Kanta information system services

Assessment of the development of digitalisation in healthcare 2010–2024

Ministry of Social Affairs and Health

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Abstract

The assessment of Kanta information system services is based on the objectives of the strategy for digitalisation and information management in healthcare and social welfare 2023–2035. The assessment sought to produce a comprehensive analysis of the development and functionality of the Kanta Services from the perspective of healthcare. The assessment focused on development costs, strategic objectives and priorities as well as on the current and future functionalities and benefits of the Kanta Services, for example. In addition, the development of Kanta and the related cooperation were assessed.

The assessment was carried out using a multimethod approach that included literary sources and empirical data. The empirical data was collected through a thematic interview and survey, in which a large number of parties involved in the development and use of the Kanta Services took part.

The current benefits of the Kanta Services were considered significant in the assessment. The results show that Kanta is a key digital infrastructure for healthcare, facilitating the sharing of patient data between different organisations. Based on the results, the transparency of funding, measures to improve the practical implementation of legislation, strategic guidance and the analytical prioritisation of development areas play a key role in ensuring the efficient development of the Kanta Services and their ability to respond to future needs in the digital service development of healthcare and social welfare.

Keywords healthcare, information systems, information management, development, assessment

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Kanta-tietojärjestelmä-palvelut
Terveydenhuollon digitalisaation kehityksen arviointi 2010–2024

Sosiaali- ja terveysministeriön raportteja ja muistioita 2025:8

Julkaisija	Sosiaali- ja terveysministeriö		
Tekijä/t	Sari Palojoki, Riikka Vuokko		
Kieli	englanti	**Sivumäärä**	89

Tiivistelmä

Kanta-tietojärjestelmäpalveluiden arviointi perustuu sosiaali- ja terveydenhuollon digitalisaatio- ja tiedonhallintastrategian 2023-2035 tavoitteisiin. Arvioinnin tavoitteena oli tuottaa kattava analyysi Kanta-palveluiden kehityksestä ja toiminnallisuudesta terveydenhuollon näkökulmasta. Arviointi painottuu mm. kehittämisen kustannuksiin, strategisiin tavoitteisiin ja painopisteisiin sekä palveluiden nykyisiin ja tuleviin toiminnallisuuksiin ja hyötyihin. Lisäksi arvioitiin Kanta-kehittämistä ja siihen liittyvää yhteistyötä.

Arviointi toteutettiin monimenetelmällisesti hyödyntäen kirjallisia lähteitä ja empiiristä aineistoa. Empiirinen aineiston kerättiin teemahaastattelulla ja kyselyllä, joihin osallistettiin laajasti Kanta-palvelujen kehittämiseen ja käyttöön osallistuvia tahoja.

Kanta-palveluiden nykyisiä hyötyjä pidettiin arvioinnissa merkittävinä Tulokset osoittavat, että Kanta on keskeinen terveydenhuollon digitaalinen infrastruktuuri, joka helpottaa potilastietojen jakamista eri organisaatioiden välillä. Tulosten perusteella rahoituksen läpinäkyvyys, lainsäädännön käytännön toteutuksen tehostaminen, strateginen ohjaus ja kehittämiskohteiden analyyttinen priorisointi ovat avainasemassa varmistettaessa Kanta-palveluiden tehokas kehitys ja niiden vastaavuus tuleviin tarpeisiin sosiaali- ja terveydenhuollon digitaalisessa palvelukehityksessä.

Asiasanat	terveydenhuolto, tietojärjestelmät, tiedonhallinta, digitalisaatio, kehittäminen, arviointi		
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E-tjänsten Kanta
Utvärdering av digitaliseringens utveckling inom hälso- och sjukvården 2010–2024

Social- och hälsovårdsministeriets rapporter och promemorior 2025:8

Utgivare	Social- och hälsovårdsministeriet		
Författare	Sari Palojoki, Riikka Vuokko		
Språk	engelska	**Sidantal**	89

Referat

Utvärderingen av e-tjänsterna i Kanta baserar sig på målen för strategin för digitalisering och informationshantering inom social- och hälsovård 2023-2035. Syftet med utvärderingen var att göra en omfattande analys av hur Kanta-tjänsterna har utvecklats och fungerat ur hälso- och sjukvårdens perspektiv. Utvärderingen fokuserar bland annat på utvecklingskostnaderna, de strategiska målen och prioriteringarna och på tjänsternas funktioner och nytta nu och i framtiden. Dessutom utvärderades utvecklandet av Kanta och det samarbete som uppkommit i anslutning till det.

Vid utvärderingen användes flera metoder. Man använde bland annat skriftliga källor och empiriskt material. Det empiriska materialet samlades in genom en temaintervju och en enkät, där både aktörer inom utvecklingsarbetet och användare av Kanta-tjänsterna deltog på bred front.

Nyttan med Kanta-tjänsterna i nuläget bedömdes vara betydande. Resultaten visade att Kanta är en central del av den digitala infrastrukturen för hälso- och sjukvården, som gör det lättare för olika organisationer att dela hälsouppgifter. Det viktigaste för att säkerställa effektivare Kanta-tjänster som kan tillgodose framtida behov under den digitala utvecklingen av social- och hälsovårdstjänsterna är enligt resultaten transparent finansiering, effektivare lagstiftning i praktiken, strategisk styrning och analytisk prioritering av utvecklingsobjekten.

Nyckelord	hälso- och sjukvård, informationssystem, informationshantering, utveckling, utvärdering		
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PREFACE

Currently, healthcare and social welfare service delivery is being developed to meet contemporary and future needs. The strengthening of primary care services and related preventive and patient-centered operating models are prepared under national steering. The factors influencing the changing operating environment include, for example, the sustainability gap and the ageing of the population. In addition, national strategies emphasise the significance of preventive healthcare and aim to promote customer orientation in all services. At the same time, the reform of national legislation and the development of technology enable new kinds of activities to support healthcare and social welfare services. At the regional level, these challenges are addressed by, for example, the integration of services and the information systems that support their implementation, as well as the deployment of various digital solutions for counselling, service use and self-care. At the same time, the improving capabilities of customers create new expectations about what services are used and how they are used. The overall goal is a high-quality and efficient service system in which digitalisation helps ensure that everyone receives timely and needs-based care and in which wellbeing and quality of life can be supported in the long term. Leveraging innovative solutions and cross-sectoral cooperation are key to achieving these goals.

In response to the changes described above, in spring 2024, the Ministry of Social Affairs and Health assessed the current state and future of the development of national information system services for healthcare and social welfare, i.e. the Kanta Services, as part of the broader set of information system services in healthcare and social welfare. The results of the assessment can be used to put forward proposals for measures for the further development of the Kanta Services and to clarify the role of the services with respect to future expectations.

We want to express special thanks to Mikko Staff, Director of Finance at the Ministry for Social Affairs and Health, for his contribution to the assessment process. In addition, we would like to thank the registry office of the Ministry of Social Affairs and Health, the registry office of the Ministry of Finance and the registry offices and experts of the Finnish Social Insurance Institution Kela and the Finnish Institute for Health and Welfare THL, who supported this work by providing resources and information related to the information search. We also want to extend special

thanks to Anna Sandberg, Senior Advisor at the Ministry of Social Affairs and Health, for her expert comments on the content of the report in the latter stages of the assessment process. Finally, we would like to thank all of the individuals and organisations who participated in the assessment. This assessment would not have been possible without their input.

Helsinki, 9 August 2024

The authors

1 Introduction

The assessment of Kanta information system services is one of the tasks set out in the strategy for digitalisation and information management in healthcare and social welfare (Ministry of Social Affairs and Health 2024:1), which was drafted by the Ministry of Social Affairs and Health in 2023. The need to update the Kanta Services emerged in the preparation of the strategy, in which emphasis was placed on the changes in the operating environment and the significance of the development of digitalisation. The strategy particularly emphasised digital healthcare and social welfare services that improve people's ability to independently take care of their wellbeing, health and functional capacity. These services can help to reduce the need for work-intensive healthcare and social welfare services, decrease the workload of professionals and strengthen the independent activity of healthcare and social welfare customers. In addition, opportunities were identified in the development of digital solutions and information system services to improve the flexibility of services and allow professionals to use their time more efficiently by enabling an increase in personal customer encounters. Based on these strategic objectives and contents, it was determined that there is an immediate need to start an assessment of Kanta information system services as part of the renewal of national information system services. The planning and implementation of the assessment were included in the digitalisation programme of the national service reform, and its results can be utilised in preparatory activities under the digitalisation programme, such as the separate preparation of a vision for the future of digital services in healthcare and social welfare.

