OKI Open up your dreams

OKI Group

Innovation and Technology Strategy Meeting

Technology Strategy

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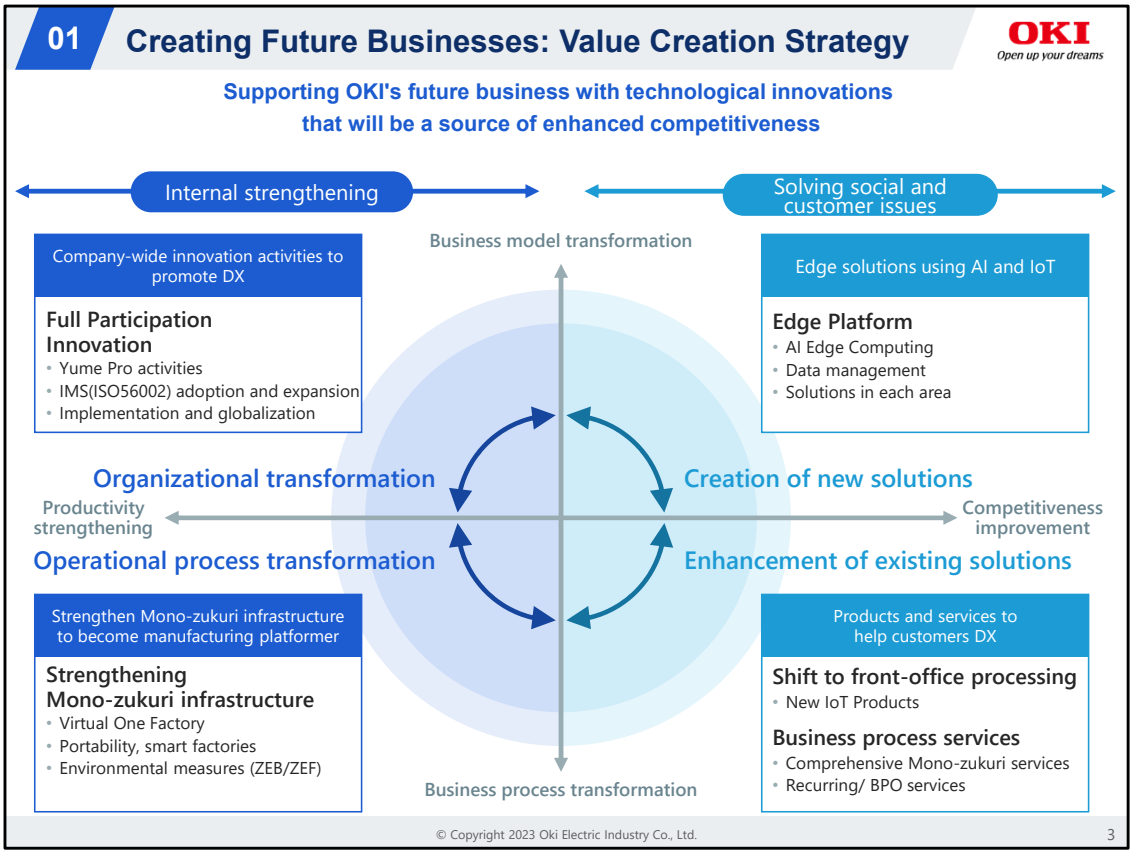
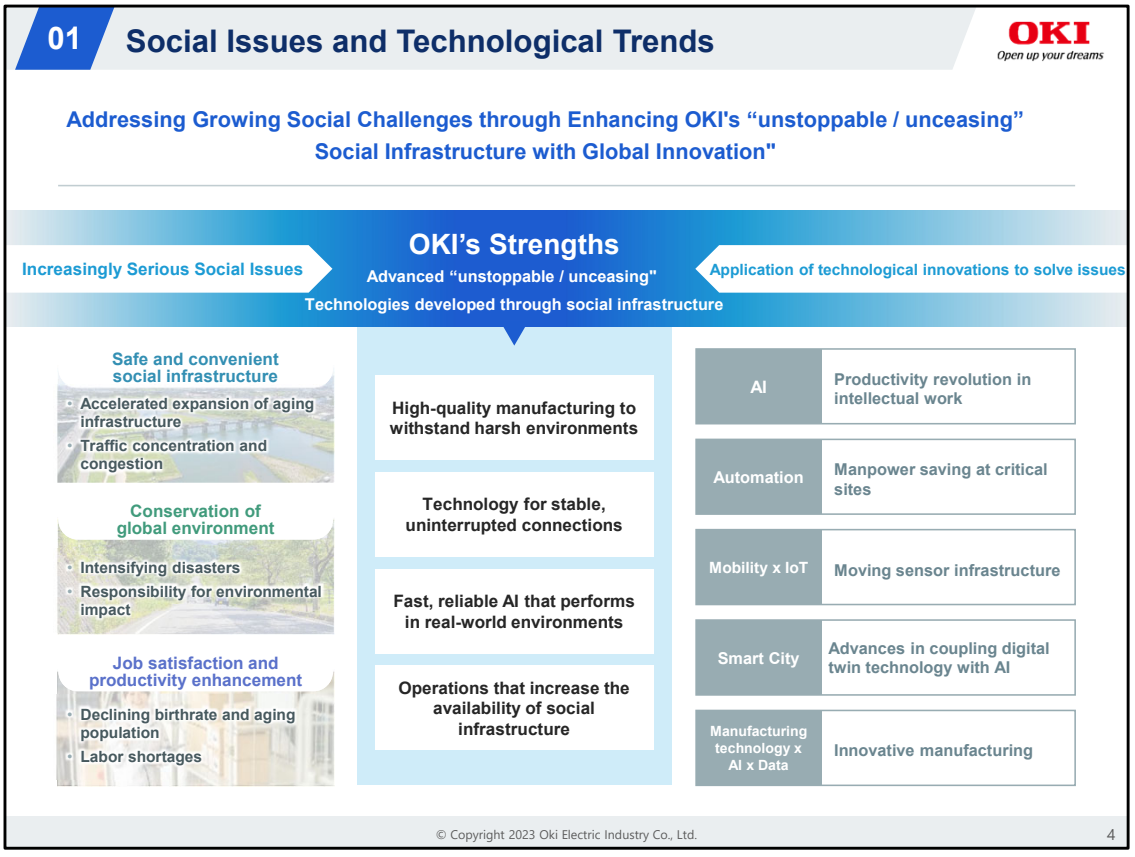
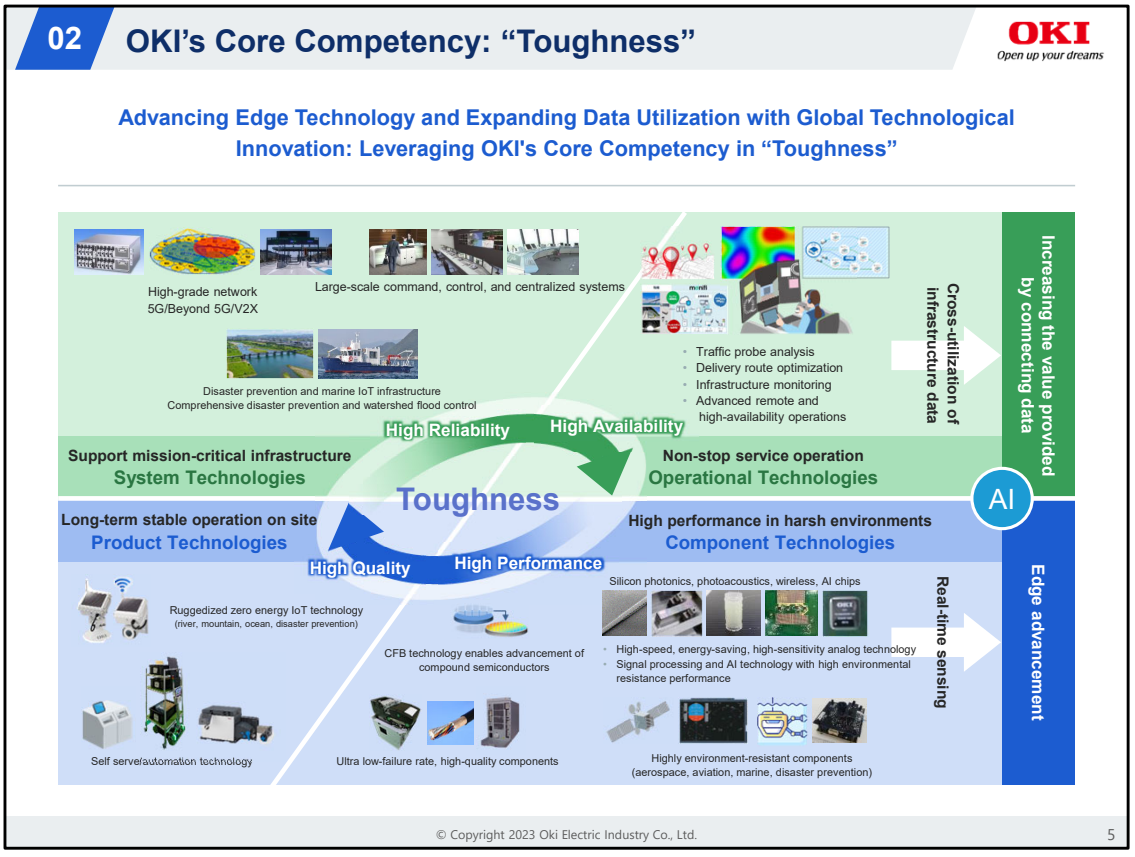


