In collaboration with HITACHI and the Ministry of Economy, Trade and Industry of Japan

WORLD ECONOMIC FORUM

Rebuilding Trust and Governance: Towards Data Free Flow with Trust (DFFT)

WHITE PAPER

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Foreword

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Of all the challenges posed by the Fourth Industrial Revolution, creating and maintaining social trust are among the most central. Virtually all of our decisions involve trust: whether we're drinking water from a faucet, getting a vaccination or sending an e-mail, we're trusting that somebody, somewhere, has taken the necessary steps to make sure that activity is safe and fair.

Today, our shared foundation of trust is under strain as never before. Rapid social change and the demands of disruptive new technologies are stretching the limits of traditional systems for building trust. Governments, businesses and civil society are struggling to keep up.

Simply put, trust is something we can no longer take for granted.

The aim of this White Paper is to provide a bird's-eye view of the governance challenges of the Fourth Industrial Revolution, with trust as the central theme. The paper outlines an updated approach to governance for the digital age that we call the "Trust Governance Framework" – an idea that, we hope, can serve as a common blueprint for addressing some of the big questions of the 21st century.

Everything about this report is cross-sectoral. It is the product of a collaboration between the World Economic Forum, Hitachi and the Ministry of Economy, Trade and Industry of Japan – an independent international organization, a business and a government agency. It attempts to treat trust and governance issues holistically, out of a recognition that these issues affect everyone, and addressing them requires dialogue and consensus among a wide range of stakeholders.

In proposing a new, trust-centric "operating system" for the Fourth Industrial Revolution, our goal is to maximize the benefits created by new technologies and ensure that they are broadly and fairly distributed, while minimizing their downsides. Artificial intelligence, big data, the internet of things and other innovations have the potential to address some of the world's most critical problems, from food security to energy efficiency to healthcare – despite the governance challenges they present.

Most of these technologies depend on data. Collecting, sharing and analysing information are core value-creating activities of the digital economy. But without trust, information stops flowing, and innovation falters. Some believe the best way to protect people and societies from the potential harms of digital technology is to build barriers to the flow of data. We do not think that is feasible or desirable. In an era when digital and physical space have become inseparably linked – what Japan calls "Society 5.0" – the better option is to make data flows safer, more transparent and more trustworthy. This is the premise of the Japanese Government's Data Free Flow with Trust (DFFT) initiative, which seeks to promote safe, reliable cross-border data sharing, and the Trust Governance Framework in this paper.

Through creative and inclusive new approaches like these, we believe it is possible to make data and technology work for everyone.

Executive summary

Rebuilding trust is a key premise for the free flow of data (the free distribution and use of data) in the age of the Fourth Industrial Revolution. That is what the Trust Governance Framework proposes.

This White Paper outlines structural changes brought about by the Fourth Industrial Revolution and proposes a Trust Governance Framework as a governance model that can build trust in an agile manner.

Why focus on trust?

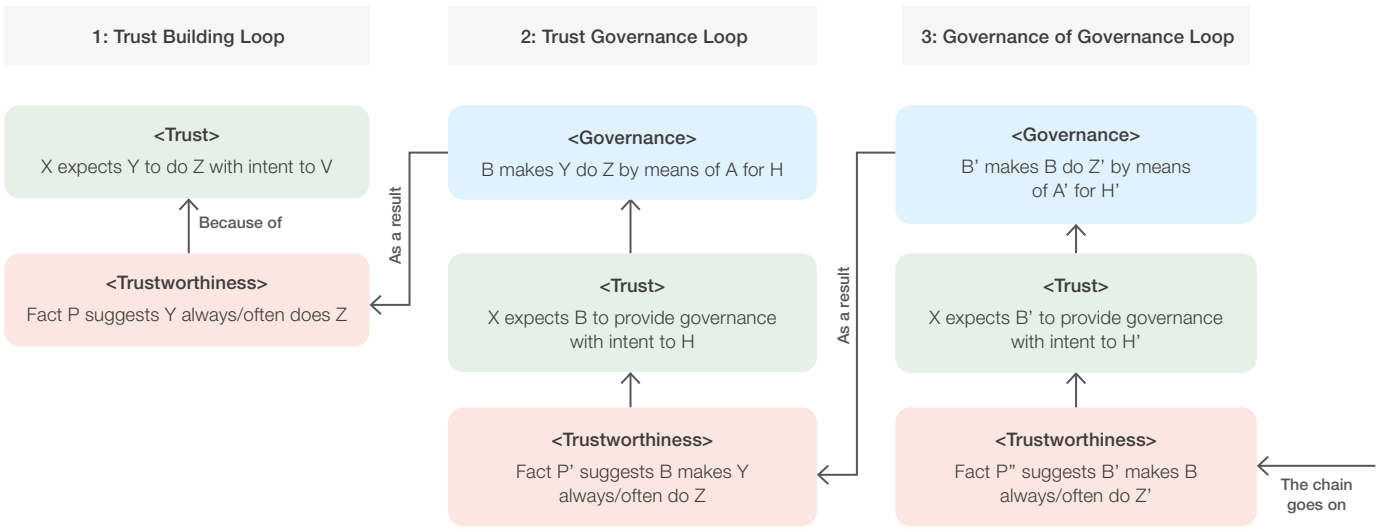
> **We don't truly appreciate trust until it is broken and lost.**
>
> Fumiko Kudo, Project Lead, World Economic Forum Centre for the Fourth Industrial Revolution Japan

Digitalization and technologies such as artificial intelligence (AI) that are driving the Fourth Industrial Revolution provide benefits to people's lives, such as personalized services. But they also increase social complexity and uncertainty, making it difficult for people to judge whether a new service or product can be trusted.

In addition, the convergence of physical and cyber space, and new technologies such as AI and deep learning are radically transforming established social structures. As a result, traditional governance has lost effectiveness, making it difficult to maintain trust.

As the Fourth Industrial Revolution progresses, it will become increasingly difficult and important to trust in people, services, systems and institutions, and to create an environment in which members of society trust each other. Without sufficient trust, social systems will not function and innovation will not progress. Thus, rebuilding trust is the most urgent and important issue of the Fourth Industrial Revolution era.

FIGURE 1 **A mechanism for building trust in the Fourth Industrial Revolution and beyond: The trust chain**



Source: World Economic Forum

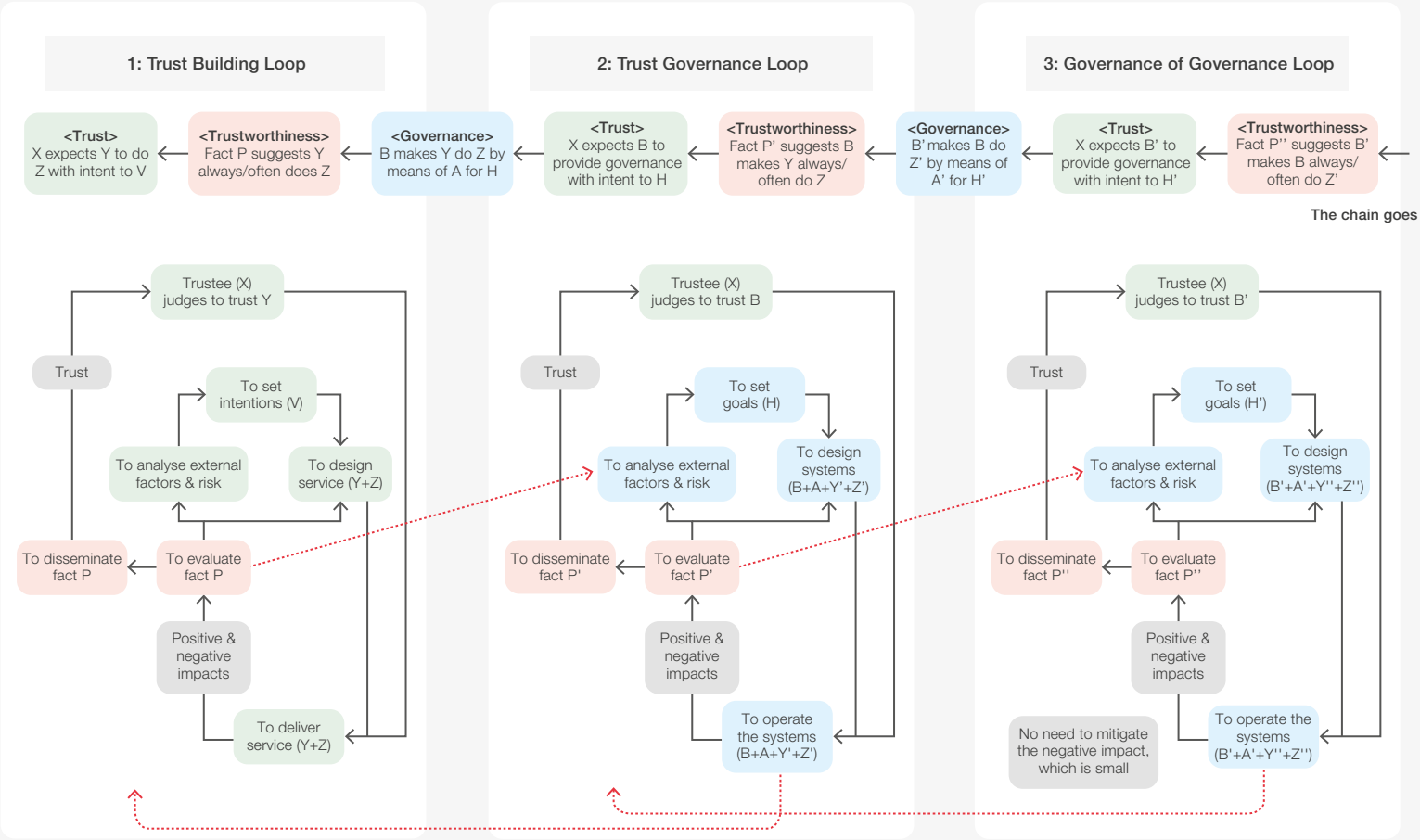
The key elements of a positive trust-building chain include the following:

