		15-Year Horizon	
Areas	**Capability/knowledge/skill needs**	**Areas**	**Capability/knowledge/skill needs**	**Areas**	**Capability/knowledge/skill needs**
Literacy	Intellectual copyright protection	Digital	Advanced cybersecurity	Digital	Web 3.0 development
	Media literacy		Global content curation		Meta-data analysis
	Financial literacy		Blockchain-based payment & accounting systems	Business management	Content production hub management
	Social media literacy		Internet of Things Integration		Multigenerational workspace management
	Tax literacy		Off-the-shelf AI application	Soft skills	Storytelling
Digital	Data analysis	Business management	International promotion		Emotional intelligence
	Coders/creative computing		Social entrepreneurship		Empathy
	Aion animation/animator		International event management		Time management
	E-commerce	Soft skills	Storytelling		
	Digital marketing		Emotional intelligence		
	Sound design/3-D designer		Time management		
Business management	International marketing (market research/online marketing/advertising design/branding)				
	Networking (partnership working)				
	Fundraising (crowdfunding)				
Creative & design	Grant and script writing				
	Creative storytelling/storyboard artists				
	Video production				
	Textile design and research				
Soft skills	Effective communication				
	Leadership				
	Self-learning				

Part 4: Discussion and proposed interventions

Building foundations

Every journey begins with a single step. Below are some foundational stepping stones that create a space for further development within the creative sector. Throughout engagements with the creative sector, a number of key factors were highlighted repeatedly, specifically the following:

- Payment gateways
- Online platforms for creators
- Intellectual property/copyright protection/enforcement
- Support to monetise creativity (training, resources, etc.)

As noted in The Creative Industries Export Strategy of Bhutan 2021-2025 report, the country can, and must, work towards nurturing "a progressive and sustainable creative sector fostered by innovation and guided by the principles of gross national happiness".[25] Furthermore, the 2021-2025 strategy highlights the need for training (courses for entrepreneurs as well as specialised schools in sub-sectors, such as film and music), marketing platforms, and collaboration and partnerships with leading international creators. While the Covid-19 pandemic has impacted all strategies across many contexts, it is evident from the participants of this study that the results of The Creative Industries Export Strategy of Bhutan 2021-2025 are not visible yet. Although the strategy has another three years, it is unclear how recovery from Covid-19 has affected national priorities.

From a workforce capabilities perspective, Bhutan can begin investing in skills and capacities that will pay dividends across a range of futures, namely:

1. Create a supportive regulatory environment.
2. Establish more communication and connectivity between the government and creators
3. Learn from best practices in the creative sector from Malaysia, Singapore and regional actors.
4. Match courses/training with both sectoral trends and workforce gaps.
5. Drive adoption of online learning opportunities that build critical, creative skills.
6. Fund platforms for online marketing and sales.
7. Strengthen regulations and enforcement of intellectual property/copyright.
8. Invest in ICT infrastructure to develop more accessible and stable payment gateways that are user-friendly for Bhutanese creative workers.
9. Make affordable and fast internet access easy for creative workers that need it.

[25] (2020). The Creative Industries Export Strategy of Bhutan 2021-2025


Picture 13 & 14: Ideation jam session with stakeholders from the creative sector, August 2022

Proposed interventions

As part of the research, the participants in the ideation workshop were presented with the two scenarios and asked to generate ideas based on them. The following are intervention ideas that can help operationalise the two propositions.

Table 22: Proposed interventions for the creative sector

Sl. No.	Goal	Intervention(s)	Good practice(s)	Proposed lead agency (Existing)	Proposed lead agency (new)	Time frame
1	Develop a creative database	• Define, classify, and harmonise the creative sub-sectors/ occupations • Develop a creative sector data repository	Through a participatory consultative process, identify creative standard classification groups to provide a good separation between creative and non-creative industries. This is a pre-requisite for discovering the proportion of people doing creative jobs in particular sub-sectors. A comprehensive database needs to be developed that contains information on the workforce capabilities and corresponding creative products and services from both the public and private sectors. CreativeGround is New England Foundation of Arts' primary tool for creative economy network and knowledge building. Both a database and directory, the user-generated and maintained profiles on CreativeGround provide a real-time picture of the creative people in New England.	MoIC	MoICE	2023-2024
2	Develop business acumen	• Provide business skills (creative specific) to the creative workforce	There is a need to provide entrepreneurial skills to creative artists to help commercialise their talents. Additionally, mentorship and information-sharing programmes can be piloted to provide networking and learning platforms.	MoIC	MoICE	2023-2024
3	Promote film-induced tourism	• •dentify and prepare shooting locations in the country • Market these locations to potential international filmmakers • Pilot incentive schemes to encourage Bhutanese/foreign film production	There is a need to capitalise on Bhutan's increased exposure and visibility in recent times through movies such as "Lunana: A Yak in the Classroom", "Fantastic Beasts" and video games such as "Far cry" and "Valorant" and identify locations and carry out destination marketing. Hobbiton village in New Zealand has received a significant increase in the number of tourists. It was the same for the film "Troy" that Turkey witnessed an increase in tourism. India provides incentive schemes for audio-visual co-production and shooting of foreign films.	MoIC, Tourism Council of Bhutan, National Film Commission	MoICE	2023-2024

4	Foster awareness of intellectual property rights	• Conduct a national campaign to raise awareness of copyright and intellectual property-related regulations	Although Bhutan has already enacted the Copyright Protection Act (2001) and National Intellectual Property Policy (2018), awareness of these laws and protection issues are limited. Outreach and promotion involve educating, informing and changing attitudes. World Intellectual Property Organisation's (WIPO) repository of awareness campaigns provides examples of strategies and campaigns.	MoEA	MoICE	2023-2024
5	Provide enabling tax policies	• Introduce time-bound tax relief on specific creative sub-sectors	The UK introduced the final tax relief to incentivise investment in productions, which was subsequently extended to video games and animation. In Austria, for income from royalty payments related to self-developed Intellectual Property (IP) that is covered by a registered patent, or capital gains from the sale of such self-developed IP, the tax rate is reduced by 50% for individual taxpayers.	MoF	MoF and MoICE	2023-2024
6	Facilitate self-promotion platforms for creative performances	• Develop code of busking practices and related regulations • Introduce busking zones in urban centres	Busking is a high-impact, low-cost option for artists to promote the creative sector and build a mental model shift towards appreciating creative professions. Busking cultures in New York, Berlin, Shibuya Crossing in Tokyo have rejuvenated public spaces and provided artists with platforms to network and showcase their works.	MoIC	MoICE	2023-2024
7	Enhance networking (national and international) and partnership opportunities	• Initiate an annual creative economy conference • Pilot a government-led marketing strategy for sub-sectors	A targeted conference or regional exhibition to promote networking and to strengthen the creative network would offer peer-to-peer support and advice, leading to partnerships and learnings. Such meetups would also help recognise and promote the potential of the creative sector and help inspire synergies and collaborations. A sub-sector-specific marketing strategy must be developed and implemented to enable access to the international market.	MoIC and MoEA	MoICE and MoFAET	2023-2025

8	Improve access to innovative financing schemes	• Experiment a government-led reward-based crowdfunding platform • Pilot a proposal with an international crowdfunding platform • Experiment seed-funding for creative start-ups • Pilot microcredits for micro-business in the creative industries • Experiment a government-supported co-production scheme for a sub-sector	Develop and experiment with a crowdsourcing platform to allow the creative workforce to access seed funds for their projects. Learnings can be drawn from ADRI fund, which is a local crowdfunding platform for creative projects in Estonia. Similarly, HEVA fund offers growth capital to creative enterprises in Kenya working in fashion, film music, crafts and performing arts. Piloting a guarantee facility for creative enterprises similar to the Culture and Creative Sectors Guarantee Facility developed by the European Union (EU) could strengthen the financial capacity by addressing the difficulties in accessing bank loans, and the limited spread of expertise among financial institutions in the area of financial analysis of creative SMEs and projects. Creative artists could also explore international platforms like Kickstarter and Indiegogo which are reward-based crowdfunding communities that offer tangible, but non-financial, benefits for the financial contributions of project backers. Likewise, through the creative Europe programme, the EU member states carry out an open call and identify and support at least 10 innovative and sustainable pilot co-production and co-creation programmes for songwriters and musicians in the music sector.	MoIC and MoF	MoICE and MoF	2023-2025
9	Strengthen the electronic payment system	• Conduct regular digital payment learning sessions • Build FinTech partnerships	There are limited open payment gateways in Bhutan. Many content creators doing business through online platforms have stressed how limited options for payment have greatly affected their business and client base (which is mostly limited to local audiences due to international payment constraints). The Electronic Payments Network companies in most countries facilitate the transmission of transfers between depository institutions.	Ministry of Finance (MoF) and RMA	MoF and RMA	2023-2025

11	Harness diaspora investments in the creative sector	• Explore and create linkages in the diaspora market • Pilot a targeted project to market investment opportunities to the Bhutanese diaspora	National and cultural content can be successfully targeted at buyers abroad. Diasporas often seek out authentic homeland culture. An example is the huge production centre for Vietnamese culture in California that is distributed internationally through diasporic retail outlets.	MoIC and MoF/ RMA	MoIC and MoF/ RMA	2023-2025
12	Provide sustainable creative spaces	• Establish a creative hub/park that provides a platform for mentorship and information sharing among creative artists • Introduce boot camps for creative artists	Creative hubs in South Korea play an essential part in building visible and vibrant creative communities, and in attracting creative talent and ideas. The hubs help connect otherwise dispersed freelancers and micro businesses to each other. Similar to the Thimphu TechPark Limited (TTPL), a creative park would play an active role in connecting practitioners to the audience in the fields of the arts, culture, and creativity.	MoIC	MoICE	2023-2028
13	Promote quality creative textile designs	• Establish a certification programme that provides an easy way for textile designers to indicate that their products meet a uniform and well-defined standard • Pilot an organic textile certification programme on a homegrown textile design house	Global Organic Textile Standard (GOTS) is one of the world's leading processing standards to ensure the organic status of textiles through environmentally- and socially-responsible manufacturing to provide a credible assurance to the end consumer. GOTS has offices in more than 70 countries. The benefits of GOTS include better consumer perception, attracting sustainable stakeholders and achieving environmental goals.	MoIC	MoICE	2023-2028

Conclusion

A targeted creative industries strategy and policy has become the mainstay of national economic policies in countries around the world. Some of these policies, such as the one in South Korea, are developed to build domestic creative production for global export. Other policies, such as the one in New Zealand, are geared towards attracting film production. These policies and strategic propositions are specific to the context and needs of a nation.

The two proposals presented with interventions should be seen as the stepping stones to a national creative industries policy, which should be targeted. This will require high-level conversations among leaders and decision-makers. The most pertinent point about the development of this targeted creative industries policy would be to highlight Bhutan's comparative and competitive advantage.

Because of its commitment to GNH, well-being, and preservation of traditional culture, Bhutan has not lost its way into globalised modernity. It has an ancient monastic tradition, highly-skilled traditional artisans, a unique storytelling and performance tradition, and the emerging music and film industries. It would be a mistake to compete on others' terms. Contemporary globalised media follows a ruthless logic of escalation. Films must become increasingly violent to stimulate audiences. Behaviour must become more and more outlandish to grab eyeballs. We live in an age of media sensationalism driving ever more excesses.

The simplicity, humility and wisdom embodied in the Bhutanese way of life is a large part of its creative industry's comparative advantage. In a world teetering on disequilibrium with high levels of mental health problems, despair about the future, nihilism and fear, Bhutan provides leadership and hope for a different way of life.

This does not mean that Bhutanese should not market their creative products to the world. It is to highlight that the fundamental comparative advantage Bhutanese arts can offer the world, something that has been lost in many places. By fully embracing its own cultural identity as a creative producer, Bhutan offers the world something refreshingly new.

As digital technologies advance, the physical and the virtual are becoming increasingly intertwined and entangled. The idea of the meta-verse, which includes mixed reality, holography, and other media provides an opportunity to invite the world to Bhutan. These technologies should not be seen as the ways Bhutan must emulate the world, but on the contrary, as ways in which the world can experience a truly different place (Bhutan).

Likewise, Bhutan's traditional craft industry stands out as a remarkable skill base in a world inundated by cheap and throwaway objects. The economies of scale production logic that has typified the global factory system produces cheap machinery, hardware and plastic products on an unprecedented scale. But in a world beset by garbage of every type, where the centre of the Pacific Ocean has become a great big garbage patch, the value of high-skill and long-life craft products becomes even greater. Our analysis is that Bhutan's comparative advantage is in promoting its strengths and capabilities. This does not mean foregoing the tools of digitisation. Bhutanese creative artists urgently need to upscale themselves in digital marketing to access global markets. It simply means doubling down on its own creative cultural identity and capabilities.

There is a need to integrate the energy of the youth and experience to move forward. The youth will inevitably become digital natives and bring the skills and energy to engage with the technologies that can underpin the capability to access global markets. However, much of the creative production in the sector is based on those with decades of experience. There will be a need to facilitate an intergenerational process of alignment. This can help strengthen traditional creative industries while generating greater and more secure income.

The two propositions provide pathways for workforce capabilities that are part of a growing economy. By strengthening digital literacy and the capability of small-scale creative producers, the sector will be able to market itself to local, regional and global audiences and marketplaces. Payment gateways designed to allow small-scale producers to sell their products will drive quick gains. Likewise, a targeted industrial policy intended to promote Bhutan as a unique producer of media and creative art can leverage the brand Bhutan, drive interest in the Bhutanese creative industry, and create new opportunities to use the world as a digital stage.

The most fundamental requirement in any of these proposals is to take care of the people who do this work. Creative industries are often trumpeted as a new and exciting transformation in the potentials and modalities of work. But everywhere, creative workers are beset by precarity. Labourers often live hand to mouth. Mutualising labour processes, fostering collaboration and developing income security and fair work systems will be of central importance to building a creative sector in which people want to work, stay on and thrive.

DIGITAL SECTOR

Digital sector

Following the narrative thread of this report from the first section, Bhutan's challenge is to use the digital revolution to perform a "leap". Stakeholders consulted want Bhutan to develop its workforce with the spiritual wisdom characteristic of the Bhutanese culture. Indeed, given the potency and potential for harm, stakeholders feel that the digital revolution will need to be matched by a wisdom revolution. This means finding ways to avoid (leaping over) the excesses of digital transformation and harnessing its potential to solve practical problems. The capacity and culture for self-learning, entrepreneurship and "roll up your sleeves" problem-solving skills will be critical to success.

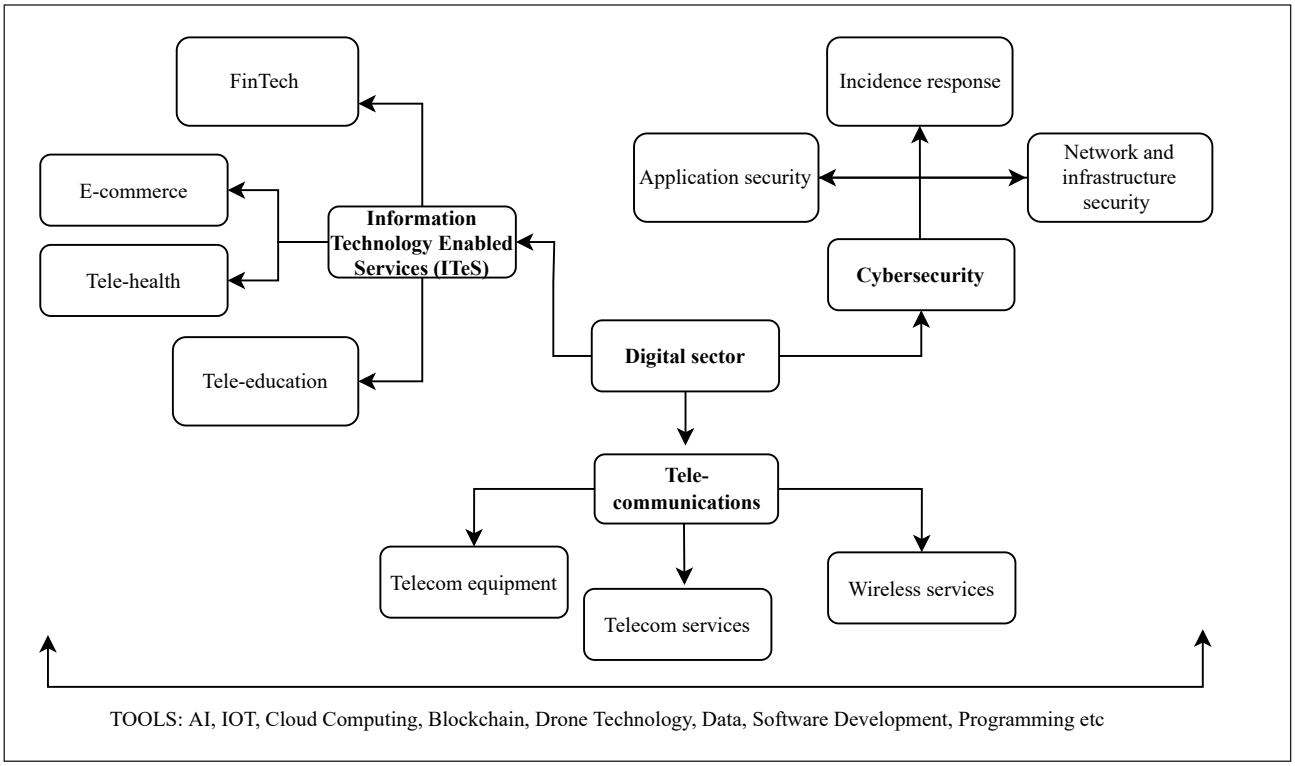
To unlock the potential of digital technology, Bhutan needs to break the cycle of importing external resources to cater to workforce gaps. Given Bhutan's context, there is an opportunity to develop a local digital technology sector tailored to its context. Bhutan will have to invest in local education to develop the sector and find a path to keep people from leaving the country for better-paid positions elsewhere.

This sector report provides an analysis of trends, both established and emerging, plausible scenarios, and industrial strategic propositions for Bhutan's digital sector. It draws from quantitative trend analysis, ethnographic fieldwork, foresight analysis, and an implications survey analysis. It presents two industrial propositions: **Connected and Safe** and **Bhutan Digital Living Lab,** based on the scenarios created for the sector. Based on these proposals, insights on skilling and capability and knowledge needs are elaborated over three-time horizons, five, 10 and 15 years.

Some of the key findings include the need for Bhutan to:

- Engage local experts in knowledge sharing and training
- Develop indicators and measures and collect data for the sector for sectoral and societal impacts.
- Create indicators and measures that highlight future and emerging needs alongside current capabilities.
- Create a strong technology foundation to exploit its benefits in other sectors and move on to more advanced technologies.
- Advance technologies such as AI, 3-D printing and IoT which can have significant economic, social and resilience impacts. This needs to be balanced with the need for rugged and repairable technologies suited to Bhutan.
- Implement a whole system approach to digital technologies which will include a range of other jobs and training needs.
- Place protections on culture and societal well-being through this transition.