The aim of this report is to produce a comprehensive assessment of the national Kanta information system services. Kanta currently offers digital services that are particularly beneficial to healthcare and social welfare professionals and organisations in the implementation of healthcare and social welfare services. Due to Kanta's multi-year development history and the current state of service development, the assessment focuses particularly on the healthcare-related aspects of the Kanta Services. The assessment also examines Kanta services aimed at citizens to the extent allowed by the available data. With respect to social welfare services, the broader deployment of Kanta information system services is still in its early stages after more than a decade of continuous development efforts. Consequently, the assessment of services related to social welfare is excluded

from this review. Similarly, facilitating the secondary use of Kanta data is still in the development stage due to ongoing legislative reforms, among other factors, which is why the topic of secondary use is not discussed in this assessment.

The Kanta assessment aims to produce benefits from multiple perspectives:

- for the strategic planning and steering of the Ministry of Social Affairs and Health,
- for the organisation of healthcare and social welfare services,
- for the provision of healthcare and social welfare services,
- for the activities and information needs of professionals (including private and public healthcare, independent practitioners),
- for digital inclusion; for example, providing persons access to their data and the sharing of their data, and
- for other Kanta functionalities potentially identified in the assessment.

At the participant level, the beneficiaries include healthcare professionals and managers, customers or patients and, for example, the public authorities responsible for steering and supervision.

The purpose of the Kanta assessment is to provide a comprehensive and up-to-date picture of the current state and development needs of the Kanta Services so that they can better respond to future challenges and leverage the opportunities presented by digitalisation even more effectively. This will ensure that the Kanta Services remain relevant and useful for all user groups and that Kanta supports the entire healthcare services in an optimal manner. The final report of the Kanta assessment thus serves as the foundation for the further development of the Kanta Services and provides starting points for assessing the effectiveness of digital services in healthcare and social welfare.

2 Subject of the assessment

2.1 Description of the Kanta Services in healthcare

The Kanta Services are a collection of national healthcare and social welfare information system services that are based on obligations set out in legislation. The relevant pieces of legislation are the Act on the Processing of Client Data in Healthcare and Social Welfare (*Client Data Act*, 703/2023) and the Act on Electronic Prescriptions (*Electronic Prescriptions Act*, 61/2007). The Kanta Services consist of various information system services, such as the implementation of electronic prescriptions (prescription service), a healthcare patient data archive and social welfare client data archive, which are conceptually combined into a Client Data Repository[1] in the latest Client Data Act, as well as the MyKanta user interface for citizens and from My Kanta and a system for issuing declarations of intent. The services also include an information management service that compiles key structured data for professionals, a storage and forwarding service for certificates and forms, and a certificate service maintained by Valvira, for example. With the exception of MyKanta, these services are, pursuant to the Client Data Act, subject to an obligation to use. The services also make use of other public information system services, including Suomi.fi authentication, communication and acting on behalf of another person.

The services are used by private individuals, public and private healthcare and social welfare service providers and pharmacy operators. Individuals can view their patient data and service visits via the MyKanta service. They can also use MyKanta to control the use of their data, monitor logs on the use of their data and issue declarations of intent such as a living will and an organ donation testament. Key structured health data, such as laboratory test results, can be viewed in a list-like format. Users can also check their outpatient prescriptions and related dispensation information, and submit prescription renewal requests when necessary. Although the development of the visibility of healthcare content in MyKanta has been slow, the content is being expanded to include the individual's personal wellbeing data and social welfare client data. During the coronavirus pandemic, the Kanta Services were also used to produce and distribute citizens' certificates, such as vaccination certificates.

1 Instead of the term "client data repository", this report uses the term "patient data archive", which was the earlier established term used during the development history of the Kanta Services.

Kanta also supports the archiving of old healthcare and social welfare data, especially with respect to discontinued client and patient information systems. Finland also participates in the development of digital health services between EU countries and was one of the first countries in Europe to adopt cross-border prescriptions, with Estonia in 2019. Finland is preparing to implement cross-border European patient summaries in 2024.

Pursuant to the Client Data Act, each service provider has an obligation to become a user of the Kanta Services. In addition to joining the Kanta Services, the client and/or patient information system used by the service provider must meet the national requirements and pass testing related to Kanta functionalities. The Client Data Act lays down the key principles of data communication, which the providers of information system services must comply with. The systems also need to meet the essential requirements concerning interoperability, information security, data protection and functionality, on which the Finnish Institute for Health and Welfare (THL) issues more detailed regulations. All data transfer between the client and patient information systems used by professionals and the Kanta Services is encrypted and takes place between identified parties. The identity of each user of the service is verified by means of strong electronic authentication.

2.2 Background and objectives of the assessment

The strategy for digitalisation and information management in healthcare and social welfare (Ministry of Social Affairs and Health 2024:1) identifies a number of objectives and expectations that are derived from the changes in the operating environment. The ageing of the population increases the need for services, while the number of professionals is simultaneously declining for reasons independent of the demographic structure. The growing inequality in society underscores the importance of ensuring equal availability of and access to services. In the Government proposal on the reform of healthcare and social welfare (HE 241/2020), digitalisation and electronic services were identified as a key functional mechanism for curbing the growth of healthcare and social welfare costs. Digitalisation can be used to improve the efficiency of service operations which, in the long term, can curb the upward pressure on costs as the population's service needs increase.

The assessment also supports the digitalisation programme of the national service reform that is based on Prime Minister Petteri Orpo's Government Programme. It includes, among other things, preparing an assessment of the effectiveness of digital healthcare and social welfare services. It also includes, as a set of preparatory activities that is separate from the assessment of the Kanta Services, time, the

simultaneous preparation of the 2030 vision for digital healthcare and social welfare services (Appointment decision VN/9059/2024-STM-11). The assessment of the Kanta Services produces assessment data that can be put to use in the preparation of the 2030 vision.

The aim of the assessment of the Kanta Services was to establish a comprehensive understanding of the following: Cost trends in the development and maintenance of Kanta, the strategic goals and development priorities of previous years, and current and future functionalities and benefits, particularly from the perspective of service implementation. Another aim was to determine how the development of Kanta and related cooperation could be further improved.

The planning of the assessment of the Kanta Services began in February 2023 and the actual work began in March. The assessment was carried out over a three-month period from April to June 2024. The main stages of the implementation of the assessment are described below (Table 1).

Table 1. The main stages of the assessment of the Kanta Services

	Work stage	Time
1	Preparation of the project plan and processing the invitation to tender	Feb–Mar
2	Specification of the methodological approach and source data collection plan	March
3	Empirical data collection	March–April
4	Data processing and analysis	April–May
5	Report preparation and working on the content	May–June
6	Specification of the proposals for measures	June

3 Previous assessments related to the Kanta Services

During the planning stage of the assessment, a scoping literature search was carried out with the aim of identifying previous assessments related to the Kanta Services. The literature search sought broad-ranging assessments describing user experiences and benefits of the Kanta Services.

The Finnish Institute for Health and Welfare has been monitoring the development of the Finnish healthcare and social welfare service system and related information management for several years. The monitoring, which broadly examines information system services in healthcare and social welfare services, is based on a survey and is descriptive in nature. In addition to the Kanta Services, the monitoring is focused on information management as a whole, particularly describing the development of Kanta on a legislative basis and from the perspective of national cooperation. The most recent monitoring report describes the status of the patient data repository at the end of 2020: the data repository comprised a total of 2,202 million patient documents concerning the health data of 6.2 million individuals. Of these, 4.1 million people (65%) had given their consent to the sharing of their health data between data controllers in healthcare. According to the the monitoring report on the Kanta Services, the modularity of the Kanta Services has made it possible to gradually add the necessary services to the national infrastructure. The assessment highlights the fact that the Kanta Services constitute the foundation for digital healthcare and social welfare services in Finland. In addition, the obligatory nature of the Kanta Services has significantly promoted the standardisation and interoperability of health data in Finland (THL 2022:6).