- A grasp of the expectations of citizens and users to obtain trust (Trust)
- An accumulation of facts that show these expectations are being met, and the communication of these facts to citizens and users (Trust « Trustworthiness)
- The accumulation of facts ensured by effective governance (Trustworthiness « Governance)
- Governance functioning well when there is trust from citizens (Governance « Trust).

In this way, trust is ensured when the trust chain continues seamlessly (Figure 1). However, the longer the chain grows, the more costly it becomes for individuals to make decisions, and ultimately for society as a whole. It is necessary to build a trust anchor, which is a governance system that breaks the chain and serves on its own as evidence of trustworthiness.

In addition, rebuilding and maintaining trust require agile governance and trust acquisition methods that can respond to changes in society. Figure 2 describes a process for implementing governance in an agile manner and continuously building trust through multistakeholder interactions on multiple layers.

FIGURE 2 **The agile trust-building process**



Source: World Economic Forum

Under the Fourth Industrial Revolution, trust, the lubricant of society, is at risk of being undermined. In this interdependent and complex world, no single organization can face the various economic, environmental, social and technological challenges alone. In order for the global economy to recover from the effects of the current pandemic, it is imperative to rebuild trust and strengthen cooperation among stakeholders to drive bold, revolutionary innovations.

And because challenges faced in diverse fields are closely related, they need to be tackled through cooperation among various stakeholders, beyond the boundaries of each field.

This White Paper aims to organize these issues in terms of trust and governance to provide a common perspective and framework for discussion, enabling collaboration.

Below: Getty Images

1 Introduction

Purpose of this paper

This White Paper presents a common blueprint for examining a range of issues relevant to the Fourth Industrial Revolution that tend to be discussed independently in different fields. Its key concepts are trust and governance.

Currently, many different fields are facing similar issues. However, differences in the way the issues are framed or in the terminology that is used hamper cross-sectoral dialogue and prevent the formation of consensus in society as a whole.

The World Economic Forum Centre for the Fourth Industrial Revolution Japan, in cooperation with the Ministry of Economy, Trade and Industry (METI) of Japan and Japanese companies and academia, is working to find solutions to common challenges that exist at the root of various fields. As part of the effort, this paper proposes a Trust Governance Framework as a model for experts in diverse fields to share their knowledge and perspectives and to work together for the total optimization of society.

Why focus on trust?

The World Economic Forum chose "A Crucial Year to Rebuild Trust" as the theme of Davos Agenda Week in January 2021, held at the start of the second year of the pandemic caused by COVID-19. The Forum called for rebuilding trust and strengthening international cooperation to foster innovative, bold solutions in order for the global economy to recover from the effects of the pandemic. In today's interdependent and complex world, no single organization can face the challenges – economic, environmental, social, technological, etc. – alone.

Similar dialogues and initiatives on the theme of trust have taken place recently in a variety of fields, especially in the context of dealing with technological uncertainty in the digital age.

Examples include the *Trust and Public Policy* report[1] issued by the OECD in 2017 and the Data Free Flow with Trust (DFFT)[2] initiative proposed by Japan at the World Economic Forum Annual Meeting 2019. In addition, trust guidelines for AI have been issued in various countries, and think tanks and academia have published numerous reports on trust.[3]

Trust is an essential part of our social activities and functions as a "social lubricant".[4] People are constantly making decisions based on trust in their daily lives. For example, a decision to send an email can be easily made because there is a baseline of trust that the service provider will respect individual privacy and not snoop into the contents of the message.

> Trust is an essential part of our social activities and functions as a "social lubricant".

"Trust is hard to earn but easily lost."[5]

Since the beginning of the modern era, human beings have found a range of ways to build trust to keep increasingly complex societies functioning smoothly.[6] In recent years, however, as the result of rapid social changes and the effects of new services and products on people's lives, it has been necessary to rethink the established mechanisms of trust building.

This White Paper aims to provide a framework to solve current challenges and realize a trust-filled society after the Fourth Industrial Revolution (or Society 5.0[7] in Japan) by focusing on how to ensure trust in systems[8] and institutions (governance), the backbone of society.

Chapter 2 describes the status quo, which is the transitional phase to the post-Fourth Industrial Revolution era, and shows the factors at work and the changes taking place. Chapter 3 presents a framework for the relationship between governance and trust required after the Fourth Industrial Revolution and provides possible directions and solutions for governance.

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2 Structural change and ineffective governance due to the Fourth Industrial Revolution

The post-Fourth Industrial Revolution era is a dynamic society in which cyber and physical spaces are fused, systems are seamlessly connected to each other and conditions are constantly changing. Conventional governance is not designed for such a society. To maintain trust in the post-Fourth Industrial Revolution era, it is necessary to update governance to meet the characteristics of this new era.

2.1 Technological changes due to the Fourth Industrial Revolution

The post-Fourth Industrial Revolution era comprises a reconfigurable society in which cyber and physical spaces are integrated and dynamically changing.

During the Fourth Industrial Revolution, the following changes are expected to occur as a result of the evolution of information technology and other factors:

- Information that previously existed only in the physical space will be digitized and converted into data, which will be processed in cyberspace by AI and other means on a daily basis.
- The results of these digital processes will influence and change the physical spaces that people operate in. As the pace of interaction between cyber and physical spaces accelerates, changes in the physical space will occur with a frequency and speed that were previously unimaginable (cyber-physical fusion).
- Data, information technology (IT) systems, operational technology (OT) systems, services, infrastructures and organizations (systems), which were previously managed centrally by a single agent, will be increasingly interconnected and interlocked with systems managed by different agents. The increased complexity will make it difficult, if not impossible, to anticipate all the specific linkages and outcomes between agents in a complex system (system of systems).
- Information processing, which used to be deterministic – i.e. system outcomes and processes were determined by humans – will be determined by AI and algorithms without human intervention as mechanization and automation progress in the post-Fourth Industrial Revolution era. In addition, algorithms such as deep learning will continue to evolve.

These changes will not be limited by geography but will transcend national borders.

2.2 Inability of conventional governance to achieve desired outcomes due to the Fourth Industrial Revolution

Limitations of governance by law

Rule-based legal governance models such as existing governmental institutions have traditionally held primary responsibility for defining rules and achieving trust in society. These traditional systems, however, tend to be rigid and slow to react to change. For example, legislative amendments may take years to pass, during which the external environment, expectations and requirements may have evolved. This causes friction that inhibits innovation or fails to fully respond to societal challenges.