Figure 34: Existing digital ecosystem as deliberated during the foresight workshops



Part 1: Megatrends shaping digital sector

Digitisation can be seen as a megatrend that the world has experienced for over 60 years. It will continue to reshape our lives in the 21st century. Digitisation began with the development of the first computers in the 1950s, expanding its reach through consumerisation and miniaturisation, and the development of the first versions of the internet.[26] The post dotcom era of the 2000s saw the development of "groupware" and collaborative software systems, culminating in the emergence of large-scale social media systems and peer-to-peer technology.[27] Recent developments have seen miniaturisation and bandwidth breakthroughs, culminating in the **emergence of the Internet of Things (IoT),** and new connection and **shared experience platforms (Augmented and Virtual Reality).** We have also recently seen the emergence of the first **artificial intelligence and machine learning systems and applications.**

Even with these formidable technological achievements, we are arguably only halfway through realising the full potential (and impacts) of the digital revolution.

[26] Castells, M. (1996). The Information Age: Economy, Society and Culture. Mass: Blackwell.
[27] Bauwens, M. (2006). The Political Economy of Peer Production. Post-Autistic Economics Review(37).

Decentralisation is another important dimension of digital transformation, with the emergence of **peer-to-peer technologies, open-source software development, and blockchain-based services.** Along with distributed computing and value accounting, this is creating the possibility of distributed manufacturing and production, whereby localised high-precision production can be done based on open-source designs.[28] A new generation of **renewable energy technologies such as off-grid wind and solar, battery systems and microgrids, also potentiate decentralised production capabilities.** Blockchain opens opportunities for crafting value exchange systems for targeted needs. They have key implications for Bhutan's agricultural and creative sectors, and grassroots entrepreneurialism in the country.

As different digital technologies converge, for example, as smartphones became cameras, audio streaming platforms and GPS systems, we have also seen the line between the online and offline worlds blurring. For internet-connected parts of the world, work re-entered the home, as Covid-19, Zoom Inc and broadband internet access converged to reshape the workspace in times of crisis. **Social media platforms** have become central locales for people to organise, record and share their social lives. New advances in virtual reality and augmented reality are layering the virtual on top of the physical or within the physical. This as well has important implications for Bhutan as a geographically remote country but digitally ubiquitous within the wider internet-connected world. Bhutan could be in every home.

In the meantime, it is also very difficult to ignore capitalism's increasing role in driving social externalities as digital transformation continues. At the systemic level, the use and misuse of social media platforms by political agents have been implicated in multiple electoral controversies around the world, including Brexit and the election of Trump.[29] At a more personal level, much of what counts as connectedness today, including the use of social media and gaming, has been intentionally designed to be addictive.[30] For instance, moderators for Facebook have filed class action lawsuits against the company for suffering from PTSD.[31] It would be naïve to believe that absorption into digital transformation will be an antidote to Bhutan's workforce futures challenges. The digital world needs to have extra critical scrutiny and sophistication.

Digitisation has also driven the erosion of traditional news sources and opened up opportunities for online media. While this has been positive in some respects, providing new channels for bloggers and independent news initiatives, it has also led to the spreading of misinformation, fake news and propaganda. Because the content of traditional media and social media has become almost indistinguishable, it has become challenging for the average citizen to sift through the media content for facts. This again has important implications for Bhutan as a country that has not experienced universal digital transformation. Bhutan has an opportunity to learn from the mistakes of other countries (to leap), but there are dangers if that learning does not happen.

[28] Ramos, J., Ede, S., Bauwens, M., & Wong, J. G. (2021). The Cosmolocal Reader. FuturesLab.
[29] See: https://www.theguardian.com/news/series/cambridge-analytica-files
[30] See: https://www.thesocialdilemma.com/
[31] See: https://www.theverge.com/2020/5/12/21255870/facebook-content-moderator-settlement-scola-ptsd-mental-health

Connectivity has moved through multiple phases of transformation, most recently from the 4G spectrum to the **5G spectrum.** But most significantly for Bhutan, as a mountainous country where infrastructure is difficult and expensive to install, a satellite-based connection is a game changer. A new generation of **low earth orbit satellites** (LEOS) is already allowing broadband speed connectivity in remote parts of the world, for example, through Elon Musk's StarLink system. The prospect of universal connectivity for most of Bhutan's population is approaching.

Finally, advances in machine learning and artificial intelligence are beginning to significantly impact many fields, from medicine to professional services and farming to science and data analytics. These increase opportunities for Bhutanese agricultural and creative sectors and economic development as a whole if targeted strategies and applications are put in place.

What does digitisation mean for Bhutan?

This workforce study was preceded by the report "Digital Jobs in Bhutan: Future Scaling and Demand Creation". That report comprehensively analysed Bhutan's digital capabilities and potential. It envisioned a future where young people are fully employed with "future skills that are transferable, relevant and meaningful, with diverse, equitable, digitally empowered job pathways to thrive". The report articulated opportunities for Bhutan to build a "homegrown ICT sector and entrepreneurial ecosystem", as well as a foreign direct investment (FDI) oriented approach to building small and medium enterprises (SMEs).

This report overlaps and supports some of the strategies and conclusions of the Digital Jobs report. This report focuses on the development of the Agriculture, Creative and Digital sectors rather than digitisation specifically. This means that digital transformation is seen as an enabler of positive change across different sectors. However, digitisation is one of several important elements and dimensions that should be considered.

As outlined in the section on megatrends, digitisation should not be seen as value-neutral or deterministic. There are sociological, political and cultural questions, challenges and choices that communities and nations must make. Our understanding of technology needs a critical eye toward the political and cultural dimensions of applying technology. Our study is not a technical or instrumental strategic lens through which to see digitisation, but rather a sociocultural and socioeconomic lens by which we must scrutinise and discern our way through the bramble and thicket of 21st-century technologies to preserve peace and equity and enhance our wealth.

Any nuanced vision of digitisation makes it clear it should not be looked at as a panacea for the development challenges of any country. Digitisation needs to be targeted. Wise boundaries and guardrails need to be put around what it means and can do. In the context of Bhutan, digitisation requires the integration of Bhutan's wisdom traditions, the demand for ecological sustainability, social equity and targeted technological modernisation.

We see an opportunity for Bhutan to use digitisation to solve problems across its economy and society. This is the most distinct difference between the Digital Jobs report and this report. While the Digital Jobs report provides a pathway to creating an ICT sector through FDI and SMEs, this report puts forward two fundamental strategic propositions for creating societal and institutional capabilities.

Part 2: Understanding the digital sector today

The digital sector in Bhutan is still small compared to other sectors. As per the Bhutan Interactive Data Portal manned by the National Statistics Bureau of Bhutan, about 58.1% of the population have access to internet as of 2017, with Thimphu having the highest accessibility (84.4%). Only 2.3% of the population have access to broadband services. However, there is a high mobile penetration rate of 96.98%, as per the 2017 data reported in the data portal of which 64.63% of households have access to mobile phones. Nevertheless, the industry experts at foresight workshops shared that employment and value generated by the sector is growing. While most of the demand for digital services is from the local public sector, there are increasing number of digital freelancers working for oversea clients. One key challenge in the digital sector is to limited human resource with advanced digital skills. Besides, there are concerns about internet costs and broadband infrastructure.

During the stakeholder consultations, the industry decision-makers cite the lack of data on digital job recruitments and vacancies as one of the key barriers. Considering this, we leveraged on workshops to identify some of the established and emerging trends in the digital sector.

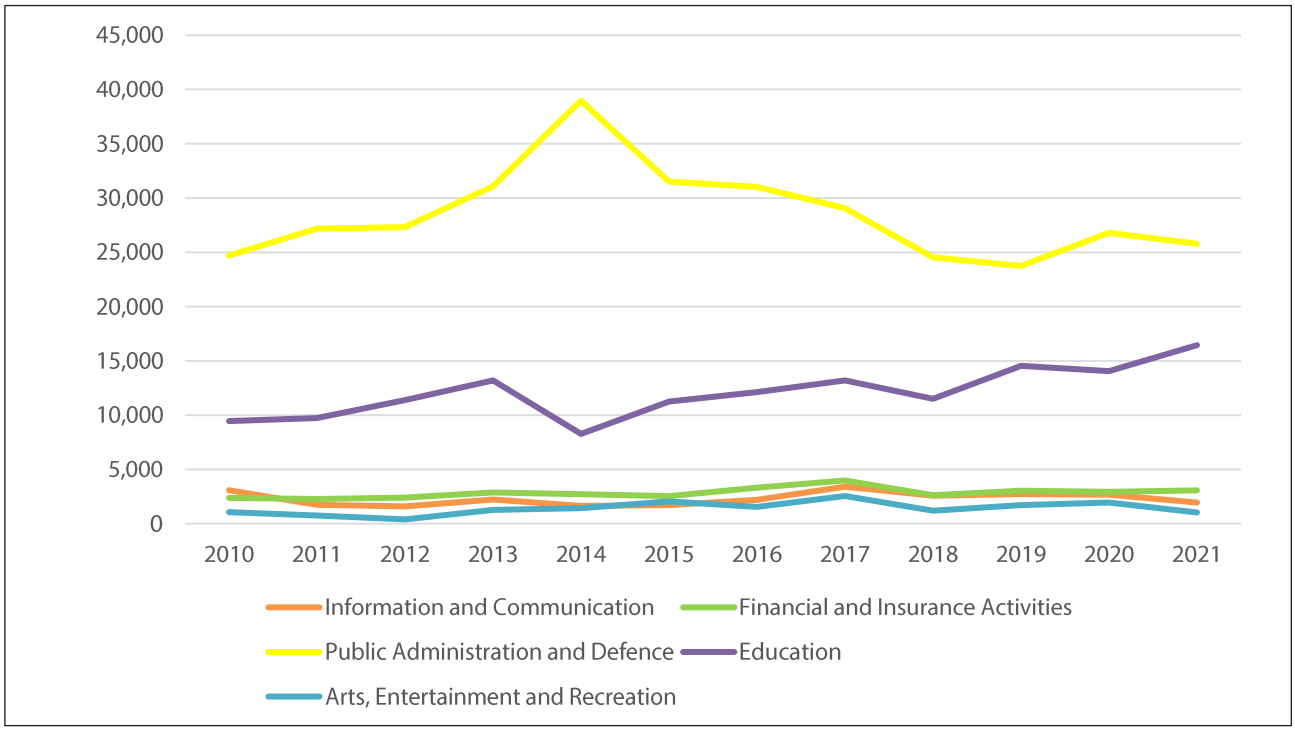
Emerging trends shaping the digital sector

There was limited data available for the digital sector. However, foresight exercises with key stakeholders provided a fairly good snapshot of the overall dimensions of Bhutan's nascent digital sector. We have drawn insights from anecdotal quantitative data to sense the dynamics and contours of the sector.

1. **Modest-sized digital sector:** When looking at employment in different sectors, information and communications jobs which also includes IT and digital jobs take up a very small proportion of the overall Bhutanese job market. To reach a stage where the IT and digital sector can have a multiplier effect, we will require substantial strategic investment. This may test Bhutan's cultural appetite for change, meaning how people are willing to accommodate digital transformation.

[32] See: https://www.nytimes.com/2021/08/30/business/media/china-online-games.html#:~:text=China's%20strict%20limits%20on%20how,under%20government%20rules%20issued%20Monday.

Figure 35: Number of employed workforce by economic activity



Source: Labour Force Survey (2010-2021)

2. **Preference for certified online digital courses.** According to the recent online Skillshare Program organised by MoLHR, demand has grown with the programme observing a huge surplus of applicants for the thousand slots available. The programme received 300% more applicants as shown below. This indicates a very strong organic demand for these kinds of courses. It also provides insight into peoples preferences in terms of digital courses.

Top 10 courses on Skillshare were:

- Graphic Design Masterclass: Learn GREAT Design
- Complete Web Design: from Figma design to Webflow development
- Adobe Photoshop CC Essentials Training Course
- Blockchain Technology - The Complete Course for Beginners including Blockchain Architecture
- The Ultimate HTML Developer 2020 Edition
- Logo Design Mastery: The Full Course
- Code your own portfolio HTML & CSS basics
- Adobe Illustrator Mega Course - From Beginner to Advanced Illustrator
- Coding 101: Python for Beginners
- Leadership & Management Essentials: Motivate, Inspire and Lead Your Team to Greatness!

Table 23: Status of the Skillshare programme offered by MoLHR

Skillshare programme (Feb. 2021 to Feb. 2022)	
Particulars	**Numbers**
Slots available	1,000
Online applications	4,351
Final applicants who received online courses	1,000+

Source: Ministry of Labour and Human Resources. Administrative Data (2021 - 2022)

Table 24: Online learning with Coursera daily update (May to December 2020)

Particulars	Numbers	Remarks
Online applications	1,1742	Application received online
Invitation	10,033	Learners invited to the programme
Enrolled	6,843	Learners who joined the Coursera programme
Completed	5,720	Learners who enrolled in the Coursera course

Source: Ministry of Labour and Human Resources. Administrative Data (2021-2022)

By contrast, online learning with Coursera appears to be accommodating a far greater number of people. Of 11,742 applications, 5,720 were enrolled in those courses. This indicates a strong demand for online educational opportunities that significantly outweighs what the educational institutes provide.

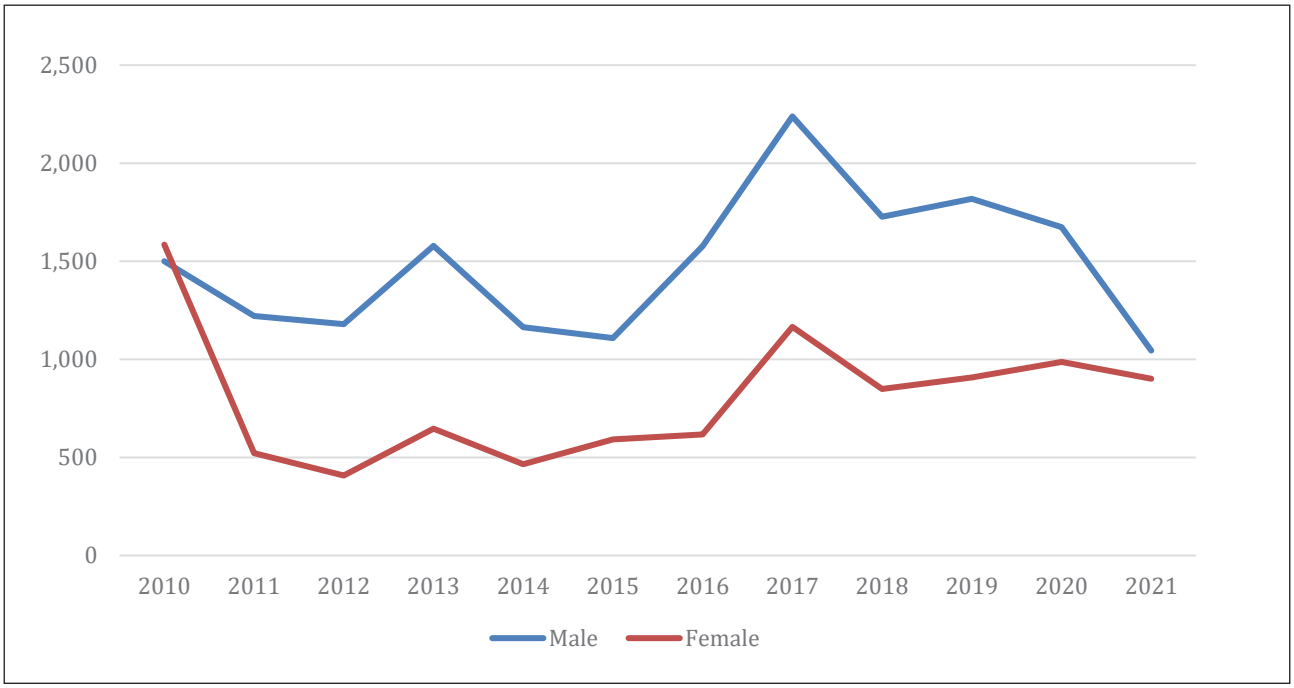
Given the high demand for online learning, there is a need to rethink how skilling, education and learning can be achieved in the era of digitisation and evolving skill needs. Online learning needs to be considered as an approach to fast-track workforce capability development in a number of sectors across the economy, especially if traditional institutional modes of delivery are neither meeting the demand nor providing the right skills and capabilities that the sectors need. Online learning requires access to a reliable and affordable internet connection, to begin with. So, we need to bring together universal access to the internet, widespread digital literacy, and the ability to engage in online learning for specialised skills.

3. **Lack of specialized skills threatening digital transformation:** As per the administrative data from MoLHR on total vacancies and recruitment by education levels in the year 2019, less than 5% of the digital slots/ positions were filled. This points to the need to match the skills Bhutanese have to the jobs in the digital sector. For the digital sector to grow, it will need to be supported by a supply of skilled workers that can match the demands of the jobs.

4. **High internet costs: I**nternet costs for broadband subscriptions remain a major barrier to people working in the digital sector. Industry experts say that the majority of Bhutanese with access to a 4G network do not use their smartphones to access mobile internet because the cost is high, thus negating the main value and purpose of having a handset capable of providing access to the internet in the first place. For Bhutan to promote digital freelancing, pro-digital policies are critical to enabling high internet speed and low costs.

5. **Gender gap in the nascent digital sector:** Available data show that men dominated digital roles. For instance, most of the employees in established IT firms and those working as digital freelancers were male. Moreover, interests and participation in Digital Jobs Innovation Challenges and hackathons organised by MoLHR also witnessed a higher number of male participants as compared to their female counterparts.

Figure 36: Number of employed workforce in the ICT sector by sex



Source: Labour Force Survey (2010-2021)

6. **Increase in tech content freelancers:** The digital economy is breaking down barriers to employment by empowering tech-savvy professionals to work remotely. Industry experts in the country shared that more companies with advanced economies are outsourcing their digital work to freelancers in developing countries due to low costs. This trend is creating fresh career opportunities.

   As per the consultations, Bhutan is witnessing an increasing number of digital freelancers. They mostly contribute to preparing and boosting digital content, including blogs, sites, podcasts and videos, the demand for which has increased due to the pandemic. The rise in internet activity and adoption of digital platforms across sectors were cited as some of the reasons for high demand for freelancers, both within Bhutan and overseas. The interviews with digital freelancers also revealed that there is a high demand for skills in digital content, designing and marketing. Insights gathered from the workshops also indicated that the top three freelancing platforms often used by Bhutanese digital freelancers are Fiverr, Upwork and Appen.

