LANDSCAPE OF THE DIGITAL ECONOMY AND SOCIETY

FUTURE PARAMETERS OF THE DIGITAL WORLD AND STRATEGIC AREAS OF ACTION TO FOSTER TRUST AND RESPONSIBILITY
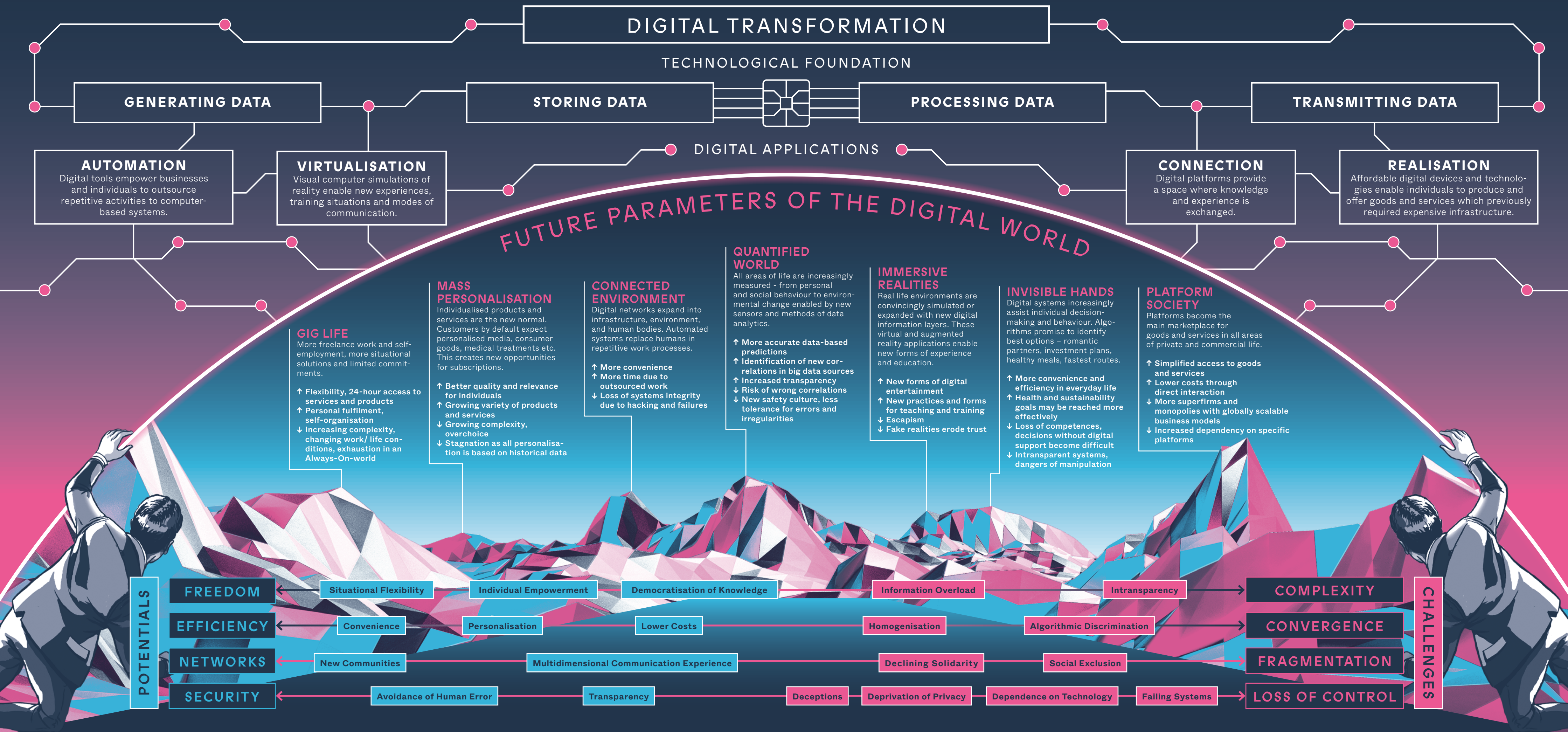
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THINK TANK FOR BUSINESS, SCIENCE AND SOCIETY