The monitoring report of the Finnish Institute for Health and Welfare notes that, during the first 10 years of development, the Kanta Services have been the subject of strong development with an emphasis on customer orientation and seamless services. Individuals have been able to access their data through MyKanta right from the start. According to the 2022 report, the use of the Kanta Services by physicians has increased substantially after the services were also deployed in the private sector. Based on the data collected in 2021, two-thirds of hospital physicians, 87% of health centre physicians and 87% of private sector physicians used Kanta at least weekly. The statistics on the use of MyKanta showed growth particularly during the coronavirus pandemic: MyKanta had approximately two

million visits per month in 2021 and approximately one million visits per month in 2022. A total of 64% of the population used MyKanta[2], and the report identified untapped potential with respect to digital healthcare and social welfare services (THL 2022:6).

Similarly, a report published in 2023 by the National Audit Office of Finland suggested that there are opportunities to make even more use of the Kanta Services, even if the services are already considered to be significant. The audit report noted that the Kanta Services consist of information system services at different life-cycle stages and there are service-specific differences in their use. The prescription service was identified as a service with an established utilisation rate, while the use of the patient data archive continues to grow. (NAOF 2023) One of the content areas of the assessment of the Kanta Services is related to the National Audit Office of Finland's assessment of the appropriateness of funding. The 2023 report of the National Audit Office of Finland extensively discussed the overall funding of the Kanta Services, particularly from the perspective of the national steering of digitalisation and the needs of the wellbeing services counties. As an action proposal, the report proposed systematic and long-term cooperation between the Ministry of Social Affairs and Health and the Ministry of Finance on the development of the digitalisation of healthcare and social welfare services and national digital services (NAOF 2023). Preparing the strategy for digitalisation and information management in healthcare and social welfare (Ministry of Social Affairs and Health 2023) so that it spans multiple terms of government is one response to this proposal. A number of measures are identified in the strategy, but there is not yet sufficient assessment data on their progress or effectiveness.

With regard to the Kanta Services, the usability of the implementation of e-prescriptions was assessed in 2012–2014 by means of a targeted survey of prescribers. The study framework was based on the technology acceptance model (TAM)[3], which was used to evaluate assumed usability and ease of use. According to the results, physicians felt that e-prescriptions improved the quality of care and patient safety. In particular, the interoperability of the patient information system in the implementation of e-prescriptions played a significant role in the experiences reported by physicians. (Kivekäs et al. 2018) According to the study, the prescription service of the Kanta Services promoted national strategic goals and improved the efficiency of physicians' work (Kivekäs et al. 2016).

2 The corresponding figure for all digital services was 83 %.

3 The TAM model is also well suited to the assessment of healthcare information systems, with a focus on the deployment phase (Holden and Karsh 2009).

User experiences of the Kanta Services were assessed from the occupational healthcare perspective in 2017. The participants indicated that health data stored in the Kanta Services provides the best possible care, as the services can be used to retrieve the patient's comprehensive health and medical history when necessary. However, the participants also reported certain challenges that reduced the utilisation rate of the Kanta Services. These challenges included difficulties in finding information and putting together an overall view of the patient's care, as well as general slowness and delays in saving data. The summary of the patient's key health data, enabled by the Kanta information management service, was seen as improving usability. (Nissinen et al. 2018; Nissinen et al. 2020)

User experiences of the Kanta Services have also been assessed from the perspective of individuals. In one study, a total of 24 people from two cities, all in the 55–70 age group, were interviewed. The incompleteness of MyKanta reduced the willingness to use the services. The users were particularly frustrated by the lack of health content, such as empty fields under individual headings in MyKanta. Some of the interviewed users said they felt confused when their previous health data was not visible in MyKanta. According to the study, increasing content and functionalities in MyKanta, along with improved usability and the development of security, could increase the use of the services. A key precondition for the use of the services was that service providers update individual persons' health information in Kanta and thus make it visible in MyKanta. The users also wished to have the ability to save their own data in MyKanta. (Eriksson-Backa et al. 2021)

The Kanta Services were also examined in an assessment of the impact of digital services in health and social care published by the Prime Minister's Office (VN 2023:52). With respect to healthcare, it was observed that digital services are widely used in different service categories at different stages of the customer path. However, secure communication was highlighted as a challenge. Customers can currently access their health and wellbeing data primarily through the MyKanta service. The region-specific assessment also identified variation in the wellbeing services counties' initial capabilities to produce their own digital services.

4 The implementation of the assessment

4.1 The starting points and constraints of the assessment

The assessment approach was specified further with the help of the assessment questions identified in the planning stage. The assessment questions focused on investigating the results and identified benefits of Kanta development as well as the importance, appropriateness and timeliness of the development priorities. The assessment themes and the related questions are shown in Table 2.

After the assessment began, the number of themes was reduced for the collection of the empirical data so that the interviews and surveys could be technically implemented with the available resources. The technical implementation of the interviews and survey was carried out by an external expert service provider, based on the content prepared by the Ministry. However, all of the themes and questions were utilised in the analysis of the data.

Table 2. Assessment themes and questions.

Assessment theme	Assessment questions
Costs	What are the costs of Kanta development and maintenance? What kinds of investments have been made in development at different times, and what kinds of results have been achieved?
Development goals	What have been the starting points for developing Kanta? What are the current priorities for the strategic development of Kanta?
The current state and future of the services	What do Kanta information system services enable at present? Based on the current state of Kanta information system services and the Kanta development roadmap that is available at present, what is the development outlook for the next few years and the longer term?
Steering and prioritisation	In light of the choices made regarding the development of Kanta, what kind of future development direction should be given a high priority and which areas of development should be lower priorities, taking into account other ongoing development?

Assessment theme	Assessment questions
Strategic goals and benefits	What kind of benefit does Kanta generate at present, and should generate through its continued development, for different stakeholders? How can, or should, Kanta data be utilised in service provision (relating to treatment situations, for example)?
Development cooperation	What kinds of development needs and opportunities have not yet been identified with respect to Kanta? What kind of insight or assessed data should the further development of Kanta be based on? Which parties should be consulted as part of the Kanta development roadmap and its maintenance, for example?

The assessment focused on the primary use of Kanta data in healthcare services and the person's (patient's) own processes. Although the plan is for the Kanta Services to play a key role as one of the national information sources in the utilisation of health data for secondary purposes, secondary use is still an evolving area of information management and is therefore excluded from this assessment. In addition, an assessment and reform of the national legislation on secondary use began in 2024. Similarly, the clarification of the roles and responsibilities of national and regional operators is taking place as part of the preparation of the digitalisation programme, in the group work on the digital vision, and it is not a focus area of this assessment.

The assessment focuses on the functionalities of the Kanta Services and related opportunities and shortcomings, but not on the assessment of the technical solution. The identified constraints included health technology as one rapidly developing area of technology. New solutions, such as personal devices and AI solutions, improve the customer's service and treatment life-cycle and, potentially, the person's quality of life, also through data refinement. These technologies transform the current service production models in healthcare and social welfare services by enabling the collection, management and analysis of data independently of time and place. The assessment aimed to take into account the development of technology with respect to factors affecting the Kanta Services, within the framework of the available data. The key aspects with regard to the Kanta Services are the storage of customer and patient data and the sharing of data between the customer, the professional and different operators. Consequently, this assessment is not focused on examining the topic at the level of data.

ICT costs in healthcare and social welfare services will increase in nearly all wellbeing services counties in the coming years. In the Government proposal on the reform of healthcare and social welfare services, digitalisation and digital services were identified as a key mechanism for curbing the increase in healthcare and social welfare costs. The Kanta Services play a significant role as shared information system services for healthcare and social welfare.

