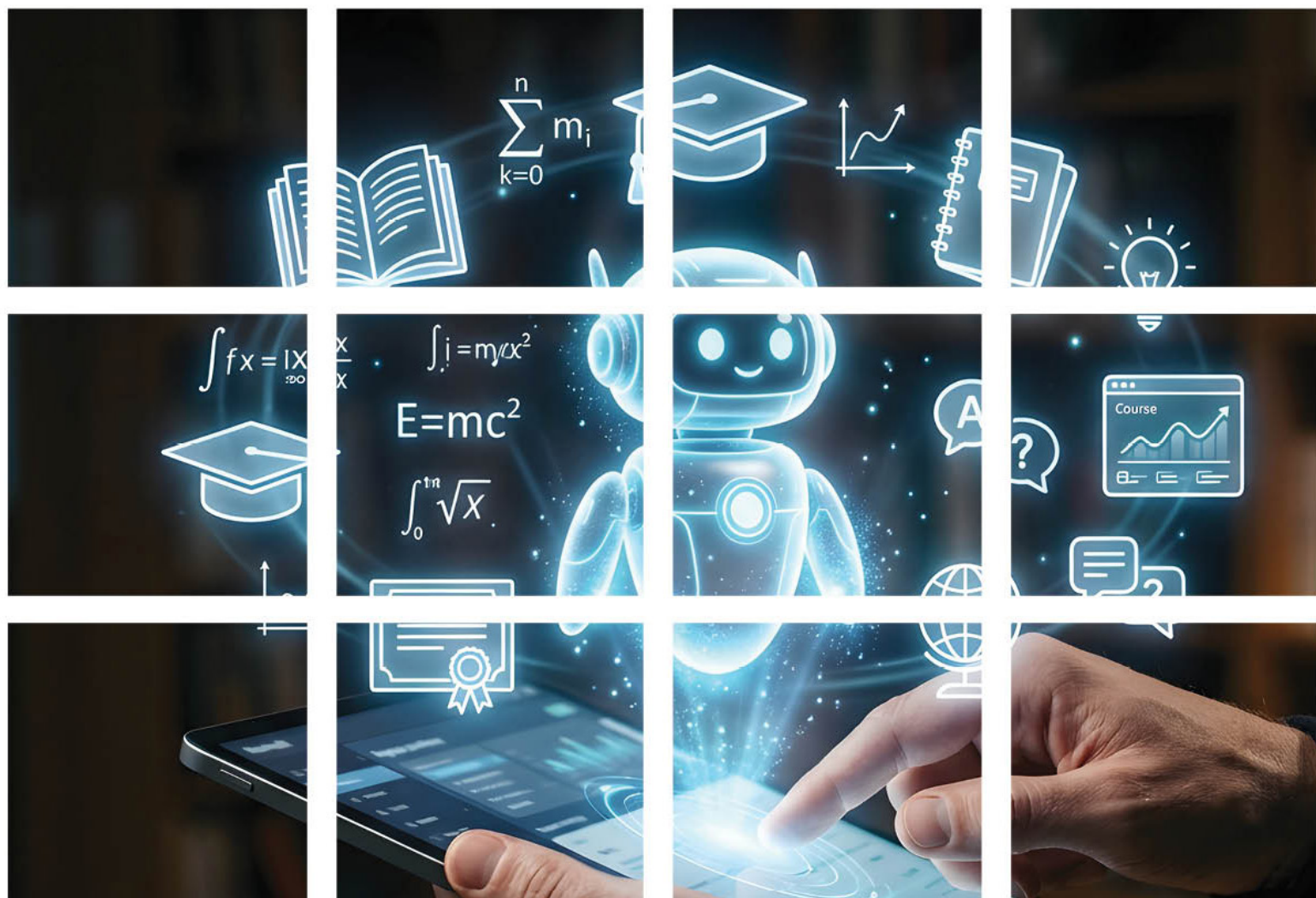


Foresight brief series

Shaping education for tomorrow



Disclaimer

The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of the International Telecommunication Union (ITU) or of the ITU secretariat concerning the legal status of any country, territory, city, or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

The mention of specific companies or of certain manufacturers' products does not imply that they are endorsed or recommended by ITU in preference to others of a similar nature that are not mentioned. Errors and omissions excepted; the names of proprietary products are distinguished by initial capital letters.

All reasonable precautions have been taken by ITU to verify the information contained in this publication. However, the published material is being distributed without warranty of any kind, either expressed or implied. The responsibility for the interpretation and use of the material lies with the reader.

The opinions, findings, and conclusions expressed in this publication do not necessarily reflect the views of ITU or its membership.

ISBN

978-92-61-42641-5 (PDF version)

978-92-61-42651-4 (EPUB version)



Please consider the environment before printing this report.

© ITU 2026

Some rights reserved. This work is licensed to the public through a Creative Commons Attribution-Non-Commercial-Share Alike 3.0 IGO license (CC BY-NC-SA 3.0 IGO).

Under the terms of this licence, you may copy, redistribute and adapt the work for non-commercial purposes, provided the work is appropriately cited. In any use of this work, there should be no suggestion that ITU endorse any specific organization, products or services. The unauthorized use of the ITU names or logos is not permitted. If you adapt the work, then you must license your work under the same or equivalent Creative Commons licence. If you create a translation of this work, you should add the following disclaimer along with the suggested citation: "This translation was not created by the International Telecommunication Union (ITU). ITU is not responsible for the content or accuracy of this translation. The original English edition shall be the binding and authentic edition". For more information, please visit <https://creativecommons.org/licenses/by-nc-sa/3.0/igo/>

Foresight brief series

Shaping education for tomorrow

**A product of the Innovation and
Entrepreneurship Alliance for
Digital Development initiative
under the Telecommunication
Development Bureau**



Acknowledgments

This report is part of the International Telecommunication Union (ITU) Foresight Brief Series, a product of the Innovation and Entrepreneurship Alliance for Digital Development (the Alliance) initiative under the ITU Telecommunication Development Bureau. It was prepared using the methodology outlined in the ITU Playbook on Strategic Foresight developed by the Digital Transformation Lab, a core component of the Alliance. The methodology aims to strengthen futures-thinking capabilities within the Alliance and among ITU Members.

The report was led and written by Dr Ahmad Sharafat, thematic lead of the Strategic Foresight Collaboration Area of the Expert Network of the Alliance, under the supervision of Mohamed Ba, head of the Digital Transformation Lab of the Alliance, with support from ITU consultant Udit Chaturvedi.

The report was first presented during the second board meeting of the Alliance and subsequently peer-reviewed by foresight experts from the Expert Network of the Alliance. It draws on a range of tools and frameworks from the ITU playbook to guide its analysis and provides an overview of the key findings from the foresight study. The report contributes to the ITU Development Sector (ITU-D) priority of digital transformation and supports the efforts of Member States to integrate innovative information and communication technologies into their national development agendas.

This report could not have been completed without the support of the Digital Innovation Board and their focal points, and the Expert Network of the Alliance, whose valuable feedback and contributions greatly enriched the analysis presented.

Table of contents

Acknowledgments	iv
Foreword	vii
1 Introduction to futures thinking and strategic foresight	1
1.1 Futures thinking and strategic foresight	1
1.2 The importance of futures thinking.....	1
1.3 Introducing the foresight brief series	2
1.4 The ITU approach to strategic foresight.....	3
1.5 Objectives of the 'Shaping education for tomorrow' foresight brief.....	4
2 Sensing in a volatile, uncertain, complex, and ambiguous world	7
2.1 Identifying signals and emerging trends	7
2.2 Exploring signals of change for an education landscape	7
3 Analysing and refining key drivers of change	11
3.1 Drivers and critical forces influencing future evolution of education.....	11
3.2 Drivers.....	12
3.1 Weak signals with disruptive potential	14
4 Visualizing possible future scenarios	17
4.1 Key drivers for exploring potential future scenarios.....	17
4.2 Envisioning scenarios through the interplay of key drivers	18
4.3 Exploring a range of scenarios	19
4.4 Four plausible scenarios.....	20
5 Prioritizing the desired scenario	27
5.1 The desired scenario	27
5.2 Enablers of the desired scenario.....	28
6 Actioning the desired future	31
6.1 A roadmap to maturity	31
6.2 Actions to drive future-ready education ecosystems	32
7 Managing the ecosystem.....	36
7.1 Strength in stakeholder collaboration	36
7.2 Activating implementation mechanisms	37
Annex	40
Glossary	42

References 43

List of figures and tables

Figures

Figure 1: VUCA.....2

Figure 2: Navigating lack of resources and adoption of emerging technologies 18

Figure 3: Potential trajectories and outcomes 19

Figure 4: Six pillars of an integrated framework for action 32

Figure 5: A well-connected ecosystem 37

Tables

Table 1: Drivers shaping the future of the education landscape..... 12

Table 2: Selected drivers 17

Table 3: Stress-testing the shortlisted scenarios against the objectives of the
foresight study 28

Table 4: Proposed roadmap to realize the desired vision 33

Table 5: Platforms and structured mechanisms for stakeholder collaboration 38

Foreword



Education is central to the development and advancement of societies. However, it is becoming increasingly clear that traditional approaches to education alone will not be enough to meet the demands of a rapidly changing world. The accelerating pace of technological change, evolving labour markets, and the imperative for lifelong learning are compelling countries to rethink how education is designed, delivered, and experienced.

This foresight brief is a product of the Innovation and Entrepreneurship Alliance for Digital Development initiative under the ITU Telecommunication Development Bureau. This series envisions equitable futures and encourages countries to shape digital ecosystems that can thrive in an evolving world.

This brief is an invitation to reimagine the possibilities of education through the lens of innovation and information and communication technologies. By leveraging digital transformations, countries can expand access, personalize learning pathways, and build resilient systems that prepare learners not only for the jobs of today, but also for the challenges and opportunities of tomorrow. Emerging technologies such as artificial intelligence (AI), immersive platforms, and data-driven learning analytics hold the potential to transform how knowledge is acquired, shared, and applied in every corner of the globe.

Innovation is not solely about technology. It encompasses the fostering of inclusive and equitable approaches that ensure no learner is left behind, and underpins an entrepreneurial and creative spirit among educators and learners alike. Most importantly, innovation calls for an ecosystem approach that enables collaboration across governments, industry, academia, and civil society to co-create education systems that reflect shared values for the future.

Foresight serves as a valuable tool to help us anticipate different futures and make more informed decisions today. By exploring multiple possibilities, countries can identify risks, uncover opportunities, and design strategies that remain adaptable as the world continues to change. In this way, foresight strengthens the capacity of countries to act with confidence and to embed innovation into long-term planning. Through its work, ITU is committed to democratizing the knowledge and practice of foresight, making the tools and methods accessible to all Member States so that every country can shape their own future.

The ITU Telecommunication Development Bureau (BDT) remains committed to supporting our membership on this transformative journey. I look forward to seeing how this report will inform national priorities and inspire action. We stand ready to work with our membership to put these insights into practice, and to build education systems that are inclusive, innovative, technology-proof, and future-ready.

A handwritten signature in black ink, reading "Dr. Cosmas Luckyson Zavazava".