SWISS DIGITAL INITIATIVE

LANDSCAPE OF THE DIGITAL ECONOMY AND SOCIETY

DIGITAL TRANSFORMATION

TECHNOLOGICAL FOUNDATION

GENERATING DATA

STORING DATA

PROCESSING DATA

TRANSMITTING DATA

DIGITAL APPLICATIONS

AUTOMATION
Digital tools empower businesses and individuals to outsource repetitive activities to computer-based systems.

VIRTUALISATION
Visual computer simulations of reality enable new experiences, training situations and modes of communication.

CONNECTION
Digital platforms provide a space where knowledge and experience is exchanged.

REALISATION
Affordable digital devices and technologies enable individuals to produce and offer goods and services which previously required expensive infrastructure.

FUTURE PARAMETERS OF THE DIGITAL WORLD

GIG LIFE
More freelance work and self-employment, more situational solutions and limited commitments.

↑ Flexibility, 24-hour access to services and products
↑ Personal fulfilment, self-organisation
↓ Increasing complexity, changing work/ life conditions, exhaustion in an Always-On-world

MASS PERSONALISATION
Individualised products and services are the new normal. Customers by default expect personalised media, consumer goods, medical treatments etc. This creates new opportunities for subscriptions.

↑ Better quality and relevance for individuals
↑ Growing variety of products and services
↓ Growing complexity, overchoice
↓ Stagnation as all personalisation is based on historical data

CONNECTED ENVIRONMENT
Digital networks expand into infrastructure, environment, and human bodies. Automated systems replace humans in repetitive work processes.

↑ More convenience
↑ More time due to outsourced work
↓ Loss of systems integrity due to hacking and failures

QUANTIFIED WORLD
All areas of life are increasingly measured - from personal and social behaviour to environmental change enabled by new sensors and methods of data analytics.

↑ More accurate data-based predictions
↑ Identification of new correlations in big data sources
↑ Increased transparency
↓ Risk of wrong correlations
↓ New safety culture, less tolerance for errors and irregularities

IMMERSIVE REALITIES
Real life environments are convincingly simulated or expanded with new digital information layers. These virtual and augmented reality applications enable new forms of experience and education.

↑ New forms of digital entertainment
↑ New practices and forms for teaching and training
↓ Escapism
↓ Fake realities erode trust

INVISIBLE HANDS
Digital systems increasingly assist individual decision-making and behaviour. Algorithms promise to identify best options – romantic partners, investment plans, healthy meals, fastest routes.

↑ More convenience and efficiency in everyday life
↑ Health and sustainability goals may be reached more effectively
↓ Loss of competences, decisions without digital support become difficult
↓ Intransparent systems, dangers of manipulation

PLATFORM SOCIETY
Platforms become the main marketplace for goods and services in all areas of private and commercial life.

↑ Simplified access to goods and services
↑ Lower costs through direct interaction
↓ More superfirms and monopolies with globally scalable business models
↓ Increased dependency on specific platforms

POTENTIALS				CHALLENGES
FREEDOM	Situational Flexibility	Individual Empowerment	Democratisation of Knowledge	Information Overload	Intransparency	**COMPLEXITY**
EFFICIENCY	Convenience	Personalisation	Lower Costs	Homogenisation	Algorithmic Discrimination	**CONVERGENCE**
NETWORKS	New Communities	Multidimensional Communication Experience	Declining Solidarity	Social Exclusion	**FRAGMENTATION**
SECURITY	Avoidance of Human Error	Transparency	Deceptions	Deprivation of Privacy	Dependence on Technology	Failing Systems	**LOSS OF CONTROL**

GUIDING PRINCIPLES SWISS DIGITAL INITIATIVE*

INCLUSIVENESS
Commit to a participatory and inclusive process open to all relevant and interested stakeholders.