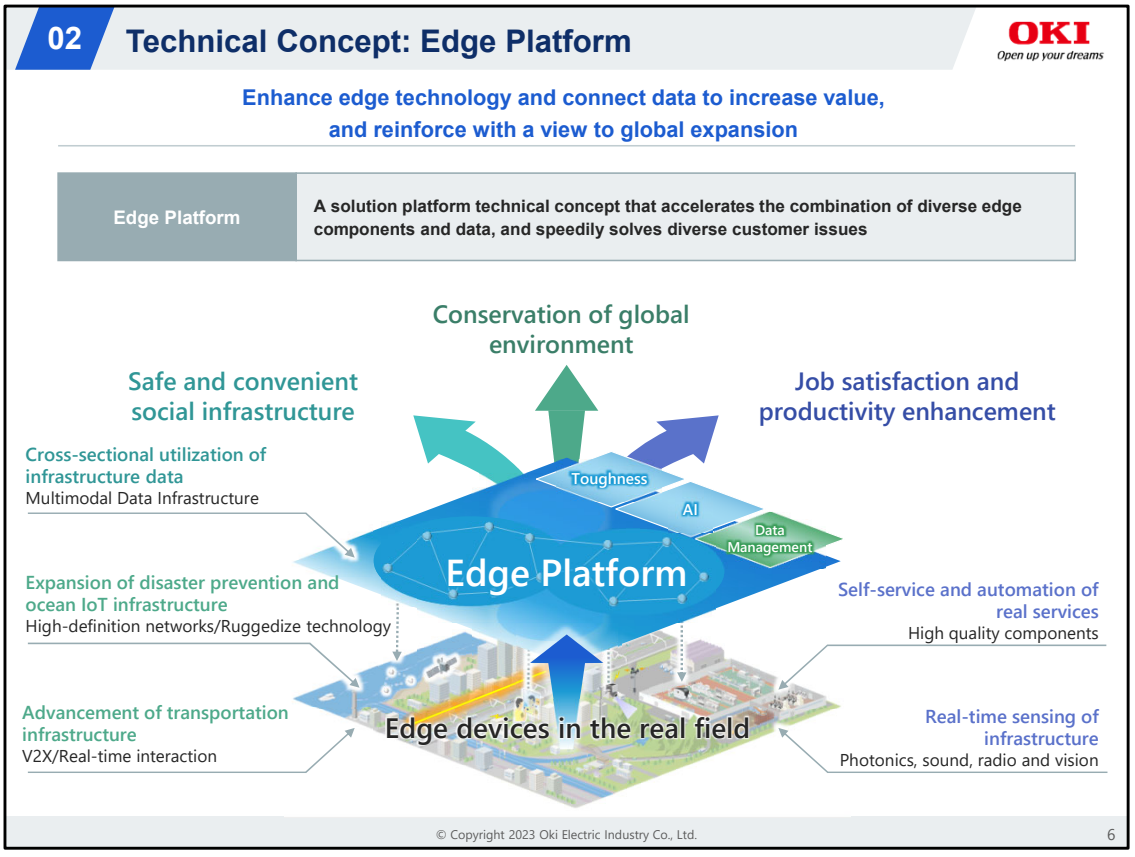
- This is an overview of the value creation strategy that was announced in our Medium-Term Business Plan in May.
- The objective of our technology strategy is to continue innovating in technologies that serve as the source for solving social and customer challenges, thereby enhancing our competitiveness.
- We will leverage our expertise in analog, AI, and IoT to devise and strengthen solutions.