Dr Cosmas Luckyson Zavazava

Director, Telecommunication Development Bureau
International Telecommunication Union



1 Introduction to futures thinking and strategic foresight

1.1 Futures thinking and strategic foresight

An approach to navigate uncertainty and shape desired futures

Futures thinking is the practice of exploring how different outcomes might unfold by identifying trends, emerging issues, and critical uncertainties, challenging linear thinking and imagining a range of plausible futures rather than relying solely on past patterns. Strategic foresight is the structured application of this approach to inform present-day decisions. It blends trend analysis with creative exploration, helping us prepare for multiple possibilities, anticipate disruptions, and build more resilient systems.

Together, futures thinking and strategic foresight provide a powerful toolkit for navigating change. Instead of predicting a single outcome, they prompt questions about what could happen, what ecosystems should prepare for, and what kind of future is desired. In doing so, these approaches shift the focus from reacting to events to proactively engaging with the forces shaping tomorrow.

Strategic foresight provides pathways to act intentionally in uncertain environments, equipping institutions, governments, and communities with the agility to adapt and the imagination to innovate. In essence, it is about expanding the field of vision to move forward with purpose, even when the road ahead is unclear.



1.2 The importance of futures thinking

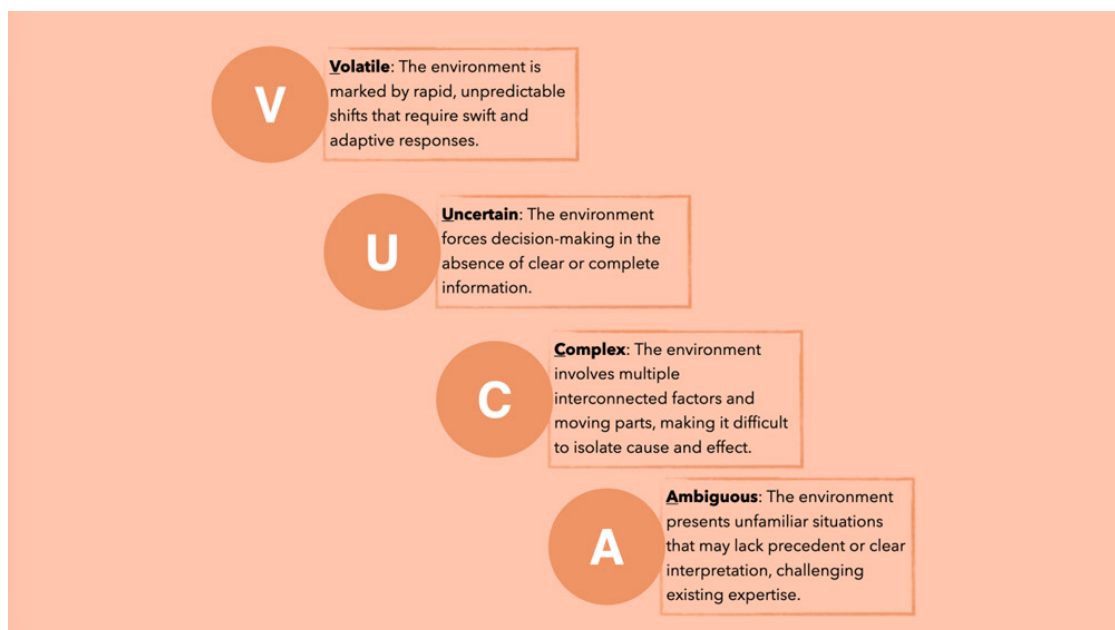
Addressing complexity and disruption in a volatile, digital world: The need for futures thinking

In an era of accelerating technological advancement, climate uncertainty, demographic shifts, and geopolitical turbulence, new ways of thinking are required to confront a volatile, uncertain, complex, and ambiguous environment.

Futures thinking is essential because it shifts the focus from short-term fixes to long-term preparedness, enabling policy-makers, innovators, and communities to anticipate disruptions and take advantage of emerging opportunities. In doing so, futures thinking fosters a mindset of resilience and adaptability, as it is about shaping the desired future and not just focused on

survival. It demands looking beyond immediate pressures and attempting to answer deeper questions about the kind of society being built, who benefits from it, and who could be left behind. In answering these questions, futures thinking becomes an essential compass for navigating uncertainty and an invaluable tool for building more inclusive, sustainable, and forward-looking systems.

Figure 1: VUCA



Source: ITU

Utilizing futures thinking to improve long-term planning

Long-term planning often struggles to keep pace with the rate of change in the modern world. Futures thinking reinvigorates the planning process by anchoring it in possibility rather than assumption. Through structured scenario development, horizon scanning, and the identification of key drivers of change, futures thinking challenges existing mental models and opens new strategic options.

Futures thinking allows organizations and governments to test the resilience of their plans under multiple future conditions. It brings clarity to complex environments by highlighting not just what might happen, but what could be done in response. As a result, decision-makers can allocate resources more effectively, prioritize innovation, and align initiatives with emerging needs.

By integrating futures thinking, planning becomes a dynamic, iterative process that is better equipped to handle shocks, adapt to transitions, and pursue transformative outcomes. Ultimately, it strengthens our ability to act with foresight today to ensure a more equitable tomorrow.

1.3 Introducing the foresight brief series

Helping stakeholders stay ahead of the curve

The Foresight Brief Series is a collection of research reports designed to help ITU Members navigate the uncertainties of an increasingly digital future. It is being developed by the

Innovation and Entrepreneurship Alliance for Digital Development (the Alliance) under the ITU Telecommunication Development Bureau.

Using structured strategic-foresight methodologies and presenting the findings in an accessible format, the series enables stakeholders to stay ahead of the curve by identifying weak signals, analysing trends, and exploring emerging disruptions that may reshape key sectors or focus areas. The briefs present scenario-based insights that impel policy-makers and ecosystem actors to consider multiple plausible futures and design strategies that are resilient, inclusive, and future-ready.

Rather than predicting the future, the series encourages a shift from short-term responses to long-term preparedness. By curating actionable futures intelligence, it empowers Members to make informed decisions in a rapidly evolving environment. The briefs are not meant to be conclusions, but to act as starting points for continued dialogue, collaboration, and development among stakeholders.

In line with these objectives, the briefs provide instructions for stakeholders seeking to move beyond fragmented initiatives towards an integrated vision supported by practical next steps.

Specifically, the briefs:

- illuminate emerging trajectories by mapping the structural trends, weak signals, and wildcard events shaping the topic in focus, informed by desktop research, stakeholder surveys, and expert interviews;
- define desirable futures using scenario thinking to articulate concrete visions for the future that advance the report's strategic objectives, while also examining alternative, less desirable, and even wholly undesirable pathways;
- develop strategic options by identifying policy levers, capacity-building measures, and ecosystem-building actions that support progress towards the desired future; and
- equip decision-makers by offering public and private stakeholders, financiers, researchers, innovators, and entrepreneurial support systems a clear roadmap for translating foresight conclusions into coordinated measures.

1.4 The ITU approach to strategic foresight

A structured and collaborative methodology to anticipate change

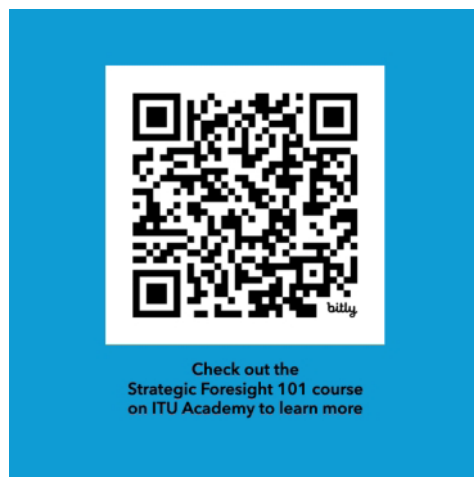
The ITU methodology provides a structured yet flexible approach to help stakeholders anticipate change, navigate uncertainty, and accelerate digital transformations. By integrating systems thinking, design thinking, and futures thinking, the ITU ecosystem-based approach fosters collaboration and co-creation, while remaining aligned with national, regional, and global development goals. This empowers countries and communities to shape inclusive, resilient, and future-ready societies.

The methodology underpinning this foresight brief is drawn from the ITU Playbook on Strategic Foresight, a step-by-step, tool-based guide. The methodology aims to democratize foresight knowledge and practice, making these powerful tools accessible to a wide range of actors.

The basics of this methodology, for a foundational understanding of strategic foresight, are also outlined in a self-paced and free online course titled 'Strategic Foresight 101', available on ITU Academy.

This image indicates a QR code that leads to the free online course titled 'Strategic Foresight 101', available on ITU Academy.

The foresight journey unfolds across several stages. It begins with framing and scanning more than 200 environmental signals and trends to identify drivers of change through desktop research, surveys, interviews with subject-matter experts, and co-creation workshops with ecosystem stakeholders to ensure that diverse perspectives are heard and incorporated. These drivers are then analysed and mapped to assess their potential impact and uncertainty, laying the groundwork for exploring future possibilities. By pairing impactful and uncertain drivers, plausible scenarios are generated to highlight emerging opportunities and challenges. From these, a preferred scenario is chosen and shaped through the creation of a forward-looking action roadmap, which is further reinforced by mechanisms that help keep recommendations responsive, relevant, and managed over time.



The findings of this report have been validated by the Members of the Innovation Alliance Strategic Foresight Thematic Group, as well as the Digital Innovation Board of the Alliance, to ensure that the findings are rigorous, future-aligned, and actionable for stakeholders.

This ecosystem-driven methodology reflects the principles of the ITU innovation framework, empowering countries and communities to develop inclusive, resilient, and future-ready societies.

Readers can explore other published reports from the Foresight Brief Series at bit.ly/itustrategicforesight.

1.5 Objectives of the 'Shaping education for tomorrow' foresight brief

Rethinking education to empower future generations

The first report in the Foresight Brief Series focuses on the broader education landscape, a sector central to human development and digital transformations.

Education is more than a system for knowledge transfer – it is a powerful enabler of sustainable development and societal transformation. It underpins many of the UN Sustainable Development Goals, including those aimed at fostering economic growth, reducing inequalities, and promoting inclusive societies. As the foundation upon which individuals build their futures, education plays a critical role in shaping not only the workforce of tomorrow, but also the values, capabilities, and resilience of future generations.



In an era marked by digital disruption, climate change, and social fragmentation, rethinking education is becoming essential. Traditional education systems are struggling to keep pace with rapid technological and socio-economic shifts. By reimagining what, how, and where people learn, students can be equipped with the digital-literacy, critical-thinking, and collaborative skills needed to be leaders in a complex, interconnected world. This is why the Foresight Brief Series begins with education.

Applying futures thinking to education allows for the exploration of possible scenarios to anticipate structural transformations and understand the evolving needs of students, educators, and systems. It is a proactive approach that prepares future generations to face uncertainty with confidence and empowers them to contribute meaningfully to their communities.

By drawing on strategic foresight, this brief calls for collective action to strengthen the ecosystems that enable learners, educators, and institutions to thrive. It advocates for policies and practices that promote inclusive, equitable, and quality learning, cultivating future-ready skills, integrating emerging technologies responsibly, and ensuring meaningful global access.