Traditional methods of periodic monitoring, ascribing liability and enforcement are also poorly suited to systems involving multiple actors that are engaged in complex and fluid interactions, especially where decision-making and actions are made autonomously by AI with little or no immediate human oversight. For instance, the information in company annual reports or monthly status reports lags behind the actual situation, and may not be suitable for use in autonomous systems that need to function in real time. Enforcement by on-site inspections may not be practicable where infrastructure is located in different geographies, such as when physical servers are located in various jurisdictions (see Box 1 “Governance Innovation ver2.0” for more information).

Difficulties in identifying the responsible agent and ensuring accountability

> The traditional governance model will become increasingly unsuitable due to the technological changes of the Fourth Industrial Revolution.

Traditionally, the relationship between service providers and the services provided has tended to be a one-to-one correlation and the provider of the service was clear. When a problem arose with the service, the basic principle was to pursue the responsibility of the service provider and seek compensation for any damage. In the post-Fourth Industrial Revolution era, however, multiple agents provide value to users through interconnected systems. The responsibility for loss or damage, where multiple interrelated actors are involved, may be difficult to determine. Therefore, the risk that damage or loss remains uncompensated exists, due to the lack of an effective response in the event of an accident.

In the post-Fourth Industrial Revolution period, algorithms and AI present a novel governance problem. Existing software coding methods reflect the intention and design of the human author. Therefore, it is easy to assign responsibility to the developer and ensure the effectiveness of governance. In contrast, AI (especially using deep learning[9]) learns inductively from a given data set. AI does not create with intent, or have the will and ability (accountability) to deal with negative effects, the way humans and corporations run by humans can. In addition, the process leading to the output from AI is difficult for humans to explain and is influenced by various factors, such as the content of the data set and the learning model. Given that explaining the rationale for a decision is a typical way to ensure trust, it is necessary to consider how governance can compensate for the explanatory difficulties arising from AI.[10]

Without such consideration, the traditional governance model will become increasingly unsuitable due to the technological changes of the Fourth Industrial Revolution.

2.3 The Fourth Industrial Revolution's impact on citizenship and trust

The technological changes of the Fourth Industrial Revolution will not only make governance ineffective but will also bring about changes in citizens' lives more directly, affecting the mechanisms of citizen trust.

Changes in citizens' lives

Traditionally, companies perceive consumers in segments determined by attributes such as gender and age group. Consumers buy standard products and services that are mass-produced to meet the needs of the entire segment.

In the post-Fourth Industrial Revolution era, companies will be able to collect and analyse large amounts of personal consumer data, easily and automatically. They will profile consumers on an individual basis and predict their behaviour to provide customized products and services with a high degree of accuracy via interfaces personalized to their needs. This trend will be further reinforced by algorithms that automatically optimize the priority of information based on individual data, such as search results and weblink clicks. Reality will differ from person to person, and other people, governments and corporations will know more about a person than they know about themselves.

Impact on trust

Since standardized products designed for a particular market segment tend to be uniform, the choices are limited. Thus, it is relatively easy to fact-check what is being communicated about the product and to weigh different opinions and positions, because there are limited and familiar sources of information to check for social cues and to supplement trust, such as how popular a product is and whether it is fairly priced compared to similar items. As a result, the decision to purchase is relatively simple, and the burden of decision-making is relatively small for the individual.

On the other hand, in the post-Fourth Industrial Revolution era, other parties, such as governments and corporations, will be able to grasp and predict emotions, cognitive and behavioural characteristics and physical traits that individuals may not be able to recognize or grasp on their own. The individualization and customization of products, services and information based on such data mean, for example, that interest rates on loans may be determined on the basis of predictions of economic conditions or friendships, or that insurance premiums may be determined based on medical or genetic information.

This not only causes various ethical concerns, but it also makes it difficult to judge such things as whether the interest rate or insurance premium offered is fair, or whether an individual is the only one being offered unfair terms. This is because, in addition to the fact that other options and objective comparisons are not always obvious due to advanced customization, new abilities and literacies are required for individuals in cyberspace to properly access evaluations and reviews on the internet and use them as clues to make decisions to accurately judge the reliability of transaction partners and transaction content.

As it becomes increasingly difficult to adequately identify and fact-check the origin and source of large amounts of information, individuals will live under the constant threat of being intervened-against, mobilized and manipulated by others without their knowledge. The cost of dispelling distrust increases as individuals wonder if the news they see is fake,[11] if an event is a conspiracy, or if their decisions are being arbitrarily manipulated by algorithms.

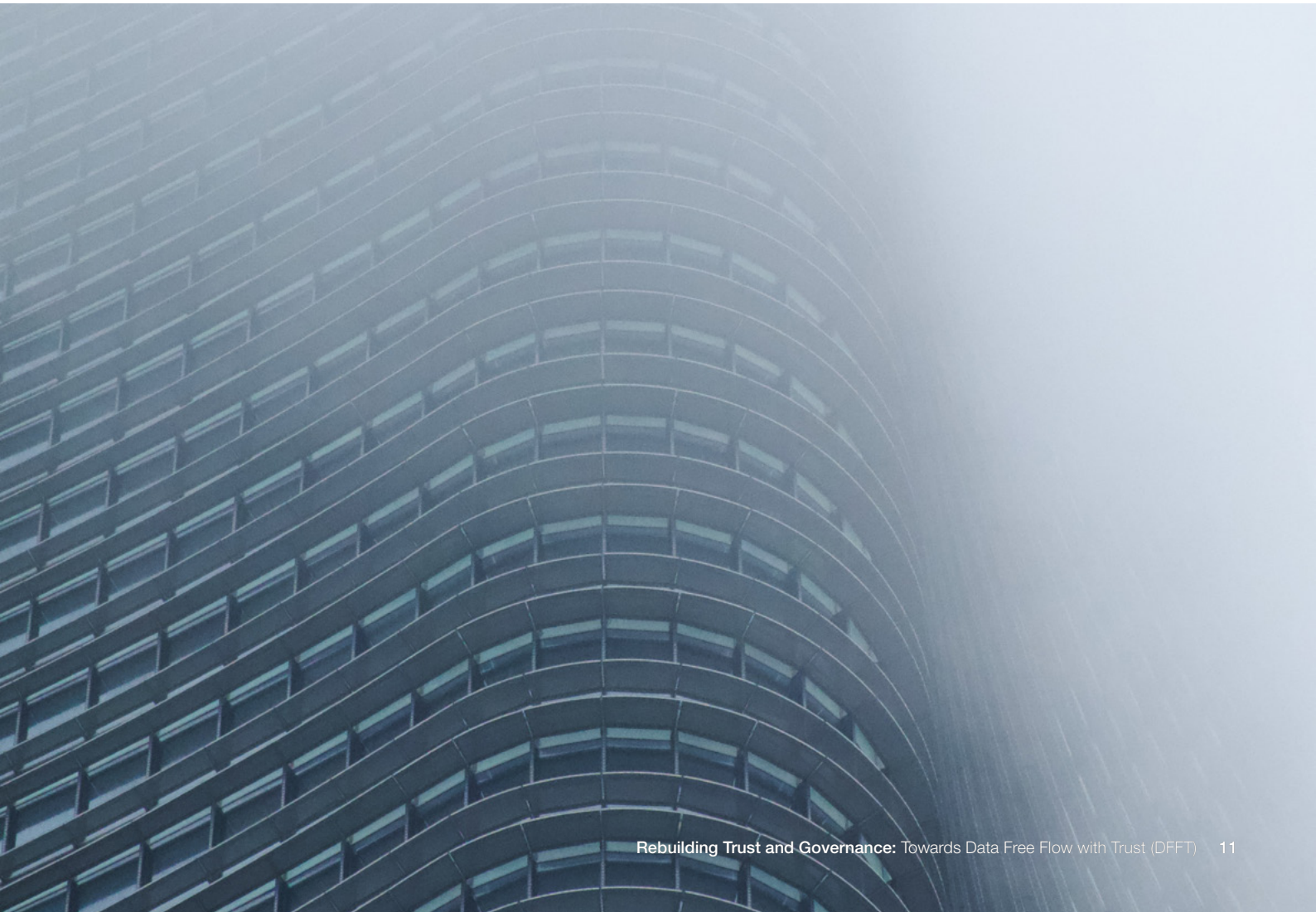
In such an environment, the burden of ensuring trust in information and decision-making is extremely high for individuals.