The 2023 report of the National Audit Office of Finland emphasises that the development and funding models of shared services must have a sustainable foundation and meet the different needs of users. However, the report notes that the Social Insurance Institution of Finland (Kela) and the Finnish Institute for Health and Welfare (THL) pointed out that the development goals and funding have not always been aligned. According to the agreed-upon division of duties, THL is responsible for preparing cost-benefit analyses relating to the Kanta Services. Such analyses have been prepared in connection with major development projects, and the costs and benefits of new features have also been assessed. In connection with this assessment, information is produced on the funding used on the Kanta Services in 2010–2023 in order to establish an understanding of the relationship between the benefits achieved and the funding used. However, questions pertaining to the impact assessment of the Kanta Services are outside the scope of this assessment.

The assessment of costs is mainly based on item 33.01.25 in the central government budget, which corresponds to the development of the Kanta Services. (National information management in healthcare and social welfare). Supplementary budgets were not analysed in this assessment. In addition to using public data, the data was supplemented with unpublished data with respect to national operators by submitting requests for information to the registry offices of the Ministry of Social Affairs and Health and the Ministry of Finance. As the assessment progressed, constraints related to the available data were identified, particularly with respect to the costs of the development of Kanta and the steering of development. The assessment examined, among other documentation, the protocols and project reports of THL's Kanta steering structure until the end of 2019 and the corresponding reporting by Kela thereafter. Although the reporting of development areas in different years was reviewed, it was not possible to establish an overall picture of the funding situation within the time limits of the assessment. The scope of reporting varied, which meant that the start and end dates of individual development projects and the related budgeted or realised funding could not be fully traced. The assessment was scheduled to be carried out over a period of 3–4 months in spring 2024. The planned use of the outsourced expert work in the assessment was not realised in accordance with the original plan, which led to a significant reduction in external work. In addition to the planning of

the assessment, officials from the Ministry of Social Affairs and Health carried out various work stages of the assessment and the writing of the report. The outsourced expert work was mainly limited to the technical implementation of the survey and the conducting of interviews, as well as the preparation of a preliminary summary of the results in the form of an MS PowerPoint file.

The results of the assessment and the proposed measures derived from them have been compiled in this final report. In addition, a separate summary was prepared for the purpose of communicating and presenting the results of the assessment. The summary contains key findings based on the interview and survey data.

4.2 Methods and data collection

The assessment process began with the specification of the assessment setup and the planning of data collection. Interviews, along with expert surveys that supplement them, were identified as the main data collection methods, and separate target groups were specified for both of these data collection methods. The starting points were the assessment themes and preliminary questions (see Table 2), which were categorised into three themes for the collection of empirical data and expanded by preparing sub-questions (Table 3). The Ministry also carried out a literature search (Chapter 3) and prepared four requests for information that were focused on investigating the funding and steering of the development of the Kanta Services (Chapter 4.3 Collection of written data).

Table 3. The specified assessment questions for the collection of empirical data.

Theme	Main questions and sub-questions
Current state	
Current state and benefits of the Kanta Services	What do the Kanta Services currently enable? What are the essential elements (building blocks) of the Kanta Services? What kinds of benefits do they generate? What would be missing if Kanta were not available in the implementation of healthcare services or in your own activities?
The suitability of the Kanta Services to different needs	How suitable are the Kanta Services to different needs and what kinds of related concrete development needs are there? • For the organisation of healthcare and social welfare services? • For the provision of healthcare and social welfare services? • For professionals' activities and information needs (including private and public healthcare, independent practitioners)? • The relationship between Kanta and patient information systems in different tasks from the professional's perspective? • For the digital participation of the individual, i.e. access to their data and the production and sharing of their data, for example? • For other Kanta functionalities (excluding secondary use and the social welfare archive)?
The maturity of the Kanta Services	What is the maturity of the Kanta Services as a whole? At what life-cycle stage are the Kanta Services? Is there a significant need for expansion or renewal of the Kanta Services, or are the services adequate in their current form?
Development	
The focus areas of the current development of the Kanta Services	Are the current development priorities of Kanta identifiable, and what do you think they are? Is the development of the Kanta Services focused on the right priorities, or is any essential perspective/service or service implementation method/solution model missing? Which aspect(s) of the development of Kanta could be assigned a lower priority or eliminated altogether? Explain why and, if you wish, you can discuss this in relation to other ongoing development, for example in regional activities.

Theme	Main questions and sub-questions
The coordination of development	Are the development measures coordinated and timely? Are the development goals realistic and feasible for the relevant parties (sufficiently concrete and with a clear division of tasks)? Are the development measures coordinated and timely in relation to, for example, regional development (readiness for change)? Have the development priorities been communicated sufficiently? Is feedback related to the development priorities heard, and does the feedback have an impact?
The future	
The future role and priorities of the Kanta Services	What should be the role or primary task of Kanta in the future? What kind of future development direction or focus should be prioritised in the coming years? What kinds of benefits could Kanta generate in the future? What should be the development direction or priority in relation to the development-related choices already made (e.g. prescription service and the management of data sharing as centralised solutions). In what areas of development could the Kanta Services be used to create added value for different operators in the future (e.g. by opening Kanta interfaces)?
The future opportunities of the Kanta Services	What kinds of development needs, opportunities or development methods have not yet been identified with respect to Kanta? What kinds of insights or assessed data should further development be based on? What kind of cooperation or activities should development be based on in the future?

The collection of data began in the planning stage of the assessment, at which time a scoping literature search was carried out. The aim of the literature search was to identify previous assessments and the assessment perspectives utilised in them in relation to the Kanta Services. The aim was to identify broad-ranging assessments concerning user experiences of the Kanta Services and the benefits generated by the services. The literature search was carried out using the PubMed database, the Finnish Institute for Health and Welfare's publication archive (Julkari) and the Google Scholar search engine. The aim of the literature search was to gain a comprehensive understanding of how previous studies and assessments have assessed the use of the Kanta Services and the benefits generated by them

in the context of healthcare. This supported the planning of the methodological framework of the present Kanta assessment and helped to ensure that the approaches used in the assessment are relevant and valid. Of the results of the search, seven previous assessments were utilised in the preparation of this report.

The Ministry's selected target group for the assessment represented a wide range of the parties responsible for the steering of the Kanta Services, as well as developers, users and other stakeholders (see appendices 2 and 4 for more information). The purpose was to collect information from experts with work experience or other expertise relating to the Kanta Services. The target group consisted of the following groups: 1) the authorities responsible for the steering of the Kanta Services, 2) the organisers and providers of healthcare and social welfare services (e.g. managers, supervisors, administrative staff), 3) the persons responsible for information management in healthcare and social welfare (e.g. information management director or specialist), 4) users of the Kanta Services in the roles of healthcare and social welfare professionals, 5) users of the Kanta Services in the roles of a customer or patient, 6) users of the Kanta Services in the role of pharmacist in a pharmacy or in health services, 7) information system vendors and other system developers, 8) those who utilise data from Kanta, such as researchers, and 9) other stakeholders such as industry organisations and federations. Multiple individuals from each of the above groups participated in the assessment. The data collection was not aimed at statistical generalisation. Rather, the assessment was based on a purposive sample.

The implementation of the assessment was based on a multimethod approach, in which empirical data-based mixed methods research was supplemented with data sources. Multimethod research combines quantitative and qualitative methodology in the same research, leveraging the strengths of both approaches to provide a deeper understanding of the phenomenon under investigation (Creswell & Plano Clark, 2017). This approach is based on the principles of pragmatism, the aim of which is to produce practical and applicable information about the assessed phenomenon in a diverse manner. Multimethod research has an established position in many scientific disciplines, including health sciences, because it enables a diverse examination of the research questions (Sormunen et al. 2013). This approach was a suitable choice given the time available for the assessment of Kanta.

Both qualitative and quantitative methods were used in the collection of the data. A semi-structured thematic interview was used as a qualitative method, while the quantitative part was implemented as a structured questionnaire that included

both quantitative and qualitative elements. The empirical data was supplemented with written data. The data was analysed in accordance with the themes of the assessment.