2 Sensing in a volatile, uncertain, complex, and ambiguous world

2.1 Identifying signals and emerging trends

This section presents the first step in the strategic foresight process: identifying early signals and emerging trends in the external environment. It begins with scanning the horizon across diverse domains (e.g. social, technological, economic, environmental, political, legal, and ethical) to identify patterns of change and map the underlying forces shaping the future.

This exploratory phase lays the foundation for the foresight process by framing the scope of an inquiry, revealing cross-cutting influences, and highlighting the dominant trends and marginal signals that may point to emerging disruption.



2.2 Exploring signals of change for an education landscape

Signals are observable events, behaviours, or developments that indicate potential change. While individually they may appear incremental or isolated, collectively they provide early insight into how systems are evolving and where transformation may be gathering momentum. The following signals, mapped across social, technological, economic, environmental, political, legal, and ethical dimensions, highlight patterns that can shape the future landscape of the sector being analysed.

Evolving social landscape

Social dynamics, which encompass demographic shifts and rising cultural diversity, are profoundly shaping the future of education by transforming expectations around access, equity, and relevance (Knowledge Sourcing Intelligence LLP, 2024). As societies become more mobile and culturally varied, education systems face mounting pressure to respond to the urgent need

for job creation and meaningful employment. The widespread adoption of digital technologies, social media, and online platforms is fundamentally altering how, when, and where people learn, while also fostering demands for personalized, flexible, and lifelong learning pathways. The growing emphasis on soft skills such as motivation, teamwork, communication, and problem-solving is even reshaping grading systems to move beyond evaluating the mere retention of knowledge (WEF, 2025). Additionally, high satisfaction with online learning is further reinforcing shifts towards alternative modes of delivery, with 94 per cent of students reporting that they enjoy their online learning experience (Venable, 2024). However, educators warn that without careful planning, sufficient resources, and digital inclusion, social dissatisfaction may rise, prompting learners to seek alternatives abroad, which could accelerate brain drain and deprive societies of essential talent.

Evolving technological landscape

Technological advances are rapidly unlocking new pedagogical possibilities and transforming learning experiences. The integration of AI, large language models, and extended reality (XR) is creating highly interactive, immersive environments that personalize education and boost engagement (Mordor Intelligence, 2024). Adoption trends reflect this momentum, with a 2021 survey finding that 40 per cent of institutes of higher education in the United States of America had experimented with XR, while 12 per cent had incorporated it across multiple departments (Mordor Intelligence, 2024). The global XR market is projected to grow at a robust compound annual rate of 35 per cent through 2028. Enhanced learning management systems, coupled with more reliable communication infrastructure, are enabling the rise of micro-learning, practitioner-led teaching via online platforms, homeschooling models, and advanced specialized courses. Yet unequal adoption persists, largely due to disparities in technological infrastructure. According to experts, the critical obstacles that must be addressed systematically are uncertainties in the digital ecosystem, operational training gaps, and persistent divides between access to devices and connectivity.

Evolving economic landscape

Economic forces are exerting a powerful influence over education, with globalization, automation, and shifting labour markets driving an urgent demand for new skills and competencies. The World Economic Forum projected that 50 per cent of the global workforce would require reskilling by 2025, putting immense pressure on education systems to prepare learners for economic volatility (WEF, 2025). Meanwhile, competitive pressures are rising as prestigious international online providers with well-known instructors and flexible pricing intensify competition, threatening domestic providers that fail to adapt. This is unfolding in a context where budgets and technical staff are often stretched thin, and cross-border migration adds further complexity. The surge in online education, a market that was projected to reach USD 319 billion by 2025, underscores the growing preference for scalable, cost-effective, and adaptable models (Knowledge Sourcing Intelligence LLP, 2024). Providers that fail to evolve risk losing relevance, while those that successfully align with industry needs can bolster both individual and national economic resilience.

Evolving environmental landscape

Environmental imperatives, ranging from climate change and natural resource scarcity to waste management, pollution, and more frequent natural disasters, are reshaping educational

content and delivery. These challenges are intensifying the demand for curricula that embed principles of sustainability and environmental stewardship, equipping learners to tackle pressing ecological issues and adapt to changing realities. Education systems must change how they operate, embracing energy-efficient digital platforms and developing content that enhances community resilience in the face of environmental risks. As global environmental pressures mount, experts see education as central to fostering the mindsets and competencies essential for a just transition to greener economies and societies.

Evolving political landscape

The political context remains integral to steering the transformation of education systems through policies, regulations, and resource allocation. The extent to which countries can undertake digital transformations and meet evolving societal and industry demands often depends on the political will of decision-makers and their readiness to cultivate inclusive, future-oriented learning ecosystems. Regulatory reforms and incentives are particularly vital for mainstreaming innovative approaches, such as through the formal accreditation of high-quality foreign or virtual programmes. Experienced educators are advocating for top-level leadership that prioritizes the transformation of education through clear planning, adequate resources, and robust follow-up, while actively engaging citizens to develop shared commitments and accountability.

Evolving legal landscape

Legal frameworks are increasingly shaping how education is developed, delivered, and evaluated. Intellectual property rights, data privacy regulations, consumer protection standards, and accreditation requirements are all influencing educational technologies and online content. Historically, online education has struggled with formal recognition, but the COVID-19 pandemic catalysed a more positive trajectory. However, many local legal systems still need to evolve to support broader uptake (Knowledge Sourcing Intelligence LLP, 2024). As accreditation standards expand to encompass digital and hybrid models, thoughtful legal measures will be essential not only to uphold quality and protect the interests of learners, but also to guard against anti-competitive practices by established institutions that could stifle new entrants or international collaborations.

Evolving ethical landscape

Ethical imperatives, meanwhile, are taking centre stage in debates on the future of education. A heightened emphasis on fairness, inclusivity, and social responsibility is driving demand for systems that champion equal opportunity and cater to diverse needs. This comes against a backdrop of widening inequality and a notable shortage of quality educators and mentors, a trend that is expected to persist (WEF, 2025). For many experts, digital transformations are not just tools but moral obligations to ensure that all citizens have the right to education, without discrimination or bias. Embedding ethical values within curricula is seen as vital to cultivating principled, socially conscious citizens and fulfilling collective aspirations for sustainable development. These ethical priorities are ultimately guiding education towards approaches that emphasize inclusivity, student well-being, and broader societal good.



3 Analysing and refining key drivers of change

This section explores the second phase of the foresight process: analysing and refining drivers of change. Building on the insights derived from the previous phase, key drivers are identified and assessed based on their potential impact on the future and the degree of uncertainty surrounding their realization. Efforts are also made to look for weak signals, which are early, often ambiguous signs of emerging change that may evolve into significant drivers over time.

This analysis helps prioritize which dynamics are most critical in shaping long-term trajectories.



3.1 Drivers and critical forces influencing future evolution of education

Drivers shaping the future of education

Drivers are the key forces or underlying factors that influence or shape change within a system. They often interact and evolve over time, shaping future scenarios. While these forces present both opportunities and challenges, their impact and certainty vary. However, together they offer a composite view of the transformations ahead, considering social dynamics, economic shifts, technological advances, environmental imperatives, and institutional reforms.

The future of education is being shaped by powerful drivers, each of which plays a vital role in influencing how the landscape will evolve. The ones identified and presented on this page reflect those most likely to shape the trajectory of the education landscape globally, and a shift in any one of these drivers could fundamentally redirect the development of an education system.

Table 1: Drivers shaping the future of the education landscape

Driver	Impact	Uncertainty
Government policies	High	High
Economy and funding	High	High
Laws and legal systems	High	High
Social, cultural, and ethical values	Medium	High
Population demographics	High	Low
Impact of economy on population	High	Low
Adoption of emerging technologies	High	High
Technological infrastructure	High	Low

To complement the qualitative analysis of each driver, the table positions them according to both their systemic impact and the degree of uncertainty around how they may evolve. This dual lens clarifies which forces are relatively predictable and which require closer monitoring. The uncertainty ratings are indicative and based on peer reviews, interview insights, and secondary evidence synthesized in the narrative sections. They are not forecasts but foresight markers, highlighting where future trajectories are more predictable and where volatility or policy shocks create higher variability. These ratings should be read as guidance for scenario-building, not as definitive estimates of the likelihood of something occurring.

3.2 Drivers

Understanding the impact and uncertainty of key drivers

Government policies

A digital mindset within governments encourages the extensive use of digital technologies across sectors and supports the timely, effective, and efficient implementation of transformation initiatives. The COVID-19 pandemic, for example, illustrated how swift policy responses and crisis-driven investments could dramatically accelerate digital education efforts. Additionally, efficient and transparent governance helps eliminate unnecessary bureaucratic barriers, enabling broader public engagement in the digital transformation of education. A positive orientation towards digital transformations is now almost universal among governments, resulting in policies that largely support these activities. Consequently, this driver has a significant impact but carries little uncertainty.

Economy and funding

Digital transformations require resources and funding, among other essentials. As such, the state of the economy and the availability of funds are instrumental in determining the objectives and extent of a sector's digital transformation, including education. This driver effectively establishes the scale of a transformation. When the economy is thriving and funds are accessible, the digital transformation of education can be pursued on a wider scale. If financing is scarcer, the transformation often begins with pilot projects to build experience, establish

foundations, and refine best practices. In 2020, public expenditure on education averaged 4.9 per cent of GDP across member states of the Organisation for Economic Co-operation and Development, although disparities in national investment priorities were made clear by the fact that some countries were investing less than 3 per cent of GDP in education and others more than 7 per cent (OECD). As economies evolve, budget allocations may fluctuate over time, introducing uncertainty in planning and resourcing for long-term initiatives. This driver is therefore characterized by high impact and high uncertainty.

Laws and legal systems

Laws and legal frameworks establish crucial foundations for the digital transformation of education systems. They regulate the use of technology in classrooms, safeguard student data privacy, and ensure that online learning remains accessible to all. However, legal systems often lag behind technological changes, potentially slowing innovation or creating regulatory gaps. Cultivating a digital mindset within legal institutions is therefore essential to fully realize the benefits of technology, broaden access, and deepen interconnectedness. If legal systems are unable to keep up with the pace of change, this driver may exert limited influence in the short term, positioning it as a high-impact driver with high uncertainty.

Social, cultural, and ethical values

Integrating social, cultural, and ethical values into the digital transformations of education systems can build trust, foster inclusivity, and significantly enhance both efficiency and relevance, all of which are critical factors for long-term success. People now have unprecedented access to tools and insights that are reshaping minds in both intended and unintended ways. At the same time, outdated educational systems and narrow measures of success are contributing to chronic health concerns, including rising mental health challenges among children. The concept of digital trust, i.e. confidence in how data and digital interactions are managed, is also becoming increasingly important. These concerns must be thoughtfully incorporated into the design and implementation of digital education. However, this driver carries many hidden elements, with considerable uncertainties due to changes in governments, attitudes of regulators towards social media, and the handling of conflicts between platform policies and local norms. Given these diverse factors, this driver may not have a significant short-term impact.