As already mentioned, in the post-Fourth Industrial Revolution era, the provision of personalized services makes citizens' lives more convenient, but the complexity and low visibility of the mechanisms used to develop and deliver them lead to anxiety and distrust of the services and ultimately of others.

Ensuring that systems of governance, products and services are trustworthy and that they are perceived as such must be the foundation of trust building.

Trust is a concept that is necessary to enable diverse values, such as security, privacy, innovation and efficiency, to coexist in a single society. For these diverse values to coexist, it is extremely valuable to ensure and build a foundation of trust in society, other people and technology, as well as in the governance that makes this possible.

Since existing systems that engender trust in society are inadequate to deal with the challenges presented by the post-Fourth Industrial Revolution period, an alternative framework for building trust must be considered.



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3 Trust design – Building trust in the post-Fourth Industrial Revolution era

This chapter examines the relationship between trust, which is essential for a complex modern society, and the governance that guarantees it, and considers mechanisms for building trust (the Trust Governance Framework) that will be necessary after the Fourth Industrial Revolution. This framework focuses on system trust[12] and organizes the relationship between system trust, trustworthiness and governance.

3.1 Trust-building mechanisms for the post-Fourth Industrial Revolution era: the Trust Governance Framework

The trust-building mechanisms required for the post-Fourth Industrial Revolution period are the key concepts of trust, trustworthiness and governance.

What is trust?

While the *OECD Guidelines on Measuring Trust*, which introduce various definitions of trust from theoretical studies, conclude that no single agreed definition exists,[13] this White Paper defines trust as follows: *the expectation, based on certain values held by a trustee, that other entities (including people, organizations and systems) will behave positively and/or not behave in certain negative ways.*

The above definition of trust can be formulated as follows:

Trustee X expects Actor Y to do Action Z for Purpose V.

– Trustee X is the entity that holds the expectations: citizens, nationals, engineers, consumers and organizations, including companies and governments.

– Actor Y is the object of Trustee X's expectations to behave or not behave in a certain manner: citizens, nationals, engineers, consumers, companies (manufacturers and operators) and organizations, including governments, institutions and society as a collective of associations and systems capable of actions such as AI.

– Action Z is a positive/negative action that Trustee X does/does not expect from Actor Y.

– Purpose V is what Trustee X presumes to be the reason/purpose for which Actor Y performs Action Z.

What is trustworthiness?

“ Trustworthiness refers to the objective properties or facts that suggest whether a subject deserves to be trusted

Trustworthiness refers to the objective properties or facts that suggest whether a subject deserves to be trusted. Examples include experimental data, reputation and legitimacy. While trust plays the role of lubricant for socio-economic activities and is mainly studied theoretically in the field of social sciences, trustworthiness is often treated as an index to evaluate the reliability of a technology or system from an engineering perspective.[14]

Although various studies have been conducted on trustworthiness, as well as on trust, there is no single agreed definition. In this White Paper, trustworthiness is defined as follows: *a state of being in which properties/facts suggest that an entity (including a person or institution/organization) will always/mostly behave as expected.*

What is governance?

The concept of governance has existed for a long time but, until the 20th century, it was discussed almost exclusively in the context of government. According to Mark Bevir, this changed as the world shifted from the era of hierarchy to the era of markets and networks.[15] In other words, the development of a modern economy and society has led to the expansion of areas where actors

other than the government play a role in maintaining order and enforcing norms, and governance is no longer a role or function of the government alone.

Given these circumstances, this paper defines governance as follows: *the act by a specific entity (organization or person) of regulating or directing the behaviour of target entities (other people, organizations or things) through means such as institutions/rules and systems in order to realize a certain value.*

Other entities in this definition include, for example, directors commanding the actions of employees within the same organization, such as through self-regulation.

The relationship between trust, trustworthiness and governance

What is the relationship between the concepts of trust, trustworthiness and governance? Trustworthiness can be one of the grounds and evidence of the establishment of trust. Therefore, between trust and trustworthiness, the following relationship can be established:

Trustee X expects Actor Y to perform Action Z because of the trustworthiness of Actor Y to perform Action Z.

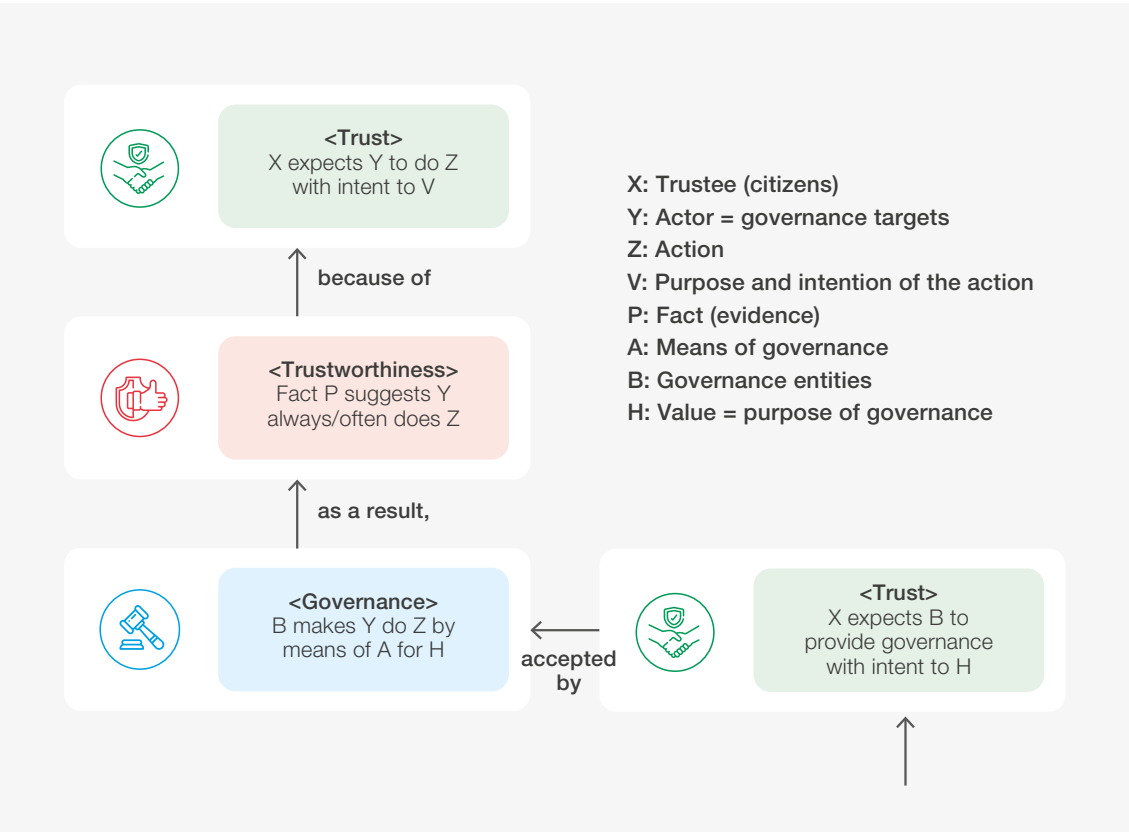
There is no simple correlation between trust and trustworthiness; the relationship is formed through the subjective recognition of trustworthiness by the trustees (i.e. the entity that places trust in another, such as Trustee X). Therefore, for actors (i.e. the entity that takes, or forbears to take, the intended action, such as Actor Y) to be trusted, it is necessary not only to accumulate trustworthiness, but also to inform and disseminate trustworthiness in a form that can be understood by trustees and to make it widely known.

What, then, is the relationship between trust and governance? Governance is implemented in order to achieve a certain value. One such value is trust building itself – to realize the trust held by trustees. Therefore, governance is one way to realize trust. However, even when governance is conducted properly, it does not necessarily mean that trust can be built between the actors and trustees.