7. **The low number of government-funded digital skill scholarships:** For the future of the digital sector, it is important to support newcomers interested in digital skills. Government-funded scholarships in the digital sector are negligible compared to the local, regional and global demand. A snapshot of students studying overseas for digital qualifications shows a modest number predominantly male with an increase in 2019 and a decrease in 2020, most likely due to the pandemic. There are also no records of the students who returned to Bhutan and whether they are playing a role in the economy. Bhutan could invest in a greater number of students to study in recognised institutes and universities to build their digital capacities.

Table 25: Students studying overseas for digital qualifications

Self-funding				Scholarships		
Year	Male	Female	Total	Male	Female	Total
2018	9	2	11	-	-	-
2019	33	13	46	2	0	2
2020	5	5	10	3	2	5
2021	**-**	**-**	**-**	**6**	**1**	**7**
Total	**47**	**20**	**67**	**11**	**3**	**14**

Source: Ministry of Education, Department of Adult and Higher Education. Administration data (2018-2021)

Ethnographic research: User personas for the digital sector

The following user personas are developed to showcase semi-fictional characters, their capacities, and the environment in which they must function. Based on several in-depth interviews with key industry workers, the personas provide glimpses of the opportunities and barriers the digital workforce faces.

Emerging trend: 26-year-old digital content freelancer

Figure 37: Persona illustration of Pema

Pema was born in Punakha in 1996. His parents owned a successful restaurant where he would often help. Pema was academically gifted and performed well in both his 10th and 12th grade board exams. He got a scholarship from the Royal Government of Bhutan to study civil engineering at a university in India. While at the university, he was exposed to the world of coding and software engineering. He became interested in it and started learning some basics from his friends and YouTube videos.

After graduating and returning to Bhutan, he joined the civil service as required by his scholarship bond. However, he remained interested in coding and software engineering, so he found a coding programme run by international experts and enrolled in it to start his self-learning process. Soon after, he completed his bond period and left his civil service job to become a full-time coder. He started freelancing but struggled as clients did not take him seriously. This was mainly because he was young and did not have a formal background in coding and lacked proper accreditation. They did not consider his online certificates as sufficient proof. He also realised that the biggest clients in Bhutan were government agencies which followed strict procedures and did not have the flexibility to work with freelancers. So, he eventually sought employment with a private software company where he worked with some older professionals who had better business acumen.

In that company, Pema got the opportunity to work on a few large projects, which helped him understand how to work with and maintain clients. He realised that, in the world of work, simply having technical skills was not enough. He had to learn to listen to clients and understand their needs. He also had to learn to explain technical things to his clients in a layman's

language. Pema is grateful for the mentorship he got from his colleagues and managers, which helped him refine his business skills. He wishes he had had these opportunities earlier. With the support of his mentors and their networks, he landed his first global client. He now works remotely and services a few international clients. But the payment gateway is a hassle. He also faces issues finding equipment with the specs necessary to do his work. He currently works and lives in Thimphu. He wishes to work from Punakha since his mother is ageing, but this is not an option since internet connectivity is not great there.

Emerging trend: 37-year-old technopreneur

Figure 38: Persona illustration of Jigme

Jigme, 37, was born and raised in Thimphu. His parents were high-ranking civil servants and highly involved in his schooling. Jigme studied business administration at a university in Bangkok, Thailand, and developed a keen interest in entrepreneurship. Jigme returned to Bhutan and started his journey as a serial entrepreneur. He tried several businesses, ranging from a marketing agency to a grocery delivery company. He availed himself of support from various local NGOs that encouraged entrepreneurial efforts. This allowed him to be more risk-taking and try a wide range of things. Some of his business ventures did better than others, but none was particularly successful. So, he sat down one day and tried to identify what worked well with each one of his businesses. The answer he found was digitisation.

Since he was not from a technology background, Jigme's first task was to find a business partner with the technical skills he lacked. He met his business partner Chimmi at an entrepreneurship challenge hosted by a local NGO in Thimphu. They discovered that they had

a common passion and complementary skills. So, they teamed up to start a web development company. Jigme's extensive network that he built over the years proved very useful as they started. He had contacts in many government agencies, so they were able to secure many clients. Jigme handles the business but has, over the years, built a good amount of knowledge of web technology and is now wel- versed in the subject.

Jigme and Chimmi are intentional about hiring talent based on demonstrated skills, not educational qualifications and formal degrees. This is rare in Bhutan, but Jigme wants to make this a norm. They have had trouble working with government clients as there often isn't a clear understanding of what the deliverables need to be. Jigme has had to be patient and develop strong social skills to manage the expectations of his clients.

In his spare time, Jigme tries to mentor young entrepreneurs and technologists on monetising their skills and managing a strong and effective network.

Insights from the implications survey

A comprehensive survey was conducted with sector stakeholders to examine the importance and implications of emerging issues, trends, and factors for the sector. The first part of the survey asked the participants to discuss the implications of emerging issues and trends, and the possible timeframe of impact. The survey asked the participants to rank critical factors in order of importance and discuss why they made this ranking.

Implication analysis

Emerging issues and trends were identified, ranked, and analysed using a three-step process. A workshop was conducted for each sector with key stakeholders to consider emerging issues and trends impacting their sector. Secondly, a ranking exercise was conducted to identify the emerging issues stakeholders considered the most important. Issues were double-checked by multiple teams to ensure that the most important issues were included. Finally, a survey was conducted with sector stakeholders to identify the implications of the emerging issue or trend.

Table 26: Emerging issues and trends which were considered of primary importance

Issues/trends	Description	Implications	Time frame
Social media	The social web or web 2.0 allows people to connect and share content virtually.	Social media is seen as a driver of cyberbullying and misinformation in the short term. However, there are benefits of connecting communities and using social media in work, education, and business promotion.	1-5 years
Digital technology impact Bhutan's workforce culture	The use of digital technologies in the workplace.	The potential benefits of digital technology include the ability to work remotely and from home. It is also seen as a possible driver of inequality where this is a luxury only afforded to those with technology and internet access, trapping others in manual work.	1-5 years
Digital divide	Digital technology divides society into those who can afford and access it and those who cannot.	With the difficulty of rolling out the technology equitably, there are concerns that those with access to the technology will have significant business, educational and informational advantages over those who do not. If this merges within regional or racial groupings, it could cause significant social discord.	1-6 years
Digital mental health	Poor mental health from the overuse of digital technology and the effects of cyberbullying or similar events.	Concerns over screen addiction and other issues, including the longer-term impacts, on young people.	1-7 years
Cyber security and privacy	Prevention of hacking, digital intrusion, data theft or scamming of individuals.	Concerns about the lack of national policies and cybersecurity capabilities. People are already losing data and falling victim to phishing scams. This has significant implications for educational needs during the national rollout.	1-7 years
Cyberbullying	Online bullying, globally prevalent.	Many people are concerned about the impact of cyberbullying, especially for people with low literacy levels and little support for online learning. There are also concerns about the long-term effects on individuals' health and the wider community.	1-7 years
Fast and low-cost internet	Fast and affordable internet connection nationwide and globally.	This is a fundamental need that enables most other elements and has the highest short-term priority.	1-7 years
Satellite-based internet	Satellite internet reduces the need for cable-based internet.	This is seen as an enabler by lowering the cost of infrastructure and more rapidly connecting Bhutan, especially given its mountainous terrain. However, there are geo-political concerns over the control and dependence on satellites.	3-7 years
NFTs (non-fungible tokens)	These tokens are a blockchain-based digital identifier of ownership.	These are seen as useful for the creative and arts sectors, and a mechanism to enhance the value of the sector in global markets. However, the crash of the sector last year and questions over what right NFTs convey suggest the market is still immature.	3-8 years

Issues/trends	Description	Implications	Time frame
3-D printing	3-D printing or additive manufacturing supports the creation of prototypes, models, and finished artefacts on a small-scale, sometimes low cost than other approaches.	The ability of designers and engineers to model prototypes and manufacture products faster is a significant positive highlight for the health sector.	3-11 years
E-waste	Disposal or recycling of electronic waste can be costly. Improper disposal can lead to hazardous pollution.	E-waste is a long-term problem with the potential for waste to build up and cause issues when it is hard to clean up. The cost of cleaning up in the short term can be high. How can this be balanced with the long-term impact?	3-15 years
Blockchain (supply chains)	It is a digital ledger that sits behind many cryptocurrencies and is increasingly used in supply chains, property rights, voting systems, securing medical records and other uses.	The primary utility is seen as securing trust in supply chains, linking to the Band Bhutan. Other considerations played a lesser role. The need for experts to develop blockchain initiatives is also noted.	4-12 years
Big data (decision-making)	The collection and use of large quantities of data, often supported by machine learning (AI) for decision-making.	Big data could aid a move towards data-informed decision-making. This would rely on the quality and consistent collection of data. There would be fewer opinion-only decisions and the ability to model and monitor systemic interventions, possibly in real-time over longer term.	5-12 years
Internet of Things (IoT)	IoT is the ability of physical devices to connect to the internet and to each other.	This could automate the process and reduce the need for labour, especially for mundane tasks. It is seen as a potential productivity booster through automation. However, increased bandwidth, heightened security and privacy would be needed.	6-13 years
Drones and autonomous vehicles	Unmanned airborne or land-based vehicles.	The potential for an airborne drone for the collection of environmental data, play roles in rescue operations and mapping exercises. Land-based versions may take longer, given the poor state of roads. The potential for the art and tourism sectors is noted for airborne drones.	7-12 years
Artificial intelligence	Artificial intelligence, as machine learning, applies learning algorithms usually to big data sets.	This supports decision-making. It is also viewed as a productivity enabler, potentially removing mundane or dangerous tasks. It can support decision-making in many sectors such as agriculture, government, education and health.	7-15 years
Augmented or virtual reality	This provides virtual, often 3-D, overlays to reality, from adding information to reality to being completely immersed in a virtual world.	The primary use of this is for the tourism sector, although other sectors like food, education, health and arts and creative sectors will also benefit from it. This is seen as an enabler of virtual and real tourism, and a way to promote the Brand Bhutan.	8-15 years

Critical factor analysis

The survey asked the participants to rank critical factors identified by stakeholders by importance: “Rank the following factors in order of importance in enabling a workforce which is prepared for the future”. The following results were obtained that point to some of the critical factors that need to be addressed as a priority.

Cultural factors

Table 27: Cultural factors enabling a workforce which is prepared for the future

Rank	Enabling factor
1.	Mindset towards digital technologies
2.	Digital literacy
3.	Critical thinking skills
4.	Remote work
5.	Digital nomads
6.	Influence of external media
7.	Brain drain
8.	Ageing populations
9.	Language barriers
10.	Fake news

The three cultural factors that ranked high relate to 1) Having a positive mindset towards digital technologies, 2) Digital literacy, and 3) Critical thinking skills. Significantly, these three were chosen because they all point to a broader cultural maturity for the use of digital technologies and digital transformation generally, rather than simply “instrumental” capabilities.

Mindset is intangible but real. A positive mindset towards digital technologies will allow people to embrace changes more easily, engage in more experimentation and exploration, and discover opportunities. One respondent wrote:

"Having a [positive] mindset to digital technologies is crucial to bring about change. Many times, a negative mindset leads to the hindrance of progress and also a majority of people may fear change. Changing this will boost the workforce that is prepared for the future."

Digital literacy can be a way of shaping a mindset. Literacy is often equated with the fundamental ideas, concepts and strategies to engage effectively in a particular domain of activity. Digital literacy covers many different dimensions suitable to the Bhutanese culture and Bhutan's particular challenges.

As discussed in the introductory section of this report, the digital age brings incredible opportunities as well as real dangers and threats. Digital literacy should enable people to engage in the digital world and prepare them to navigate challenges and dangers. How will people deal with misinformation, cyberbullying, cyber security threats, screen addiction, and polarisation that has been driven by certain social media platforms?

Digital literacy needs to be custom-designed for the needs of Bhutan. Bhutanese have taken great pains to protect their culture from many pathologies of the contemporary globalised world. If Bhutan is to be able to preserve the best of its culture while engaging in the digital world productively, a careful literacy strategy has to be developed.

"Being digitally literate opens multiple doors to explore opportunities in a safer way to support our workforce for the future. Critical thinking also enables the workforce to solve larger problems that can help the population at large."

The third factor, critical thinking, is often associated with intellectual maturity and discernment. Critical thinking stands above any one area of engagement. It allows people to engage in the digital world with greater security, understanding the tension between multiple issues, and a way to initiate change more pragmatically.

Economic factors

Interestingly, when the digital cohort was asked to rank economic factors, the two most highly ranked factors were related exclusively to farming.

The first, farming technology adoption, related to the take-up of the internet and broader digital technologies, is supported by the findings in the research on the agricultural sector's workforce futures. There, universalising access to the internet and digital literacy also factored as key ingredients.

Table 28: Economic factors enabling a workforce which is prepared for the future

Rank	Enabling factor
1.	Farming technology adoption (internet, digital technologies)
2.	Equipment to mechanise farming
3.	Innovative advertising
4.	Expensive data charges
5.	Intellectual property theft

Farm mechanisation also featured as an important factor in the agricultural research findings. It is important to improve productivity in the lives of agricultural workers and pave way for commercialisation and the ability to scale farm enterprises. Digital technologies can be an important factor in creating smart mechanisation and customising farm mechanisation to Bhutan's unique agricultural needs.

Political and policy factors

In the area of political or policy factors, the most highly ranked factor was international market access. This is consistent with the findings in the agriculture and creative sectors. In both sectors, finding new market opportunities internationally is a key concern.

This indicates that the government must play a role in facilitating international market access through a variety of potential strategies, which can include educational, literacy, government-led marketing and promotion, and several other ways in which international market access can be expanded for Bhutanese businesses, services and products. This has important implications for workforce capabilities, which is explored in the next section.

It is observed that regulations on emerging technologies may be overly restrictive or unclear. This points to the need for clearer messaging from the government on what emerging technologies are promoted and supported by the government and which ones are not.

The adoption of new technologies requires experimentation which, in turn, requires understanding where it is safe to experiment in the first place.

Table 29: Political/policy factors enabling a workforce which is prepared for the future

Rank	Enabling factor
1.	International market access
2.	Regulations on emerging technologies
3.	Privacy and security policies
4.	Policy sandboxes
5.	Cloud computing storage policies
6.	Policy restrictions

Part 3: Industrial propositions for Bhutan's digital workforce futures

This section presents two industrial propositions connected to scenarios for Bhutan's digital workforce futures. Both propositions underline the need to protect Bhutanese people from the excesses of IT, maintain a focus on GNH, use IT to solve practical problems and challenges across different sectors, and bring economic well-being to the people. They are drawn from the fieldwork, survey responses and the workshop results.

Both propositions are designed to highlight the opportunities for technology deployment and the risks over the longer term. The first is based on a safe and connected rollout of the technology, aligning with the desire to draw upon Bhutan's wisdom tradition, and dignity. It focuses on the rollout of IT by managing this change safely. The second, Bhutan Digital Living Lab, is oriented to learning, self-determination and entrepreneurial use of technology. This focuses on the potential across other sectors, entrepreneurship, problem-solving and international businesses. These are segregated to highlight how each approach can shape and interact with the others. Pushing the entrepreneurial aspect too fast might lead to the rollout of technology before communities are ready, leading to negative social consequences. No rollout will ever be completely 'safe'. Likewise, if the entrepreneurial aspect is pushed too slowly, Bhutan may lose out on economic and social benefits. Balancing these two approaches will enable Bhutan to maintain harmony.

The first proposition, **Connected and Safe,** focuses on universalising access to the internet. However, it must be accompanied by the provision of high-level digital literacy and digital guardrails to keep the internet safe and protect the traditional culture. Providing the majority of Bhutanese access to affordable and fast internet will be both empowering and disruptive. Bhutan will need to create and service technological, policy and cultural infrastructure.

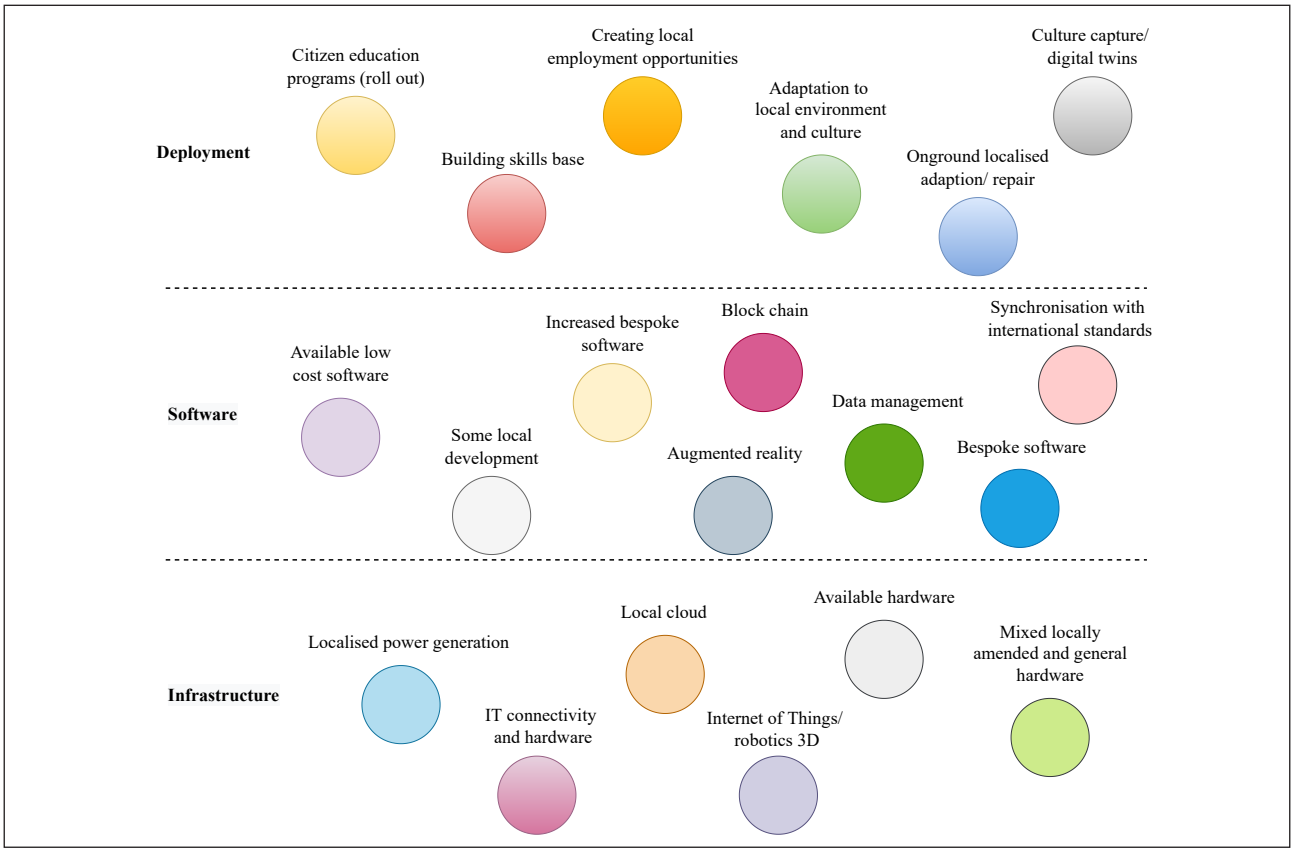
The second proposition, **Bhutan Digital Living Lab,** focuses on developing a digital sector that can do problem-solving, prototyping and innovation targeted at Bhutan's major challenges. We see the possibility of building a digital technology application capacity that can provide new technology resources across the economy, for the agriculture sector, creative sector and other sectors of the economy.