Population demographics

Demographic factors such as age, gender, and education level can greatly influence the rationale and objectives of digital transformations of education systems. According to World Bank, the digital divide continues to restrain growth and restrict opportunities, a gap that could be addressed by an education sector more closely aligned to current needs and expectations. Additionally, ageing populations are prompting many countries to adjust retirement ages to preserve pension systems, requiring older generations to learn new skills to remain productive. While demographic shifts typically occur gradually and carry low short-term uncertainty, this driver may profoundly affect long-term transformation strategies.

Impact of economy on population

When economies are strained, populations often become more receptive to solutions that promise desirable change and improved prospects, particularly in less affluent communities.

In such contexts, digital transformations can make education more relevant to industry needs, enhance efficiency, and reduce costs, especially in places where full-time schooling is increasingly combined with part-time work due to economic necessity. As economies generally evolve at a measured pace, the short-term impact of this driver tends to be stable, resulting in low uncertainty.

Adoption of emerging technologies

AI and machine learning, along with their associated algorithms, are rapidly automating many aspects of life. While adoption levels differ by country and context, this trend is expanding worldwide. Other emerging technologies, such as XR, the metaverse, and next-generation networks, offer promising features that could substantially reshape the future of education. However, these future technologies face inherent uncertainties, with their success heavily dependent on their integration into existing systems and societal readiness. This driver is therefore a high-impact one, but with considerable uncertainty.

Technological infrastructure

Digital transformations begin by leveraging existing technological infrastructure, which is subsequently improved, expanded, and adapted to support new services and platforms. This infrastructure effectively sets the parameters for what is achievable in the near term. Although relatively stable, disparities in the availability of this infrastructure remain stark. For example, an estimated 2.6 billion people, or about one-third of the global population, remained offline in 2023, with rural and underserved areas the most affected (ITU, September 2023). This underlines why infrastructure is considered a high-impact driver, albeit with very low uncertainty in the immediate timeframe.

3.1 Weak signals with disruptive potential

Potential disruptors that could redefine the sector

Often overlooked or underestimated, weak signals are unpredictable forces that can either catalyse or hinder the evolution of systems. The following signals, though varied in maturity and visibility, warrant closer attention because of their potential to shape the future.

Edutainment

Gamified learning is increasingly blending education with entertainment through interactive, immersive experiences. The global edutainment market is projected to reach approximately USD 28 billion by 2032, underscoring how rapidly this space is expanding (Emergen Research, 2023). Augmented-reality and virtual-reality technologies are expected to drive this growth by opening new, engaging, and inclusive pathways to learning, particularly for marginalized communities who may otherwise lack access to traditional educational environments.

AI-generated course materials

AI is beginning to revolutionize education by generating textbooks, exams, and learning materials tailored to the needs of individual students. As education publishers start adopting AI-driven content creation, traditional curriculum design is being fundamentally redefined.

Platforms such as Khan Academy are already piloting AI tutors that can support learners at scale, signalling a major shift in how educational content is developed and delivered.

Micro-schools and learning pods

The popularity of micro-schools and learning pods, which are decentralized, community-led educational spaces that provide small-scale, tailored alternatives to mainstream schooling, is growing. These personalized environments offer flexible learning models that can be better aligned to the needs, preferences, and living conditions of individual students. As more parents and educators explore these options, micro-schools have the potential to significantly reshape local education landscapes.

Interactive textbooks

Multimedia-rich, adaptive textbooks are emerging as a way to cater to diverse learning styles, incorporating features such as quizzes, animations, and 3D visualizations to enhance understanding and engagement. This market is growing particularly fast in K-12 education, pointing to a future where textbooks are no longer static but highly interactive, acting as personalized tools that adapt to each learner's pace and interests.



4 Visualizing possible future scenarios

Possible transformational scenarios

This section presents the process of envisioning a diverse set of possible futures by examining how selected drivers of change might interact and intersect over time. Through structured exploration, several scenarios have been developed, each of which reflects a different combination of risks, opportunities, and system dynamics.

These scenarios are then studied to understand their implications, including their potential strengths, vulnerabilities, and cascade effects.



4.1 Key drivers for exploring potential future scenarios

Tensions expected to critically influence system dynamics over time

To explore how the future will unfold for the global education landscape, but particularly in developing countries, this study identified the key drivers of change. From a broader set, two impactful and uncertain drivers were prioritized based on their potential to shape educational equity, system responsiveness, and future workforce readiness.

Table 2: Selected drivers

Driver	Impact	Uncertainty
Economy and funding	High	High
Adoption of emerging technologies	High	High

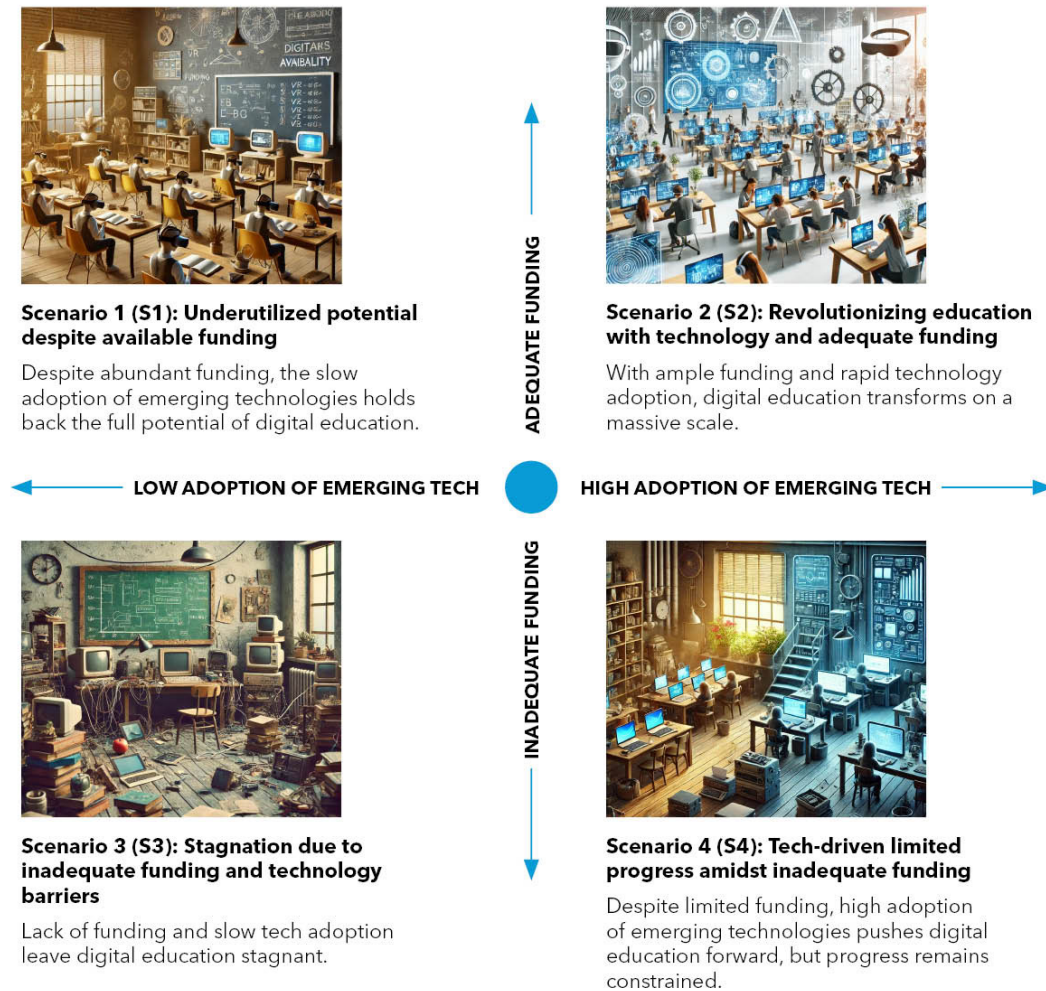
These drivers were then paired to demonstrate the critical tensions or trade-offs likely to emerge in the future. The mapped pair represents a distinct way in which the future could evolve.

One driver pairing was explored for this study, with both drivers reflecting a key axis of uncertainty and opportunity: **Economy and funding + adoption of emerging technologies.**

4.2 Envisioning scenarios through the interplay of key drivers

Navigating resource stability vs technological leapfrogging

Figure 2: Navigating lack of resources and adoption of emerging technologies



Source: ITU

This pair captures the overlap between the funding needed to sustain the large-scale digital transformation of an education system and the rapid evolution of emerging technologies such as AI, XR, and adaptive platforms. It highlights how the pace of technological adoption might outstrip or be constrained by fluctuating economic realities, especially in resource-limited contexts.

4.3 Exploring a range of scenarios

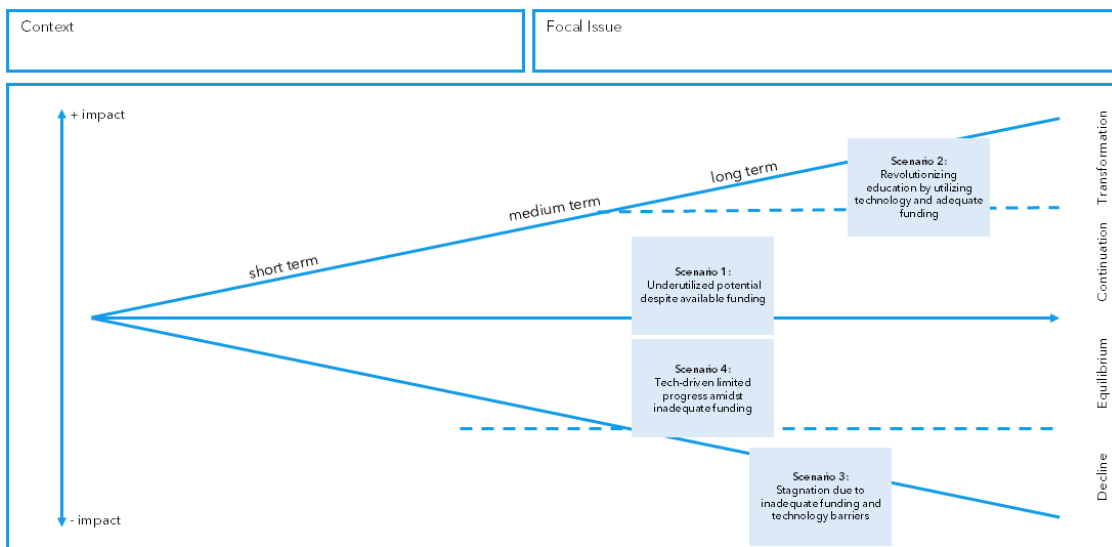
Potential directions for the future landscape of education

The range of possible trajectories is shaped by the different levels of impact and uncertainty of the relevant drivers. The timeline for realizing these scenarios may range from the short to long term, depending on how quickly uncertainties develop and system-level responses take shape.

From this range of possibilities, a desired scenario was identified. It is a future that aspires to ensure inclusive, equitable, and quality learning that cultivates future-ready skills, integrates emerging technologies responsibly, and guarantees global access.