It is important to build trustworthiness in a manner that makes clear that "the expectations of trustees are being realized" through proper governance. In other words, this relationship can be expressed as follows:

As a result of Governance Entity B regulating or directing Governance Target Y to do Action Z by means of A, evidence (trustworthiness) suggesting that Actor Y will do Action Z accumulates.

FIGURE 3 **The Trust Governance Framework**



Source:
World Economic Forum

In other words, the relationship between trust/trustworthiness and governance is as follows:

As a result of Governance Entity B regulating or directing Governance Target Y to do Action Z by means of A, trustworthiness is formed by accumulating Fact P that suggests that Actor Y will perform Action Z. As trustworthiness is recognized by Trustee X, Trustee X has trust that Actor Y will perform Action Z for Purpose V.

Here, it is worth noting that whether or not the existence of trustworthiness leads to trust depends on the literacy and general trust of Trustee X. A diagram of this mechanism for rebuilding trust is referred to as the Trust Governance Framework (Figure 3).

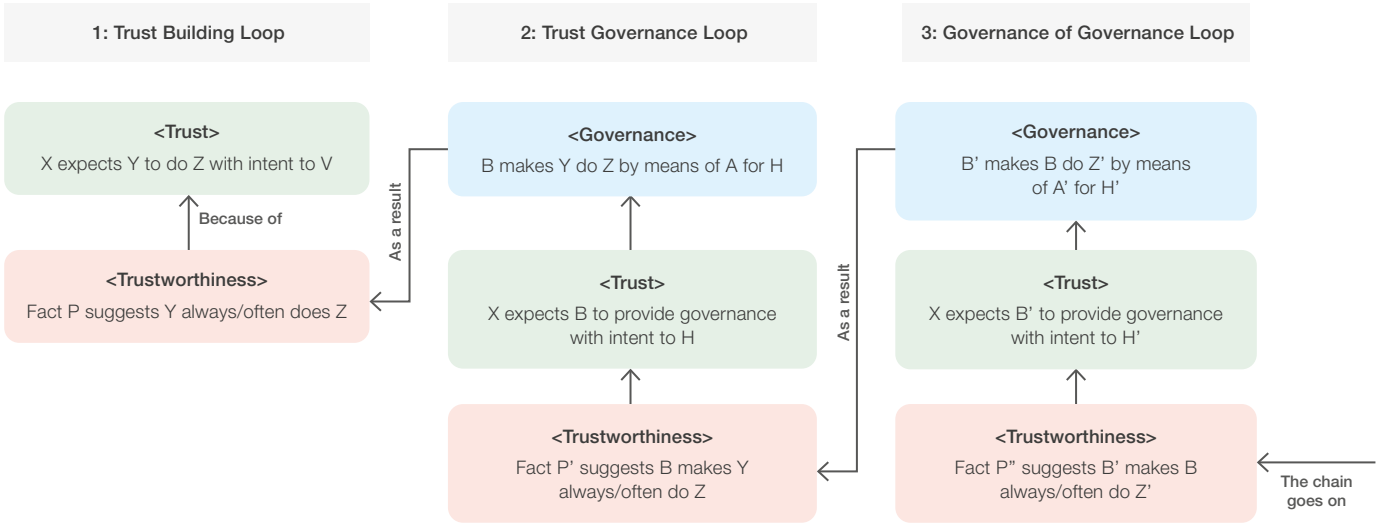
Building trust in governance

In the Trust Governance Framework, there is one precondition for the relationship Trustee X expects Actor Y to perform Action Z. That is that Trustee X also has trust in Governance Entity B to perform proper governance. If there is a lack of trust in governance, all the subsequent conditional relations will not work.

So how can that trust in governance be constructed? The mechanism is the same as the one for building trust for service providers, who are the actors. As with trust in other services, trust in governance is established when trustworthiness in governance exists and the trustee recognizes it. In order for trustworthiness to be established, a higher level of governance is required, and that higher level of governance also requires trust.

As shown in Figure 4, the relationship between trust, trustworthiness and governance is a chain structure, and the chain structure ensures trust in the system.

FIGURE 4 **The trust chain**

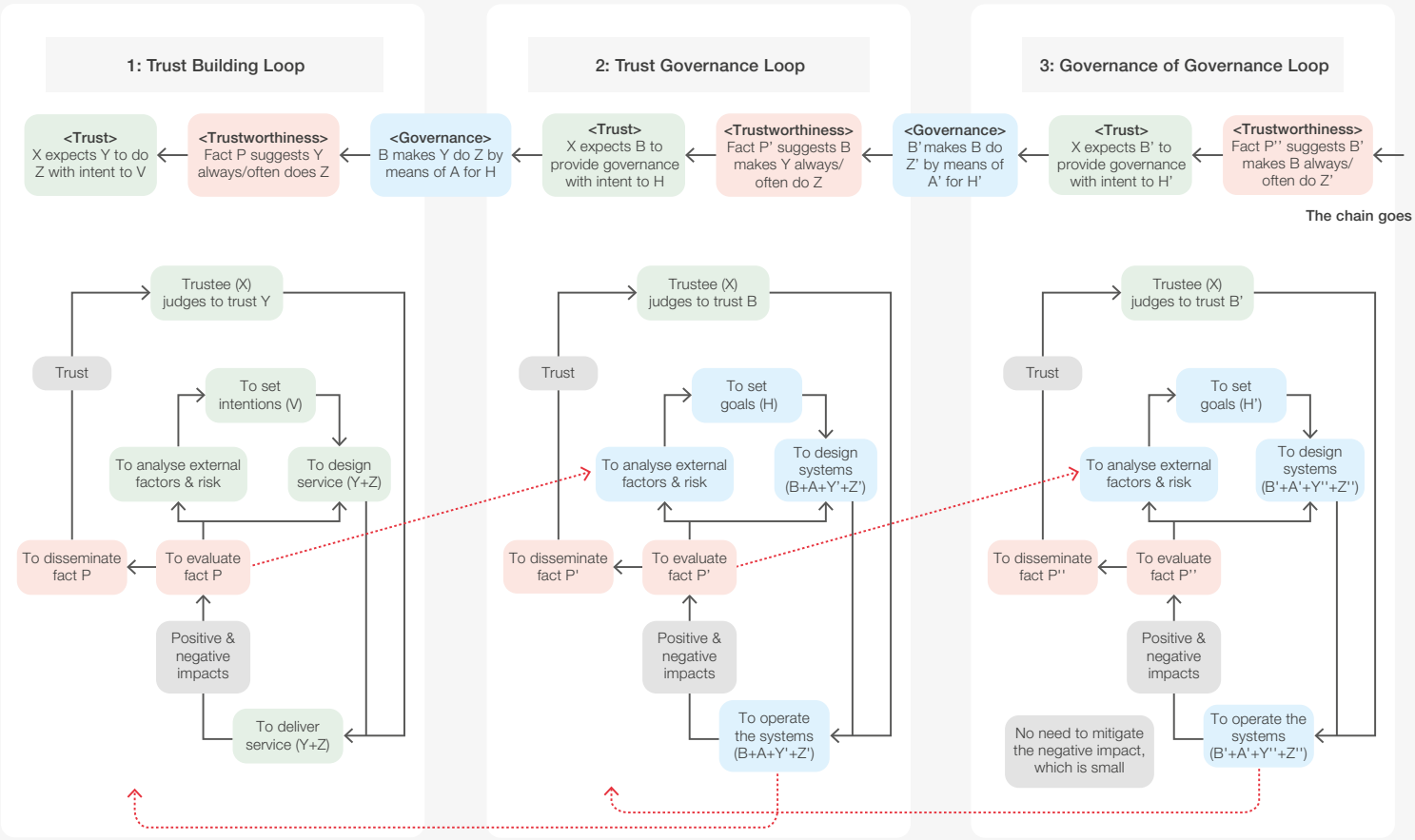


Source: World Economic Forum

3.2 The agile trust-building process in the post-Fourth Industrial Revolution era

This section proposes an agile trust-building process for the post-Fourth Industrial Revolution era, which is based on the Trust Governance Framework from the perspective of process.