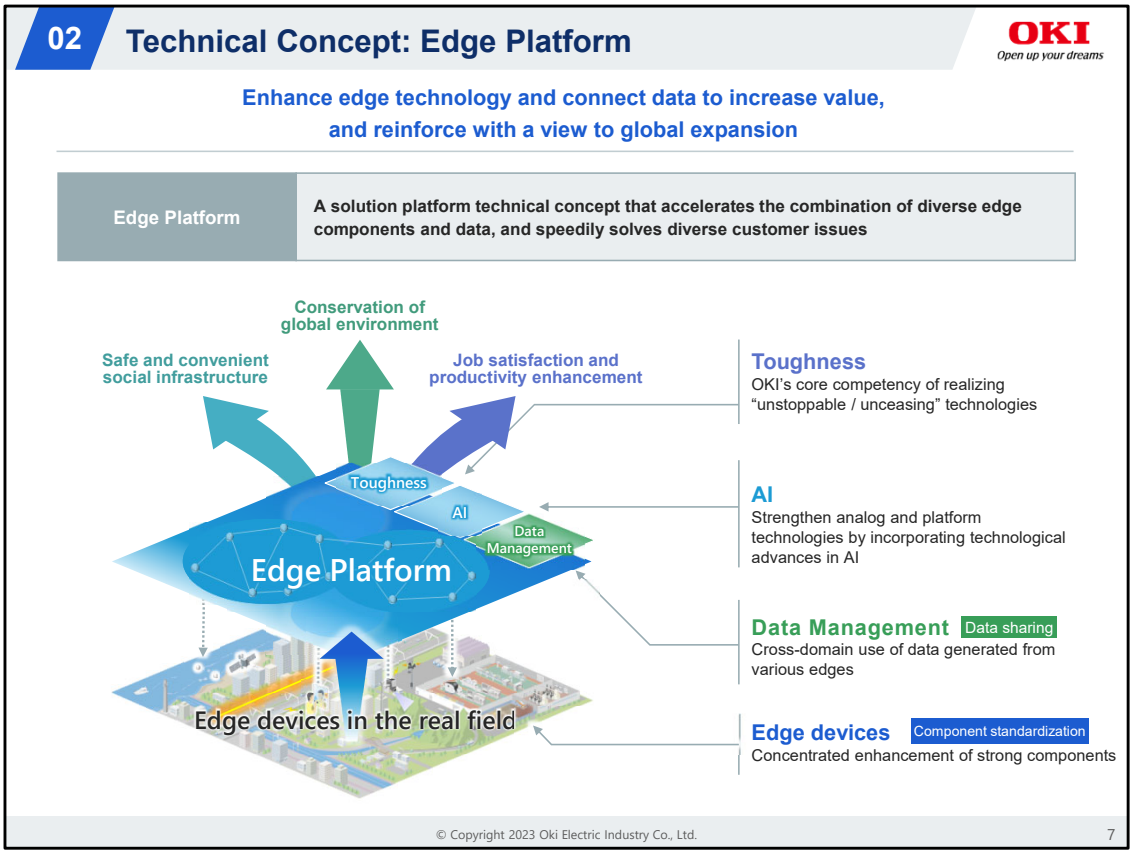
- First, we have increasingly serious social issues and technological trends.
- Social issues such as labor shortages, aging infrastructure, and worsening natural disasters are becoming increasingly severe.
- On the other hand, recent technological advancements in such fields as AI, automation, mobility, IoT, smart cities, and manufacturing have been remarkable.
- Since its establishment, OKI has been providing “unstoppable / unceasing” solutions in a wide range of fields to build reliable and convenient social infrastructure and pursuing our goal of “Delivering OK! to your life.”
- OKI will incorporate these global technological innovations and integrate them with the technology developed through “unstoppable / unceasing” social infrastructure, thereby improving the sophistication of social infrastructure.



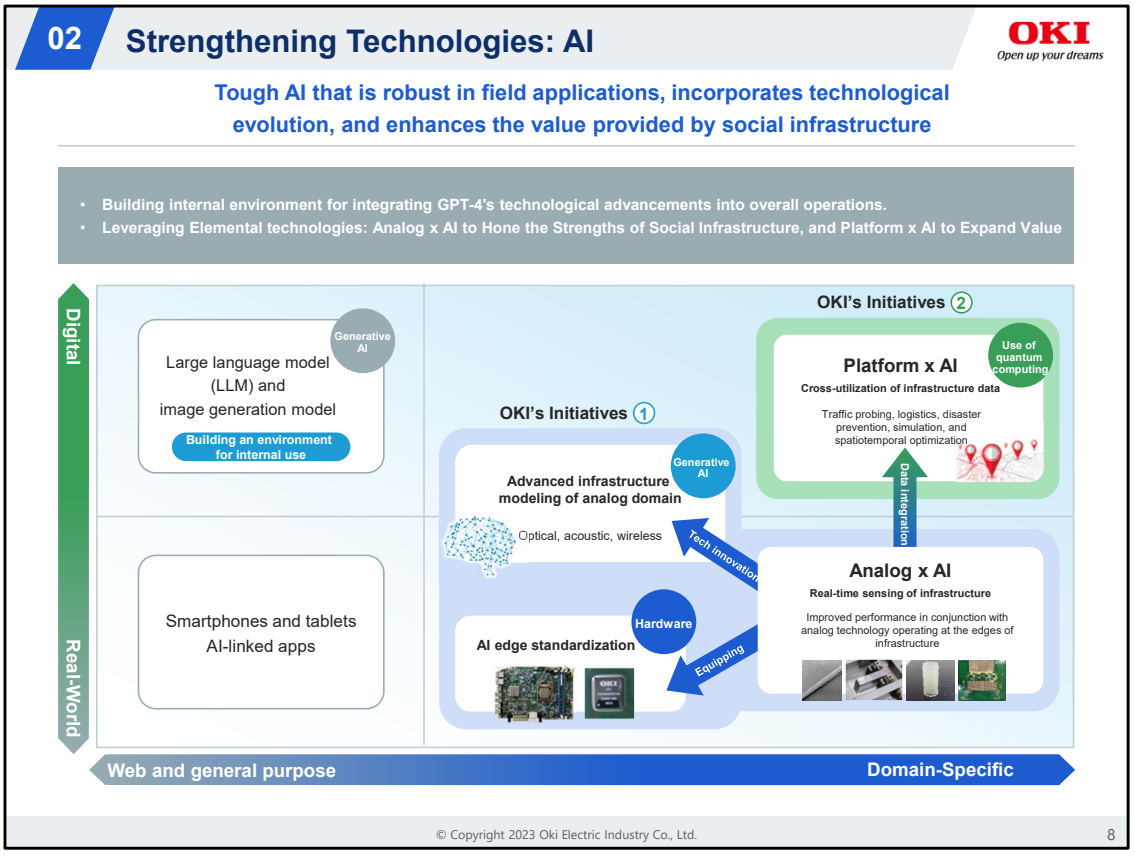
- "Toughness" is OKI's core competency that enables "unstoppable / unceasing" advancement.
- We do not use the word here to simply mean "creating high-quality products that do not break."
- "Toughness" rather denotes OKI's value chain, which constitutes its business, including components, products, systems, and operations. "Toughness" is built on the integration of technologies in each of these fields.
- Our component technologies achieve "high performance" in harsh environments. We combine advanced analog and AI technologies to enable high-performance sensing that is meant to be used in harsh environments such as those of intense weather and/or noise.
- Using these components, our product technologies ensure "high quality" for long-term stable operation in the field. We also possess technologies with which we create systems that support the "high reliability" of mission-critical infrastructure.
- Further, these systems operate based on our operational technologies, which provide "high availability" through non-stop service operation.
- In components, we combine advanced analog and AI technologies to achieve real-time sensing that advances edge devices that are robust in the field.
- In operations, data generated at edge devices accumulates in large quantities. We enhance value proposition through cross-utilization of connected data.
- AI technology is positioned as the core technology that hones these strengths at both the edge and data level.