Figure 3: Potential trajectories and outcomes

Futures cone canvas



Source: ITU Playbook on Strategic Foresight

Source: ITU

The following section outlines these scenarios and presents the desired future vision to guide the strategic recommendations listed in this report.

4.4 Four plausible scenarios

Equilibrium: Underutilized potential despite available funding



In this scenario, strong economic conditions and stable government budgets provide ample funding to support digital transformations of education systems. Policies remain broadly supportive, and public expenditure flows steadily into initiatives aimed at expanding online, remote, and virtual learning. However, despite these advantages, the uptake of emerging technologies such as AI, XR, and advanced learning platforms is slow and fragmented, constrained by cautious regulatory environments, limited technical expertise, and institutional inertia.

Legal systems, though stable, evolve too slowly to encourage rapid experimentation, while cultural expectations within institutes of education often favour conventional approaches over innovation. Socially, communities express growing aspirations for modern, flexible education, yet educators and system leaders struggle to integrate advanced tools that can meet these demands. Demographic trends, such as a youthful population eager for new skills, highlight the disconnect between expectations and delivery.

Infrastructure investments maintain robust digital connectivity. However, without the widespread adoption of transformative technologies, platforms remain underleveraged. Human capacity builds only incrementally, and a hesitancy towards new pedagogies limits deeper shifts in teaching and learning, although educators receive some professional development. Cross-border or

multidisciplinary learning opportunities are sporadic, and collaboration between academia, industry, and private players lacks the strategic depth needed to align curricula with evolving labour markets or accelerate research commercialization.

As a result, education systems reach a plateau where investments produce modest gains but fall short of driving systemic change. Over time, this underutilization erodes confidence, with unmet expectations becoming a critical challenge. Without more decisive, collaborative action to embrace innovation, the promise of a digitally transformed, inclusive education landscape remains out of reach, risking a decline in both human and institutional potential and slowing societal progress.

Transformational: Revolutionizing education by utilizing technology and adequate funding



In this future scenario, abundant funding combined with the widespread adoption of emerging technologies paves the way for a profound digital transformation.

Strong economic foundations and supportive government policies provide stable resources, while agile legal systems adapt to new realities, encouraging a responsible, technology-driven evolution in learning. This transformation unfolds across societies eager for inclusive progress, where cultural expectations shift to embrace innovative educational pathways tailored to diverse demographic needs.

Robust and secure infrastructure underpins this transition, enabling online, remote, and safe virtual learning on a massive scale. AI-powered platforms deliver personalized, engaging education that nurtures future-ready skills that are aligned to industry demands. As a result, learners benefit from higher employability, better wages, and improved standards of living, helping reduce social tensions and structural inequalities. Micro-credentials, part-time study, and accessible digital courses allow individuals to seamlessly balance work and learning, advancing human and institutional capacity.

Educators are also strengthened in this ecosystem. Targeted investments and professional development improve their capacity and capability to integrate technology meaningfully, mentor diverse learners, and adapt to evolving pedagogical approaches. Cross-border and multidisciplinary learning becomes commonplace, broadening perspectives and embedding global competencies. Educational ecosystems thrive on partnerships. Closer collaboration between academia, industry, and the public sector ensures that curricula are aligned with real-world needs, fuels demand-driven research, and accelerates the commercialization of new ideas. Inspired educators and industry practitioners work within supportive environments that enable the scaling of quality, affordable learning. This inclusivity unlocks new talent pools, fosters universal capacity building, and makes lifelong learning the norm. Ethical considerations remain central, as emerging technologies are deployed thoughtfully to build trust, reduce anxiety around education, and uphold values of fairness, transparency, and social responsibility. Ultimately, this scenario improves societies and creates lasting value.

Decline: Stagnation due to inadequate funding and technology barriers



In this scenario, strained economic conditions and limited government budgets mean that there is insufficient funding to drive digital transformations of education systems. Scarce financial resources mean that investments in critical infrastructure, robust digital platforms, and emerging technologies like AI or XR remain out of reach. Slow-moving policies and cautious regulatory environments further compound these challenges, offering little incentive for innovation.

Legal frameworks remain outdated and fail to adapt to the new digital realities, while public-private partnerships remain weak, unable to bridge funding and expertise gaps. Cultural attitudes within education systems often resist change, favouring traditional classroom-based approaches even as societal demands evolve. Meanwhile, demographic pressures, such as growing numbers of young people needing future-ready skills, expose stark gaps between expectations and what education systems can realistically deliver.

Without the adoption of advanced technologies, online, remote, and virtual education remains fragmented and underdeveloped. This undermines both human and institutional capacity, as educators have few opportunities for meaningful professional development in digital pedagogy, and students miss out on diverse, flexible learning pathways. Industry engagement is minimal, with limited collaboration on aligning curricula to meet evolving market needs or propel innovation through the applied-research and commercialization stages.

Over time, these barriers push education towards stagnation. Systems struggle to equip learners with relevant skills, deepening social inequalities and fuelling frustration among communities seeking better economic and personal prospects. As global competition intensifies and technological change accelerates elsewhere, these education systems risk becoming obsolete. This scenario shows decision-makers that without strategic intervention, renewed funding, and stronger alliances among public, private, and industry actors, the future of education may face a significant decline and fail to meet the needs of students or society as a whole.

Business as usual: Tech-driven limited progress amidst inadequate funding



In this scenario, emerging technologies advance rapidly and begin to penetrate education systems, but inadequate funding severely limits their wide-scale integration. Economic constraints and stretched government budgets provide little financial support for comprehensive digital transformations. Policies remain generally positive towards innovation, but their impact is muted without strong fiscal backing. Legal frameworks adapt slowly, offering limited incentives and little regulatory flexibility to accelerate the uptake of new technologies.

Socially, there is excitement around new tools that promise personalized, engaging learning, and cultural norms start to accept more digital modes of education. However, persistent inequalities emerge as only well-resourced institutions and urban areas can afford to pilot or adopt these technologies meaningfully. Rural and marginalized communities are often left behind, widening existing gaps. Meanwhile, demographic pressures, especially the growing number of young people, create rising demand for modern skills that education systems cannot fully meet.

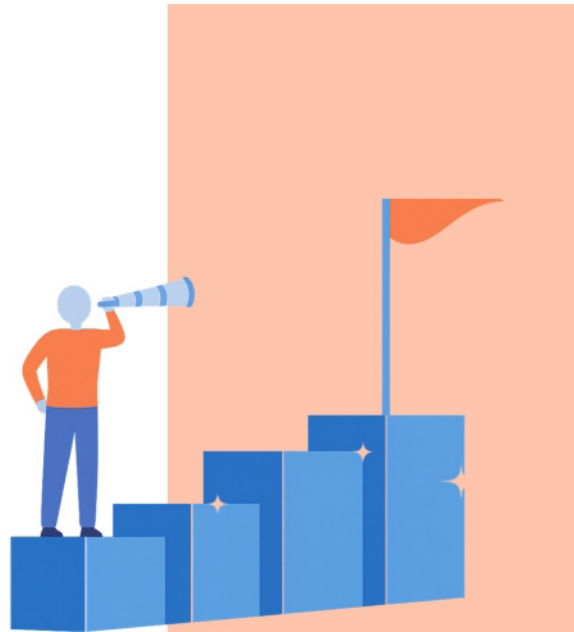
Infrastructure remains uneven. While new digital platforms and AI-driven learning solutions enter classrooms, they do so in fragmented, pilot-like ways. Educators face challenges too, as many struggle to integrate advanced tools effectively without sustained investment in training or support, limiting gains in human capacity. Collaboration between academia, industry, and the private sector continues, but it often focuses on isolated projects rather than systemic partnerships that could drive curriculum reform, applied research, and commercialization.

As a result, digital transformations proceed only in pockets, offering glimpses of promise but failing to impel broader changes. Over time, the mismatch between technological optimism and constrained resources becomes increasingly unsustainable. The system remains weighed down by its old shortcomings, unable to realize the full benefits of innovation. Without targeted funding and deeper ecosystem collaboration, this path risks entrenching disparities and missing critical opportunities to build inclusive, future-ready education systems.



5 Prioritizing the desired scenario

This section stress-tests the shortlisted scenarios against the objectives of the study to assess their potential impacts and alignment. Using this assessment, a desired scenario is identified and analysed, offering a shared vision to guide planning and decision-making.



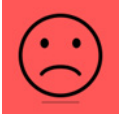
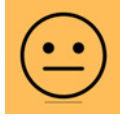
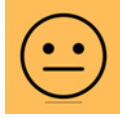
5.1 The desired scenario

Stress-testing strategic objectives in different scenarios

To assess their alignment with the core objectives of the foresight study to prioritize the desired future outcome, the four scenarios were mapped against the intended outcomes of the research and stress-tested.

In the table on this page, a smiling-face emoji indicates a positive impact on an objective, a straight-face emoji indicates a neutral impact, and a sad-face emoji indicates a negative impact. The comparison shows that while each scenario has distinct strengths and weaknesses, one clearly emerges as the most desirable future, demonstrating strong alignment across all four objectives.

Table 3: Stress-testing the shortlisted scenarios against the objectives of the foresight study

Objective / Scenario	Objective 1: Inclusive learning	Objective 2: Future-ready skills	Objective 3: Responsible tech integration	Objective 4: Global education access
Underutilized potential despite available funding				
Revolutionizing education by utilizing technology and adequate funding				
Stagnation due to inadequate funding and technology barriers				
Tech-driven limited progress amidst inadequate funding				

5.2 Enablers of the desired scenario

Factors that make revolutionizing education by utilizing technology and adequate funding the desired scenario

Alignment with industry demands: Education systems equip learners with future-ready skills that match the needs of the labour market, driving investment, raising wages, and lifting overall living standards. This builds confidence in education as a pathway to economic mobility.

Universal, borderless access: A robust digital infrastructure ensures that quality education reaches all learners, regardless of location. This broadens knowledge bases, unlocks hidden talent, and fosters more equitable, educated communities.

AI-powered personalized learning: Intelligent platforms deliver tailored, engaging educational journeys that adapt to the strengths and needs of individuals. This deepens understanding, improves retention, and makes learning more enjoyable and effective.

Reduced inequalities and stress: Digital transformations tackle structural biases in education, increasing fairness and reducing the anxieties and barriers that often burden underrepresented or disadvantaged learners.

Affordable, scalable quality: Tech-driven delivery models lower the costs of high-quality education, making advanced learning affordable and widely accessible, and removing the traditional constraints connected to geography or income.

Real-world industry expertise: Stronger partnerships between academia and industry integrate practitioners directly into the delivery of education, ensuring that curricula remain relevant, applied, and responsive to dynamic market shifts.

Secure digital foundations: A focus on cybersecurity increases trust in expansive digital-learning ecosystems, protecting data and systems from attacks that could otherwise disrupt educational continuity.

Sustainable, collaborative transformations: Long-term success depends on consistent funding, expertise, and cross-sectoral collaboration. These foundations ensure that any digital transformation is resilient, inclusive, and capable of addressing future challenges.