4.2.1 Collection of written data

The empirical data was supplemented with documentary data, particularly with regard to the assessment themes "costs" and "steering and prioritisation" (see Table 2). Experts from the Ministry of Social Affairs and Health prepared four requests for information for this purpose. The requests were sent to the registry offices of the Ministry of Social Affairs and Health, the Ministry of Finance, the Finnish Institute for Health and Welfare (THL) and the Social Insurance Institution of Finland (Kela). The cover letter attached to the requests for information described the objectives of the assessment of the Kanta Services and its positioning in the implementation of the strategy and the Government Programme. The first two requests for information focused particularly on the cost perspective of the Kanta Services. The requested documents were dated from 2010 onwards and included documents related to Kanta funding decisions, such as general government fiscal plan proposals and decisions, budget proposals and decisions, and other related documents.

The requests for information addressed to THL and Kela were focused on reporting and planning documents related to the costs, resource allocations and development of the Kanta Services from 2010 onwards. The period for which the documents were requested from THL extended to 2019, and documents were requested Kela from 2020 onwards. This is due to the change in the responsibility for steering the development of the Kanta Services that took place in 2020.

From the registry offices, the requests for information were forwarded to specialists. The researchers subsequently held more specific discussions with the specialists concerning the requests and documents, and agreed on practices concerning the sharing of the data. The implementation of the requests for information required more time from the Ministry's experts than was allocated in the original assessment plan. Planning and monitoring material relating to the development of the Kanta Services could not be directly found from the registry offices of the Ministry of Social Affairs and Health, THL and Kela. However, the relevant departments at THL and Kela provided necessary data that was used in the analysis. In addition, the financial department of the Ministry of Social Affairs and Health provided financial documents that enriched the data.

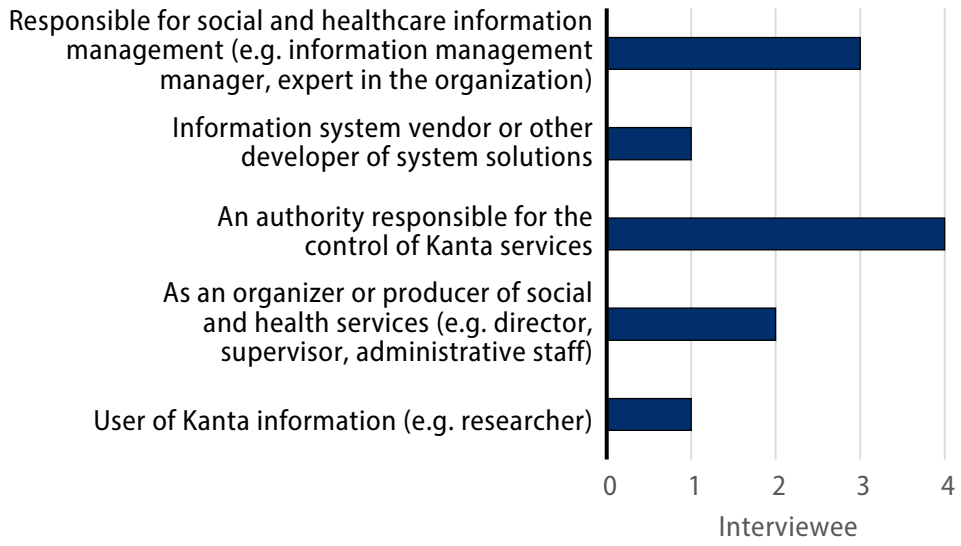
4.2.2 Collection of interview data

Semi-structured thematic interviews were conducted with selected representatives of the target group of the assessment. The interview framework and thematic interview guide were developed on the basis of the preliminary assessment questions. The focus was on three main themes: The current state of the Kanta Services, the development of the Kanta Services, and the future of the Kanta Services (Table 3). The interview guide was designed as a logically structured sequence beginning with an examination of the current state of the Kanta Services and ending with reflections on future prospects. The interview framework consisted of three main themes, each divided into two or three sub-themes. A main question was drawn up for each sub-theme based on the preliminary assessment questions, and a set of more detailed sub-questions were created for each main question.

The framework's suitability to the needs of the assessment was evaluated after the first interviews had been conducted. Based on feedback from the interviewees and the experiences of the interviewers, it was determined that the framework served its purpose and enabled the collection of relevant data from the perspective of the research questions of the assessment. It was also observed that, in the latter stages of the interviews, the views of the interviewees started to become saturated, i.e. the same issues were repeated in spite of different questions being asked. This suggested that the information had already comprehensively emerged in the answers to the various questions asked. Based on these observations, it was decided that the interview framework and guide did not need to be further developed during the data collection stage of the assessment.

With 10 individual interviews and one group interview that had two participants, a total of 12 people were interviewed for the assessment. The interviewees represented 10 different organisations. The interviewees were identified and selected by the ministry. Four of the people originally invited to an interview designated another person to represent their organisation in the interview instead. Figure 1 shows the types of Kanta Services stakeholders represented by the interviewees.

Figure 1. Categorisation of the interviewees based on their primary relationship to Kanta (N=12).



The Ministry sent an interview invitation to the interviewees in advance. The persons who accepted the interview invitation were sent the thematic interview framework in MS PowerPoint format before the interview. The framework included the main themes and sub-themes, as well as the main questions and sub-questions. This introduced the interviewees to the content of the interview before the actual interview.

The interviews were conducted as MS Teams video calls between 12 April and 26 April 2024. The average duration of an individual interview was 45 minutes. The interviews were carried out by an expert service provider external to the Ministry. Two people participated in the implementation of each interview: one conducted the interview and the other took notes and, if necessary, transcribed the interviewee's remarks. During the video call, the interviewer presented an interview guide that was included in the MS PowerPoint presentation material. The interview guide was used to direct the conversation and ask questions. The same themes and main questions were covered with all interviewees.

Transcription is a process that relates to qualitative research and involves converting spoken language into written form. In transcription, the aim is to retain the content and meanings of the original spoken words as accurately as possible, including potential repetitions, fillers and other characteristics typical of spoken language. According to the representatives of the expert service provider, interview

content was transcribed during the interviews at a level of accuracy assessed by the expert service provider to be sufficient for the key content to be communicated and used in the analysis.

4.2.3 Collection of survey data

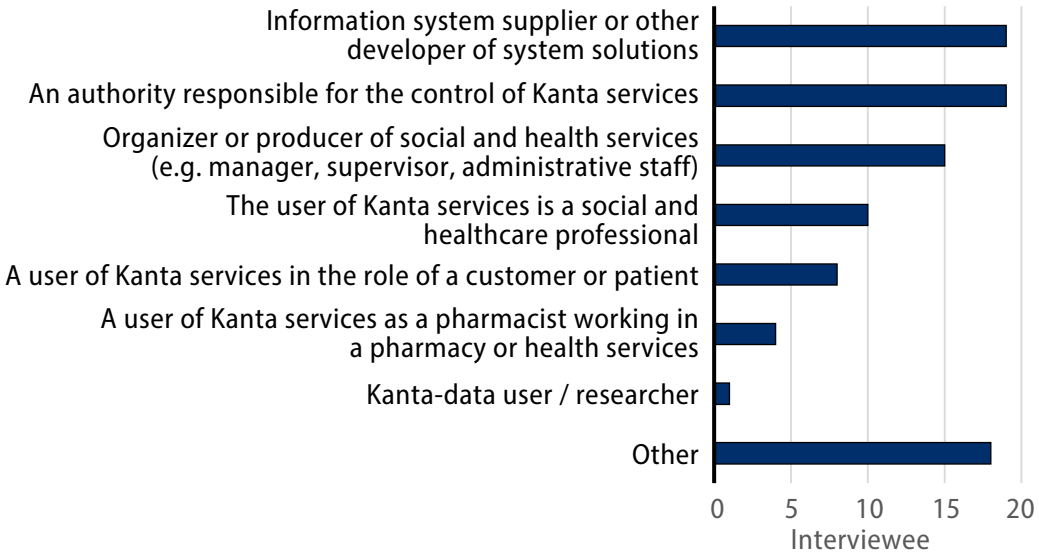
A structured questionnaire was carried out for the rest of the target group of the assessment of the Kanta Services, excluding the interviewed individuals. The survey was prepared on the basis of the assessment themes. The survey covered the same main themes and sub-themes, but the wording of the questions was partly different and broader. The survey consisted of 25 statements for the respondents to express their views on the Kanta Services and their development using a five-point Likert scale (from "completely disagree" to "completely agree"). The survey also included two questions for evaluating the Kanta Services on a 10-point scale (from "very little" to "very much"), and one question that invited the respondents to selected and prioritise the development areas of the Kanta Services from a provided list. Answering the multiple-choice questions was mandatory, but the answer choice "no opinion/not relevant to me" was also available. Additionally, there were 13 open-ended questions in the survey.