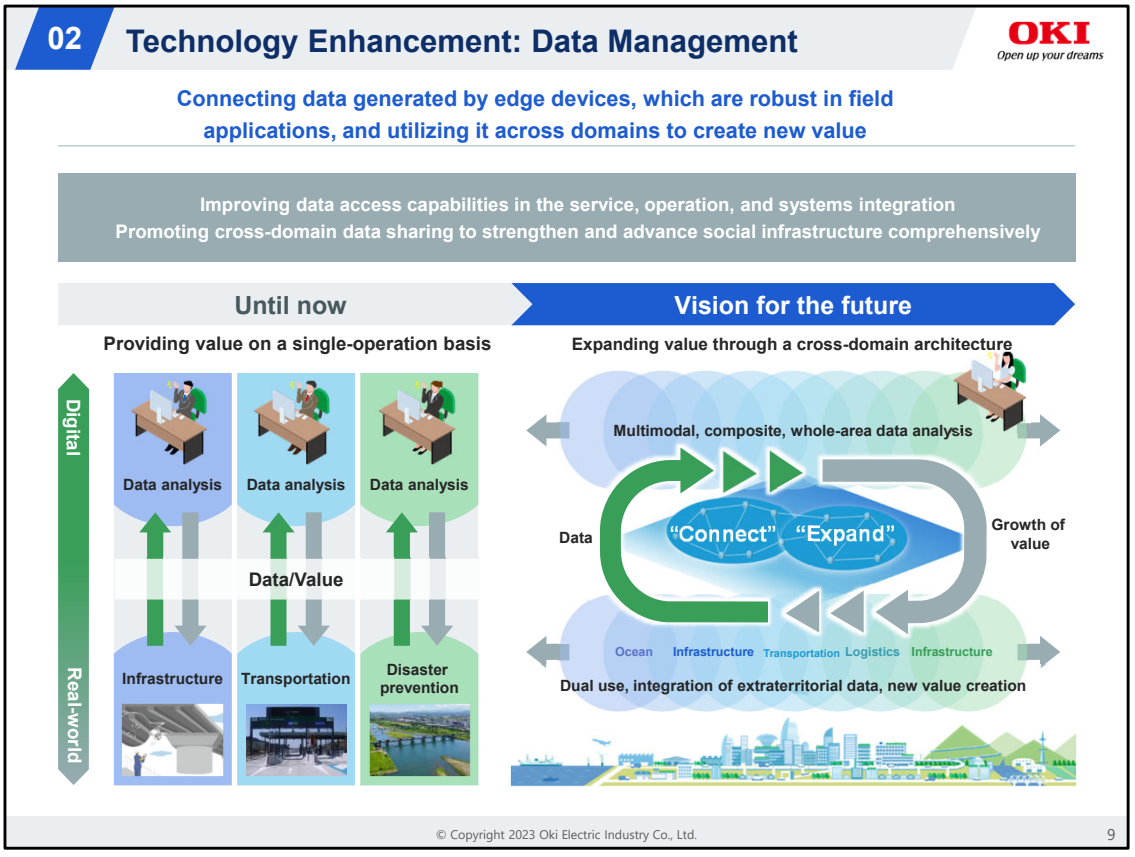
- Building on OKI's core competencies, we will continue to evolve our technological expertise in social infrastructure.
- To achieve this, we have announced the technological concept of the edge platform in May as part of Medium-Term Business Plan 2025. This concept aims to leverage the advancement of edge technologies to expand the value provided from connected data, with an aim of global expansion.
- Now, let's dive into the key points of this edge platform concept.



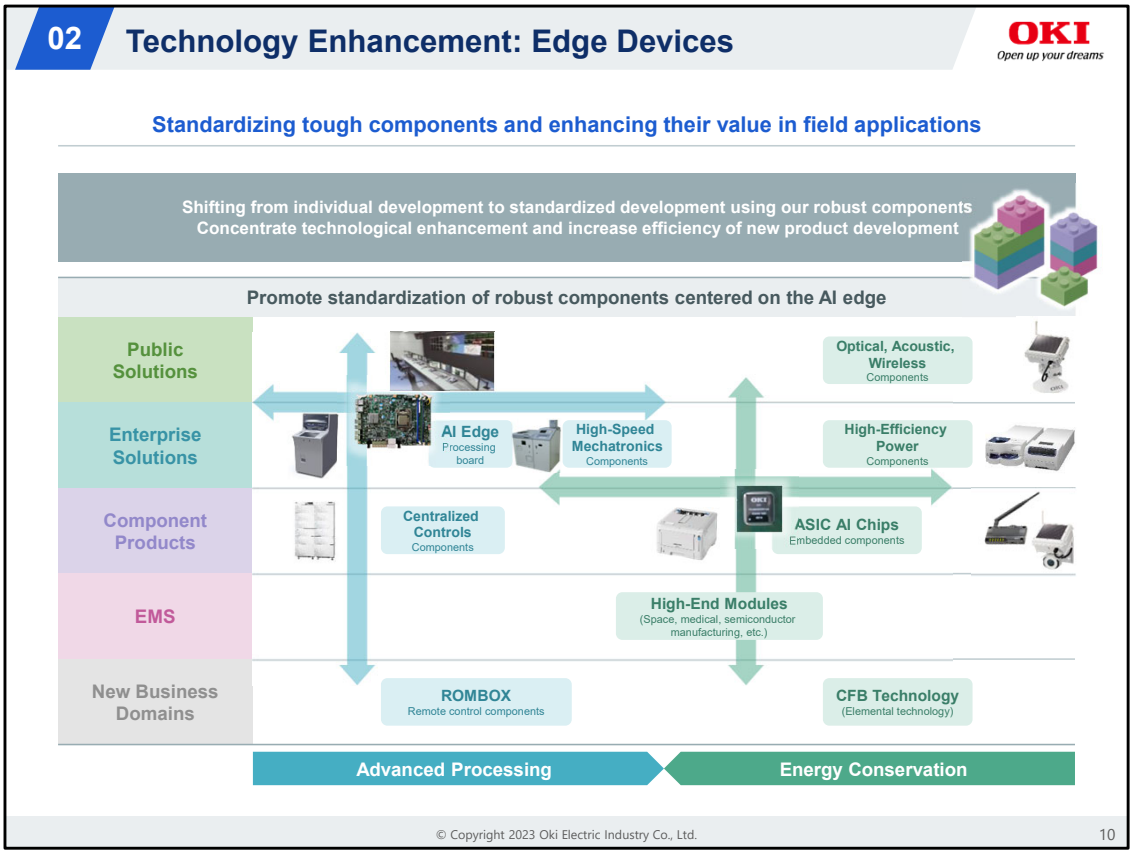
- Firstly, the edge platform is a technological concept that accelerates the combination of various edge components and data to swiftly address diverse customer issues.
- There are four key points to this concept.
- First, "toughness," as explained above, serves as the foundation for the edge platform, enabling it to be "unstoppable / unceasing". It is one of OKI's core competencies.
- Second, "AI" strengthens the platform by incorporating global technological advancements, enhancing the analog technology at the edge and the data platform. Utilizing AI enhances data analysis and processing, increasing the value of data that adequately reflects edge conditions.
- Third, "data management" focuses on improving the management of vast amounts of data generated at the edge. Data sharing is crucial in order to utilize data across domains and maximize its value.
- Lastly, "edge devices" aim to standardize the components that constitute the edge and concentrate on enhancing their strengths. Strengthened edge devices, widespread in society, facilitate cross-domain data utilization. . Moving forward, we will explain the initiatives to strengthen the edge platform, starting with AI, followed by data management, and then edge devices.