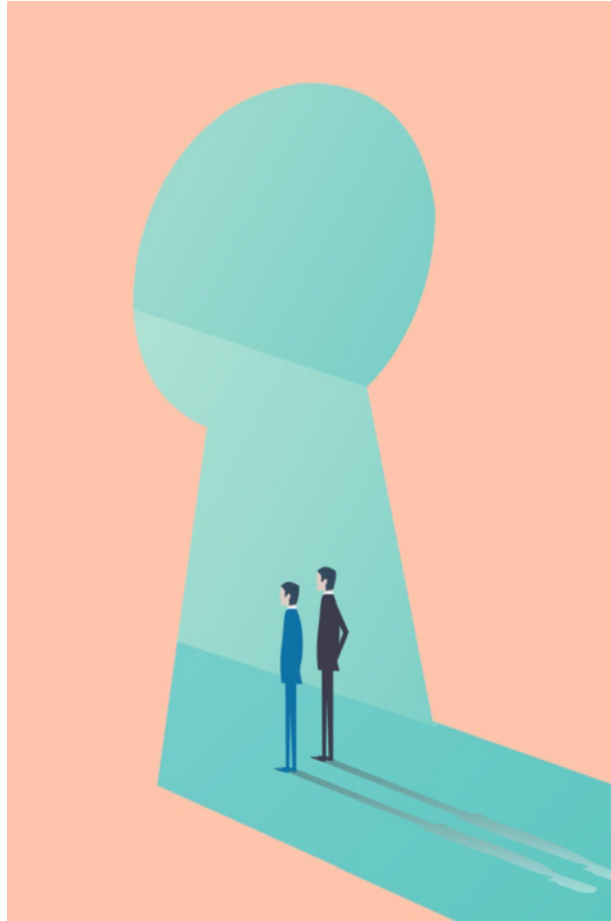


6 Actioning the desired future

Shaping the future

This section marks the transition from foresight to strategy by translating the desired future into reality through an actionable agenda. It outlines the key interventions and strategic priorities needed to close the gap between the present conditions and the desired future.

A preliminary roadmap grounded in a shared understanding of stakeholder roles, the order of actions to be taken, and areas for coordination has been developed to guide implementation, setting the direction for proactive and inclusive changes in existing systems.

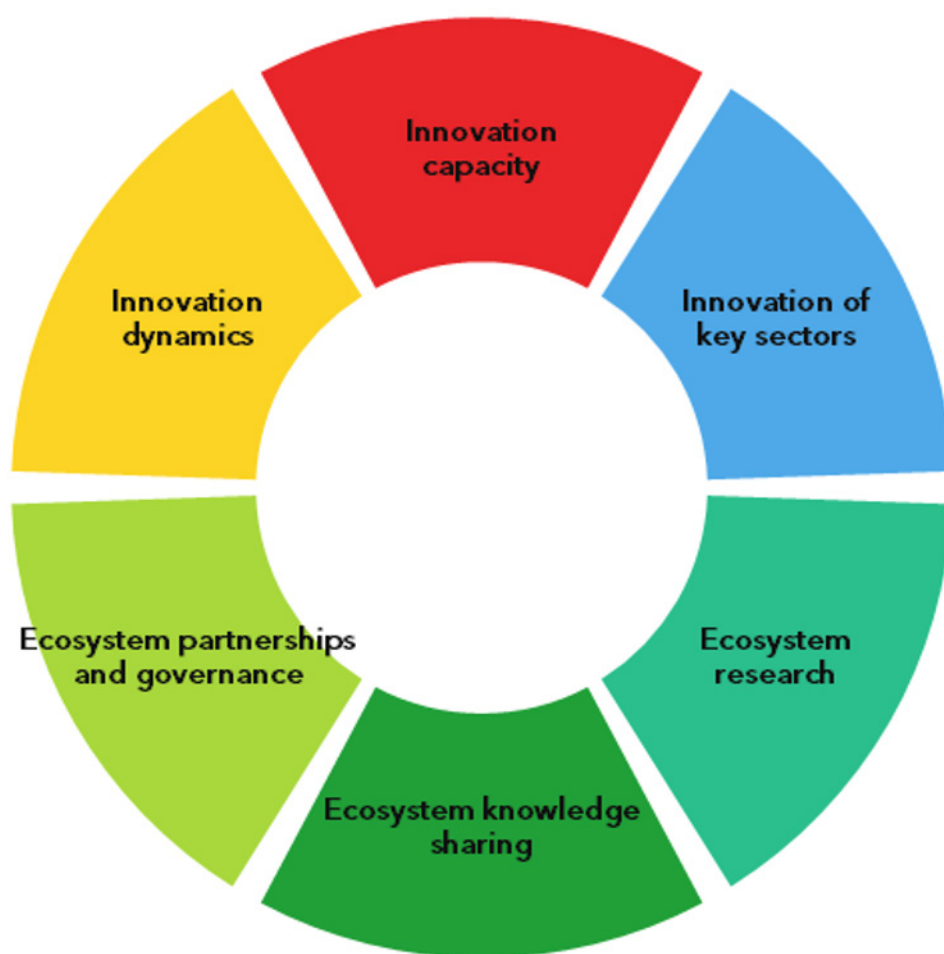


6.1 A roadmap to maturity

Building blocks of innovation-led growth

The recommendations are structured around six pillars that together provide a coherent roadmap for connected, inclusive, and sustainable economic growth powered by innovation. The first three pillars of innovation dynamics, innovation capacity, and innovation of key sectors provide the foundation for building the ecosystem, while the other three pillars of ecosystem research, ecosystem knowledge sharing, and ecosystem partnerships and governance play critical roles in leading the ecosystem towards maturity.

Figure 4: Six pillars of an integrated framework for action



Source: ITU

Together, these pillars form an integrated framework for action, although the pathways to implementation will naturally differ across countries. Domestic ecosystems vary when it comes to institutional readiness, resource availability, technological maturity, and governance capacity. As a result, governments and stakeholders may prioritize recommendations depending on local conditions while still moving in the collective long-term direction set out in this study. The roadmap is therefore not meant to be linear or prescriptive. Rather, countries are encouraged to adapt and sequence actions in ways that best fit their domestic context, identifying appropriate champions across government, industry, finance, academia, support networks, and civil society.

6.2 Actions to drive future-ready education ecosystems

To translate the desired vision into tangible outcomes, the following roadmap is proposed. It encompasses a comprehensive set of interventions involving policy, capacity development, market activation, research, knowledge sharing, and collaboration, ensuring a coordinated and systemic approach to implementation.

Table 4: Proposed roadmap to realize the desired vision

Innovation dynamics (ID)	Innovation capacity (IC)	Innovation of key sectors (IKS)
<i>Policies and strategies that advance secure, inclusive, and affordable access to digital education</i>	<i>Actions that build skills, strengthen infrastructure, and expand access to tools and connectivity for effective digital education</i>	<i>Actions that drive innovation in the education sector by boosting enterprise competitiveness</i>
ID1: Develop policies that address privacy, security, and plagiarism in digital education.	IC1: Establish hubs for digital pedagogy, AI ethics, and XR tools that train educators and system leaders, building long-term local talent pools.	IKS1: Prioritize the creation of relevant educational content and course materials for the digital platform.
ID2: Implement regulations to close the digital divide and ensure meaningful, reliable, affordable, and trustworthy broadband access.	IC2: Arrange practical training opportunities, both domestically and internationally, to establish best practices, and train and hire academic and technical staff to ensure continuous support and system maintenance.	IKS2: Support platforms based on information and communication technologies that enable the seamless delivery of educational content.
ID3: Introduce guidelines to handle digital addiction and academic integrity.	ID3: Enhance network readiness (including internet exchange points and local traffic engineering) to support large-scale digital education.	IKS3: Encourage public-private partnerships for funding digital education solutions and scaling innovative models.
ID4: Introduce tax exemptions and preferential rates for educational services and companies that provide education technologies to make digital learning more affordable.	ID4: Equip underserved areas with affordable devices and reliable connectivity.	IKS4: Pilot industry-academia partnerships to co-create micro-credentials and applied learning modules.
ID5: Create national guidelines on AI ethics in education that are in line with global accords, safeguarding privacy, fairness, and non-discrimination.	ID5: Introduce digital well-being modules to help learners manage screen time and digital stress.	IKS5: Pilot sandbox environments for EdTech startups to test AI tutors, XR labs, and adaptive assessments with regulatory oversight.

Ecosystem research (ER) <i>Actions and platforms that generate insights and advance research and development to strengthen educational technologies and promote inclusivity</i>	Ecosystem knowledge sharing (EKS) <i>Actions and platforms that exchange findings, share best practices, and build global networks to accelerate innovation in education</i>	Ecosystem partnerships and governance (EPG) <i>Mechanisms that strengthen governance, foster partnerships, and secure resources to strengthen education</i>
ER1: Invest in research and development for AI-driven course materials, XR, and learning management systems.	EKS1: Enable global knowledge exchanges to share insights on ecosystem management.	EPG1: Establish a multi-stakeholder Global Advisory Committee on ICT for Education with ITU and UNESCO.
ER2: Promote open access platforms and localized user interfaces for global reach.	EKS2: Build global observatories to track the impacts of educational technologies, sharing lessons on what works across regions.	EPG2: Establish national inter-ministerial digital education task forces (e.g. ministries of education, ICT, finance, and labour) to avoid fragmented approaches and align digital transformations with industrial, labour, and social protection policies.
ER3: Develop educational technologies and platforms that support multiple languages for broader accessibility.	EKS3: Share best practices on privacy, security, and digital education platforms.	EPG3: Establish dedicated offices and teams to manage cybersecurity and ensure robust governance structures for accountability.
ER4: Engage in collaborative research and development to innovate and refine educational tools.	EKS4: Establish participatory curriculum forums involving industry players, civil society, and young people to keep skill frameworks relevant.	EPG4: Ensure that supportive mechanisms and structures are in place for the efficient management of transformation roadmaps and accountability.
ER6: Establish public grants for research into the long-term outcomes of digital education and emerging technologies on education, especially for marginalized groups.		



7 Managing the ecosystem

This section outlines structured mechanisms for providing guidance, supporting implementation, activating inclusive platforms, and enabling strategic partnerships and communication pathways, ensuring that the roadmap remains responsive, relevant, and ecosystem-driven over time.