AWARENESS
Take into account other relevant initiatives and research projects within the sphere of digital ethics.

TRANSPARENCY
Guarantee transparent communication with stakeholders and the public.

AGILITY
Ensure flexibility and agility to allow for experimentation and innovation, balancing benefits with risks.

RESPONSIVENESS
Enable appropriate responses to emerging dangers unforeseen during the development of new digital processes.

SUSTAINABILITY
Strive for a minimised impact on resources.

BENEVOLENCE
Put people's rights and needs (as enshrined in principles such as autonomy and fairness) at the heart of progress.

ACCOUNTABILITY
Commit to acting responsibly and in accordance with applicable data protections laws.

STRATEGIC AREAS OF ACTION TO FOSTER TRUST AND RESPONSIBILITY

INITIATE ETHICS DIALOGUE
Foster public debate and identify future challenges at an early stage in order to establish a long-term perspective on the ethical and societal challenges in the digital age.

PREPARE FOR A DATA-BASED ECONOMY
Develop a framework for a society that uses data as currency, create a differentiated model to distinguish private from public data.

DEVELOP GLOBAL FRAMEWORKS
Establish ethical guidelines and international trust labels for private companies and government services.

FOSTER DIGITAL SKILLS
Identify and develop digital competences, raise data awareness, debate the political and societal value of privacy.

ADAPT SOCIAL SECURITY
Enhance existing social security systems to make them future-proof and investigate the taxation potentials for digital platforms and highly automated industries.

MANAGE DIGITAL RISKS
Protect critical infrastructure from cyber-attacks, minimise dependence on ethically non-committed digital players.

WARRANT INDEPENDENT DECISION-MAKING
Safeguard democratic-decision processes from manipulation or censorship and define the conditions for neuro-technological applications.

*These principles were drawn upon the basis of contributions by renowned experts from Swiss universities and international guidelines.

TOWARDS A DIGITAL SOCIETY

SHAPING THE FUTURE – ANTICIPATING SOCIETAL CHALLENGES

The digital transformation alters our economic and social realities. It changes how companies conduct business, how governments work and how humans interact.

This process carries great promise to increase productivity and to further the welfare of individuals and societies. But it also presents substantial risks, confronting states, companies and citizens with challenges in the realms of privacy and surveillance, fairness and discrimination, access and intelligibility, autonomy or democratic participation, trust and responsibility.

The digital transformation has ethical implications as it touches upon the norms and standards which our societies and laws agree are good and worth protecting. Private and public institutions must anticipate these challenges by developing ethical standards in order to ensure that digital technologies will benefit humanity and promote welfare.

Forecasting the digital transformation's opportunities and risks is a task for both public and private sectors. The commercial companies who are shaping the future economy increasingly rely on a new and holistic understanding of innovation – an understanding that considers the social and ethical implications of their business models. Such consideration forms the foundation for a sustainable and responsible way of doing business.

In recent years, reactions to digital technologies' social and ethical implications often came too late. Too many companies and regulatory bodies failed to anticipate critical social issues such as privacy breaches from social media, rising real estate prices as a consequence of home-sharing or social security issues in platform-based mobility services.

Today, at the beginning of the next phase of digitalisation, the corporate world is starting to focus on values that go beyond traditional economic shareholder gains. Business leaders are searching for solutions that social or ethical dimensions as part of the business model. Continuous and holistic horizon scanning will become an ever more vital competence for commercial players. Successful companies must anticipate social risks and potentials and develop advanced solutions to challenges caused by the very digital transformation which enables their businesses.

This map demonstrates A) how the application of digital technologies will fuel societal and economic change, B) how seven new parameters will shape the digital society and economy in the forthcoming decade, C) what challenges and potentials accompany this transition, D) which fields of action present themselves to businesses, politics, and civil society. Furthermore, this map recalls the ethical principles governing the work of the Swiss Digital Initiative.