FIGURE 5 **The agile trust-building process**



Source:
World Economic Forum

Loop 1 on the left of Figure 5 shows the process of building trust in service provision (Y does Z with intent to V). In this process, the service providers set the goals to be achieved by services, and design and operate the system (service) to realize those goals. They will minimize the negative impact caused by their services through evaluating and analysing the results of these operations and revising the system design and operation methods.

In addition, the service providers will keep abreast of changes in the external environment and the resulting risks, and will continue their efforts to redefine the value they offer. In order to gain the trust of users, it is necessary for service providers themselves to evaluate the value they have created and make it known to users. Only when users decide to trust the service based on the evaluation results will the service be accepted. The value created by the service will increase as the number of users who trust the service increases, further accelerating the increase in users. In this way, building trust is essential for a service to be accepted by society.

On the other hand, the negative impact of service operation damages user trust, resulting in users discontinuing service use. The more users who do not trust the service, the more users will leave. In this way, the impact of system (service) operation is greatly affected by users' trust in the service provider.

However, the impact of system (service) operation is not necessarily something that can be managed solely by the service provider's own efforts. This is where governance plays a role in increasing the positive impact and reducing the negative impact. Loop 2 in the centre of Figure 5 shows the process of trust building for this governance (B makes Y do Z by means of A for H).

The governance entities evaluate and analyse the positive and negative impacts and external environmental changes created by the provision of services by Actor Y, and set goals for increasing/reducing the positive and negative impacts. Then they design and operate the system to realize the set goals, and revise the system design and expected value by evaluating and analysing the results and external environmental changes.

As well as building trust in the service, governance entities are required to evaluate the results of the governance and disseminate them to citizens and users. If citizens and users decide to trust the governance and the number of trustees increases, the governance will be accepted by the society. Loop 2 also influences Loop 1. The discipline and the positive and negative impact on the behaviour of the service provider brought about by governance affect the users' evaluation of the service in Loop 1, and can lead to building trust in the service provider. In addition, governance itself needs to be regulated or directed by a higher level of governance. Loop 3 on the right of Figure 5 shows the process of gaining trust in the higher level of governance. Loop 3 has the same process as Loop 1 and Loop 2.

In the post-Fourth Industrial Revolution period, governance is thus implemented by different entities at multiple levels. In order for these multiple layers of governance to work organically with each other and contribute to building trust in society as a whole, mutual coordination and collaboration are essential.

BOX 1

Governance Innovation ver2.0[16]

In July 2020, the report *Governance Innovation: Redesigning Law and Architecture for Society 5.0*[17] was released as an outcome of the "*New Governance Model Study Group in Society 5.0*",[18] established by the Ministry of Economy, Trade and Industry of Japan in 2019. The report presents a new governance model in terms of governance processes (rule-making, compliance, monitoring, enforcement) and actors (government, corporations, individuals/communities). Governance Innovation ver2.0 is the second report of the project, which presents a grand design for the governance transformation of society as a whole, embodying the concept of agile governance as a key element in realizing Society 5.0.

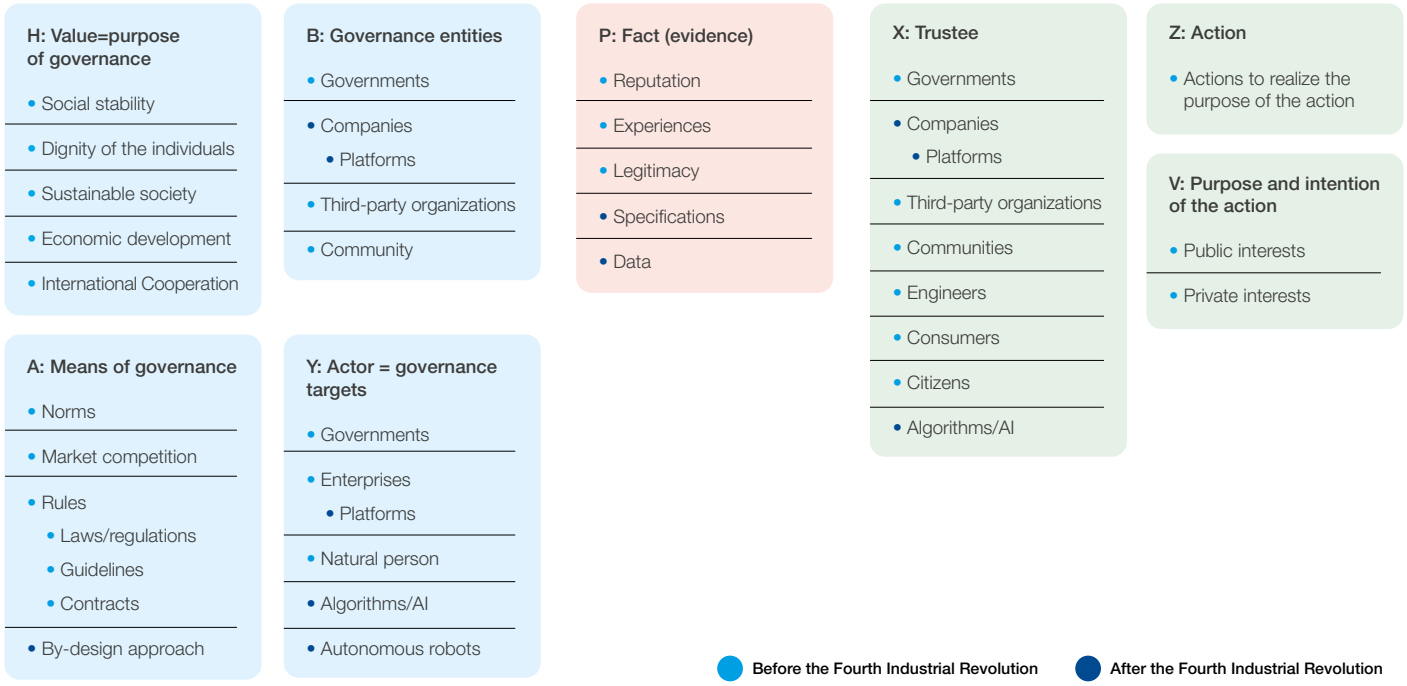
Agile governance differs from traditional governance that has fixed rules and predetermined procedures; it is a multistakeholder, continuous process of environment and risk analyses, goal setting, system design, operation, evaluation and improvement in various governance systems, such as companies, laws and regulations, infrastructure, markets and social norms. The report also points out that it is essential to design an overall framework of governance (governance of governance) and international cooperation on these governance efforts to accomplish the goals.

In addition, the Digital Architecture Design Center[19] has been established as a neutral place for the multistakeholder design of architectures to realize governance reform, and several projects are in progress.

3.3 Consideration for each component

This section examines the direction of governance for the post-Fourth Industrial Revolution period, based on the schematic of the Trust Governance Framework (Figure 6).

FIGURE 6 **Components of the Trust Governance Framework in the periods before and after the Fourth Industrial Revolution**



Source: World Economic Forum

Value = Purpose of governance (H)

In the framework, value/purpose of governance and trust are related as follows:

For Purpose of Governance H (Value), Governance Entity B regulates or directs (governs) Action Z of Governance Target Y by means of A. As a result of the accumulation of Fact P by Governance Target Y, trustworthiness is formed, and trust is formed when Trustee X recognizes the trustworthiness.

With a wide variety of values, it is extremely important to determine which values to consider and how much to emphasize them. The basic premise of the governance model should be the existence of opportunities to build consensus among diverse stakeholders on the value to be realized through governance.

In addition, it is essential to establish a mechanism to check whether the design, operation and evaluation methods used in each process of service provision and governance are appropriate for the purpose, and to correct any gaps that may arise.

To unlock the opportunities that data can bring, the World Economic Forum Data for Common Purpose Initiative (DCPI) is examining governance mechanisms that focus on data use and allow flexible, rather than uniform, approaches depending on its purpose (see Box 2).

BOX 2 | **Data for Common Purpose Initiative (DCPI)[20]**

Equitable access to trusted data to unlock opportunities for both the public good and commercial spheres

The challenge: Many data governance approaches have focused primarily on data protection and privacy. Existing policy and regulatory models usually emphasize the source of the data over its intended or eventual use. This leads to a failure to harness the full value of data, the fragmentation of policies and impediments to data sharing for agreed-upon purposes.