7.1 Strength in stakeholder collaboration

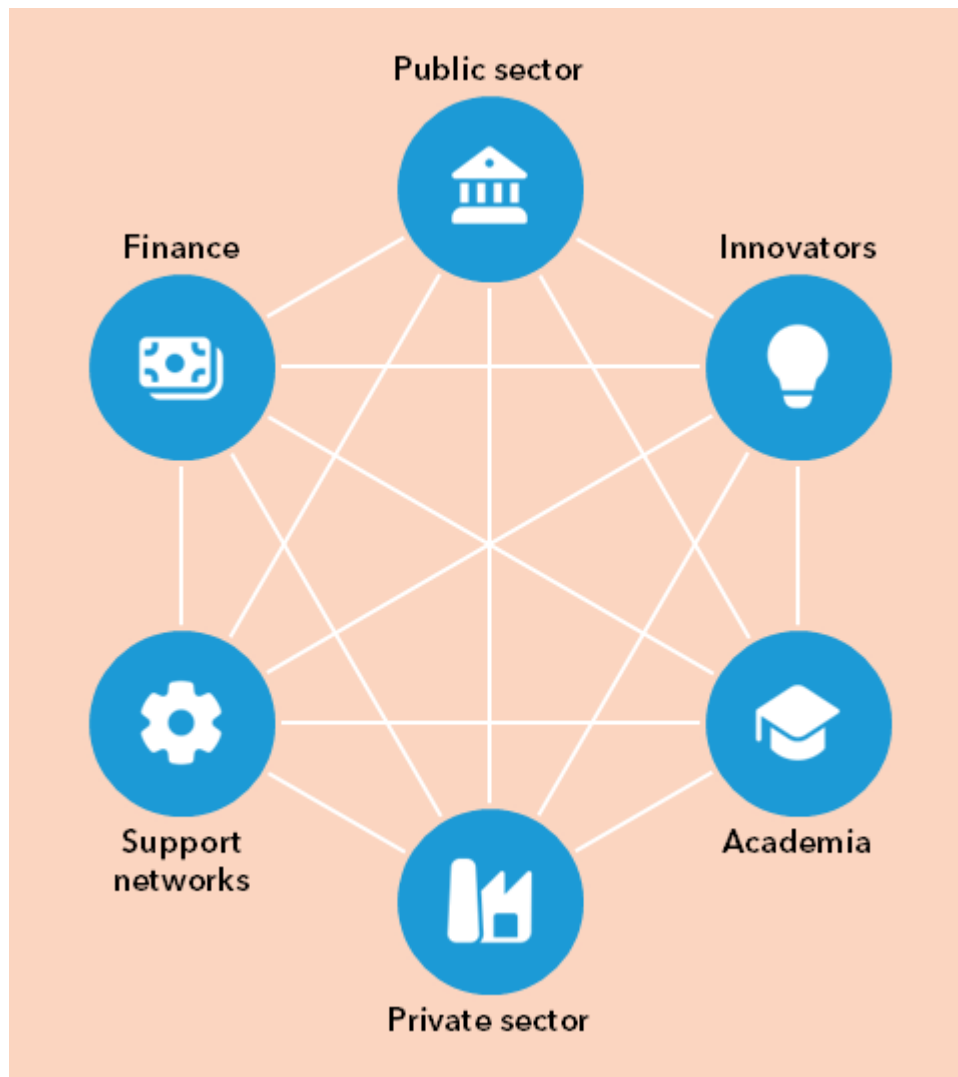
Mechanisms to align strengths and build a resilient ecosystem

Translating recommendations into lasting results requires a system in which diverse stakeholders not only participate but actively co-create, implement, and champion transformation. The interconnected roles of key stakeholder groups provide the foundation for the kind of thriving ecosystem required to revolutionize the education landscape. Public institutions provide the policy frameworks, governance structures, and long-term stewardship that anchor national efforts and align them with societal priorities. The private sector and financial institutions drive innovation and investment, delivering scalable solutions and mobilizing capital to extend reach and impact. Academia and research bodies contribute evidence, expertise, and talent pipelines, ensuring approaches are rigorous, relevant, and future-focused. Civil society and entrepreneurial support networks amplify local needs, strengthen capacities, and advocate for inclusion. Innovators and entrepreneurs transform opportunities into practical products, services, and learning models that respond dynamically to emerging challenges and opportunities.

In a rapidly changing world, education must evolve into a future-ready, digitally enabled system that equips all learners with the skills, knowledge, and values needed to drive sustainable development, break cycles of poverty, reduce inequalities, and encourage sustainable lifestyles. Such transformations depend on reliable, affordable, and ubiquitous networks, platforms, and services to form the essential infrastructure for delivering innovative, inclusive, and resilient digital learning experiences that can be co-created, implemented, and championed by all stakeholders in the ecosystem.

Driving such an ambitious agenda requires more than transactional engagement. It demands deliberate platforms and processes that bring stakeholders together, foster meaningful collaboration, ensure diverse perspectives, shape decision-making, and embed trust at every level. In education, this approach enables the ecosystem to adapt to emerging technologies, respond to shifting societal needs, and align with global trends, supporting the development of a digitally transformed, inclusive, and future-ready education landscape.

Figure 5: A well-connected ecosystem



Source: ITU

7.2 Activating implementation mechanisms

Building processes and platforms for meaningful collaboration

Delivering on a shared vision requires not just defined roles, but also structured mechanisms that enable stakeholders to collaborate effectively over time. Platforms for engagement, transparent governance arrangements, catalytic partnerships, and open communication channels are essential to translate strategic intent into coordinated action. By institutionalizing inclusive

processes and feedback loops, ecosystems can sustain momentum, strengthen trust, and ensure that implementation remains adaptive, accountable, and aligned with long-term objectives.

Table 5: Platforms and structured mechanisms for stakeholder collaboration

CHAMPIONS FOR SHARED OWNERSHIP		
Revolutionizing education worldwide requires mobilizing influential champions to coordinate, fund, and sustain transformation efforts. Priority stakeholders include ministries of education and information and communication technologies (ICT), or other relevant government bodies; technology providers, and technical support agencies. Education ministries should secure funding, align stakeholders, and foster cohesive ecosystems, while ICT ministries should establish clear policies and regulatory frameworks for affordable, scalable, and reliable connectivity in collaboration with service providers, educators, and students. Technology providers should deliver transparent, user-friendly innovations, using pilot programmes to build trust. Technical support agencies must have the skilled personnel, tools, and resources to ensure operational continuity, along with defined service standards. Overall, champions should keep ecosystems connected, informed, and committed.		
GOVERNANCE FOR TRUST AND ACCOUNTABILITY	PARTNERSHIPS FOR CATALYTIC ENGAGEMENT	COMMUNITY FOR SHARED LEARNING
A strong governance framework provides the strategic direction, authority, and accountability needed to help transform an education system. Based on an adaptive, multi-stakeholder approach, it should ensure inclusive participation by ministries, regulators, funding bodies, industry players, and educators. The governance body, which has a clear legal mandate, should operate transparently, uphold equity, and reflect local priorities, while acting in line with global standards. Clearly defined structures and processes enable coherent decision-making, policy harmonization, resource allocation, and progress monitoring. Regular meetings, transparency, and stakeholder engagement build legitimacy, align strategies, and ensure resilient, future-ready education systems.	No single stakeholder alone can deliver systemic change. Strategic partnerships between the public and private sectors, startups, academia, civil society, and domestic and international donors are essential to mobilize resources, pool expertise, and drive innovation. A collaboratively developed partnership strategy should set a shared vision, define roles and responsibilities, align incentives, and create mutual value to ensure efforts are mutually reinforcing, scalable, and locally relevant. Targets can include expanding connectivity, developing scalable platforms, and introducing inclusive course materials. Mechanisms such as public-private partnerships, joint pilot projects, and co-funded research can strengthen ecosystem capacity and accelerate progress towards the desired future.	A vibrant, inclusive community is essential to sustain momentum. Such a community should connect educators, tutors, learners, guardians, policy-makers, technical experts, industry players, and civil society to share experiences, exchange guidance, and showcase domestic and international best practices. Structured platforms such as online forums, peer-learning circles, workshops, and events enable stakeholders at all levels to contribute insights and feedback, keeping solutions relevant and user-focused. Organizing members, identifying needs, and defining mutual values fosters trust and collaboration, ensuring that knowledge flows in all directions and the ecosystem can adapt, innovate, and advance towards inclusive, future-ready learning for all.
COMMUNICATING AND ADVOCATING FOR IMPACT		
A robust communication strategy aligns stakeholders, promotes transparency, and ensures that all actors are informed, engaged, and empowered. This fosters trust and enables diverse voices to contribute meaningfully to the transformation of education systems. The strategy should convey a clear vision, celebrate milestones, address concerns proactively, and maintain feedback loops for long-term success. Messages should highlight cooperation among stakeholders, the role of digital transformations in enabling sustainable development, and the importance of equitable access. Channels may include internal platforms, targeted events, and direct partner engagement, with tailored, consistent messaging that amplifies success stories, strengthens support, and builds the momentum necessary to have a long-term impact. Co-designing this strategy with stakeholders would ensure relevance, inclusivity, and a unified voice across the ecosystem.		



Annex

Global best practices

National Digital Education Architecture (Republic of India)

This architecture integrates privacy, cybersecurity, ethical AI, multilingual content, and affordability into a unified digital framework. It bridges the digital divide through inclusive policies and incentivizes the development of domestic education technology (EdTech) through tax measures and transparent procurement. This approach strengthens governance and drives equitable, secure digital transformations at scale, positioning India as a model for comprehensive policy-led innovation.

Human Capital Initiative (Ireland)

Ireland funds universities to develop micro-credentials and blended programmes tied to industry needs. It enhances educator training, builds digital pedagogy hubs, improves network infrastructure, and ensures device access in rural areas. By increasing the capabilities of technical staff and leadership, this initiative gives education systems the tools to adopt emerging technologies effectively, making education more resilient and more closely aligned with the evolving needs of labour markets.

Smart Classrooms and EdTech public-private partnerships (Republic of Rwanda)

The Smart Classrooms initiative uses public-private partnerships to develop local course materials, co-create micro-credentials with industry players, and pilot adaptive EdTech tools. Transparent procurement processes expand domestic markets, embedding quality and relevance. This approach ensures that digital education is not imported wholesale but built through local collaboration, driving competitiveness and making learning more tailored, inclusive, and future-focused.

National Technological Initiative (Russian Federation)

This initiative funds research on AI-driven learning, multilingual XR, and LMS innovations. It also provides grants for studying their long-term impacts on education, and advances open-access platforms and detailed ecosystem maps to guide strategic investment. This coordinated, research-rich approach strengthens evidence-based policy, ensures inclusivity, and accelerates the evolution of EdTech.

Dubai Future Accelerators and Global Teacher Exchange (United Arab Emirates)

Dubai combines global accelerators with teacher exchanges to bring international insights into local classrooms. It builds networks for EdTech research and development and pilots the recognition of micro-credentials nationally. By sharing lessons on privacy, security, and curricula regionally, this initiative deepens collaboration and ensures that digital transformations utilize collective learning and the implementation of global educational norms.

Broadband Commission Working Group on School Connectivity (Global)

This ITU-UNESCO platform unites ministries, industry, civil society, and young people to shape policy, embed cybersecurity governance, and structure national advisory councils. It integrates education with economic and labour strategies, preventing fragmentation. By fostering shared standards and partnerships, it ensures the resources and accountability required to build robust systems that can sustain inclusive digital transformations on a global scale.

SkillsFuture (Republic of Singapore)

The SkillsFuture programme builds local capacity by funding modular courses, micro-credentials, and tailored upskilling tied to industry needs. It includes leadership and pedagogy hubs to train principals and curriculum experts on emerging technologies, ensuring that they oversee their effective adoption. Grants support institutions to embed AI ethics, XR, and robust digital delivery, while comprehensive data systems track outcomes and help refine policy. This unified strategy aims to build a future-ready workforce, strengthen institutional ecosystems, and embed digital transformations at all levels, helping Singapore remain a frontrunner in aligning education with economic growth.