UNDERSTANDING DIGITALISATION – FROM TECHNOLOGY TO VALUES

A forward-looking approach to understanding digitalisation requires a change of perspective. Recent years saw a strong focus on new digital technologies such as the blockchain and artificial intelligence. Today, it is essential to focus on outcomes. The digital transformation's true potential lies in four applications of technology: automation, virtualisation, connection, and realisation.

1. Automation
Digital tools enable businesses and individuals to outsource activities to computer-based systems. Software based on algorithms can perform numerous functions – from remotely controlling home temperatures to operating autonomous vehicles. Robots already carry out selected household chores and increase efficiency in manufacturing.

2. Virtualisation
More potent monitors and processors open up new possibilities for the simulation of reality, either as augmented (AR) or virtual reality (VR). This creates new ways of communication, simplifies navigation, generates new experiences and new forms of entertainment in which real space is reconfigured.

3. Connection
Digital platforms provide a space where knowledge and experience are exchanged, joint projects are developed and financed, existing assets are shared, and resources are distributed. The interlinking of digital devices empowers the "internet of things" as a foundation to use and control infrastructure in the connected world.

4. Realisation
Digital devices have become more affordable and available in recent years, ushering in a democratisation of technology and giving more and more people the ability to produce and offer goods and services – activities which previously required access to expensive infrastructure. This process is set to continue, and affect all areas of production. The advent of 3D printing is set to transform the manufacturing industry with a technology that makes it possible to produce one-off editions of even the most complex objects.

NEW PARAMETERS: OUTLOOK ON THE DATA-DRIVEN WORLD

The digital transformation establishes new normalities in business, politics, science, and society. These normalities are shaped by seven parameters.

1. Gig Life: Private and professional lives become more flexible and sequential. Digital platforms and permanent connectedness promote self-employment, part-time work, and multi-tasking. Commitments and communal structures are increasingly situational. This development has the potential to empower and liberate, but also to increase economic and organisational pressure on individuals.

2. Mass Personalisation: Customised goods and services – individualised according to individual preferences and individual data sets – become the new standard. Customers and citizens grow accustomed to curated content (e.g. entertainment, news, food, medicine). But algorithm-based segmentation such as dynamic pricing may also lead to a restriction of diversity and harbour the risk of discrimination and social fragmentation.

3. Connected Environment: With the spread of powerful sensors and microchips in everyday infrastructure emerges a networked environment. It allows for more autonomous systems and smart infrastructure which respond to user needs. This creates opportunities for new situational business models but also increases the risk of far reaching surveillance and compromised system integrity due to system failure or hacking.

4. Quantified World: Permanent monitoring produces growing amounts of data on individual and collective preferences and behaviour. This may increase transparency, improve personalised services such as medical treatments, and facilitate predictions, e.g. about ecological risks. However, large scale quantification also carries the risk of privacy loss, information asymmetry and surveillance by states or companies.

5. Immersive Realities: Virtual reality applications allow for new experiences, product presentations, and training environments. But hyper-realistic simulations also enable deception through deep fake applications which undermines trust in digital media. The virtual presence of companies in countries where they have no physical representation brings up questions about taxation and the obligation to meet local regulatory requirements.

6. Invisible Hands: Digital systems increasingly assist individual decision-making and behaviour. Algorithms promise to reduce

complexity and identify best options – romantic partners, invest-ment plans, healthy meals, fast routes. These guiding systems increase efficiency and convenience, but also create new digital dependencies, intransparencies, and fuel a loss of competences and autonomy.

7. Platform Society: Digital platforms provide fast and easy access to services and products. They have the potential to strengthen the democratisation of information by providing more and more people with access. But the dominance of platforms may also fur-ther monopolies and so-called "super firms" that rely on globally scalable business models.