The solution: The Data for Common Purpose Initiative (DCPI), led by the World Economic Forum, is built on the belief that data can and should be treated differently depending on its actual and anticipated use, and Fourth Industrial Revolution technologies can be used to make this feasible in practice. Fourth Industrial Revolution technologies are on a path to enabling differentiated permissioning of the same data, dependent upon context (purpose). As new uses for a person's data within their permitted purposes arise, their relevant data can be tagged according to their permissioning, automatically encrypted, anonymized and transmitted along with digital rights management rules.

The focal concept, data for "common purpose," emphasizes common or agreed-upon purposes for data utilization, including health, sustainability and well-being, in addition to the data source.

The initiative suggests solutions to establish a new governance system, such as technologies to facilitate data distribution and market-based mechanisms.

Governance Entities (B)

In the framework, Governance Entity B in trust acquisition has the following role:

Governance Entity B in trust acquisition has the role of accumulating Fact P by regulating or directing Action Z of Governance Target Y by means of A, and forming trust by communicating the trustworthiness formed by this process to Trustee X.

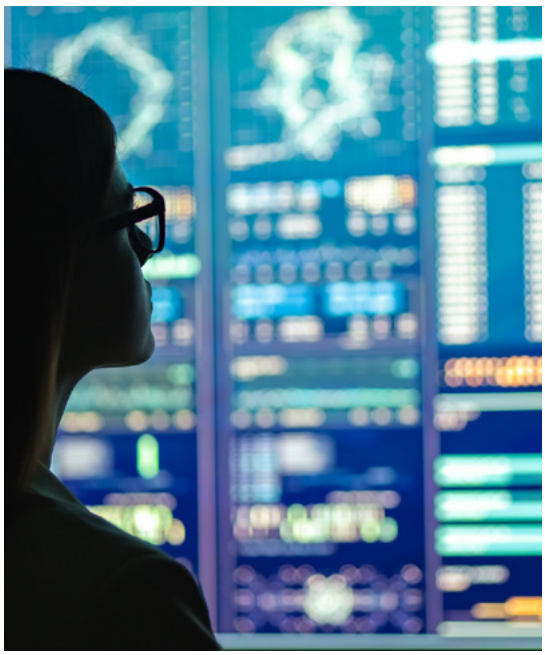
> "...it is desirable in the post-Fourth Industrial Revolution era to promote collaboration among a variety of entities...

In conventional societies, the governance entity is often the public authority, such as the government. Private entities, such as people and corporations, may be the governance entity in some private spheres, but they are positioned as the governed in society as a whole. However, to depart from this structure and to ensure the effectiveness of governance and trust, it is desirable in the post-Fourth Industrial Revolution era to promote collaboration among a variety of entities, including not only the government, but also companies, third-party organizations and communities representing citizens and users.

Governments as governance entities in the post-Fourth Industrial Revolution era

Four important roles for the government can be identified in the post-Fourth Industrial Revolution period. The first is to design and encourage a governance system in which diverse entities participate. Government can accomplish this by developing the laws, guidelines and standards that form the backbone of the governance system, and by acting as facilitators. The second is to encourage the effective functioning of governance by communities and individuals. This includes providing incentives for the private sector to cooperate through the development of market rules and information disclosure. The third is to form and transmit trustworthiness. Trustworthiness is formed when the government, as a member of the broader governance structure, complies with the law and follows its own accountability rules. It is also important for the government to convey its trustworthiness to the people, who are the trustees, in order to secure their trust in the government. The fourth is to coordinate on behalf of the people among nations with different legal systems and value norms.

In data governance as well, it is desirable to establish opportunities to deliberate on international rule-making and to consider measures to facilitate cooperation among governments. Dialogues are taking place among countries for interoperable regulatory models towards DFFT (see Box 3).



BOX 3 | **Data Free Flow with Trust (DFFT)[21]**

Towards free and trusted data flows by convening multistakeholder dialogues in four countries

The challenge: Cross-border data flows are essential to the digital economy, fuelling emerging industries, such as the internet of things and digital services. However, governments are increasingly adopting policies that restrict or prohibit cross-border data flows. These restrictions indicate a lack of confidence among governments and the belief that data outside of one's borders cannot meet domestic policy objectives, such as privacy, security and access to data.

The solution: The Forum has heeded the call to build an international order for data flows involving leading experts, businesses and stakeholders to turn a landmark concept into a governance architecture. During the Annual Meeting 2019 in Davos-Klosters, former Japanese Prime Minister Shinzo Abe shared a vision of Data Free Flow with Trust (DFFT), where openness to data flows co-exists with the confidence that data could be secure across borders. In May 2020, the Forum released the White Paper "Data Free Flow with Trust (DFFT): Paths towards Free and Trusted Data Flows" that outlines existing policies in data flow governance and proposes an initial roadmap that highlights specific areas for cooperation.

Four country dialogues: With public- and private-sector representatives, the Forum is hosting virtual dialogues on data flows from November 2020 to March 2021. Four emerging economies in South and South-East Asia were selected: the Philippines, Thailand, Viet Nam and India. Each is at various stages of data flow governance, capacity and engagement in international cooperation mechanisms. Such opportunities to discuss the current situation of national, regional and international data governance, as well as ideas for policy development and capacity building, can empower each respective country to move towards interoperable regulatory models that underpin the vision of DFFT.

Corporations/digital platforms as governance entities in the post-Fourth Industrial Revolution era

Companies, including digital platforms, will not only be an object of governance but will be required to participate as governance entities. In order for governance to realize value through trust building, it is essential that companies, not just government and laws, have direct enforcement power over cyberspace.

Companies themselves are responsible for the governance of their platforms, services and products, and for accumulating and verifying trustworthiness. Their participation as governance entities is needed so they have the opportunity to fulfil their social responsibilities.

To achieve agile governance that can respond to change beyond a single company, it is also necessary to proactively develop guidelines and standards that enable the realization of values agreed upon by society. The management of industry associations and the process of establishing guidelines must be transparent, verifiable and accountable in order for such efforts to gain trust.

The role of third parties and communities in the post-Fourth Industrial Revolution era

For the purpose of ensuring trust in governance, it is extremely important to involve third parties with neutral, academic and scientific viewpoints, as well as non-experts, the general public and their collective communities in governance, to verify the validity of the values that governance aims for and the trustworthiness of governance. If there is opacity, as society becomes more complex and systems become more black-boxed, it may not be possible to detect risks that infringe on people's interests. Therefore, user and citizen communities need to monitor and evaluate more than ever whether the policies and services are legitimate or whether they cause exploitation.

For example, civic tech communities such as Code for America and g0v are contributing to citizen-centred governance not only through monitoring and evaluation, but also by taking a proactive role in designing the system architecture of governance itself.

Means of Governance (A)

The relationship between governance instrument A and institutional trust in the framework may be expressed as:

Governance Entity B uses Means of Governance A to regulate or direct Governance Target Y to perform Action Z.

In doing so, Means of Governance A contributes to the building of trustworthiness, and trustworthiness accumulates in the trust system through Trustee X.

This White Paper categorizes the means of governance into not only legal enforcement but also into: 1) social norms; 2) markets; 3) rules;

and 4) “by-design” approaches. Each means of governance has elements that work together to build trust. It is important to systematically combine these means.

1. Social norms

American academic Lawrence Lessig identifies social norms as one of the four modes of governance.[22] A social norm is an unwritten rule in a society or community and is a means of governance that restricts the social activities of companies and individuals by, for example, exposing them to community condemnation if they violate it.

Social norms depend on the culture and experiences of each society and community, and they influence people’s behaviour even when unwanted behaviours are not prohibited by law. Social norms, like morals and ethics, should mature with society. They are an important means of governance for realizing human independence, in that they enable an autonomous social order based on the spontaneity and initiative of citizens, without relying on an external power, such as enforceable laws and surveillance technology.

“Social norms depend on the culture and experiences of each society and community, and they influence people’s behaviour even when unwanted behaviours are not prohibited by law.

In the post-Fourth Industrial Revolution era, to avoid the violation of human autonomy by the total dependence of humans on the system and AI technology, society should not abandon the autonomous governance of humans through the sharing of these social norms, but should rather use technology as a useful tool for their articulation and sharing, while avoiding polarization by social norms.