- The first initiative is strengthening our AI technology.
- In recent years, there has been remarkable progress in AI, including the development of generative AI. In this context, our AI excels in real-world scenarios at the edge. We will enhance the strength of our edge technology and expand the multifaceted utilization of the data obtained from these settings. These are the two points on which we will focus to strengthen our AI.
- First, in the edge domain, we have advanced analog technology that comprises high-definition sensors for on-site conditions. By integrating AI with these sensors, we will strengthen real-time sensing to gain a deeper understanding of the field. This type of AI at the edge will be incorporated into standardized AI edge hardware. We will standardize functional modules with small, power-saving AI chips and advanced modules equipped with CPU/GPU.
- Through these efforts, OKI will be able to collect a significant amount of data unique to the harsh environments where our edge technology is deployed. The vast amount of collected data can be used to build a new "advanced foundation model" that enhances our understanding of the field, similar to the paradigm of recent generative AI models such as large language models. OKI will take on challenges in this domain.
- It should be noted that we have already begun internally releasing systems utilizing Chat GPT-4 for various operations and the advancement of our company towards large language models.
- Further, in utilizing the collected on-site data, we will combine technologies such as spatiotemporal simulation, optimization, and quantum annealing to create multifaceted value.



- The next initiative is “data management”.
- In data management, we are concerned with connecting the data generated by OKI’s robust on-site edge technology and utilizing it across different operational domains to expand its value.
- So far, data utilization has been limited to specific operations and domains, providing value at the operational unit level. Going forward, we will disconnect and reconnect the edge, data analysis, service provision, etc., at the operational unit level, expanding diverse value beyond our previous business scope.
- For example, we will contribute to disaster prevention and mitigation by the dual use of traffic condition and infrastructure monitoring. By integrating data from multiple regions for analysis, we will provide and expand new values such as detecting and predicting various events that were difficult to grasp individually, from municipal disaster prevention to flood control.



- The third initiative is “edge devices”. The key point is to thoroughly standardize rugged components that are robust in the field.

  We will expand the application of standardization to products within each business segment while promoting cross-segment standardization.

  Through standardization, we can leverage advanced performance across a wide range of products and focus on enhancing hardware development needed. This will improve development efficiency and contribute to the creation of a large number of attractive products.

- We will further standardization in two fields: advanced processing and energy conservation.

  For example, in advanced processing, we will standardize AI edge processing boards that are currently developed separately in various business divisions. Similarly, in energy conservation, we will expand the deployment of AI chips for component products to other domains and promote cross-segment standardization.

02 Relationship with Business Segments

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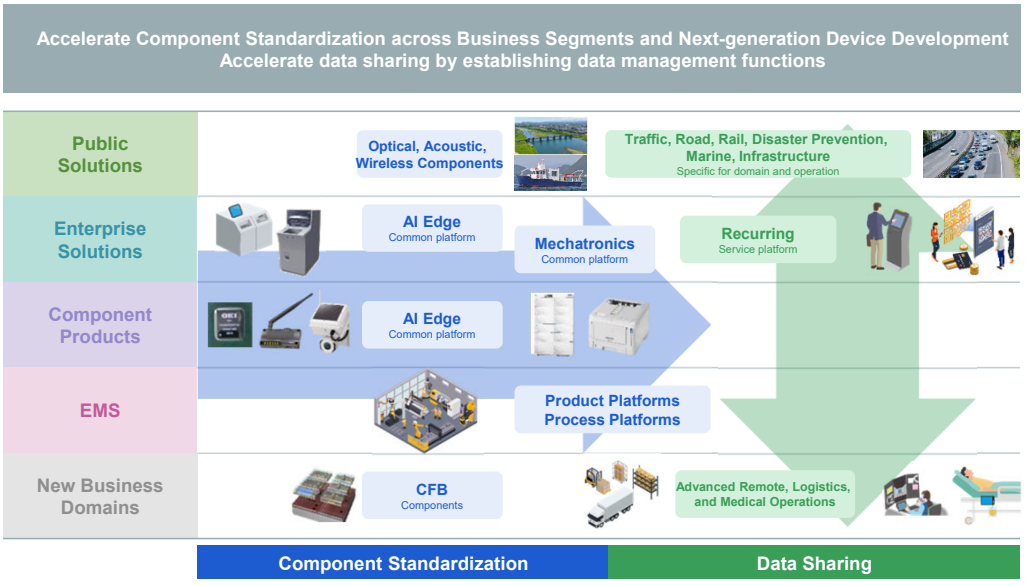
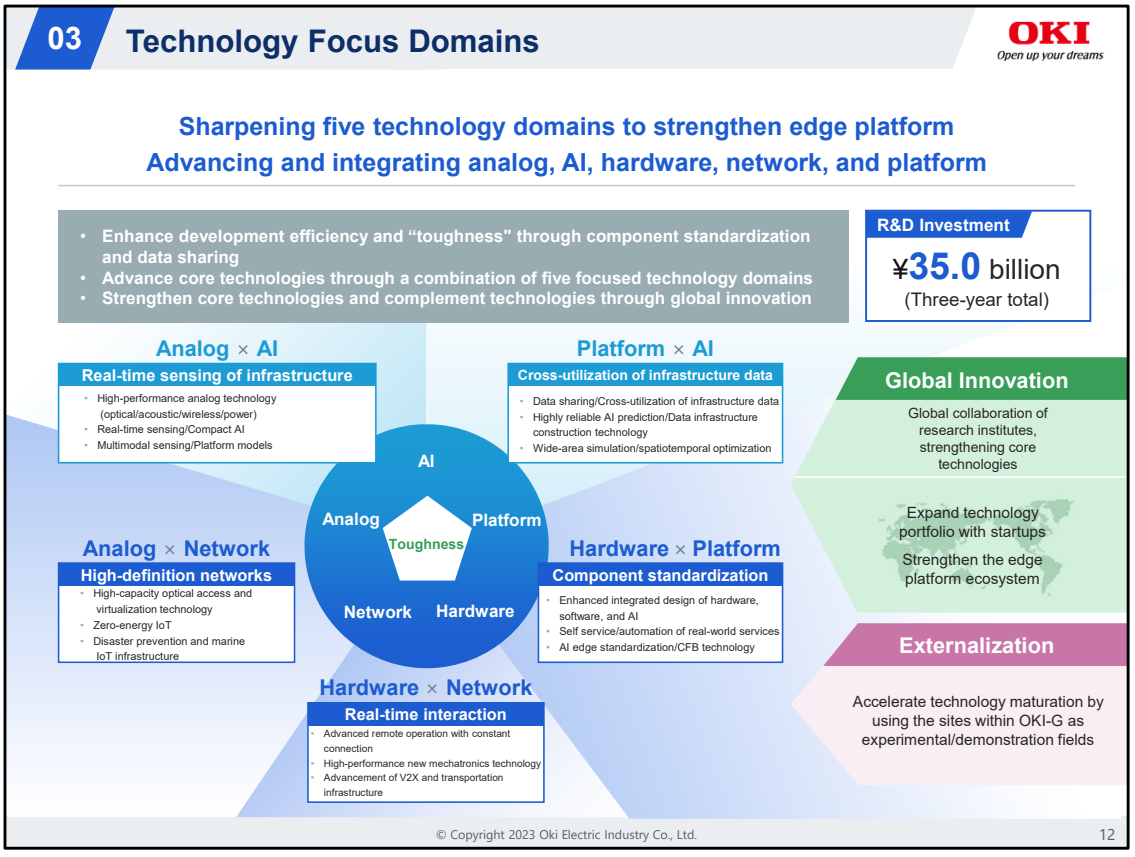
Advance the edge platform, accelerate the combination of components and data across segments, and move to a structure that speedily delivers high-quality services