The target individuals and groups for the survey were identified and selected by the Ministry. Figure 2 shows the groups of respondents based on their primary relationship to the Kanta Services. The Ministry sent the target groups an invitation to participate in the survey. The invitation described the objectives of the assessment, the purpose of the survey responses and the confidentiality of the processing of the data. The technical survey form and the technical analysis of the response data were carried out by external parties on behalf of the Ministry.

The survey form included an introduction page explaining the background and objectives of the survey, the content of the survey, its confidentiality and more detailed answering instructions. The respondents were requested to first indicate their role in the context of the Kanta Services by choosing one of the provided options or typing in their answer. The survey was built using the MS Forms survey tool prioritised by the expert service provider, which made it possible to conduct the survey electronically. The survey respondents subsequently sent feedback to point out that the survey tool had a restriction that prevented the saving of incomplete responses. The company did not have another tool available.

The survey was open to respondents from 6 to 24 May 2024, i.e. for a total of 19 days, of which 15 were weekdays. The survey was originally scheduled to close on 17 May 2024, but the deadline for completing the survey was extended by one week at the request of a few respondents. The target groups were sent a reminder about responding to the survey before the original deadline, which significantly increased the number of respondents. A total of 119 people responded to the survey (see Figure 2). Some of the respondents indicated that they compiled the views of a broader group of specialists in the organisation they represent. Consequently, some of the survey responses represent the views of multiple individuals. The survey data included a total of 841 responses to open-ended questions. The respondents took an average of 67 minutes to complete the survey.

Figure 2. Categorisation of the survey respondents based on their primary relationship to Kanta (N=119).



4.3 Processing and analysis of the data

The empirical research data for the assessment consisted of three parts: the quantitative data derived from the multiple-choice questions in the structured questionnaire, the qualitative data derived from the answers to open-ended questions in the structured questionnaire, and the qualitative data derived from the interviews. Both quantitative and qualitative analysis methods were used in the processing of the data.

The survey data was exported from the survey tool in MS Excel format to be analysed using the spreadsheet software. A frequency table was created for each multiple choice question in the survey to show the distribution of the answers. The results were also presented visually on the basis of the tables, which helped illustrate the results.

The answers to the open-ended questions in the survey were imported to MS Word for processing. The answers were compiled so that the responses related to each open-ended question could be examined as a whole. This made it easier to identify and analyse themes and shared perspectives.

The interview data was imported to MS Word for processing. The data was compiled in accordance with the framework so that the responses related to each subtheme could be examined as a whole. In addition, tags were added to the data, making it easy to link each response to a particular interview and theme. This facilitated the analysis and reporting of the data. A quantitative analysis of the data was carried out in accordance with the themes of the assessment. Qualitative analysis is based on processing the data in depth and with an interpretative approach, seeking to understand the phenomena within their respective contexts (Patton 2015). In the first stage of the analysis, the data was read through to establish an overall picture. In the next stage, thematic analysis was used. It is an analytical method used to identify key themes within the data and divide them into categories that are relevant to the assessment framework (Kallinen and Kinnunen 2021).

The assessment and the assessment questions were used to identify key themes in the data that were frequently mentioned by the interviewees and survey respondents. A rough theme frequency analysis and keyword search of the data were used to identify the key themes. Although no systematic quantitative analysis of the data was carried out, different data types were analysed both separately and together. Finally, based on the analysis, the key results and conclusions of the assessment were described on a theme-specific basis for the report on the results, ensuring that the report comprehensively reflects the diversity of the data.

The reporting of the results of the assessment is based on the framework described above, which was created for the purpose of the interviews and the survey. With respect to the empirical data, the results are divided into three main chapters that reflect the main themes: The current state of the Kanta Services, the current development of the Kanta Services, and the future of the Kanta Services.

In reporting the results, the aim was to apply a comprehensive approach, which meant considering not only the individual data source but also relevant observations from other data. Each subchapter reports the quantitative results based on the survey data, which are enriched and supplemented with observations that are based on interviews and answers to open-ended survey questions. Results based on the document analysis are also presented as a separate section. Data triangulation was taken into account in the reporting to improve the reliability of the results with the help of different data sources. If the results of the different types of data were consistent, the empirical data was not broken down by data source in the reporting.

4.4 Assessment of validity and reliability

The report provides a comprehensive description of the methods used and their application for the purpose of assessment, which increases the credibility of the results and the reliability of their interpretation. Efforts were made to ensure the validity and reliability of the implementation of the assessment, and the results, in various ways. For the purpose of the transparency and repeatability of the assessment process, the report includes a detailed description of the methodological approach and framework of the assessment, the data collection methods, the data itself, and the processing and analysis of the data. This allows external parties to subsequently evaluate the validity and reliability of the assessment process.

The reliability of the assessment method was enhanced by using a multimethod approach that included method, data and analysis triangulation. This meant the use of different data acquisition methods (a form-based survey and semi-structured thematic interviews), the use of different types of data (interview data, qualitative survey data and quantitative survey data) and the application of different analysis methods (quantitative and qualitative analysis). The assessment strategy and methods were selected according to the subject and nature of the assessment. In addition, an analysis triangulation was carried out, in which two experts from the ministry were responsible for the implementation of the assessment process.

The target group selected for the assessment represented a wide range of stakeholders of the Kanta Services and, based on their current or previous roles or responsibilities, had the in-depth understanding necessary to answer the assessment questions. All of the planned target groups were included in the assessment, and none of the groups were significantly under- or overrepresented, thereby reducing the possibility of bias in the results. Participation in the assessment was voluntary. The answers were anonymised and processed confidentially to ensure that the participants were motivated and willing to share their views and experiences. Together, these principles ensured the reliability and ethical integrity of the assessment process, which is essential for the credibility and usability of the assessment results.

The questions were carefully planned with the aim of improving the validity of the survey: the questionnaire was evaluated and developed over multiple iterations by the Ministry and the expert service provider that carried out the survey. This ensured that the survey design was both clear and appropriate for the respondents. The reliability of the survey was enhanced by adding "no opinion/not relevant to me" as a choice for each multiple choice question. The survey responses were anonymous, which promoted the credibility and honesty of the answers. At the end of the survey, the respondents were given the opportunity to provide feedback on the survey, which provided valuable information on the effectiveness of the survey. Most of the feedback characterised the survey as good, useful, comprehensive and well-designed. Some negative feedback was received regarding individual questions and concepts being unclear, but the amount of such feedback was small relative to the number of respondents. Before the survey was opened, its technical functionality was thoroughly tested by both the Ministry and the external party that implemented the survey. The respondents did not report any significant technical problems with respect to responding to the survey.

The survey had a sufficient number of respondents (N=119), which supported the reliability of the assessment and the generalisability of the results. The average response time was 67 minutes and the answers to open-ended questions were long, which demonstrated the respondents' careful and motivated participation. The survey data was transferred directly from the survey tool to the analysis tool without intermediate conversions, which ensured the integrity of the data. The frequency tables were created using automatic formulae instead of manual coding and verified by two different persons, ensuring the reliability and accuracy of the data.

The interview guide for the thematic interviews was evaluated and developed by both the Ministry and the external expert service provider that carried out the survey. The interviews were conducted by external experts and the results were reported anonymously. The carefully prepared structured interview questions would be likely to produce similar answers if the interview were to be repeated. Open-ended questions allow the interviewees to express their views freely, which leads to authentic and honest answers. However, it should be noted that the interviewees' responses may vary depending on many factors, such as external circumstances or other influencing factors at the time of the interview. Although repeatability is the goal, it is not always fully achievable in a qualitative study.