Industrial proposition 1: Connected and Safe

This proposition focuses on maximum reach with maximum safety. It is mostly concerned with the safe rollout of digital technologies that best serves the Bhutanese people. The interventions are at the policy level and focus on the digital use in service of other sectors such as agriculture, creative, transport, and health. The goal of this proposition is to make digital capabilities as widespread as possible with the greatest level of socialisation of the technologies possible. It aims to leapfrog the various stages of internet connectivity most countries have undergone and to leapfrog many of the social problems connectivity has brought about in other parts of the world.

High-level goal: The rollout of digital infrastructure, software, and literacy to the country while minimising harm and maximising utility for citizens.

Figure 39: Identified stepping stones for Connected and Safe



Digital sector scenario 1: 5-year horizon

There is a huge interest in technology across all sectors. Therefore, it is difficult to make budget decisions and choose the ones that will have the biggest impact. Rolling out reliable internet is the priority, alongside building the capability and providing safety education to support people new to the digital world. The technology component should be enabled by on-ground infrastructure and satellite. Often, this computer technology is rolled out with solar power generation. While most people were connected to the grid years ago, distributed generation can improve reliability and reduce blackouts. The rollout to communities is done with local community leaders to tailor general programmes to their needs. Follow-on programmes are usually run by local people. Cyberbullying, scams, cyber security, and fake news delay the benefits when programmes are rushed or when the technology is provided before the education. In many countries, the digital revolution has come with increased distractions and erosion of mindfulness. These issues often lead to lower productivity. In keeping with Bhutan's culture of mindfulness, education programmes and some software can be designed to reduce distractions.

Building skills in core digital sectors – hardware and software skills – can be supported by the government and education providers. This approach aims to ensure that people in the digital sector have internationally recognised qualifications. Given Bhutan's small population and a sizable section of it not connected to the internet, there is only a small market for locally developed software. Nevertheless, Bhutanese people can be encouraged to use locally developed software wherever available.

Digital sector scenario 1: 10-year horizon

With the rollout of universal internet, different sectors start to exploit the connectivity within Bhutan and the rest of the world. E-commerce will likely increase the transaction of goods, both physical and digital, within Bhutan and with the neighbouring countries. Engaging a high number of women in the IT sector will benefit the sector and society at large. Women may take the opportunity to work from home. The delivery of education is changed significantly with the use of IT in classrooms. This will prepare the current and next generation of Bhutanese for greater integration with the outside world. There is an option in the citizenship identity card to store health, employment and other information.

The policy and research agenda can move towards more advanced technologies whose use is applicable to Bhutan. In view of Bhutan's terrain, there should be a focus on the repair and resilience of technologies. Other examples include the use of IT to protect farms and wildlife and increase virtual tourism.

Digital sector scenario 1: 15-year horizon

In 15 years, the first born-digital generation is expected to enter high school and will leave high school no earlier than sixteen. This transition can be aided by the education ministry's attention to the use of digital technologies in education to make up for the teacher shortage. Various technologies can be deployed across the country to support people's needs, such as 3-D printing to repair machinery, IoT to support farmers, and augmented reality to support creative industries.

As the climate crisis deepens, technology has been usefully deployed to create "digital cultural twins"[33] to capture images, representations of immaterial, symbolic, and conceptual meanings carried by the art, sculpture, practices and other materials to ensure that the Bhutanese culture is captured and stored. This twin capture could be based on the CARE Principles for Indigenous Data Governance and AI deployed in other countries, with the community orientation more in keeping with the Bhutanese heritage.[34] Technology is also used to inform and provide early warnings and recovery in the event of a disaster. On a day-to-day level, farmers could have updated information and advice from the government's portals to protect their crops. The IT workforce could have a roughly even female/male split now. Ensuring that different regions have support for early technology adoption will lessen the migration to cities.

Labour force capabilities for digital sector scenario 1

To accelerate growth in the digital sector, the labour force would require technology-related capabilities starting with existing technologies and moving towards more complex technologies. The following table highlights skills, knowledge and capabilities required to achieve the objectives of the scenarios.

[33] https://arxiv.org/abs/2205.13206
[34] See: https://www.gida-global.org/care

Table 30: Capacity needs for scenario 1 (Connected and Safe)

5-year horizon		10-year horizon		15-year horizon	
Areas	**Capability/knowledge/skill needs**	**Areas**	**Capability/knowledge/skill needs**	**Areas**	**Capability/knowledge/skill needs**
Literacy	Cybersecurity literacy	Literacy	Smart systems	Hardware/ Infrastructure	Nanotechnology
	Data literacy	Hardware/ Infrastructure	Satellite internet	Digital technology	Digital Twin
	Programming literacy		Advanced e-waste management system		Augmented reality
	Basic digital literacy		Artificial Intelligence and robotics		Real-time data systems
	Tax literacy	Digital technology	Advanced digital storage systems		Advanced cybersecurity
Hardware/ Infrastructure	Energy storage		Metaverse		Digital Disaster Risk Management Information System (DRMIS)
	Satellite and ground-based internet infrastructure		Digital intellectual property		Advanced sensing technology expertise
	E-waste management		Real-time data systems	Business management	Micro-business management
	Equipment repair and maintenance		Advanced cybersecurity		Tokenomics
Digital technology	Internationally accredited information technologies	Business management	Mixed reality (MR)	Soft skills	Empathy
	Machine learning/artificial intelligence		Advanced Internet of Things		Leadership
	Digital ethics		Data interoperability		Critical thinking
	Programming, web and app development		International contract management		Emotional intelligence
	Agile project methodologies		International partnerships		Stress management
	Cloud computing		Tokenomics		
	Blockchain		International Commercial Law		
	Data interoperability	Soft skills	Critical thinking		
	Big Data		Effective communication		
	Video game development		Empathy		

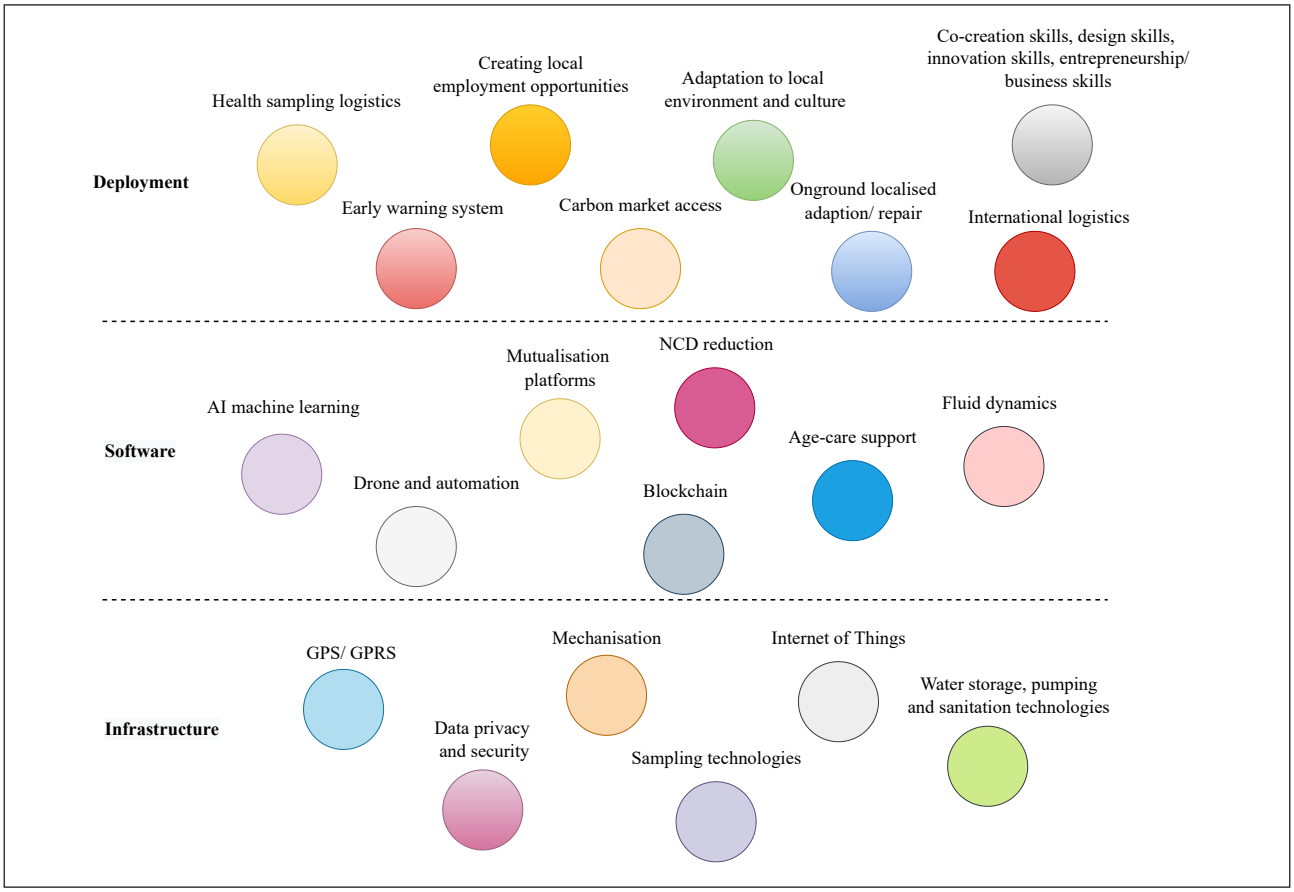
Business management	International contract management	Soft skills	Emotional intelligence		
	Intellectual property rights		Leadership		
	Community-oriented business models		Time management		
	Marketing		Stress management		
	Project management (Agile Project Methodologies)				
Creative & design	Content creation				
	Design thinking				
Soft skills	Collaboration				
	Networking/negotiation				
	Emotional intelligence				
	Effective communication				
	Mindfulness				
	Culture awareness				
	Critical thinking				

Digital proposition 2: Bhutan Digital Living Lab

The proposal is centred on creating a digital technology application capability through the methodology of Living Labs (spaces to carry out local experiments using user-centric co-creation approaches). This proposal envisions a digital high-tech capability that becomes a resource for problem-solving and innovation for the agricultural, creative, and other sectors. The spillover effects of digital capabilities flow into increasing productivity and growth across the broader economy. This approach requires a high level of coordination and cooperation across the government, businesses, research, and citizens. This relies on making Bhutan a platform for digital experimentation to address its most pressing challenges, while at the same time using its own technology application journey to help address humanity's 21st-century issues (an approach called "open innovation"). This approach sees Bhutan bringing leading experts into the country to work with local people to tackle sector-specific challenges, using digital tech as a resource. Living Labs methodology emphasises innovating end-user applications supported by entrepreneurship and the use of technology.[35]

High-level goal: *Establish the high-level capability to prototype and apply digital technologies to address Bhutan's major challenges across multiple economic sectors and create the conditions for local entrepreneurship and government uptake of innovative technologies to create new services and economic opportunities.*

Figure 40: Identified stepping stones for Digital Living Labs



[35] We note that the IT industry is dominated by females and think about how that might influence an industry that is elsewhere dominated by male views. Those views often have profound and unintended consequences for women, having women in the industry represents an opportunity to overcome this potential bias.

Digital sector scenario 2: 5-year horizon

Bhutan begins its journey to apply Living Labs methodologies to explore the application of digital technology across sectors. An Advanced Technology Lab reviews new technologies that might be useful to Bhutan. A Social-Technology Living Lab aims to cocreate social-technical solutions that work for Bhutanese people. Living Labs are open innovation ecosystems in real-life environments using iterative feedback processes throughout a lifecycle approach of innovation to create sustainable impact. They focus on co-creation, rapid prototyping and testing and scaling up innovations and businesses, providing (different types of) joint value to the involved stakeholders. In this context, living labs operate as intermediaries/orchestrators among citizens, research organisations, companies, and government agencies/levels.[36] They can be used across many settings, including health,[37] transport, energy, and farming, and integrate with futures approaches.[38]

The five-year horizon builds on some of the current initiatives in Bhutan. It relies on building ties with digital innovators from around the world and the Indian entrepreneurship community, focused on using technology to enter niche markets. With Bhutan's small market, much of the activity is outward-looking and, in doing so, is tied to other sectors such as agriculture. Bhutanese entrepreneurs must actively engage in these markets. Initially focusing on so-called "LOHAS" (lifestyle of health and sustainability) foreign markets where people want to make health choices and are concerned about sustainability health choices and social justice. This segment is willing to pay a premium price for these products.

In this proposal, the impact of technology exploration is threefold:

1. Technology is used to support international sales and supply chain mechanics.
2. Used to support aggregation and cooperatives in rural areas to work together to supply these markets.
3. Education on changing farming production techniques to increase yield or change crops.

The use of social media by doctors to share information for diagnosis can be extended to the communities. The government could roll out a private system for doctors to overcome issues related to confidentiality. The government can use social media for initiatives aimed at reducing noncommunicable diseases (NCDs) across the country. Such initiatives may become more urgent as the number of health professionals drop due to external demands and attraction to higher-paid IT work in the future. New charging and safety stations along key routes, including 4G repeaters could support the use of drones to fly medical samples, emergency materials and goods along these corridors. This would enable a small leap in the diagnosis and treatment of diseases.

[36] https://enoll.org/about-us/what-are-living-labs/

[37] Priday,G, Pedel, P 2020, Subverting the Narrative: Alternate Technology Approaches for Active Ageing in Studies in Health Technology and Informatics, Vol 268 ISBN 978-1-64368-058-3 (print) | 978-1-64368-059-0 (online)

[38] Priday,G and Ramos, J, "Futures in action – the 'Futures Action Model' a new tool for Living Labs" - ENoLL Open Living Lab Days, 2014, https://livinglabdays2014.files.wordpress.com/2014/09/openlivinglabdays2014_conference-proceedings.pdf

Digital sector scenario 2: 10-year horizon

In the following 10 years, e-commerce will expand beyond agriculture into other sectors, including the creative arts. The demand for traceability through the supply chain will likely lead to demand for blockchain and IoT sensing. This will impact the whole supply chain as each creation, processing or hand-off point is seen as a point of vulnerability. There may be a big competition for the limited blockchain coding resources in Bhutan. The creative sector has branched out from in-person to virtual tourism, micro-virtual breaks and happiness practices. This may be overlayed with items sent from Bhutan to the participants. The Social-Technology Living Lab works with Bhutanese people, researchers, technology experts, the government and businesses. The lab identifies needs and creates and implements solutions across health, education, finance and farming. The government widens the concept to introduce the Living Lab Bhutan to ensure this approach is applied broadly.

The technology applied to the finance sector enables many more people to access funds and purchase local and foreign goods. Most people have access to some form of mobile banking.

On farms and in rural areas, sophisticated technologies are applied to automate and support farmers. Much of the equipment is co-owned and shared in keeping with the cooperative roots from early initiatives. Farm drones, the Internet of Things provide real-time information on ways to protect or enhance production. Traditional mechanisation is applied to increase productivity, but for local sustainability and repair. Ten years of research into seeds, soils and farm practices enables longer, more productive farming. Machine learning is also starting to make an impact.

The role of women in technology, particularly in the capital, has not changed. Data collected by the government must be gender-disaggregated, and decisions are gender-sensitive. Women in the technology and entrepreneurial sector are vocal and proactive in ensuring women's needs. Many of the micro banks may be owned by women like in other countries. Woman entrepreneurs run courses on business, financial management and other subjects. As a result of more women entering the workforce, there is increased demand for services that support their careers.

Health and emergency services could be supported by new heavy-lift drone capabilities that can reliably handle 50 kg payloads over 40 km. This supports a range of activities, such as firefighting and medical kit transport. Most of the country is within reach of at least one heavy drone.

Bhutan has very favourable conditions for hemp growth. Farming communities could use small-scale pyrolysis systems to convert hemp production into biochar. Using verification technology to demonstrate the creation and generation of biochar, farmers can access global carbon markets. By turning over a third of the farm to hemp biochar production, the average farmer can make an additional US$ 2,500 a year based on five crops a year. Better still, biochar can be used to improve soil quality for all crops. The software can be used to account for and verify production, including local sampling, and mutualise access to markets. The products receive a premium price as they represent sequestration and social good.

Digital sector scenario 2: 15-year horizon

Living Lab Bhutan (LLB) can develop a place-based innovation mindset and practice across the nation. LLB now hosts hundreds of local researchers and innovators, and thousands in its global network. The diligent collection of population and environmental data is paying dividends. The government's support to open data and LLB helps create niche developments that represent the interests of different regions and populations. It brings a whole new level of transparency in decision-making. E-waste is an emerging problem despite the repair and reuse mentality. There is a national clean-up campaign before any damage is done to Bhutan's pristine reputation. Machine learning is now prevalent in the health and happiness industry. This could be bolstered using remote semi-automated healthcare centres. It allows even small operations to be undertaken remotely. Machine learning continues to nudge people towards healthier behaviours. As a result, NCDs drop dramatically. The citizens generally have better access to education and healthcare, and the average life expectancy increases. There may be more people working in the economy. There is a likely increased need for age-care support and extra housing. The number of people in rural areas may still be low, so much of the age-care support will be local and supported by clever use of technology and multipurpose facilities.

Glacial lake outbursts have been a feature of the last 10 years. Technology could be employed across Bhutan's remaining glaciers to provide early warnings of potential breaches. There could be automated mechanisms to pump out excess water into storage facilities. This helps regulate river flows and protect hydropower. Glaciers are less reliable as a source of fresh water. Pumping, local sanitation and recycling for farms become common. While river flows are regulated and there is water storage, they cannot replace the old natural water cycle. Technology plays a vital role in managing these resources alongside new farming techniques.

Labour force capabilities required for digital sector scenario 2

Based on the three scenarios, the following digital capabilities were mapped. The table also provides information on technological concepts and knowledge required to realize the aspirations reflected in the scenarios.