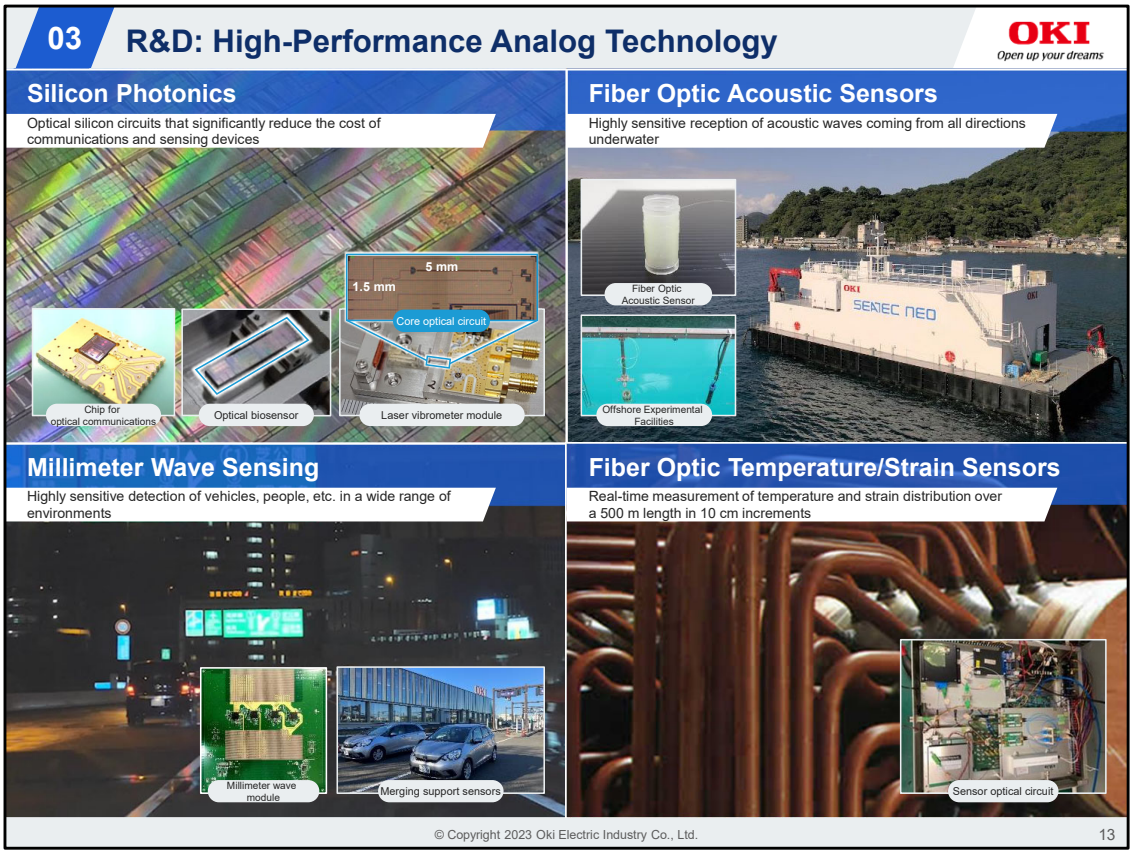
- We are making steady progress on the edge platform that we have introduced above in line with our Medium-Term Business Plan 2025.

  This slide shows the relationship between our business segments and the edge platform.

- In each business segment, we are strengthening the technology of data sharing and component standardization within the edge platform.
- First, in component standardization, we are promoting the standardization of development components, enabling efficient and speedy execution of next-generation device development, and accelerating the market provision of edge devices.
- In data sharing, we are progressing the utilization of data collected by edge devices provided to the market in each business field. Additionally, we are leveraging AI to enhance the added value of the data.
- In the future, we will accelerate the combination of components and data across segments and move to a structure that speedily delivers high-quality services that are effective in the field.