In the analysis stage of the qualitative data collected by means of the survey and interviews, the data was analysed separately by two individuals. The preliminary results derived from the analysis stage were subsequently compared with each other. The original empirical data was forwarded to the Ministry's experts, who validated the preliminary results, wrote the chapters discussing the results and formed the conclusions based on them. This way, the Ministry ensured that the results were justified and reliable, and that they comprehensively reflected the information provided by the survey and interviews.

5 Assessment results

5.1 Results of the document analysis

The results concerning the development of the Kanta Services are based on strategic and legislative starting points and a careful analysis of previous documentation. Strategically, the development of the Kanta Services has been based on national healthcare digitalisation strategies and related goals. This has provided a direction for service development and ensured their functionality in the context of the wider healthcare system. Legislation has also guided the development efforts by laying down requirements concerning information management and patient information systems, for example.

The following chapters discussing the results provide a more detailed examination of the current state of the development of Kanta, as well as key achievements and development needs, based on strategic and legislative perspectives and previous documentation.

5.1.1 The Kanta Services in national strategies

In 1996, the Ministry of Social Affairs and Health published the first strategy for the utilisation of information technology in healthcare and social welfare, which laid down guidelines for development in the subsequent years. One of the key shifts outlined in the strategy was the transition from organisation-centric service provision to the customer-driven planning, optimisation and management of the treatment process. This required networking and partnerships in service production. The networking would be implemented at the level of joint municipal authorities and co-management areas, but the strategy also recognised the potential of virtual networks. Locally built information networks would be integrated regionally and, ultimately, at the national level. The aim was for the information networks to improve the customer's opportunities to function and support their independent living at home through the provision of technological products and services. (STM 1996)

The strategy stated that the Ministry has a central role in the development of information systems: "Information systems in healthcare and social welfare services must be based on open, interoperable and standardised solutions. The Ministry

of Social Affairs and Health has the national responsibility for the coordination of information systems in its administrative branch." (STM 1996, p. 9) In addition to the diverse utilisation of data, the strategy identified the need for training professionals so that they are competent and have the ability to cope with the demands of their work. In 2002, the second Government of Prime Minister Paavo Lipponen issued a government resolution according to which a national electronic medical records system would be deployed by the end of 2007. The information society implementation programme implementation plan of the first government of Prime Minister Matti Vanhanen and the Government's 2006 strategy document, among other documents, included measures to promote the use of information and communication technology in healthcare and social welfare. The measures included a healthcare information system architecture project focused on the specification of the national information system architecture, and supporting services at the national level, including an electronic patient information archive and a supporting code set service, as well as an electronic prescription centre. In 2006, the ministerial working group on the information society programme also decided to strengthen the role of the Ministry of Social Affairs and Health in the steering of information management in healthcare and social welfare services. The overall objective was that national information systems for healthcare would be in national use starting from 1 April 2011.

Customer orientation, the effectiveness of services and equal access were emphasised in the subsequent strategy: Information to support wellbeing and service renewal – eHealth and eSocial strategy 2020 (STM 2014). The exchange of information and multiprofessional cooperation between different operators in the healthcare and social welfare sector were identified as prerequisites for achieving the objectives of the strategy. Electronic information management would enable the use of up-to-date information and, based on it, modern tools could be developed for citizens, professionals and management to support decision-making and the assessment of service operations. The Kanta Services were described in the strategy as follows: "The Kanta services include ePrescription, My Kanta Pages and the Patient Data Repository. Patient information created by health care service producers is transferred to the national patient data repository. The information can be accessed by citizens via the My Kanta Pages service. They are also, upon the patient's consent, accessible to private and public producers of health services treating the patient. Similar development efforts and legislation are currently under preparation in the social welfare sector." (STM 2014, p. 8) At that time, Finland was an international model country with respect to information management in healthcare. The objective set out in the strategy with respect to citizens as service users is the implementation of a platform for shared use by citizens and professionals to manage personal wellbeing and health data. The implementation

would rely on the secure use of the Kanta Services and open interfaces. Citizens would use electronic services and produce information for their own use and for use by professionals. Citizens would have the opportunity to interact with service providers electronically independent of their place of residence. Information produced and maintained by citizens themselves would be used in the planning and implementation of treatment and services to the extent permitted by the citizen.

Challenges were observed in the information management skills of professionals when preparing the strategy for 2014–2020: "In this respect, the current situation is not satisfactory. Furthermore, there is a constant need for continuing education. Adopters of national Kanta services are supported by online training, by offering training in the use of the operating models, and with other support material." (STM 2014, p. 13) This is why "capable professional" was set as one of the goals of the strategy. This required increasing training and education in information management, data entry, data protection, information security and data-driven management in vocational education and supplementary training in the field of healthcare and social welfare. It was also important to ensure that the decision-making of professionals is based on comprehensive and up-to-date information accessed via the Kanta Services and the service provider's own patient information systems.

The strategic objective set for healthcare was to have the Kanta Services deployed (including e-prescription, patient data archive, patient information management service) in all public healthcare organisations and all private healthcare organisations required by the legislation so that the limited resources would be allocated correctly. It was already recognised at this stage that there was a need to gradually expand the information content and functionalities of the Kanta Services to include, for example, imaging and oral healthcare data and the information management service content planned at the time. In integrated social welfare and healthcare services, emphasis was placed on the joint use of the information repositories between healthcare and social welfare. In cooperation with the regions, electronic solutions would be deployed in service production to strengthen the provision of healthcare and social welfare services in new, customer-oriented ways.

In the interim assessment of the eHealth and eSocial strategy (STM 2018), it was noted that the strategy was successful and it emphasised the utilisation and opportunities of healthcare and social welfare data in a new way. The strategy described, at an adequate level, society's goal regarding the direction of development of information management in healthcare and social welfare, and promoted the coordination of activities between various operators and the central

government. The strategy took data into consideration in a broader context than previously, which is why the focus was no longer only on patient information systems and the Kanta Services. The progress of the Kanta Services, the scope of their use and the inclusion of social welfare services in the Kanta Services were highlighted as particular accomplishments of the strategy. At the same time, criticism was expressed about the fact that the utilisation of the Kanta Services in operational activities was not seamless. This may have been due to patient information system vendors not having focused adequately on presenting client data retrieved from Kanta in a way that supports the work of professionals. From the perspective of the service system, the problem is the lack of integration and cross-sectoral information management.

When the eHealth and eSocial strategy ended in 2020, the Ministry of Social Affairs and Health started scenario work on Kanta by creating alternative scenarios to identify potential directions for future development. The starting point identified for the scenario work was that the content of the Kanta Services had gradually expanded and, at the same time, the utilisation rate of the services and trust in the services had increased. The use of MyKanta services had grown, but development needs were identified in the Kanta Services with respect to professionals. The goals were to identify the role and position of Kanta information system services in the broader framework of information management in healthcare and social welfare, as well as identify the next stage of development of the Kanta Services in terms of whether the focus should be on information management or the development and enabling of operations, for example. (STM 2019a, 2019b) The identified prerequisites for achieving the goals included, among other things, the quality of data, one-time entry and better utilisation of data, implementing the management of the user's entire medication regimen, wellbeing data and integrating self-care applications into the Kanta service ecosystem (STM 2019a). A large number of uncertainties were identified with respect to the development of Kanta: Kanta as an active developer of operations vs. Kanta as a passive enabler; relying on artificial intelligence for monitoring and quality control vs. the immutability of current methods and processes; the proliferation and differentiation of competing ecosystems vs. cooperation across project boundaries and cooperative development; incorporating various artificial intelligence solutions into the Kanta Services vs. having the solutions develop on a market-driven basis, with Kanta enabling them; incorporating various data products and situational picture solutions into the Kanta Services vs. having others build these, potentially utilising Kanta in their development; people's value base changing and trust in the public authorities and the use of data decreasing vs. trust remaining the same; legislation enabling healthcare and social welfare service integration vs. legislation

not developing; national development of context-aware services and virtual clinics vs. these being developed by the market and the vendors of client and patient information systems. (STM 2019b)

The Ministry of Social Affairs and Health's next strategy for digitalisation and information management was prepared in 2023, when the participation of the wellbeing services counties that had been newly established as part of the reform of healthcare and social welfare services could be engaged in the preparatory work. The strategy was aimed at ensuring a long-term approach to, and continuity of, digitalisation and information management across government terms or any other transitional periods instead of the fragmented development of information management and digitalisation. The goals of the strategy include providing people with better opportunities to independently take care of their wellbeing and health as individuals, service customers or as persons managing the affairs of their close family members. The flexibility and efficiency of healthcare and social welfare services will be increased through customer and service counselling and the introduction of advanced technology to reduce the workload of personnel. Health and social services will be organised on the basis of effectiveness data and evidence (research findings or evaluated data) on a higher-quality basis and in a socially, economically and ecologically sustainable manner. The strategy identifies 12 tasks, which include, for example, updating the Kanta Services and their development, and developing the overall steering of the digitalisation of healthcare and social welfare and related responsibilities. Several of the tasks are linked to Kanta information system services, but six sets of tasks that particularly affect Kanta or are targeted at Kanta were identified: promoting the use of the customer's own data; ensuring the quality of data; ensuring interoperability and the selection of data models; assessing and updating Kanta information system services; improving the benefits of Kanta data; and developing the management and steering model for information management and digitalisation.