Table 31:Capacity needs for scenario 2 (Digital Living Lab)

5-year horizon		10-year horizon		15-year horizon	
Areas	**Capability/knowledge/skill needs**	**Areas**	**Capability/knowledge/skill needs**	**Areas**	**Capability/knowledge/ skill needs**
Literacy	Digital ethics	Literacy	Smart systems	Literacy	Digital ethics
	Data literacy		Digital ethics		Digital collaboration
	Basic digital literacy	Hardware/ infrastructure	Drone maintenance and repair	Hardware/ infrastructure	Remote sensing
	Financial literacy		Quantum computing		Drone-led water management
	Lifestyle of Health and Sustainability (LOHAS)		High-speed broadband connectivity	Digital tech	Advanced cyber security
Hardware/ infrastructure	Drone pathway design		Microgrid infrastructure for power generation		Robotics
	High-speed broadband connectivity		Advanced data back-up and storage		
	Satellite internet		E-waste management system		Fluid dynamic modelling
	Electronic equipment repair and maintenance		Satellite internet		Data interoperability
	Biometric instrumentation (digital ID)		Drone-led water management		Automated manufacturing
	5G		Remote sampling technology	Business management	Social ventures
	E-waste management		Artificial Intelligence and Robotics	Soft skills	Empathy
Digital tech	Big data/open data	Digital tech	Blockchain		Critical Thinking
	Data interoperability		Virtual/Augmented Reality		Emotional intelligence
	Internet of Things		Real-time data systems		Leadership
	3-D Printing		Advanced 3-D printing		
	Real Time Data Systems		Early warning systems		
	Blockchain		Advanced Internet of Things		

Digital tech	Living lab orchestration	Business management	Social ventures	
	Rural population social media engagement strategies		Carbon faming market access and trading	
	Machine learning/artificial intelligence		Biochar production technologies	
	Programming, web and app development	Soft skills	Critical thinking	
	Data science/data analysis		Effective communication	
	Drone and cloud computing		Empathy	
Business management	International contract management		Emotional intelligence	
	Advance recruitment practices		Leadership	
	E-commerce			
	International accreditation standardisation			
	International business qualification standards			
	Intellectual property rights			
	International marketing			
	Project management			
Soft skills	Team building			
	Networking/negotiation			
	Emotional intelligence			
	Effective communication			
	Productivity and accountability			
Creative and design	Content creation			
	Research and development			

Part 4: Discussion and proposed interventions

Start with fundamentals

Going digital is clearly seen as a key driver for agriculture and creative sectors. Its impact extends across education, transport, health and business, among others. Early experiments show a willingness to try out new technologies[39] in novel ways to improve the lives of Bhutanese people or apply technology to business. [40] However, there is a significant gap between the technological skills and the availability of jobs. Many jobs require specialized skills. There is an appetite for courses, with high demand for data science, analytics and programming courses online, but the applicants complete only half of the courses. It is acknowledged that the courses offered are not accredited and are often short in duration.

The implications survey in part 1 of this section shows that there is awareness of current and emerging technologies and their potential alongside concerns over the dilution of culture and identity. The real challenge for Bhutan is to embrace technology without following the normative international approach. Bhutan needs to create a sector that makes technology and digital services unique to Bhutan.

Physical attributes of digital technologies

Within the context of the two industrial propositions, we see the importance of the following physical attributes for digital technologies in Bhutan:

- **Small:** Across a variety of technologies, there has been a trend to reduce the physical size to make them more mobile. This supports infrastructure, manufacturing and energy production to localise more activities using advanced technologies. Examples include small desalination plants, 3-D printing, small biochar, solar panels and small nuclear reactors. Many of them are often connected to renewable energy sources. The ability for smaller towns and villages to have technologies that provide resilient services has increased.

- **Rugged and repairable:** Technology is becoming increasingly rugged. Military standards are available for many phones, laptops and other devices. Drones are being developed to carry heavier payloads in adverse conditions. In parallel, there is an increased ability to prototype and build useful technologies. This started with Raspberry Pi microcontrollers but now many alternatives support low-cost development of hardware applications. The right-to-repair movement closes this loop with increasing public awareness of climate change and a desire to repair or adapt (or hack) technologies without having to rely on the manufacturer. For Bhutan, there is an increased ability to develop locally relevant hardware and potentially adapt to or repair existing technologies and reduce dependence on expensive external providers. This reduces waste, increases resilience, and ensures the longevity of technologies.

[39] See: https://worksthatwork.com/8/bhutan-telemedicine

[40] See: https://www.youtube.com/watch?v=6ikNBCVHavw

- **Low-cost start and mutualising:** Many software platforms support the rapid development and launching of businesses, communities or other organisations. Many of them are free or low-cost. An intersecting trend is platform cooperatives and similar structures. They combine the types of activities that larger corporations support, such as gig economy work with the ownership localised. In the short term, these low-cost trends provide opportunities for new business ventures and communities. As the intersection with platform cooperatives increases, there will be opportunities for low-cost platforms that provide work and services in other cities but localises most benefits.

Picture 15 & 16: Ideation jam session with stakeholders from the digital sector, August 2022

Proposed interventions

As part of the research, participants in the ideation workshop were presented with various strategic propositions and asked to generate ideas based on these propositions. The following are intervention ideas that can help operationalise the strategy.

Table 32: Proposed interventions for the digital sector

Sl. No.	Goal	Intervention(s)	Good practice(s)	Proposed lead agency (Existing)	Proposed lead agency (New)	Time-frame
1	Motivate self-directed learning for jobseekers	• Pilot schemes (cost sharing) to improve accessibility to digital skill-based certification online courses	The Online Coursera and edX programme initiated by MoLHR could be opened up for jobseekers. Cost-sharing programmes wherein top-up fees could be piloted to assess completion rates, and their impact on skill specialisation. Singapore has a scheme of incentivising the workforce to invest in their own digital skills development through credit schemes to enrol in courses that cover various competencies.	MoLHR	MoESD and MoICE	2023
2	Strengthen data ecosystem	• Carry out regular capacity building sessions on capturing, storing and managing information across data-producing agencies • Build capacities of data-producing agencies on Application Programming Interface (API) driven development • Implement the national data-sharing clause under the E-governance policy	Estonian open data portal offers a user-friendly way of accessing open data by offering an advanced set of filtering options. For all datasets, the portal displays the data publisher, when the dataset was added to the portal, when it was last updated, and the frequency at which the data is being updated.	MoLHR and MoIC	Ministry of Education and Skills Development (MoESD), MoICE, Ministry of Infrastructure and Transport (MoIT)	2023-2025
3	Reinforce start-up support to technopreneurs	• Experiment an incubation centre for digital start-ups targeted	Learnings could be drawn from TTPL to set up an incubation centre for technopreneurs. The centre could act as, among others, a digital support hub for information and knowledge sharing for start-ups. Qatar's Incubation Centre for Digital Start-ups offer support for about two years for each start-up and provides workspace, administrative and logistic services, education and training, mentors, and networking avenues.	MoEA	MoICE	2023-2025

4	Foster digital innovation	• Pilot a private-led financing model to co-create digital solutions • Experiment a digital innovation challenge/ hackathon to solve pressing problems • Establish Research and Development Centre for the digital sector to promote innovation	Open up avenues for IT firms to co-create digital solutions. Innovate for Digital India Challenge seeks to create breakthrough digital solutions. Ireland's National Challenge Fund was established to support digital entrepreneurs and help create new digital products, processes or services. In India, three Technology and R&D centres were established for shared usage among academics, labs, start-ups, and industries.	MoIC	MoICE	2023-2025
5	Strengthen regional collaborative learnings	• Collaborate and conduct regional digital skills boot camp • Pilot onsite apprenticeship training.	The SAARC CCI Start-up Boot Camp held in Sri Lanka guided and trained young Sri Lankan entrepreneurs to take their start-ups to a next level. The boot camp enabled a direct feedback mechanism between the start-ups and experts and gave the youth entrepreneurs direct access to business networks across South Asia and beyond.	MoEA and MoIC	MoICE and MoESD	2023-2025
6	Provide affordable devices and services	• Conduct an internet pricing assessment analysis for lower-cost plans • Introduce digital equipment subsidies	Periodic assessments need to be done to take stock of connectivity trends (fixed and mobile broadband) and pricing structures to suggest better affordability strategies and lower cost plans. Singapore has several subsidy schemes for the import and purchase of digital devices.	MoIC and mobile network companies	MoIT and mobile network companies	2025-2030
7	Foster digital networks and partnerships (national and international)	• Initiate partnerships that enable digital training opportunities and employment	The Digital Skills and Jobs Coalition EU Project is a partnership between Member States, companies, social partners, non-profit organisations and education providers to enhance knowledge-sharing, training, learning opportunities and employment in the digital sector. Likewise, Bhutan could explore partnerships within and across countries to promote digital skills training in host organisations. Upon completion, establish a platform that encourages remote working for digitally-skilled people working overseas.	MoEA and MoIC	MoICE, MoIT and MoESD	2023-2025 and beyond

8	Promote skills-based recruitment	• Promote skills-based recruitment instead of conventional qualification and job titles	Singapore's Skills Path initiative offers candidates an alternative path to hiring employees based on skills rather than the conventional yardsticks such as past job titles and qualifications. This initiative was supported by the National Jobs Council to help jobseekers demonstrate their competencies, as well as support firms in expanding their pool of talent with diverse experiences. Jobseekers pursuing open roles through the programme can pick up the required skills with free learning courses on LinkedIn and validate their skills.	MoLHR and IT firms	MoICE	2023-2025 and be-yond

Conclusion

Bhutan Ready: Bhutan has a unique culture and context. Many technologies will appear over the next 15 years, so the current list is not exhaustive. There should be a mechanism to explore what technologies are best suited for Bhutan and a "translation mechanism" to exploit those technologies. An Advanced Digital Research lab could explore and research those technologies and a Living Lab Bhutan could perform the translation research and implementation to make the chosen technologies useful for Bhutanese people.

User-centred rollout: Internet rollout in countries with similar lack of familiarity with web technologies and poor literacy has led to increased cyberbullying and social discord. Therefore, the internet must be rolled out along with programmes that mitigate social discord and emphasise positive, learning and mutualising potential and skills, such as the ability to remain mindful while using the internet. This should be tailored to cover different age groups and needs, centering on what the technology can do to improve their lives and engage their interests.

Generational thinking: The young cohorts between 0 and 10 years of age have the potential to become digital literate over the course of the next 15 years whereas those 45 and above will have resigned from work at the end of the 15-year period. While we should not limit the potential of anyone based on age, we might recognise that there is likely to be a shift in attitudes across generations. Programmes to upskill those of working age and harness the potential of technology could form part of a digital literacy programme. Managing the changing perspectives of digital technologies will be an important part of its acceptance in society.

Focus on IT-related skills: IT-related skills and skills within value chains are important to realise technology's potential. They include entrepreneurship, creative, analysis, testing, and innovation skills. Skills can be considered by sector, e.g. supply chain, to ensure that all skills and infrastructure are available to enable an economic and social transition.

Develop multiple pathways for people to reach international standards in IT skills. They may include learn, migrate and return programmes that enable Bhutanese people to try out new skills outside the country and return to be part of the workforce using incentives. Training teachers to be able to deliver internationally recognised qualifications might be another. Encouraging digital nomad teachers is another. It is unlikely that a single pathway will deliver the overall need for skills and experience.

Social consequences of software selection: There is a lot of free or low-cost software that can be quickly used to promote businesses. A piece of software hides a number of models. Some come with an individualistic or capitalist model, while others are part of efforts to advance greater equity (such as with the open-source software movement). Evaluate and develop software that meets Bhutan's needs, such as platform cooperatives and employee-owned businesses.

Measures: Develop a suite of indicators that measure the performance and potential of the digital strategy. Consider measures that capture positive aspects of technology and those that capture those that must be avoided or reduced.

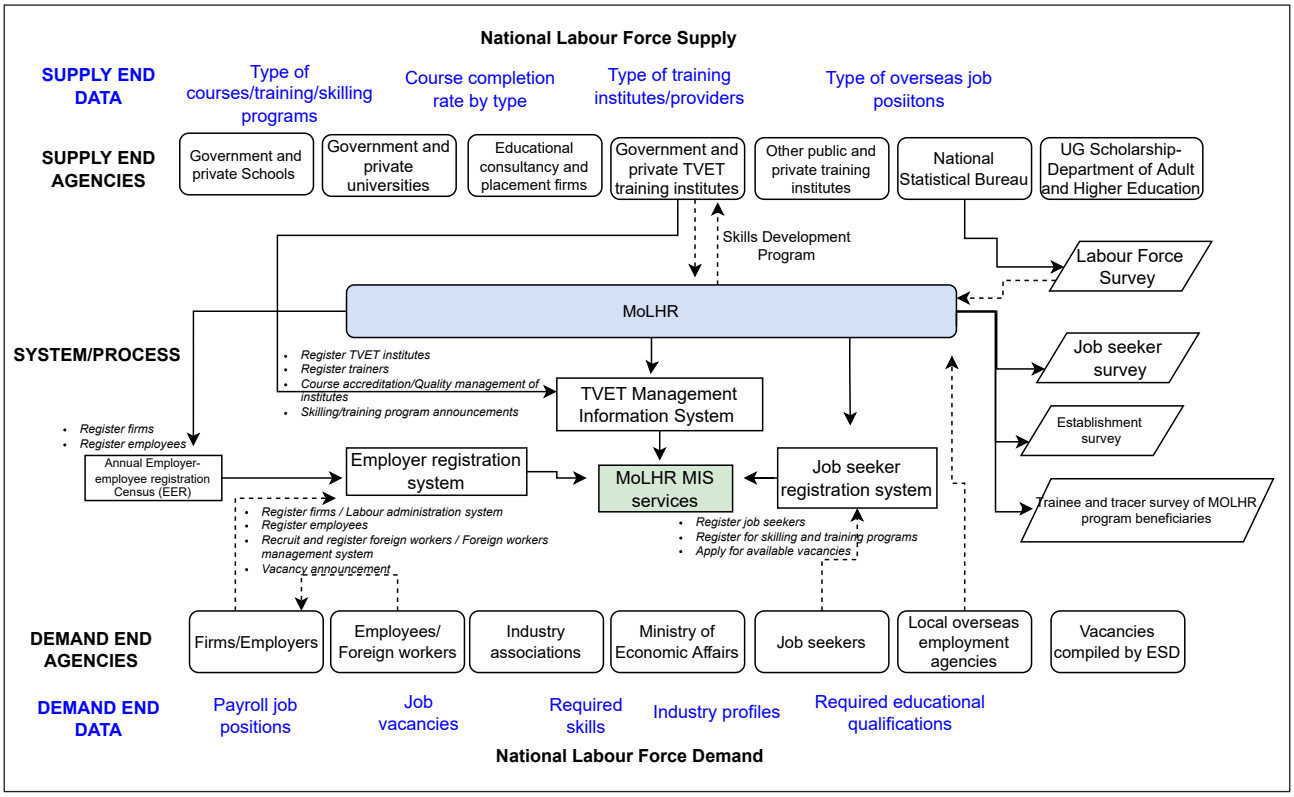
Technology mindsets: A positive technology mindset is needed across government and businesses to improve economic and social outcomes. This should be developed through training for businesses and government leaders through critical thinking and basic digital literacy relevant to their domains. This might also be supported through communities of practice.

Regulations/Policy Sandboxes: Regulations associated with technology can be prohibitive or too lax. Consider opportunities for policy sandboxes that permit experimentation around a focused area when resources can be applied to monitor and adjust for unintended consequences.

Labour market information system

As a part of this study, efforts have been made to map any quantitative intelligence from the supply and demand end of the labour market that could assist decision-makers in making informed plans and decisions for job search, training and skilling policies and programmes, and preparation and career guidance for the workforce. A robust labour market information system is key to ensuring access to a comprehensive database that induces occupational demand and supply trends and opportunities, projections, and skill requirements, among others. One major challenge in formulating the six propositions was limited relevant labour statistics. Direct measurement of the skills could not be done because of limited data on the skills supplied and demanded across the workforce. Instead, the team relied on indirect and proxy measures.

Figure 41: Existing labour market information system



The key actors in the labour market information system are as follows:

1. National Statistics Bureau
2. Ministry of Labour and Human Resources
3. Ministry of Education
4. Ministry of Economic Affairs
5. Business firms/employers
6. Training institutions (vocational, generic, academic)

7. Recruitment agencies
8. Education consultants
9. Universities/schools (public and private)
10. Sector strategists/sector experts
11. Academics/scholars
12. Jobseekers
13. Students
14. Overseas workers

Based on the capacity of the system, its level of engagement with stakeholders and use of the system outputs in decision-making, the existing LMIS may be classified as a basic one. The system largely depends on survey data and engages only few public actors. To transition into an advanced system, first and foremost, there needs to be an improved collaboration across key labour market data producers. This would mean engaging additional labour market information producers, including the private sector and establishing more collaborative system governance to assist students, jobseekers, employers, policy-makers and researchers. Secondly, both demand and supply end institutional capacities on management and analysis of administrative data need to be developed. Sound labour market analysis requires the collection and compilation of labour market data and information from household surveys, establishment surveys and administrative records. Finally, its vital to have institutional arrangements in place to allow the production and distribution of systematic labour market information analysis in real time. Such a system would provide a mechanism to exchange labour market intelligence and ensure that different labour market institutions and stakeholders contribute to employment and labour strategies, policies, plans and targets. Overall, the LMIS should aim to serve as the single source of truth (SSOT), providing qualitative and quantitative information for workforce management.

Table 33: Measures for skills supply and demand

Theme	Variables/indicators (sector and sub-sector-specific)
Quantitative measures for supply of skills	Require a standardised *occupation/job classification system for the three sectors*
	1. Number and type of skilling/training programs offered
	2. Number of skilled workforces by type of skill, field of study and sub-sector
	3. Number of scholarships by type of skill, field of study and sub-sector
	4. Number of foreign labourers by type of skill and sub-sector
Qualitative measures for supply of skills	1. Insights from training/skilling institutes
	2. Insights from sector associations and public sector agencie

Quantitative measures for demand of skills	1. Number of job positions/vacancies by sub-sector
	2. Number of unfilled job positions/vacancies by sub-sector
	3. Number of positions newly employed by sub-sector
	4. Number and type of training/skilling institutes
	5. Number and type of courses offered by the training/skilling institutes
	6. Number and type of training/skilling programs offered by public sector agencies/sector associations to respective sector workforces
Qualitative measures for demand of skills	1. Subjective insights from employers' demand of skills/occupation/field of study for workers
	2. Subjective insights from job seekers' preference in job positions/ occupations
	3. Subjective insights from jobseekers' preference in job positions/ occupations
	4. Subjective insights from employees on demand of skills/occupation/field of study
	5. Insights on skills/occupation/field of study demand from trends/weak signals (national and regional)

Research limitations

The team faced several challenges throughout the research process. A few noteworthy ones are discussed here.