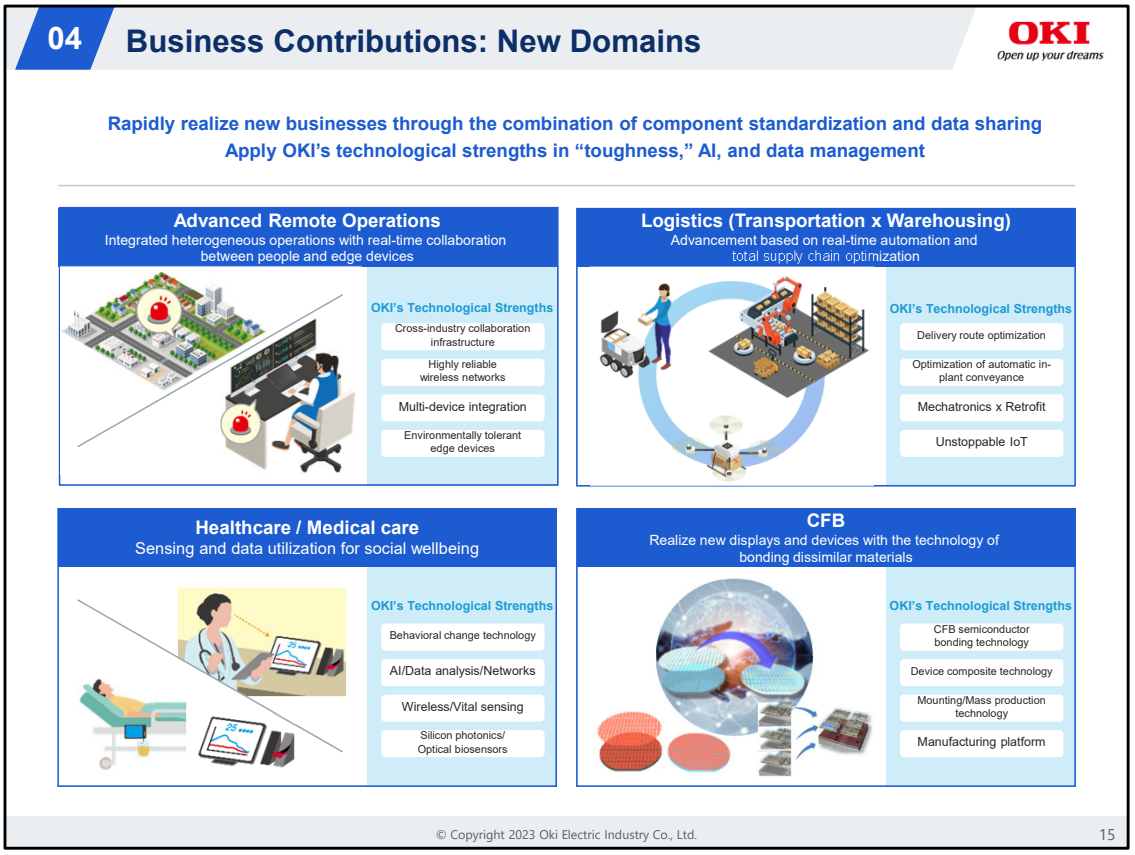
- We will focus on R&D in five technology domains to strengthen our edge platform. These domains are: Analog, AI, Hardware, Network, and Platform. We will advance the sophistication of our core technologies by integrating these domains.
- As mentioned above, we will enhance “Hardware x Platform” component standardization and improve development efficiency through the cross-utilization of infrastructure data with “Platform x AI,” further strengthening our “toughness.”
- With “Analog x AI,” we will leverage the strengths of optical, acoustic, and wireless technologies to achieve real-time sensing of diverse infrastructures.
- Further, we will leverage our strengths in network technology to realize high-definition networks and real-time interaction.
- We will pursue the strengthening of these technologies by incorporating global technological innovations. We will further advance our core technologies through collaborative research with global research institutions. Additionally, we will engage in open innovation with startups to complement our technology portfolio.
- To accelerate technological innovation, we will use OKI-G as a testing ground for our prototyped technology and expedite the maturation and externalization of technologies.
- By focusing on key technology domains and promoting global innovation and externalization, we aim to establish globally competitive core technologies through cumulative investment of ¥35.0 billion over three years.



- Here we have a case study of OKI's analog technology R&D.
- OKI has provided products that exhibit its strengths based on high-performance analog sensors in domains such as advanced road traffic systems, marine infrastructure, and infrastructure maintenance.
- Examples of these products include silicon photonics, which greatly reduce the cost of communication and sensing devices in optical semiconductor circuits, fiber optic acoustic sensors, which accurately detect minute sounds underwater using light, millimeter-wave sensors, which detect people and vehicles over a wide area with high responsiveness to environmental changes, and optical fiber sensors, which accurately measure temperature and strain distribution up to 500 m in 10 cm increments.
- OKI will continue to evolve these technologies moving forward by integrating them with AI.

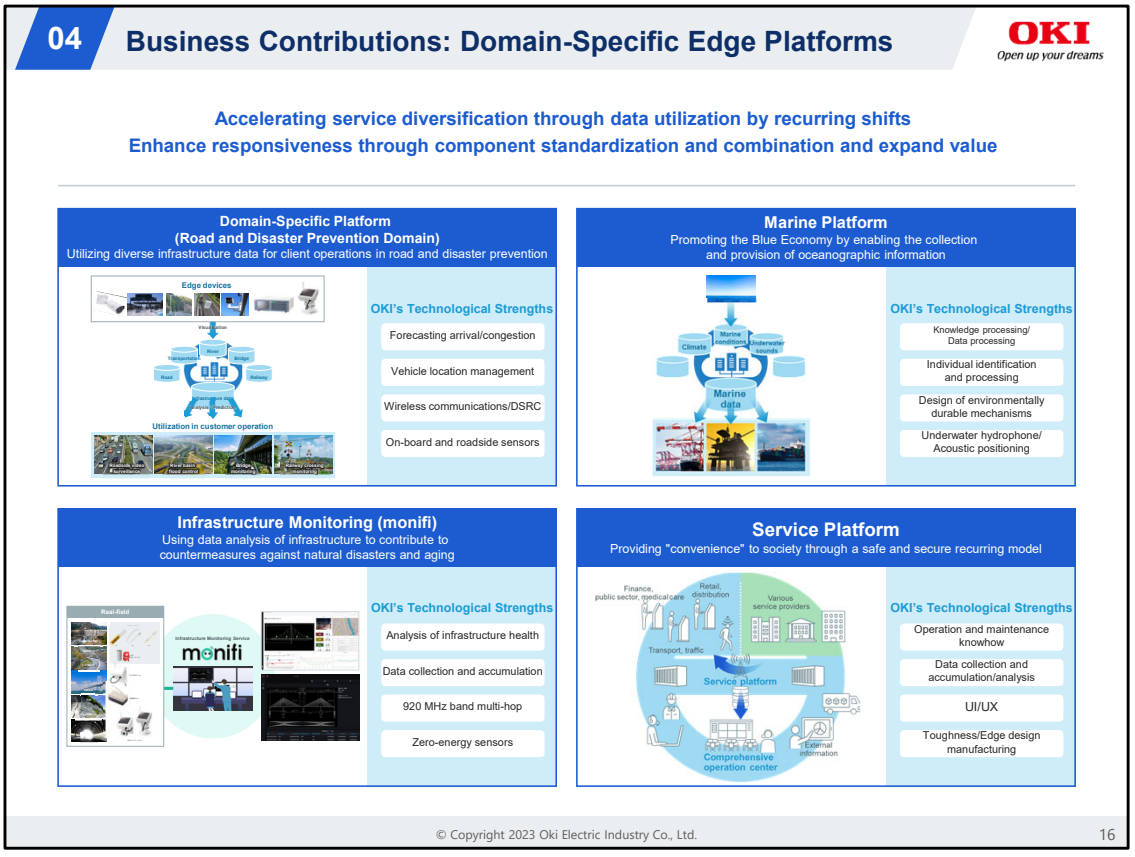
- Next, I would like to introduce examples of experiments and demonstration testing within OKI-G with a view toward externalization.
- Technologies that enable remote real-time work instructions and understanding of on-site conditions are increasingly in demand to address social issues such as labor shortages.

  We are experimentally using our developed remote work support system at the Numazu, Honjo, and Tomioka factories.
- While office security is well-established, there is a growing concern about insufficient security at manufacturing sites and other areas where networking has advanced. To address new threats to on-site networks, we are conducting trials of IoT security technologies that utilize traffic analysis at the Numazu and Honjo factories.
- At our printer factory, we use AI to detect the position of label application on printers. We have achieved a speed increase of more than 50% in inspection time using AI model compression technology.
- In the assembly process, we have developed an AI-based system for automatic recognition of correct procedural steps to ensure quality. We are currently conducting experiments at the Honjo factory.