BIG PICTURE – LONG TERM CHALLENGES AND POTENTIALS

The digital world's new parameters give rise to a number of poten-tials and challenges in four key dimensions. These risks and oppor-tunities define the environment for public and private institutions in the next decade.

1. Freedom – Complexity
The digital transformation empowers individuals and organi-sations. As the internet creates a connected environment and as everyday life is mapped and organised via platforms, we gain access to more data and make faster, more accurate decisions. Empowered individuals receive tailor-made services, network with others and exchange ideas in real time. They enjoy new experiences in virtual space, create products and services without having to invest a fortune. A flood of new economic, scientific, and cultural goods will lead to a diversification of markets and open niches of growth for small entrepreneurs.

This increase in freedom, however, is accompanied by an overwhelming complexity of choices and options which test our capacity to cope with new options and liberties. Exponential growth of data will produce intransparency – widened by the advent of artificially intelligent neuronal networks whose indistinct solutions are often incomprehensible even to their programmers.

2. Efficiency – Convergence
Autonomous systems increase efficiency in all areas of life and work: mobility, shopping, health care, banking, education etc. While humans will remain responsible for the more complex and sensitive tasks, we still must expect structural changes that will alter job pro-files and require a continuous education, the training of new skills for new jobs. In contrast to earlier industrial revolutions the digital changes affect not merely one educational class, but all levels of education: manufacturing jobs, service and administrative jobs.

With more efficiency, the output of digital systems is also characterised by a higher convergence. Machines and algorithms may outperform humans in accounting tasks, but this means there are fewer opportunities to differentiate. Measuring our behaviour

and implementing this data generates an increasing normalisa-tion. This can contribute to quality, but at the same time prevent innovation that lies outside of the standardised solutions. When applied, this can also lead to discrimination, for example through algorithms that are used in HR processes.

3. Networks – Fragmentation
Digital platforms assist the formation of new communities and new solutions. They help to connect shared interests on a global level or allow to identify new contributors to a value chain. Such new networks may strengthen minority interest groups, facilitate political lobbying, enable self-help structures, and inspire new products and businesses.

However, new communities and particularly algorithm-based profile linking may foster social fragmentation as people with similar interests receive similar information but are walled off from different profiles. Such a circular communication structure holds risks as closed groups undermine the cohesion of the larger society.

4. Security – Loss of Control
Digital technology promises to increase our control over the real world and to make our lives more transparent and secure. Human error is reduced in automated systems, individual decisions are optimised by digital assistants, known terrorists are recognised by facial recognition software. Traffic jams are minimised by vehicles that communicate among themselves, blockchains allow build-ings to exchange energy automatically.

As interests and habits of consumers and citizens are more closely tracked, the risk of data loss and theft and the resulting potential for abuse increase. Moreover, a fundamental ambiguity concerning the ownership of personal data persists: a person's genetic data might reveal a predisposition for a certain illness that might occur at some date in the future, thus calling into question existing insurance models. With the emergence of a digital infra-structure comes the danger of cyber-attacks which threatens the integrity of the system. External powers could assume control over cars, homes, or hospitals.

STRATEGIC AREAS OF ACTION – ETHICAL PRINCIPLES TO FOSTER TRUST & RESPONSIBILITY
The challenges ahead are a call to action for private and public actors.

In its commitment statement discussed at the Swiss Global Digital Summit in Geneva in September 2019, the Swiss Digital Initiative puts forward eight principles governing the definition and implementation of projects pursued by the initiative: Inclu-siveness, awareness, transparency, agility, responsiveness, sus-tainability, benevolence, and accountability. These principles were drawn up on the basis of contributions by experts from Swiss universities and are based on existing international initiatives and guidelines. In particular, the SDI intends to build upon the "key principles of global digital cooperation" highlighted by the Re-

port of the UN Secretary-General's High-level Panel on Digital Cooperation entitled "The Age of Global Interdependence".

Applying these principles to the digital transformation's new parameters and main challenges gives way for seven fields of action.