First, the scope of the study was observed to be too large given the limited time. The team had only four months to engage the participants across the three sectors. This was too ambitious. It required a brisk pace of organisation and implementation, which, at times, circumvented the slower nature of some qualitative research (allowing insights to emerge organically). Besides, because many stakeholders were decision-makers, workshop engagements were often deliberately kept short to avoid overwhelming the participants.

Second, an acute lack of data or reliable data in the sub-sectors limited the scope of the analysis. There was a significant obstacle in carrying out trend analysis and finding associations due to limited sub-sector-specific demand and supply-oriented structured time series data on vacancies, training/skilling completion and scholarships. This has to do with the limited maturity of Bhutan's data-gathering system, and limited collaboration between different institutions and organisations. This means that, for the sector-specific analysis, quantitative data often provided anecdotal snapshots rather than robust time-series data that would lead to stronger conclusions.

Thirdly, a substantial part of the data was collected through qualitative means, namely by carrying out foresight exercises and collective intelligence workshops. While efforts were made to include a comprehensive sample of sub-sector representatives, biases may have crept in due to selective memory, telescoping and attribution.

In addition, there was a gap in longitudinal participation, as the participants engaged in each sector were not consistently engaged across the four-month period. The implications of this on the research outcome are not entirely clear but is still a significant limitation.

Deep ethnographic understanding requires cultural immersion and sufficient time in a culture and place. Understanding a culture requires first-hand experience and immersion. However, carrying out in-depth ethnographic research was not a possibility for this study.

The team also faced the challenge of integrating the quantitative and qualitative methods to understand workforce futures. This was new for the research team, and this integration was achieved in the analysis and write-up stage rather than designed into the research implementation.

While the study engaged a wide range of participants in each sector, both decision-makers and critical reference groups (e.g. agricultural and creative workers), the overall sample size was modest but, by no means, small. The study engaged people in the field, stakeholders in various institutions, decision-makers across a number of domains, and a variety of methods. However, it would not be accurate to call the sample size large or robust. Most workshops were well-attended. However, some workshops had modest or small attendance.

Conclusion

Exploring Bhutan's workforce futures does not just entail forecasting industry trends that the Bhutanese workforce has to fit into, but it requires thinking about how different economic sectors can grow through the addition and application of workforce propositions. The combination of supply and demand side workforce considerations, the need to strategize economic growth, and the contextual nature of the strategy requirements organically lead to the need for targeted industrial policies across different sectors. This study attempts to provide an understanding of workforce capability needs for a 15-year timeframe based on the propositions developed. But it can also be seen as stepping stones to such a targeted industrial policy conversation.

This brief conclusion highlights the key learnings from the study summarised as follows:

- Reveals a need for developing workforce futures policies that align with Bhutan's unique culture and allow the integration of modernity/globalisation and tradition.
- Shows that initiatives to shape workforce futures cannot be piecemeal. Comprehensive and holistic industrial policy initiatives are needed.
- Underlines the importance for Bhutan to shape its governance systems to be anticipatory, agile and adaptive to navigate the extreme nature of change in the 21st century.
- Indicates a critical need for developing a data-gathering ecosystem that will allow Bhutan to measure change in the three sectors better.

Cultural alignment

As argued earlier, change initiatives need to fit Bhutan's cultural context. Organisations often exhibit an **"immunity to change",** resistance based on competing commitments and older underlying assumptions. These can often sabotage or undermine well-meaning intentions.[41] "Alignment work" in this study began through the first stage of the study, Critical Futures Assessment, to probe underlying assumptions and cultural dynamics. In multiple consultations and conversations (e.g. Causal Layered Analysis), the participants expressed the importance of the **Bhutanese industry using and honouring its unique strengths, wisdom and cultural needs, rather than looking outside for solutions and power.**

The six industrial propositions presented in the three sectors were later designed to reflect this "power and wisdom within" sensibility. The idea of the "leap", also offered by the participants, further extends on this. Instead of looking at Bhutan's agricultural, creative and digital sectors as under-developed, (e.g. from a conventional economic perspective), Bhutan can be seen to have avoided many of the contemporary problems that the world faces today. The concept of leap allows us to consider how Bhutan can modernise, while preserving the most important aspects of life valued by the Bhutanese people. This dynamic between modernity and tradition is a critical factor in this study. Bhutanese decision-makers will need to find ways of making their traditions resilient while accessing the many gifts of economic and cultural globalisation.

[41] Kegan, R., & Lahey, L. L. (2009). Immunity to change: How to overcome it and unlock potential in yourself and your organisation. Harvard Business Press.

This report can only provide insights and ideas for the potential alignment between Bhutanese culture and industrial policies to shape workforce futures. The bridge between designing industrial policies and what will resonate and work in Bhutan must be crossed by institutional and organisational decision-makers at the highest level.

Selective and targeted industrial policy

It became clear early on in the study that achieving meaningful change in the three sectors would require more than piecemeal efforts for several reasons. There was a need for demand side approaches – how to grow the economy through the application of workforce futures thinking. These sectors are asking for a "leap", a new level of dynamism and capabilities. While this study used a form of forecasting industry trends for which the Bhutanese workforce should supply skills is not enough. Approaches need to be supply and demand-oriented, focused on the skills and capabilities required for the economy to grow. This study provides an understanding of workforce capability needs until 15 years from now based on the scenarios developed in the study. But to generate a sea change requires a more encompassing vision and effort than just adding skills.

Bhutan is considered a global leader among many writers, scholars and laypeople because of its conceptualisation of Gross National Happiness and its commitment to well-being and the preservation of its culture and environment. The challenge this study poses is whether Bhutan can leverage its brand to generate leaps across these three sectors that continue to lead the development discourse.

To make the strategies work, Bhutan will need to generate a new level of expertise and capability. There will be a need for better and more targeted education and training opportunities for Bhutanese. There will also be a need for literacies of many kinds besides foreign expertise in multiple fields. Each of the strategies proposes different conceptions of how this expertise can be developed. Developing this expertise will require many strategies: making sure Bhutanese studying abroad return with their skills and knowledge, using Bhutan as a Living Lab that attracts global innovators, drawing on the open-source movement to build capability in software and hardware, finding the best online education opportunities that can fast-track skills needs, developing specialised visas for field-specific experts, drawing on digital nomads, and using action research and action learning strategies to build knowledge while solving problems. Building this new capability and expertise will require an unprecedented effort in educational, training and learning innovation.

Each sector will need to develop key performance indicators for the various sector development. While some indicators will need to be generic and follow industry standards set by bodies such as the ILO, measuring success in the development of workforces requires a clear idea of what success means in the first place. **These strategies provide stepping stones for targeted industry policies and strategies.** But ultimately, the leaders, decision-makers and stakeholders in these sectors will need to decide what success means for their sectors over the next 15 years. Discussions on success indicators should engage stakeholders from both supply and demand side of the labour market. Once there is high-level clarity on what success in these sectors looks like, performance indicators and measurements can be developed that will keep track of the change. **The principle of measuring what matters should be followed.** If there is any country in the world that knows this best, it is Bhutan, a country that took the bold and courageous step to develop a Gross National Happiness index because it decided this was what truly mattered.

Therefore, the industrial policy proposals entail a comprehensive and holistic approach to workforce futures that are intended to generate these "leaps". Of course, Bhutan will need to create new expertise and capability, better and more targeted education and training opportunities for Bhutanese, literacies of many kinds, and foreign expertise in multiple fields. The government will need to play a critical role in leading, focusing, coordinating and investing in efforts to grow and shape the economies in each sector, based on its vision of desired change.

Anticipatory, agile and adaptive governance

A critical role of government leadership underlines the need for adding new capabilities to Bhutan's governance culture and systems. In a world undergoing rapid and disruptive change, the ability to adapt quickly is critical. This requires anticipatory, agile and adaptive governance, meaning governments and institutions with some capacity to anticipate change, shift organisational mindsets quickly, and implement new initiatives adaptive to changing contexts. This type of anticipatory governance, Triple A Governance, will be fundamental for any nation to respond to a rapidly changing world.

In addition, societies need to cultivate the ability among people to experiment with new ideas and models to address their critical challenges. Approaches such as participatory action research, codesign, living labs and other methodologies are proven approaches for testing and experimenting to drive socio-technical innovation and solve people's real problems.

Measuring what really matters and data ecosystems

In an age beset by ecological crises, crippling inequalities, and mental health problems, much of which was created in the name of economic growth, Bhutan has stood out by asserting that what really matters is the happiness of its people. Bhutanese policy-makers set out to develop the world-leading Gross National Happiness approach.

For each of the three sectors, decision-makers and policy-makers will need to decide **"What Really Matters"** and **"What Needs to be Measured".** The industrial propositions show that goals should guide what gets measured. For example, with Brand Organic Bhutan, exports of organic goods would be measured, along with changes in commercial farm productivity. With Bhutan Digital Living Lab, the measure might be the level of international collaborators working on practical Bhutanese challenges. Goals and "success" differ from policy to policy. As the industrial policy propositions in this study are intended as conceptual stepping stones, decision-makers and policy-makers will need to identify what success means for each sector and then systematically develop measures and indicators that can track changes.

These measures require a robust data ecosystem. One of the key learnings from this study is that Bhutan needs to improve its data-gathering, data standardising, data collaboration/sharing and data analysis if it has to understand what is happening to its economic sectors. As discussed, the development of these data ecosystems will have to follow the logic of measuring what matters, key goals and definitions of success. It might be imagined that some measures and indicators, and hence data sources, will be tailored to these specific goals, while other indicators and data will need to be generic and follow global industry standards set by bodies such as the ILO.

Bhutan and the world

The challenges Bhutan face today require people to collaborate and utilise all of humanity's knowledge and resources. Just as Bhutan can learn from other countries and communities around the world to solve its challenges and share its learnings, Bhutan can help the world address its challenges. The global open source and open hardware movement provide ample resources for engineers and innovators to solve local problems. A "global design commons" has emerged over the past decades, which is a resource for local enterprises to create livelihoods and generate solutions to pressing issues.[42] Exploring how Bhutan can leverage global partnerships, collaboration and resource and knowledge sharing will be critical not just to Bhutan's success, but in fostering a spirit of global community as we navigate the precarious 21st century.

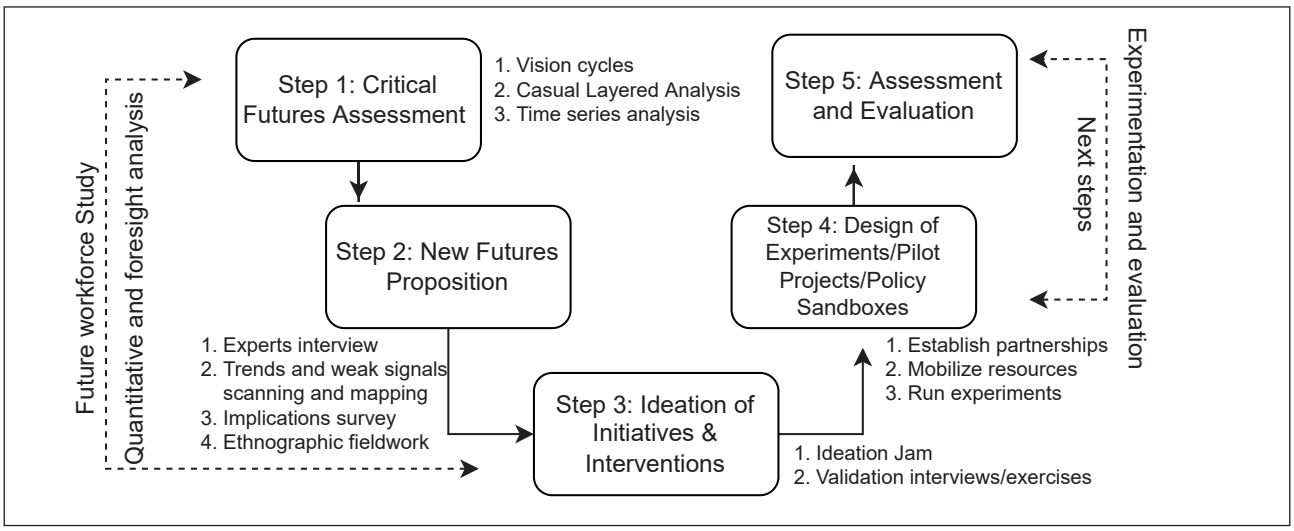
[42] Kostakis, V., Niaros, V., Dafermos, G., & Bauwens, M. (2015). Design global, manufacture local: Exploring the contours of an emerging productive model. Futures, 73, 126-135.

Appendix

Research methodology

The team used a mixed method approach to understand current issues and emerging workforce capability needs in the three sectors. More than 1,000 key actors in the three sectors were engaged over the course of the study. The study included both qualitative and quantitative methods comprising gathering expert views, in-depth interviews, collective intelligence workshops, foresight technique-based workshops and sensemaking exercises, structured surveys, and analysis of quantitative secondary data.

Figure 42: Overall methodology of anticipatory experimentation



The study used an approach called "anticipatory experimentation".[43] This approach develops a bridge between our understanding of emerging futures and intervention ideas that can lead to experiments that can be scaled for impact. The approach in its full conception has five stages. However, for the limited scope of the present study, only three stages were used.

Step 1: Critical futures assessment

The most prevalent factors in our ability to anticipate change, reduce blind spots and discover new strategic opportunities are the assumptions and worldviews that we hold.[44] Both imagination and the use of data related to the future are determined by the assumptions we hold about the future. Therefore, in this approach, we begin by challenging what Inayatullah calls the "used future", which is the image of the future that people have unconsciously accepted although its value and usefulness are declining.[45]

[43] Ramos, J. (2017). FuturesLab: Anticipatory experimentation, social emergence and evolutionary change. Journal of Futures Studies, 22(2), 107-118.

[44] Inayatullah, S. (1998). Causal Layered Analysis: Post-Structuralism as Method. Futures, 30(8), 815-829; Ramos, J. (2003). From Critique to Cultural Recovery: Critical Futures Studies and Causal Layered Analysis, Swinburne University of Technology. Melbourne

[45] Inayatullah, S. (2008). Six pillars: futures thinking for transforming. Foresight, 10(1).

In this research, we ran two key processes for challenging the used future and exploring new thinking patterns.

I. **Vision cycles:** The first was a workshop using a method called "vision cycles" that explores how assumptions about the future have driven strategy through the history of an issue. A timeline method, it reveals the iterations in thinking and action that have characterised the issue. The session engaged the 10 taskforce members and a few key stakeholders from respective sectors. (Key findings from this method are in the introduction to this report). Key questions asked in the workshop included:

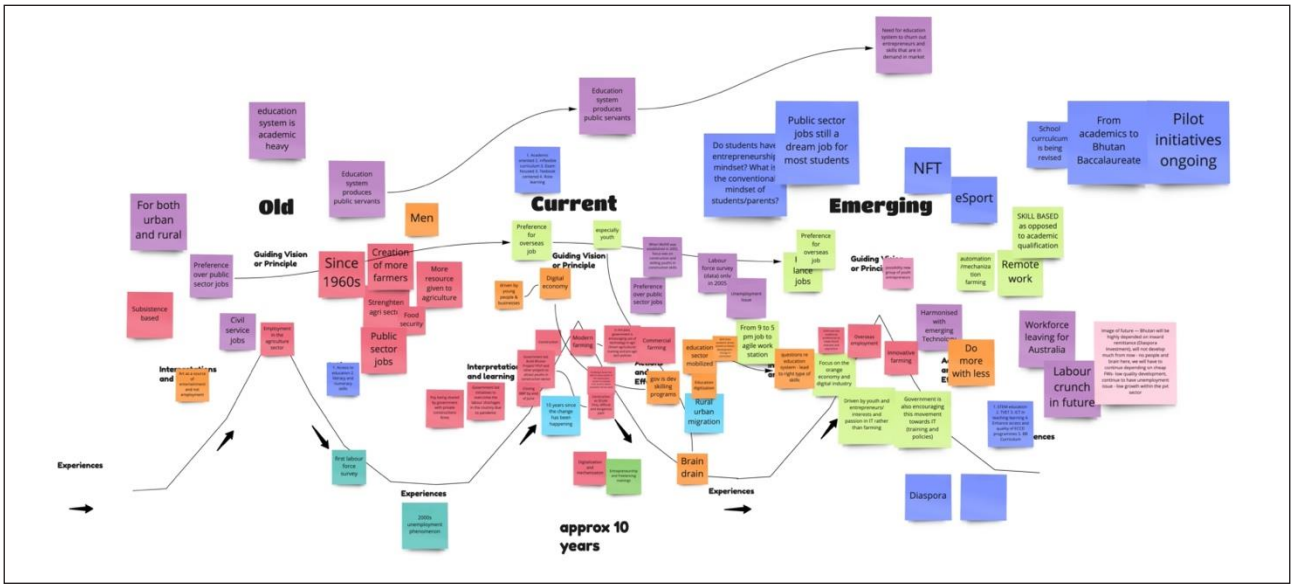
   A. What were/are the guiding visions (images of the future), principles or ideas for how the workforce should develop in Bhutan?

   B. What effects and impacts has this had?

   C. What have people experienced because of this?

   D. What interpretations were made because of this?

Figure 43: Screenshot from the miro board for vision cycles



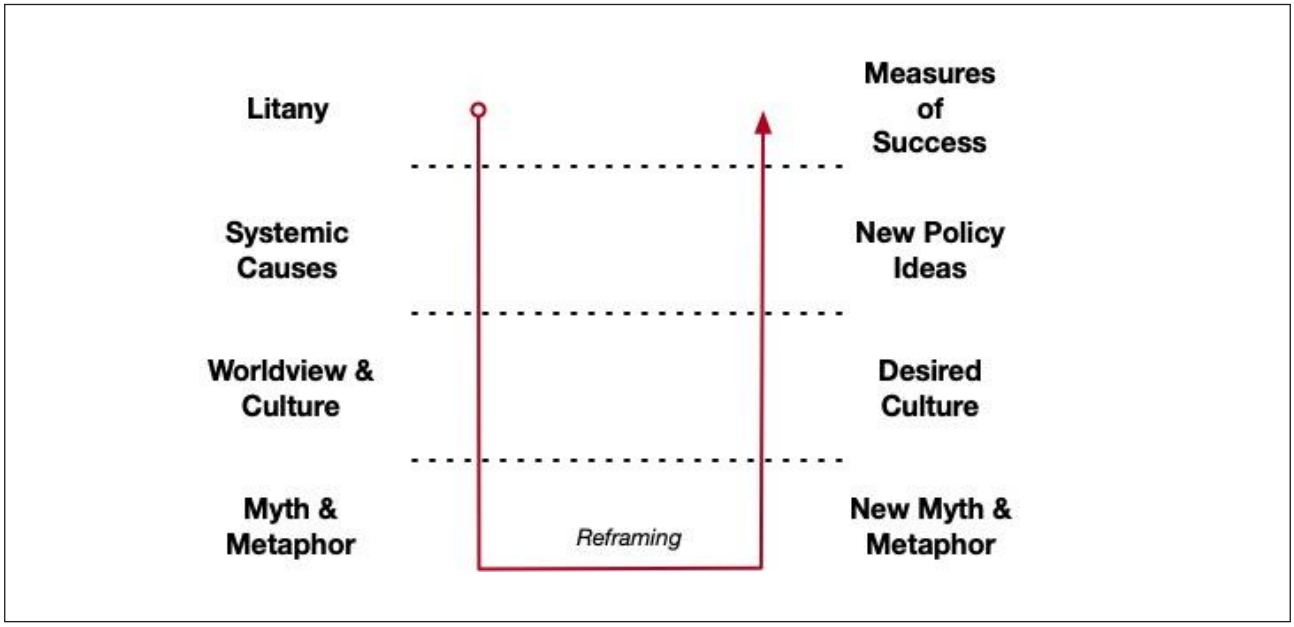
II. **Casual Layered Analysis (CLA):** The second was a workshop using a method called Causal Layered Analysis developed by Inayatullah.[46] This method helps explore the underlying worldviews and cultural patterns within Bhutan concerning workforce capability issues. The method probes the source of the problem or challenge and reframes it using new perspectives that provide new pathways.