- Now allow me to explain some examples of contributions to our business.
- These are our new domains. these four businesses are composed of technologies developed through our edge platform. We will grow our new businesses on technology with a sophisticated and reliable background.
- Advanced Remote Operations, Logistics, and Healthcare / Medical care businesses comprise edge hardware, networks connecting the hardware to services, operations based on data generated by edge devices, and AI to optimize these operations.
- Technology development for new businesses involves a lot of trial and error. However, by leveraging the edge platform, we can smoothly move forward with such technology development and increase the likelihood of successful business commercialization.
- Additionally, CFB is a technology for joining dissimilar materials, such as silicon and compound semiconductors. We developed it in the mass production of LED heads for printers.

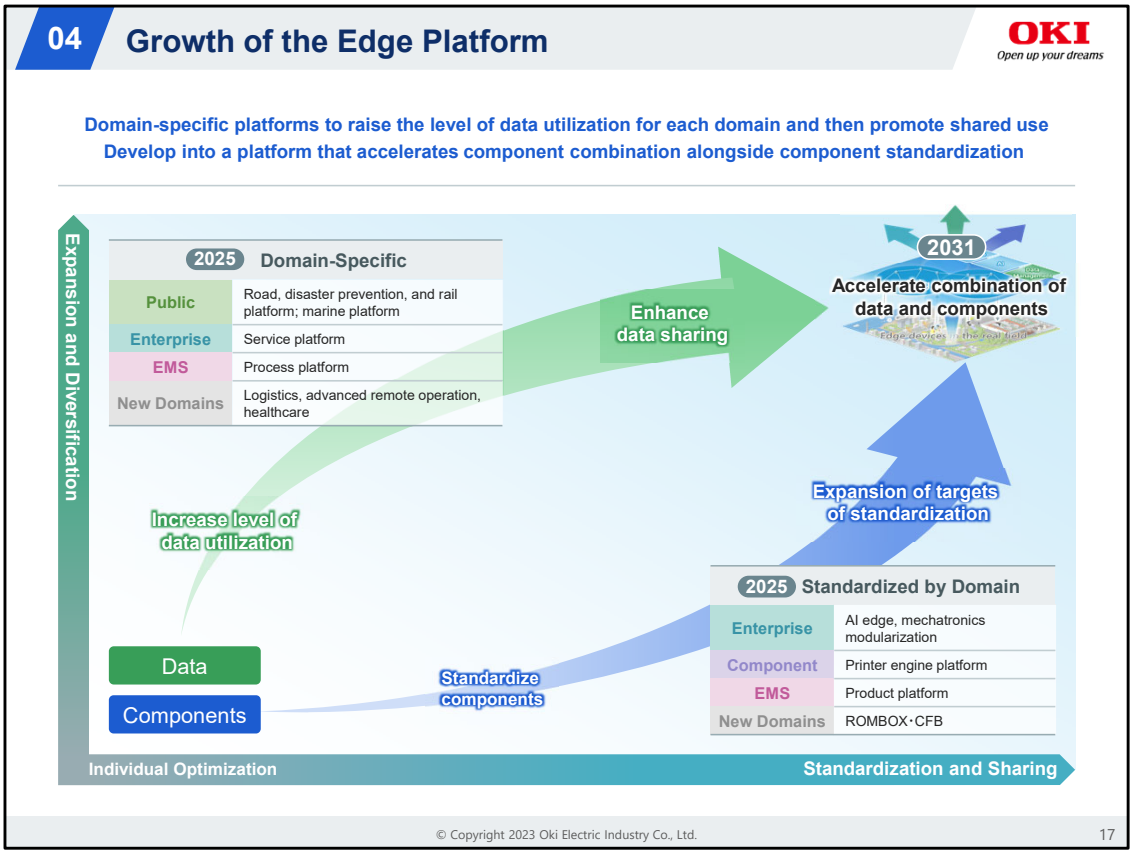
  This technology can be considered a platform technology that contributes to enhanced performance of various semiconductor devices, such as new optical devices like displays and power semiconductors, as well as high-frequency devices and MEMS.



- Next, let me introduce OKI's domain-specific edge platforms that aim to leverage data and enable service formation in our domains of expertise.
- Up to the present, OKI has been providing solutions and services tailored to our customers' business needs.

  In the fields of roads and disaster prevention, ocean data, infrastructure monitoring, and financial distribution, we will enhance the utilization of data through the edge platform. We will first expand and diversify domain-specific services.

  Then, by combining component standardization and data utilization, we will strengthen our ability to address customer challenges and expand the value we provide.



- As mentioned above, the edge platform will progress toward standardizing components and sharing data, but each will follow different expansion routes.
- In data sharing, we will pursue domain-specific platforms through 2025 and promote the use of data at a business domain-specific level, before realizing cross-domain data sharing. We will first standardize components, and then expand the scope of standardization.
- In this way, various combinations of data and components will accelerate by 2031 and contribute to diverse businesses.
- Further, leveraging advanced edge capabilities, we will enhance the value provided from data.

05 Summary

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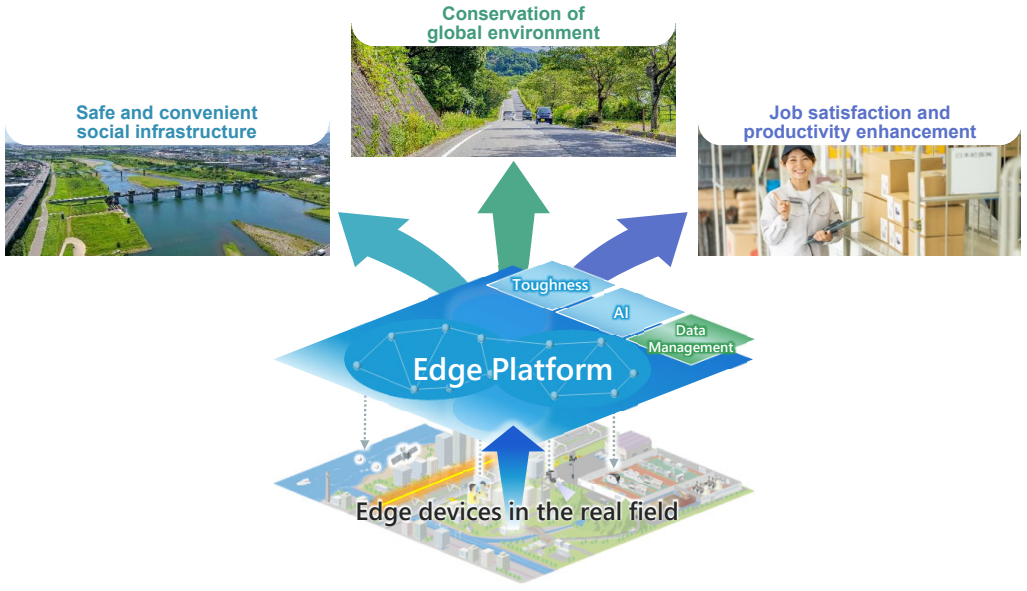
Providing “safe and convenient social infrastructure” through technological innovation on the edge platform



- We have reached the end of the explanation of our technology strategy.
- OKI is committed to delivering sustainable, secure, and convenient social infrastructure to everyone through technological innovation of the edge platform.
- Thank you for your attention.