2. Markets

Lessig also refers to markets as one mode of governance.[23] Markets have the power to constrain the social activities of individuals and corporations through stock prices and the functions of price, supply and demand adjustment.

In particular, the closer to perfect information, the more appropriately the market selection mechanism will work. If information asymmetry is large, however, market failures will occur and governance will be impaired. To avoid this, it is necessary to ensure the proper governance and trustworthiness of the market itself, for instance by increasing transparency.

In order to make these market governance functions more effective, the concept of market design, which is based on the “by-design” approach described in point 4), begins to be used by policy-makers.[24]

3. Rules

Rules include laws and regulations set by legislatures, governmental and ministerial ordinances, notifications and notices set by each ministry and agency, guidelines set by business organizations as self-regulation, and contracts between companies.

In the past, the means of achieving goals and requirements were often specified in detail in laws and regulations. In the post-Fourth Industrial Revolution period, the review of laws and regulations cannot keep up with the rapid pace of social change and becomes an impediment to implementing services and products. Therefore, it is necessary to shift to a goal-based approach,[25] in which goals are set in laws and regulations, and the means to achieve them and the way the system operates are dependent on government and ministerial ordinances and guidelines set by business organizations.

Against the backdrop of the growing need to protect personal information and privacy, the thorough acquisition of individual consent for data use is needed. Yet this is causing “consent fatigue” among users. The appropriate mechanisms and tools that will support obtaining meaningful user consent and decision-making in the post-Fourth Industrial Revolution period needs greater consideration.

4. “By-design” approach

This White Paper defines the “by-design” approach as “a means of governance that enables values such as security and privacy to be incorporated into the design, operation and management of systems across the entire service or product life cycle”.[26]

The “by-design” approach refers to the design of laws, regulations, organizations, hardware/software, data and algorithms, as well as the design of the overall governance architecture. It also incorporates so-called policy “nudges” based on behavioural economics. In the post-Fourth Industrial Revolution era, algorithms and AI are emerging as governance targets, but to effectively realize governance for them, not only setting rules but also the mechanisms to implement contents prescribed in the rules is required. It is imperative to define the desired policies and conditions, and to realize the contents specified in the rules as a mechanism by using the “by-design” approach (see Box 4). It is important to combine different approaches in a complementary manner, for example by using monitoring to detect any deviation from the expected policies and conditions.

While the “by-design” approach is gaining attention for its effectiveness, it also has aspects that conflict with a major principle of modern society: self-determination by autonomous individuals. Therefore, the approach should be implemented with sufficient consensus-building, monitoring, transparency and verifiability assurance functions in the governance mechanism.

BOX 4 **Ethics by Design**[27]

Many are beginning to recognize the ethical challenges associated with the potential for innovations like AI, blockchain and quantum computing to be designed, delivered and used in ways that undermine fundamental human values. In particular, issues such as data privacy and algorithmic bias can result in significant reputational and/or financial risks. The "Ethics by Design" White Paper provides three basic principles to promote ethical behaviour: attention, construal and motivation.

Examples in recent years show how employees can be motivated to act ethically by adding ethical decisions to the process of developing services and products, and reveal leaders formulating their missions in an ethical context. Therefore, it is expected that attention, interpretation and motivation will be used as design principles in the creation of ethical systems.

Trust acquisition based on trustworthiness

In the Trust Governance Framework, trustworthiness is "formed by accumulated evidence under trusted governance". Therefore, facts (data) play an important role.

However, as already mentioned, the existence of trustworthiness does not necessarily mean that trust will be built. If people do not know about it, cannot properly evaluate it or do not believe in it, trust is not created. Thus, sufficient objective and neutral evidence should be disclosed to trustees to permit them to evaluate the trustworthiness of the actors in the system.[28] In addition, since evidence itself may be evaluated for trustworthiness, the evidence needs to be verified by a third party for accuracy and authenticity, with appropriate governance for storage, processing and sharing.

To make evidence understandable to trustees, it is not enough to simply provide data and information. Based on the premise that human beings have cognitive biases, it is important to have a method of dissemination and an information disclosure system that can prevent trustees from reaching erroneous conclusions and placing trust where it is undeserved. In addition, those methods and systems must have trustworthiness and be trusted by people through appropriate governance.

Having trust means people believe that when something goes wrong, it will be identified and fixed quickly. Such trust can be built through conversations and engagements with citizens, technologists and policy-makers.[29]

3.4 The importance of trust anchors

As mentioned earlier, the relationship between trust, trustworthiness and governance is a chained structure. When individuals, as trustees, make decisions in their lives, such as choosing services, how far back in the chain do they need to go to check for trustworthy evidence? The longer the chain to be traced back is, the more costly it becomes, not only to the individual as trustees, but also to society.

Trust anchors lower the cost for individuals to verify trustworthiness. They communicate evidence of sources of trustworthiness and prove trustworthiness to trustees. According to related research, for governance to be a potential trust anchor, factors such as the competence and values of governance entities are necessary (see Box 5).

As indicated, governance in the post-Fourth Industrial Revolution era includes not only governments, but also corporations, third parties and communities. Since governance is currently divided among countries and regions, it is difficult to set up common trust anchors to achieve DFFT. In such cases, mutual authentication mechanisms between trust anchors are required. Hence, for trust anchors to form and fully function, it is essential to have multistakeholder initiatives and collaboration.

BOX 5 **TIGTech, *Trust & Tech Governance***[30]

Benefits, risks and public trust in technology innovations are usually the focus of political and societal attention. Almost entirely overlooked, however, is the need for the governance of these technologies, in its own right, to be trustworthy and to earn trust. TIGTech research and consultation sought to understand the drivers of trust and sources of distrust. They apply the knowledge to consider how tech governance may differ, and in what ways, if

trustworthiness and the earning of trust were considered and systematically incorporated into governance institutions and governance design. For such diverse fields of research, there was an unusual and remarkable consensus on the qualities that are important for trust: intent, competence, respect, integrity, inclusion, fairness and openness. These seven trust drivers are deeply rooted in people's individual and collective psychology and in societies.

A number of new competencies will be important for developing new technologies' trustworthy and trusted governance. Three are highlighted in the report:

1. Society trusts governance when it is seen to be working in the public interest. A new openness and approach to communicating "evidence of trustworthiness" maybe required.

2. The greatest concern of citizens and civil society groups in tech governance focuses on ethics and values. This is not the heartland of governance design, and new skills to create the trusted environment may be needed to navigate this complex terrain.

3. Many of the complex issues brought about by the use of digital technologies do not have simple answers and will need to reflect the values of societies. The involvement of citizens will be important in this process, and innovation in this area is required.

Below: Getty Images

4 Conclusion

“ To keep the chain of trust intact, trust anchors must be built in the post-Fourth Industrial Revolution era through the mutual cooperation of the members of society.

The current era of change is known as the Fourth Industrial Revolution. New technologies have the power to expand human potential by realizing personalized services and innovative businesses that address the needs of each individual user. But these technological and business innovations amplify the complexity and uncertainty of society, creating a backdrop of distrust among people. This distrust is deepened by the fact that existing governance tools are ineffective in dealing with dramatic structural change in society and the speed of innovation brought about by the Fourth Industrial Revolution. As a result, values that people hold dear, such as privacy and the right to self-determination, are being undermined.

Establishing objective facts or conditions (trustworthiness) that show that governance is balancing the expansion of human potential through technology with the protection of important values is the first step towards dispelling this distrust. This is difficult to achieve using existing governance methods alone. It is essential to conduct the governance process in an agile manner with the participation of multiple stakeholders. At the same time, it is necessary to communicate carefully with citizens and users, with trustworthiness built through governance, and to continually strive to earn their trust.

To realize this agile process, it is necessary to change the mindset of each entity, implement a mechanism to enable the operation of the process, and nurture new capabilities in business and governance entities. To keep the chain of trust intact, trust anchors must be built in the post-Fourth Industrial Revolution era through the mutual cooperation of the members of society. The Trust Governance Framework proposed in this White Paper will help to realize the vision of a society that transcends national and disciplinary barriers, in which all actors work together to rebuild trust.

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Endnotes

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