The CLA workshop included participants from all three sectors. From the agriculture sector, we had participants from the Ministry of Agriculture, Rural Development Training Centre, and private agriculture businesses like Farm Machinery Corporation Limited, Ashish Horticulture and Nursery, Green Life Farm, and farming champions such as Farmer Sangay (an educated farmer paving the

[46] Inayatullah, S. (1998) ... Ibid

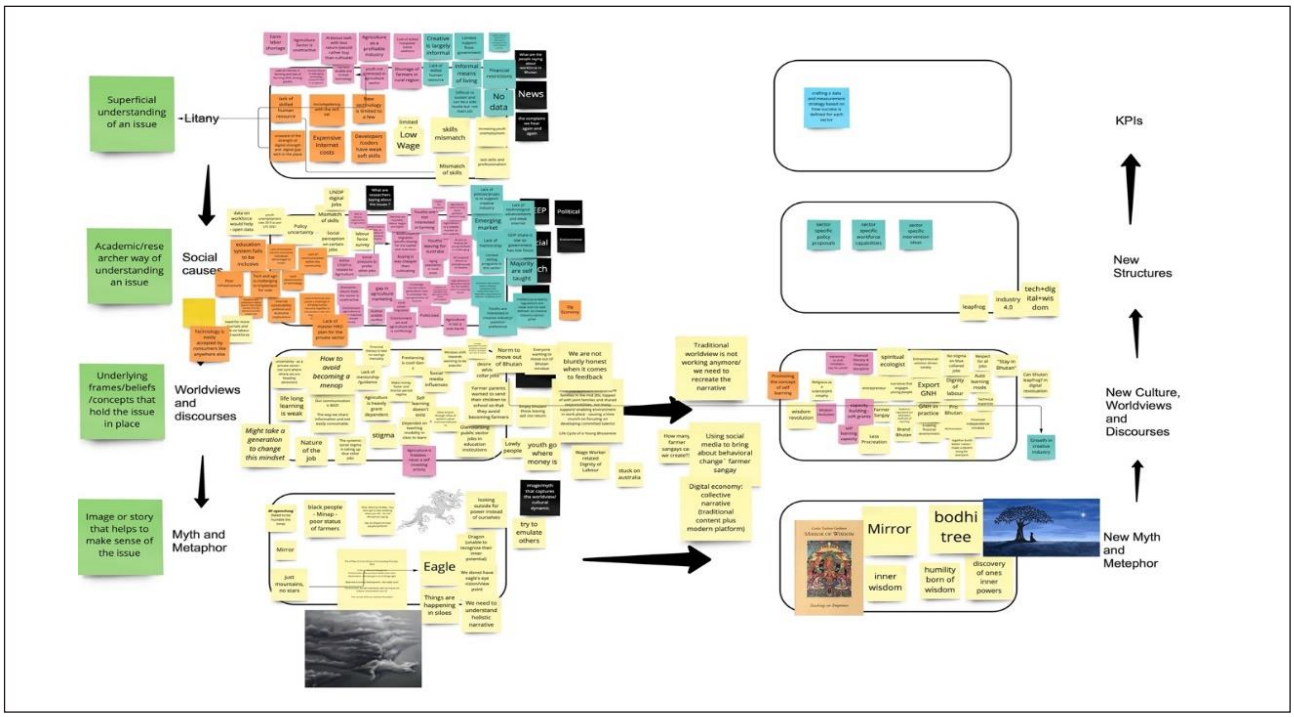
way for aspiring young farmers). Likewise, for the digital sector, we had participants from the Ministry of Economic Affairs, upcoming tech companies such as Green E, Athang Training Academy, iBest Studio, and digital consultants with expert knowledge of the digital sector landscape of Bhutan. For the creative sector, we had private creative firms such as M-Studio. Attendance was on average 30 participants. The method was a critical part of the research as it helped provide insights to develop the narrative arch of the study, described in detail in the introduction. This then provided a framework for the scenarios and proposals.

Figure 44: Overview of CLA process



CLA works by moving through layers of an issue, starting with litany (the most superficial understanding of an issue), moving to systemic causes (the economic, political, technological, demographic and ecological drivers of an issue (e.g. determinants), and then to the underlying ways of knowing (worldviews, discourses, perspectives) that hold the issue in place. The myth/metaphor level is a way of using creative thinking to find an image, metaphor or story (myth) that provides a synthesis of the problem. After this, the myth-metaphor is reframed in a way to help resolve or improve the issue. The process then proceeds by exploring the "entailments" of the new myth and metaphor, what new cultures and worldviews come forth, what new policy ideas and what new measures of success.

Figure 45: Screenshot from the Miro board for Causal Layered Analysis



III. Time series analysis: This research began by looking at overall workforce-related data from a time series perspective. A quantity can be seen year-to-year over several years so that changes and patterns can be discerned. For the overall workforce data, an attempt was made to find time series data that would provide at least a 10-year timeframe. Once time series data had been developed, some comparative analysis between different data sets was conducted to draw some broad conclusions about Bhutan's workforce. These data and their analysis are presented in the report as a general orientation to understanding the dynamics of Bhutan's workforce.

IV. Sector-based data analysis: As a follow-up, sector-based data were gathered. As with the macro-economic data, sector-based data could only be assembled based on available data resources. The data provided did not span more than two or three years in most cases. Therefore, they could not be used in a time series analysis. As a result, much of the sector data provides more of a recent snapshot, rather than a longer-term time series where stronger conclusions can be drawn. Nevertheless, the sector-based data analysis does provide a window into some of the dynamics and issues the different sectors face. This is presented in each of the sector-specific sections.

Step 2: New Futures Propositions (new assumptions and visions): To generate ideas about the future that will lead to new strategic opportunities, it is important to have new assumptions drawn from the future that is distinct from the "used future" explored in the first stage. New assumptions about the future need to draw from participant knowledge and concerns about the issues that they are facing, as well as distinctions within strategic foresight that elicit relevant trends and emerging issues/weak signals.[47] It is not enough to come up with a list of trends if it is not relevant to the people within a

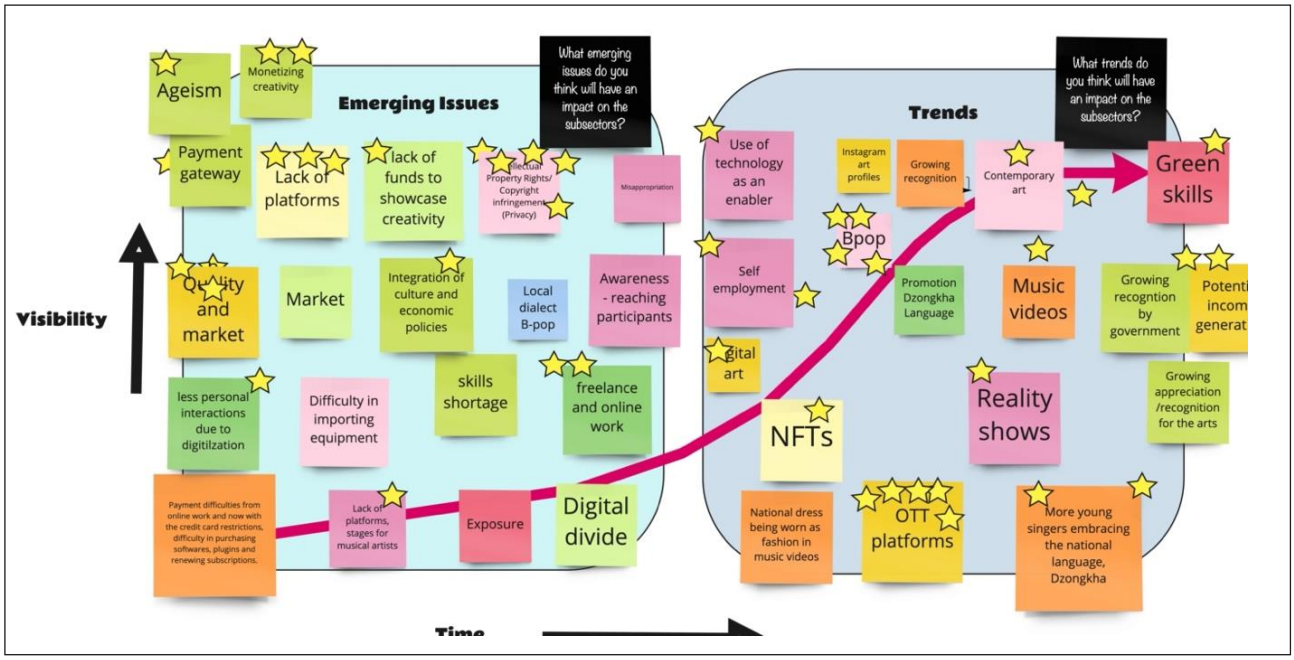
[47] Molitor, G. (2010). Timeline 22-Step Model for Tracking and Forecasting Public Policy Change. Journal of Futures Studies, 14(3), 1 - 12; Hiltunen, E. (2008). The future sign and its three dimensions. Futures, 40 247–260.

domain of concern. Equally, from a strategic foresight perspective, it is not enough to come up with a list of issues that a community is concerned about if it does not help generate new assumptions about the future.

To do this, we undertook several processes.

V. **Trends and weak signals identification with stakeholders and experts:** First, we conducted three workshops with key stakeholders from each of the three sectors to find out what the key issues and trends are in those sectors that are most relevant to them. This included a voting process that allowed the participants to vote on the issues that they felt are most important to the sector's present and future. Twelve participants from the agriculture sector, 24 participants from the creative sector and six participants from the digital sector attended the workshops.

Figure 46: Screenshot of miro board for emerging issues analysis



Example of an emerging issues analysis process in the Miro board (creative sector board 1)

VI. **Verification of key issues:** We double-checked to ensure that we had included all trends, emerging issues, and factors of relevance by circling back to the core UNDP and MoLHR teams. Where an important issue was felt to be left out, it was added to the core body of issues. Ten people attended the meeting.

VII. **Implication surveys:** We then conducted three surveys for the three sectors to ask what the implications of those emerging issues and trends are, when they thought those issues would have an impact, and what factors they considered were most important and why. One hundred and one stakeholders from the agriculture sector responded to the survey. Fifty-four responded from the creative sector and 49 from the digital sector. The qualitative feedback from the participants on the implications of emerging issues and their assessment of the timeframe of the impact informed the narrative and writing of scenarios developed in the Ideation phase. The survey feedback on key factors informed the overall sector analysis.

VIII. **Ethnographic fieldwork:** In addition to the qualitative research within the strategic foresight field, field visits were made to record the experiences of individuals working in the respective sectors. The narrative inquiry method allowed us to uncover unique perspectives and a deeper understanding of the work culture and environment, including attitudes, mindsets, and behaviours.

For the field work, a semi-structured questionnaire was prepared and administered over a small sample of workers, often including the marginalised population whose perspectives are not often sought. Around 50 individuals in the three sectors were reached out.

This research was prompted by the questions related to the issues and challenges that the workforce was facing. For instance, for the agriculture sector, as many subsistence farmers are illiterate, we felt that it was necessary to have personal conversations with them to understand what the real issues are for them.

This research was significant because it highlighted many practical issues and problems facing the workforce, particularly the subsistence farmers, and sensitised the researchers to the need to address fundamental challenges and issues in the near and distant future. One of the key lessons here is that fundamental interventions and reforms are required before more ambitious plans can be realised. Additionally, the fieldwork enabled MoLHR and UNDP teams to develop personas, representations of the people working in the sectors that highlight the issues, and the challenges and pain points they experience.

IX. **Scenario writing:** This stage was concluded by developing two timeline scenarios for each sector that encapsulated the new images and assumptions about the future for each sector that participants expressed. The scenarios provided the platform for participants to imagine and develop ideas about future workforce capability needs and useful interventions.

Step 3: Ideation of initiatives and interventions

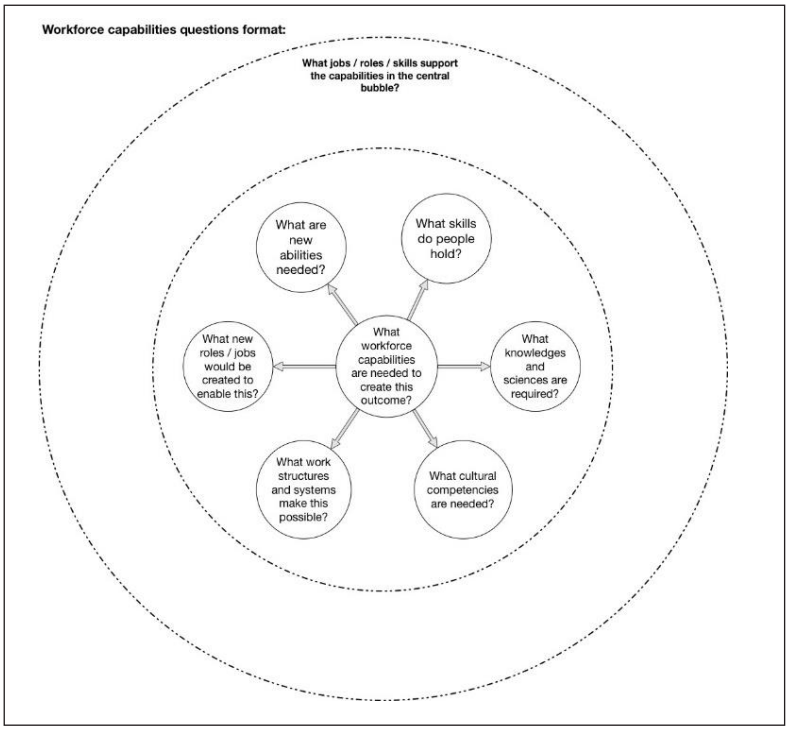
Once there are new images and assumptions about the future to draw from that are not just rehashed "used futures", ideas can be generated for new strategic options and opportunities. This requires leveraging the new images and assumptions about the future as a platform for ideation.

To do this, we conducted three ideation workshops, one for each sector, where stakeholders engaged with the new images and assumptions about the futures and generated ideas for the new workforce capabilities based on the scenarios and intervention ideas to build Bhutan's workforce capabilities in these sectors.

These ideation workshops provoked the participants into thinking about future workforce needs based on the scenario written for each sector. The scenarios were written in a timeline fashion so that readers could see how the future unfolded in 5, 10 and 15-year timeframes. This allowed the participants to consider workforce needs across the timeframes, thereby getting clarity on what may be shorter-term workforce needs and what are longer-term workforce needs. For example, the participants would read a scenario's five-year horizon and consider future workforce needs based on what was depicted in this. They would then read the 10-year horizon and consider future workforce needs based on this, and so would they with the 15-year horizon. Questions asked included:

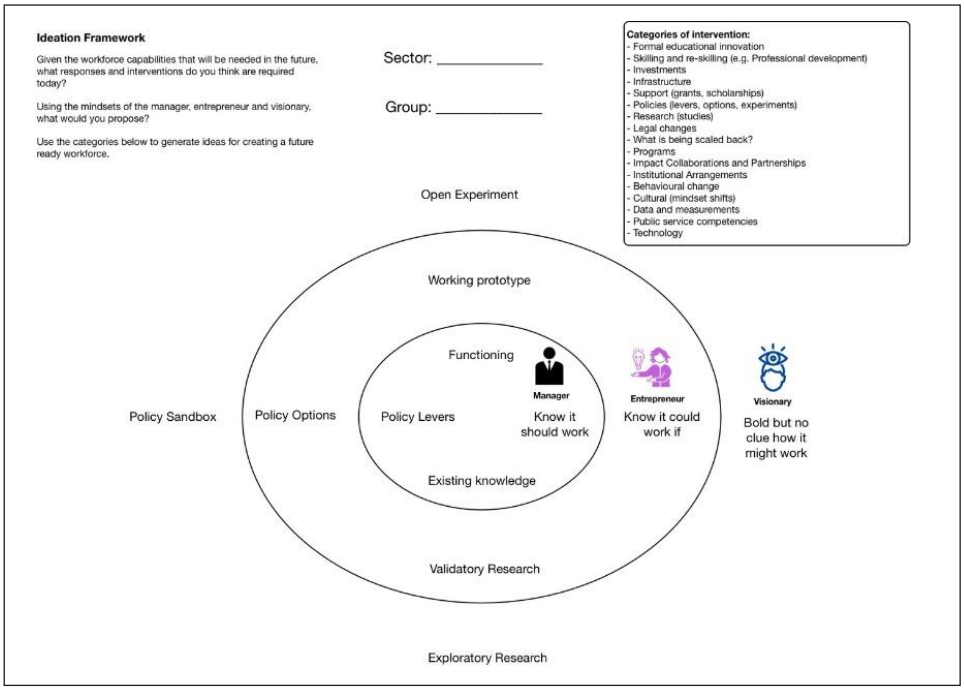
- What workforce capabilities are needed to create this [scenario] outcome?
- What work structures and systems make this possible?
- What cultural competencies are needed?
- What knowledges and sciences are required?
- What new roles/jobs would be created to enable this?
- What skills do people hold?
- What are new abilities needed?

Figure 47: Depiction of the workforce futures exploration template



Once the participants explored a full scenario timeline from five, 10 to 15 years and explored workforce capabilities needed, they developed ideas for interventions to support the fulfilment of these future workforce capabilities. Based on the Three-Horizons approach, the participants were asked to develop ideas that were managerial (know it should work today), entrepreneurial (know it could work tomorrow) and visionary (bold but don't know how it would work). This provided various ideas, from those that should be ready for implementation to more ambitious ideas that were harder to implement, but necessary, nonetheless.