INITIATE AN OPEN DIALOGUE ON FUTURE SOCIETAL AND ETHICAL CHALLENGES
– Develop early detection and horizon scanning systems to identify future challenges
– Inspire public-private debate on ethical and societal challenges in the digital age
– Establish a long-term perspective on the societal desirability and scope of digitalisation in consultation with all parties concerned

PREPARE FOR A DATA-BASED ECONOMY
– Develop a regulatory framework for data ownership
– Apply guidelines to prevent discrimination and unethical usage of data
– Develop a framework for a society that uses data as currency, create a differentiated model to distinguish private from public data

DEVELOP GLOBAL FRAMEWORKS
– Establish ethical guidelines and international trust labels
– Facilitate international antitrust regulation
– Share successful solutions and benchmarks

FOSTER DIGITAL SKILLS
– Identify and develop future-oriented skills through life-long learning
– Raise data awareness, debate the political and societal value of privacy

ADAPT SOCIAL SECURITY
– Prepare the existing social security system to cope with the digital world
– Investigate the taxation potentials and risks for digital platforms and highly automated industries (robot-taxes)

MANAGE DIGITAL RISKS
– Protect critical infrastructure from cyberattacks with investments in security infrastructure
– Develop regulatory frameworks for the application of (semi-)autonomous weapons
– Minimise dependency on ethically non-committed digital actors

WARRANT INDEPENDENT DECISION-MAKING
– Safeguard democratic decision processes from manipulation or censorship
– Define the conditions for neuro-technological applications

The digital transformation fundamentally changes the frameworks of the economic world – and of our society. Digital applications confront us with numerous benefits – but also with new intransparencies produced by growing amounts of data, with the risk of automated discrimination and exclusion as a consequence of algorithmic biases, with a growing public dependency on technology due to outsourced decisions and connected infrastructure, and with distrust in digital media channels fuelled by the rise of simulations and deep fakes.

In order to foster trust in sustainable and future-minded business models and policies, companies and public institutions have to identify societal and ethical challenges in advance. Combining market perspectives with a responsibility for society will be essential to any sustainable business in the digital age.

This map of the digital society was developed by Think Tank W.I.R.E. for the Swiss Digital Initiative. It provides an overview on the challenges and opportunities arising from the digital transformation in the next decade. It takes into account the guiding principles developed by the Swiss Digital Initiative and identifies strategic fields of action for decision makers and organisations.

THINK TANK W.I.R.E.

W.I.R.E. is a leading interdisciplinary Think Tank. In over ten years of engaging with global trends in business, science and society, the independent, nonpartisan Swiss idea laboratory has focused on identifying new trends early and translating them into strategies and areas for action by private companies and public institutions. At the interface between academia and practical application, W.I.R.E.'s critical mindset and political neutrality mark it as distinctive. Its key topics are the digital economy, social innovation, and future-proofing.

W.I.R.E. places its expertise at the service of the general public, private enterprises and public agencies, in fields ranging from life science, financial services and media to food and industry. W.I.R.E.'s document- and experience-based knowledge transfer formats are notable for their harmony of form and content and the outstanding quality of their aesthetics and design. The Think Tank boasts an international network of experts, thought leaders and decision makers.

In 2020 W.I.R.E. launches the Future Society Association, a new non-profit platform focusing on the early detection of societal change. It supports public institutions, private companies, and non-profit organisations to build long term oriented business- and working models.

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SWISS DIGITAL INITIATIVE

The Swiss Digital Initiative is a long-term, sustainable process to safeguard ethical standards in the digital world through concrete projects. It brings together academia, government, civil society and business to find solutions to strengthen trust in digital technologies and in the actors involved in ongoing digital transformation.

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The initiative has a global focus and is headquartered in Geneva, Switzerland. It was initiated by the cross-sectoral association digitalswitzerland under the patronage of Federal Councillor Ueli Maurer.

www.digitalswitzerland.com/sdi

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