Glossary

Term	Definition
Desired scenario	The most desirable future outcome, based on stakeholder values, aspirations, and strategic priorities.
Digital education	The use of digital tools, platforms, and technologies to support, enhance, or deliver teaching and learning.
Drivers	The key forces or underlying factors that influence or shape change within a system. Drivers may be internal or external, and they can feature economic, technological, political, environmental, or social aspects. They often interact and evolve over time, shaping future scenarios.
Education landscape	The overall structure and dynamics of education systems, including institutions, policies, practices, and technologies.
Foresight	A structured approach to exploring possible futures by identifying trends, drivers, uncertainties, and opportunities to inform long-term decision-making and strategy.
Futures thinking	The mindset and practice of considering multiple plausible futures to anticipate change and guide proactive action in the present.
Innovation ecosystem	A dynamic network of institutions, stakeholders, policies, and technologies that collectively enable innovation, collaboration, and systemic transformation.
Scenario	A narrative or model that describes a plausible future state based on drivers and uncertainties.
Signals	Early indicators or weak signs of change that may point to emerging trends, disruptions, or innovations in their early stages.
Stakeholder engagement	A participatory process of involving key actors in shaping decisions, aligning efforts, and ensuring the shared ownership of outcomes.
Transformation pathways	Strategic routes or sequences of actions taken to move from current conditions towards a preferred future scenario.
Trends	Patterns of change that have already gained momentum and may continue to shape the future over time.
Weak signals	Early signs of potentially important changes that are not yet widely recognized or understood. Weak signals may indicate the emergence of new trends, disruptions, or innovations, and they are often detected on the margins of mainstream awareness.
Wildcards	Low-probability, high-impact events or developments that could significantly disrupt current trajectories.

References

- 360iResearch (2026), *Edutainment market – Global Forecast 2026-2032*. https://www.researchandmarkets.com/report/edutainment?srsltid=AfmBOopGvxkm_RkCiO7eWt2TucKwioalyaWVxHZzdThMBj0m9zWSTcCw
- Emergen Research (2023), "Edutainment Market Size Worth USD 28.04 billion in 2032". <https://www.globenewswire.com/news-release/2023/11/23/2785270/0/en/Edutainment-Market-Size-Worth-USD-28-04-Billion-in-2032-Emergen-Research.html>
- Faculty Center for Teaching and Learning at the University of Maryland, Baltimore, "Virtual Reality (VR)". <https://www.umaryland.edu/fctl/resources/technology/emerging-trends/virtual-reality-vr/>
- Giraldo, Juan-Pablo; Jenkins, Robert; and Tungatarova, Auken (2022), "The case for edutainment: Rethinking how we can enable multiple pathways to learning for all children". UN International Children's Emergency Fund. <https://www.unicef.org/blog/edutainment-multiple-pathways-learning>
- Global Education Monitoring Report Team (2023), *Technology in education: A tool on whose terms?* UN Educational, Scientific and Cultural Organization. <https://unesdoc.unesco.org/ark:/48223/pf0000385723>
- ITU (2023), *Playbook on strategic foresight: A practical guide for digital development*. <https://www.itu.int/en/ITU-D/Innovation/Pages/Publications.aspx>
- ITU (2023), "Population of global offline continues steady decline to 2.6 billion people in 2023". <https://www.itu.int/en/mediacentre/Pages/PR-2023-09-12-universal-and-meaningful-connectivity-by-2030.aspx>
- Knowledge Sourcing Intelligence LLP (2024), *Online Education Market – Forecasts from 2025 to 2030*. <https://www.researchandmarkets.com/reports/5978060/online-education-market-forecasts>
- McKinsey & Company (2022), *The future of education in a hybrid world*. <https://www.mckinsey.com/industries/education/our-insights/the-future-of-education-in-a-hybrid-world>
- Mordor Intelligence (2024), "Extended reality (XR) market - Growth, trends, COVID-19 impact, and forecasts (2024-2029)". <https://www.mordorintelligence.com/industry-reports/extended-reality-xr-market>
- Nuñez, Roland (2022), "What is edutainment? The past, present, and future of this innovative framework". Nuñez Enterprise. <https://www.nunezenterprise.com/post/what-is-edutainment-the-past-present-and-future-of-this-innovative-framework>
- Organisation for Economic Co-operation and Development (2022), *AI and the Future of Skills, Volume 1: Capabilities and Assessments*. https://www.oecd.org/en/publications/ai-and-the-future-of-skills-volume-1_5ee71f34-en.html
- Organisation for Economic Co-operation and Development (2012), *Education at a Glance 2012 Highlights*. https://www.oecd.org/content/dam/oecd/en/publications/reports/2012/09/education-at-a-glance-2012_g1g1fa8b/eag_highlights-2012-en.pdf
- Organisation for Economic Co-operation and Development, "Education financing". <https://www.oecd.org/en/topics/policy-issues/education-financing.html>
- United Nations, "Sustainable Development Goals". <https://sdgs.un.org/>
- Venable, Melissa A (2025), *Online Education Trends Report*. <https://www.bestcolleges.com/research/annual-trends-in-online-education/>
- Winthrop, Rebecca, and Vegas, E (2020), "Education technology: The promise and the risks". Brookings Institution. <https://www.brookings.edu/articles/education-technology-the-promise-and-the-risk/>

- World Economic Forum (2025), *Future of Jobs Report 2025*. <https://www.weforum.org/publications/the-future-of-jobs-report-2025/digest/>

Office of the Director
International Telecommunication Union (ITU)
Telecommunication Development Bureau (BDT)
Place des Nations
CH-1211 Geneva 20
Switzerland

Email: bdtdirector@itu.int
Tel.: +41 22 730 5035/5435

Office of the Deputy Director
Operations Coordination Department (DDR)
Place des Nations
CH-1211 Geneva 20
Switzerland

Email: bdtdeputydir@itu.int
Tel.: +41 22 730 5131

**Digital Networks and Environment
Department (DNE)**

Email: bdt-dne@itu.int
Tel.: +41 22 730 5421

**Digital Knowledge Society
Department (DKS)**

Email: bdt-dks@itu.int
Tel.: +41 22 730 5900

**Projects, Partnerships and Digital
Skills Department (PPS)**

Email: bdt-pps@itu.int
Tel.: +41 22 730 5447

Africa

Ethiopia

**International Telecommunication
Union (ITU) Regional Office**
Gambia Road
Leghar Ethio Telecom Bldg. 3rd floor
P.O. Box 60 005
Addis Ababa
Ethiopia

Email: itu-ro-africa@itu.int
Tel.: +251 11 551 4977
Tel.: +251 11 551 4855
Tel.: +251 11 551 8328
Fax: +251 11 551 7299

Cameroon

**Union internationale des
télécommunications (UIT)**
Bureau de zone
Immeuble CAMPOST, 3^e étage
Boulevard du 20 mai
Boîte postale 11017
Yaoundé
Cameroon

Email: itu-yaounde@itu.int
Tel.: +237 22 22 9292
Tel.: +237 22 22 9291
Fax: +237 22 22 9297

Senegal

**Union internationale des
télécommunications (UIT)**
Bureau de zone
8, Route du Méridien Président
Immeuble Rokhaya, 3^e étage
Boîte postale 29471
Dakar - Yoff
Senegal

Email: itu-dakar@itu.int
Tel.: +221 33 859 7010
Tel.: +221 33 859 7021
Fax: +221 33 868 6386

Zimbabwe

**International Telecommunication
Union (ITU) Area Office**
USAF POTRAZ Building
877 Endeavour Crescent
Mount Pleasant Business Park
Harare
Zimbabwe

Email: itu-harare@itu.int
Tel.: +263 242 369015
Tel.: +263 242 369016

Americas

Brazil

**União Internacional de
Telecomunicações (UIT)**
Escritório Regional
SAUS Quadra 6 Ed. Luis Eduardo
Magalhães,
Bloco "E", 10^o andar, Ala Sul
(Anatel)
CEP 70070-940 Brasília - DF
Brazil

Email: itubrasilia@itu.int
Tel.: +55 61 2312 2730-1
Tel.: +55 61 2312 2733-5
Fax: +55 61 2312 2738

Barbados

**International Telecommunication
Union (ITU) Area Office**
United Nations House
Marine Gardens
Hastings, Christ Church
P.O. Box 1047
Bridgetown
Barbados

Email: itubridgetown@itu.int
Tel.: +1 246 431 0343
Fax: +1 246 437 7403

Chile

**Unión Internacional de
Telecomunicaciones (UIT)**
Oficina de Representación de Área
Merced 753, Piso 4
Santiago de Chile
Chile

Email: itusantiago@itu.int
Tel.: +56 2 632 6134/6147
Fax: +56 2 632 6154

Honduras

**Unión Internacional de
Telecomunicaciones (UIT)**
Oficina de Representación de Área
Colonia Altos de Miramontes
Calle principal, Edificio No. 1583
Frente a Santos y Cia
Apartado Postal 976
Tegucigalpa
Honduras

Email: itutegucigalpa@itu.int
Tel.: +504 2235 5470
Fax: +504 2235 5471

Arab States

Egypt

**International Telecommunication
Union (ITU) Regional Office**
Smart Village, Building B 147,
3rd floor
Km 28 Cairo
Alexandria Desert Road
Giza Governorate
Cairo
Egypt

Email: itu-ro-arabstates@itu.int
Tel.: +202 3537 1777
Fax: +202 3537 1888

Asia-Pacific

Thailand

**International Telecommunication
Union (ITU) Regional Office**
4th floor NBTC Region 1 Building
101 Chaengwattana Road
Laksi,
Bangkok 10210,
Thailand

Email: itu-ro-asiapacific@itu.int
Tel.: +66 2 575 0055

Indonesia

**International Telecommunication
Union (ITU) Area Office**
Gedung Sapta Pesona
13th floor
Jalan Medan Merdeka Barat No. 17
Jakarta 10110
Indonesia

Email: bdt-ao-jakarta@itu.int
Tel.: +62 21 380 2322

India

**International Telecommunication
Union (ITU) Area Office and Innovation
Centre**
C-DOT Campus
Mandi Road
Chhatarpur, Mehrauli
New Delhi 110030
India

Email: itu-ao-southasia@itu.int
Area Office: itu-ao-southasia@itu.int
Innovation
Centre: itu-ic-southasia@itu.int
Website: ITU Innovation Centre in
New Delhi, India

CIS

Russian Federation
**International Telecommunication
Union (ITU) Regional Office**
4, Building 1
Sergiy Radonezhsky Str.
Moscow 105120
Russian Federation
Email: itu-ro-cis@itu.int
Tel.: +7 495 926 6070

Europe

Switzerland

**International Telecommunication
Union (ITU) Office for Europe**
Place des Nations
CH-1211 Geneva 20
Switzerland

Email: euregion@itu.int
Tel.: +41 22 730 5467

International Telecommunication Union
Telecommunication Development Bureau
Place des Nations
CH-1211 Geneva 20
Switzerland

ISBN 978-92-61-42641-5



Published in Switzerland
Geneva, 2026

Photo credit: Adobe Stock