Figure 48: Depiction of the workforce futures ideation framework



I. **Digital ideation jam:** During the day-long ideation jam session, more than 20 key actors in the digital sector participated. They included those from the decision-making bodies such as the Ministry of Information and Communications, Thimphu TechPark Limited, Bhutan Telecom Limited, Bhutan InfoComm and Media Authority, Tashi InfoComm Limited, Druk Holding and Investments and representatives from digital platform developers such as SELISE, iHub Bhutan, and Scan Cafe Bhutan.

II. **Agriculture ideation jam:** The one-day event was attended by 34 participants from decision-makers of public sector agencies, including the Ministry of Agriculture and Forestry, Bhutan Livestock Development Corporation Limited, Farm Machinery Corporation Limited, Horticulture Association of Bhutan, National Post Harvest Centre and representatives from the farm cooperatives and agriprenuers such as Bhutan Hydroponics, Cottage and Small Industry market, Kinz Farm Mushrooms, Shaoulee Food Products and Drongsep Yargay Detsen, Bhutan Mountain Coffee and Farmer Sangay, among others.

III. **Creative ideation jam:** Some 28 creative artists, firm owners, and decision-makers from public sector agencies took part in the ideation session. They included the Ministry of Information and Communications, the Ministry of Economic Affairs, the National film Commission, the Ministry of Education, and creative institutions and businesses such as the Royal Academy of Performing Arts, the Technical Training Institute, the Fashion Institute of Technology, Athang Training Academy, the National Institute for Zorig Chusum, Agency for Promotion of Indigenous Crafts, Radio Valley, Yeshi Lhendup Films, GOKAB Dance Studio, M-Studio, Samuh Mediatech, CDK Fashion House.

Step 4: Design of experiments, pilot projects, policy sandboxes

Ideally, once ideas are generated, there is a process of evaluating them and translating them into real-world experiments that can be scaled for impact. The power of a real-world experiment that, for example, draws on participatory action research as a way to do this is that ideas can be tested in the field, refined and adapted. Once a new approach has been validated by real-world experience, it can be scaled for impact. For example, this is the world-leading approach taken in Bangladesh by BRAC and the Grameen Bank for poverty alleviation. Organisations like these run participatory action research projects to experiment how issues like literacy, poverty alleviation, youth services can be addressed. Once there is a working model, these organisations scale up the intervention.

This project did not include setting up real-world experiments, as this requires in-house champions and institutional hosts to further develop the ideas and commit to experiments. Because of changes in the machinery of government in Bhutan, it was felt that the report should stop at stage 3, presenting key intervention ideas and recommendations, which the relevant bodies would pick up and take forward when they are ready.

Step 5: Assessment and evaluation

As with any public project, once there are opportunities to test and experiment with new approaches, evaluation is necessary to see how well the experiments worked.[48] At this point, experiments and pilots can be discarded if they are found to not work at all, changed and modified if they show some promise but require adjustments and improvements, or scaled up if they are found to be mature and ready to be replicated.

[48] Wadsworth, Y. (1997). Everyday Evaluation on the Run. Melbourne Allen and Unwin; Wadsworth, Y. (2010). Building in Research and Evaluation: Human inquiry for living systems. Crows Nest NSW: Allen & Unwin.

Existing policy and strategy analysis for the agriculture, creative, and digital sectors

Table 34: Existing policies and strategies in the agriculture sector

Title of the policy	Year	Policy objective number	Examples of policy objective relating to workforce
RNR Research Policy	2011	5.2.3	Initiate a Researcher - Farmer - Policy Forum to facilitate interactions and bridge the gaps between policy and research.
		5.2.2	Conduct collaborative research activities with extension agents, farmers and private sector
		5.1.2	Transform farming from subsistence to a commercial and market orientated farming.
Food and Nutrition Security Policy	2014	4.1.5	Promote climate smart agriculture and farming practices.
		4.3	Ensure interventions in markets and price stability of food commodities
		4.3.2	Promote financial services that enable saving and provide access to loans and insurance products that protect livelihoods.
		2.2.2	Formalize National School Agriculture Program as a part of the school curriculum to create awareness on employment opportunities in the RNR sector for the youth and to supplement nutrient requirement in school feeding
		2.3.2	Develop special employment schemes to capture particular interests and needs of vulnerable groups
RNR Marketing Policy	2017	5.2.2	Institute special programmes to encourage the private sector in RNRprocessing, and empower women and youth for increased participation in RNR marketing.
		5.2.3	Support investment for research and developmentinto RNRproduct processing.
		5.2.7	Facilitate establishment of mutual recognition of quality certification and sanitary and phytosanitary-standards between Bhutan and its trading partners
		5.3.3	Develop strategic RNR marketing infrastructure such as farm shops, collection depots/centres, local market outlets, Sunday market facilities, and cold stores.
		5.3.5.	Provide support to the private sector and communities to build, operate, and maintain RNR marketing infrastructure.

Economic Development Policy	2016	7.6.4	The Ministry of Agriculture and Forests (MoAF) shall encourage and promote commercial scale feed plants on a regional basis.
		7.6.5	Commercial farming shall be extensively promoted by expediting the leasing process for SRF land as per relevant laws.
		7.6.25	Promote green and climate smart agriculture
		7.6.26	Develop comprehensive input supply (greenhouse, seeds, fertilizers, seedlings, livestock inputs etc) systems as basis for production.
National Forest Policy 2011	2011	3.3.5	An economically viable and efficient forest based industry, utilising both wood and non wood products, aimed at adding value.
		2.4.2.	Human-wild life conflicts is an important issue in Bhutan and the most affected are farmers who loose crops and livestock to wildlife significantly. Therefore conservation measures should mainstream sustainable solutions to mitigate this conflict through culling enterprises of non-scheduled animal species, crop and livestock insurance schemes, resettlement programs and land exchange programs. Culling programs should be based on information on population dynamics and habitat status.
Cottage and Small Industry Policy 2019	2019	6.2.6.	Develop and institutionalize support professions such as mentors to guide and advise entrepreneurs.
		6.2.7.	Conduct skills needs assessment of the CSIs for TVET curriculum revision and development
		6.2.9.	Map and match CSI skills database with Bhutan Labor Market Information System, Job Portal System, Employment Registration System for coordinated demand and supply of workforce.
		6.2.11.	Promote private sector participation in entrepreneurship curriculum review and development boards to foster greater linkage between the human resources demanded by the economic sectors and the skills supplied by the training and education institutions.
		6.2.12.	Ensure collaborative and synchronized efforts amongst agencies in providing skills development training with a focus to encourage women and youth entrepreneurship
National Human Resource Development Policy	2010	10.5	Technical and vocational training programmes shall also be introduced in schools in order to promote and improve both attitude and skills towards vocational education among students
		13	Disabled and other special groups shall be supported to develop vocational skills. Extra efforts shall be made to bolster rural and village skills development schemes

Cooperatives Act of Bhutan	2001, 2009 (Amendment)	3	It is the declared policy of the Royal Government of Bhutan (RGOB) to promote cooperatives for the well being of members and communities. The RGOB shall facilities the development of co-operatives as strong and sustainable pillar of the private sector that will contribute to the economic development of the Bhutanese society, especially the poor.
Agriculture Extension Strategy 2019 - 2028	2020	3.2.4.	Lead farmer approach: Lead farmer approach helps in bridging the technologies transfer gap by complementing the roles of research and extension. The lead farmer approach begins with a training programme of a packaged course in farming provided for a selected group of farmers with potentials to disseminate skills acquired from the training programme to others.

Table 35: Existing policies and strategies in the creative sector

Sl. No.	Title of the policy/ act	Year	Policy objective number	Examples of policy objective relating to workforce
1	The Copyright Act of Kingdom of Bhutan	2001	Preamble	Protection of the rights of authors over creative works to encourage intellectual endeavors - recognition of creative efforts.
2	Economic Development Policy	2016	7.10.13	To encourage and promote innovation in the development of the film, media and creative art sector, foreign investments shall be allowed in the sector. Media shall not include news media in all its forms.
			7.10.10	The ICT and Media Advisory Panel shall be mandated to identify and develop the relevant skills in the private sector for overall development of the ICT ecosystem.
			7.10.16	The Royal Government shall support innovation and development in the ICT and media sector.
3	National Film Policy	2013	7 (Policy statement)	An assessment of training needs shall be conducted with a long-term aim of establishing a film school by the private sector

4	Cottage and Small Industry Policy 2019	2019	6.2.6.	Develop and institutionalize support professions such as mentors to guide and advise entrepreneurs.
			6.2.7.	Conduct skills needs assessment of the CSIs for TVET curriculum revision and development
			6.2.9.	Map and match CSI skills database with Bhutan Labor Market Information System, Job Portal System, Employment Registration System for coordinated demand and supply of workforce.
			6.2.11.	Promote private sector participation in entrepreneurship curriculum review and development boards to foster greater linkage between the human resources demanded by the economic sectors and the skills supplied by the training and education institutions.
			6.2.12.	Ensure collaborative and synchronized efforts amongst agencies in providing skills development training with a focus to encourage women and youth entrepreneurship
5	National Human Resource Development Policy	2010	10.5	Technical and vocational training programmes shall also be introduced in schools in order to promote and improve both attitude and skills towards vocational education among students
			13	Disabled and other special groups shall be supported to develop vocational skills. Extra efforts shall be made to bolster rural and village skills development schemes

Table 36: Existing policies and strategies in the digital sector

Sl. No.	Title of the policy	Year	Policy objective number	Examples of policy objective relating to workforce
1	Economic Development Policy	2016	7.10.5	The Royal Government shall identify the core competency in niche areas and requirement of differ- entail skills for establishment of regional institute of excellence in ICT
			7.10.10	Review and integrate market oriented ICT courses in colleges and educational institutions to develop the required skills. The ICT and Media Advisory Panel shall be mandated to identify and develop the relevant skills in the private sector for overall development of the ICT ecosystem.
			7.1.14.2	The Royal Government in collaboration with the private sector shall identify critical skilled labour deficiency areas and support skills development to address the needs of the labour market including addressing gender gaps in skills development, where necessary.
			7.1.14.4	The Royal Government shall establish an autonomous Entrepreneurship Development Institute by 2018 to promote entrepreneurship.

2	e-Governance Policy		5.2.1	Relevant RGoB agencies shall ensure reuse and sharing of existing common services, ICT infrastructure and information (data), for all ICT initiatives, including compliance of ICT standards.
3	Cottage and Small Industry Policy 2019	2019	6.2.6.	Develop and institutionalize support professions such as mentors to guide and advise entrepreneurs.
			6.2.7.	Conduct skills needs assessment of the CSIs for TVET curriculum revision and development
			6.2.9.	Map and match CSI skills database with Bhutan Labor Market Information System, Job Portal System, Employment Registration System for coordinated demand and supply of workforce.
			6.2.11.	Promote private sector participation in entrepreneurship curriculum review and development boards to foster greater linkage between the human resources demanded by the economic sectors and the skills supplied by the training and education institutions.
			6.2.12.	Ensure collaborative and synchronized efforts amongst agencies in providing skills development training with a focus to encourage women and youth entrepreneurship
7	National Human Resource Development Policy	2010	10.5	Technical and vocational training programmes shall also be introduced in schools in order to promote and improve both attitude and skills towards vocational education among students
			13	Disabled and other special groups shall be supported to develop vocational skills. Extra efforts shall be made to bolster rural and village skills development schemes

References

ADBI. (2022) *The Performance and Determinants of Creative Industries in Asia, in Creative Economy 2030: Imagining and Delivering a Robust, Creative, Inclusive, and Sustainable Recovery Publisher:* Asian Development Bank Institute (ADBI) https://www.researchgate.net/publication/361461559_The_Performance_and_Determinants_of_Creative_Industries_in_Asia

Balawejder, F., & Monahan, E. (2020). *Effective Policy Approaches to Sectoral Issues.* Industrial Strategy Council Research Paper. https://industrialstrategycouncil.org/sites/default/files/2020-10/Effective%20Policy%20Approaches%20-%20Research%20Paper.pdf

Bauwens, M. (2006). *The Political Economy of Peer Production.* Post-Autistic Economics Review(37).

Birdsall, N. M., Campos, J. E. L., Kim, C. S., Corden, W. M., MacDonald, L., Pack, H & Stiglitz, J. E. (1993). *The East Asian miracle: economic growth and public policy.* World Bank. https://documents1.worldbank.org/curated/en/975081468244550798/pdf/multi-page.pdf

Bussey, M. (2009). *Six shamanic concepts: charting the between in futures work.* Foresight.

Candy, S., & Dunagan, J. (2017). *Designing an experiential scenario:* The people who vanished. Futures, 86, 136-153.

Castells, M. (1996). *The Information Age: Economy, Society and Culture.* Mass: Blackwell.

Cavanagh, J., Mander, J. (2003). *Alternatives to Economic Globalisation.* San Francisco: Berrett-Koehler.

Galbraith, J. K. (1994). *The World Economy Since the Wars.* London Sinclair-Stevenson.

Hiltunen, E. (2008). *The future sign and its three dimensions.* Futures, 40 247–260.

Holmgren, D. (2020). *Essence of permaculture.* Melliodora Publishing.

Inayatullah, S. (1998). *Causal Layered Analysis: Post-Structuralism as Method.* Futures, 30(8), 815-829.

Inayatullah, S. (2004). *The Causal Layered Analysis (CLA) Reader: Theory and Case Studies of an Integrative and Transformative Methodology.* Taipei: Tamkang University Press.

Inayatullah, S. (2008). *Six pillars: futures thinking for transforming.* Foresight, 10(1).

Kegan, R., & Lahey, L. L. (2009). *Immunity to change: How to overcome it and unlock potential in yourself and your organization.* Harvard Business Press.

Kostakis, V., Niaros, V., Dafermos, G., & Bauwens, M. (2015). *Design global, manufacture local: Exploring the contours of an emerging productive model.* Futures, 73, 126-135.

Lang, T., & Whittington, R. (2022). The best strategies don't just take a long view: they take a broad view. Harvard Business Review. https://hbr.org/2022/05/the-best-strategies-dont-just-take-a-long-view-they-take-a-broad-view

Molitor, G. (2010). *Timeline 22-Step Model for Tracking and Forecasting Public Policy Change.* Journal of Futures Studies, 14(3), 1 - 12.

Ministry of Economic Affairs. (2021). *Creative Industries Export Strategy of Bhutan 2021-2025.*

Ministry of Finance. (2020). Bhutan Trade Statistics 2020. https://www.mof.gov.bt/wp-content/uploads/2021/05/BhutanTradeStatistic2020_Publication.pdf

National Statistics Bureau. (2021). 2021 Labour Force Survey Report Bhutan. https://www.nsb.gov.bt/labour-force-survey-2021/

National Statistics Bureau. (2020). 2020 Labour Force Survey Report Bhutan. https://www.nsb.gov.bt/labour-force-survey-2020/

National Statistics Bureau. (2019). 2019 Labour Force Survey Report Bhutan. https://www.nsb.gov.bt/labour-force-survey-2019/

National Statistics Bureau. (2018). 2018 Labour Force Survey Report Bhutan. https://www.nsb.gov.bt/labour-force-survey-2018/

National Statistics Bureau. (2017). 2017 Labour Force Survey Report Bhutan. https://www.nsb.gov.bt/labour-force-survey-2017/

National Statistics Bureau. (2016). 2016 Labour Force Survey Report Bhutan. https://www.nsb.gov.bt/labour-force-survey-2016/

National Statistics Bureau. (2015). 2015 Labour Force Survey Report Bhutan. https://www.nsb.gov.bt/labour-force-survey-2015/

Priday,G and Ramos, J. (2014). "Futures in action – *the 'Futures Action Model' a new tool for Living Labs"* - ENoLL Open Living Lab Days. https://livinglabdays2014.files.wordpress.com/2014/09/openlivinglabdays2014_conference-proceedings.pdf

Priday, G. and Pedel, P (2020). *Subverting the Narrative: Alternate Technology Approaches for Active Ageing in Studies in Health Technology and Informatics,* Vol 268 ISBN 978-1-64368-058-3 (print) | 978-1-64368-059-0 (online)

Priday, G & Pedell, p. (2020). *Living Labs in an evolutionary context of human orchestration, Co-creating and Orchestrating Multistakeholder Innovation Co-creating and Orchestrating Multistakeholder Innovation.* Laurean julkaisusarja / Laurea Publications. Laurea-ammattikorkeakoulu., Hirvikoski T., Erkkilä L., Fred M., Helariutta A., Kurkela I., Pöyry-Lassila P., Saastamoinen K., Salmi A., Äyväri A. (Eds.).

Ramos, J. (2003). *From Critique to Cultural Recovery: Critical Futures Studies and Causal Layered Analysis,* Swinburne University of Technology. Melbourne

Ramos, J. (2017). FuturesLab: *Anticipatory experimentation, social emergence and evolutionary change. Journal of Futures Studies,* 22(2), 107-118.

Ramos, J., Ede, S., Bauwens, M., & Wong, J. G. (2021). *The Cosmolocal Reader.* FuturesLab.

Rogers, E. (1995). *Diffusion of Innovations* (4th ed.). New York: The Free Press.

Savory, A. (1983). *The Savory grazing method or holistic resource management.* Rangelands Archives, 5(4), 155-159.

Salazar-Xirinachs, J. M., Nübler, I., & Kozul-Wright, R. (2014). *Industrial policy, productive transformation and jobs: theory, history and practice. Transforming Economies. Making industrial policy work for growth, jobs and development.*

Sonobe, T., Buchoud, N. J., Tan Ghee Tiong, J., Baek, S., Hendriyetty, N., & Sioson, E. P. (2022). *Creative Economy 2030: Imagining and Delivering a Robust, Creative, Inclusive, and Sustainable Recovery.* https://www.adb.org/publications/creative-economy-2030-imagining-and-delivering-a-robust-creative-inclusive-and-sustainable-recovery

United Nations Development Programme. (2021). *Digital Jobs In Bhutan: Future Scaling And Demand Creation.* https://www.undp.org/bhutan/publications/digital-jobs-bhutan-future-skilling-and-demand-creation

Wadsworth, Y. (1997). *Everyday Evaluation on the Run.* Melbourne Allen and Unwin

Wadsworth, Y. (2010). *Building in Research and Evaluation: Human inquiry for living systems.* Crows Nest NSW: Allen & Unwin.

Witte, F. X. P., & Xué, F. (2018). *Living the Law of Origin: The Cosmological, Ontological, Epistemological, and Ecological Framework of Kogi Environmental Politics* (Doctoral dissertation, University of Cambridge).

Wohlleben, P. (2016). *The hidden life of trees: What they feel, how they communicate—Discoveries from a secret world* (Vol. 1). Greystone Books.

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