5.1.2 The Kanta Services in legislation

Since 2006, a key objective in the development of the Kanta Services has been to create a lifelong comprehensive record of healthcare and social welfare data for each individual. From the outset, the starting point for the development work was a nationally centralised[4] service to enable the sharing of client and patient data during the client process across industry[5], sector, organisational[6] and information system boundaries in healthcare and social welfare services. At the same time, an electronic long-term archive in accordance with the Sähke norm was implemented. One of the development principles has been that the client relationship is based on trust. In the development of the Kanta Services, it has been ensured that the client has the right to control the use of their client data within the limits laid down by law, and the client has visibility to disclosures of their client data. The key starting point is that the use of data requires a treatment and/or client relationship.

The implementation of Kanta information system services is based on the Act on the Electronic Processing of Client Data in Healthcare and Social Welfare (703/2023), the first version of which was enacted in 2007 (159/2007). Another key piece of legislation is the Act on Electronic Prescriptions (61/2007). The objective of the Client Data Act is to harmonise the processing of client data in healthcare and social welfare services and in the organisation and provision of healthcare and social welfare services. The purpose of the Electronic Prescriptions Act, in turn, is to improve patient and medication safety and to facilitate the prescription and dispensation of medicinal products as well as make it more efficient. The Client Data Act lays down provisions on, for example, the principles of the processing of client data, data controlling, patient documents and related data entry, the right of access of service providers in healthcare and social welfare services, and the disclosure of data. The Act also specifies requirements for information systems in healthcare and social welfare, including national information system services, i.e. the Kanta Services. The Kanta Services consist of the following information system services: client data repository, log data file storage service, the user interface for professionals (Kelain), the user interface for citizens (MyKanta), personal health record, information management service, system for issuing declarations of intent,

4 HE 253/2006: The development of information technology and telecommunications connections, as well as the adoption of standards and nationally agreed specifications, enable the transition to more centralised solutions. Some information management solutions are most appropriate and economical to implement nationally instead of using local solutions.

5 The integration of healthcare and social welfare has been stronger focus area of development since 2010.

6 For example, private and public healthcare and occupational healthcare.

prescription centre, pharmaceutical database, and query and forwarding service. The Client Data Act also lays down requirements concerning information systems and wellbeing applications used in healthcare and social welfare, as well as related monitoring.

Pursuant to the Client Data Act, public healthcare and social welfare service providers have an obligation to store client and patient data in the Kanta Services. For private providers of healthcare and social welfare services, the implementation of the Kanta Services is mandatory if they have an information system in use for processing client and patient data. Legislation also confirms the national steering model, wherein the Ministry of Social Affairs and Health and the Finnish Institute for Health and Welfare (THL) play a key role, and Kela has a significant role in the implementation of services.

The key data required for treatment to be compiled from the Kanta patient data archive was previously specified in section 2 of the Decree on National Information System Services in Healthcare (165/2012, hereinafter referred to as the *Phasing Decree*). The entry into force provision of the Decree (section 3) specified deadlines for when this key data needed to be available via the Kanta information management service. The schedules specified in the entry into force provision were amended several times before it was repealed. In later stages, entry into force provisions concerning different documents and data sets have been specified in the Client Data Act.

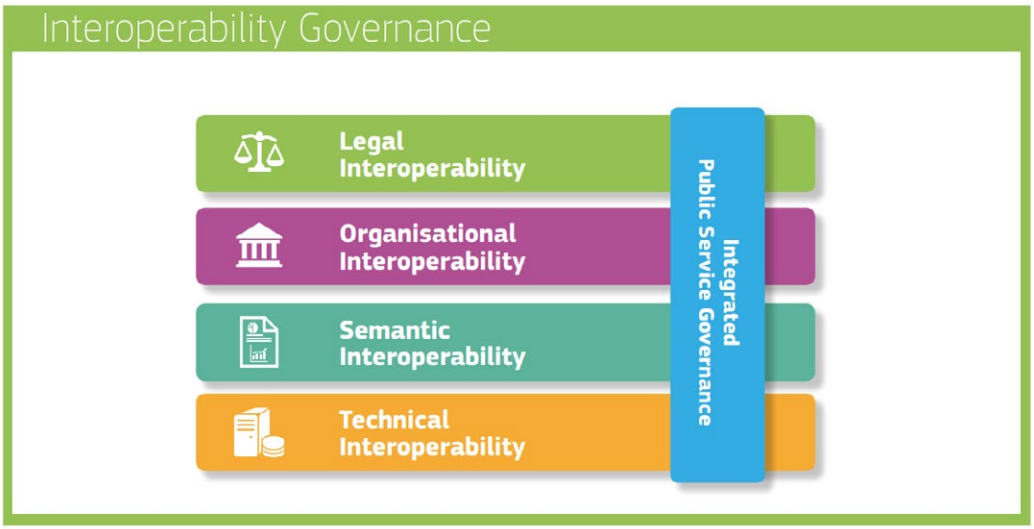
The Electronic Prescriptions Act lays down specifications for a system in which the patient's prescriptions and related entries are stored electronically in a national prescription centre. This makes it possible for medications to be dispensed to the patient at their desired time via a pharmacy of their choice, based on prescriptions stored in the electronic prescription centre. The Kanta prescription centre fulfils these requirements. A further aim of the Act has been to make it possible to determine the patient's overall medication and take it into account in the planning and implementation of pharmacotherapy. The Electronic Prescriptions Act also identifies the Kanta medication list as a patient-specific summary that is compiled from prescriptions and related entries stored in the electronic prescription centre.

In addition to the Client Data Act and the Electronic Prescriptions Act, healthcare and social welfare services are governed by substantive legislation. The general legislation governing electronic information management, in turn, includes provisions on subjects such as data protection and electronic services in the

activities of the public authorities.[7] In addition, information management and the electronic processing of client data in healthcare and social welfare services are governed by regulations issued by the Finnish Institute for Health and Welfare on the basis of the Client Data Act[8].

From the outset, one of the key tasks of the Kanta Services has been to enable the interoperability of data. Interoperability refers to the ability of systems to exchange data and understand the data models used by each other and to work together between different information systems. This is based on the European Interoperability Framework (COM 2017), which defines four layers of interoperability (Figure 1).

Figure 3. European Interoperability Framework



7 Up-to-date legislation: https://www.finlex.fi/en/ and key legislation on information management in healthcare and social welfare: https://yhteistyotilat.fi/wiki08/pages/viewpage.action?pageId=85934686

8 Regulations issued by the Finnish Institute for Health and Welfare: https://thl.fi/aiheet/tiedonhallinta-sosiaali-ja-terveysalalla/maaraykset-ja-maarittelyt/maaraykset (in Finnish)

The Kanta Services implement legal interoperability on the basis of the current legislation. The legislation enables, amongst other things: The use of the Kanta Services and the sharing of client data in the client process, digital healthcare and social welfare solutions, cross-border prescription and dispensation of medicines, and the implementation of the European Patient Summary. It also supports the management of common concepts and structures. The reform of the legislation governing information management in healthcare and social welfare is currently being promoted. The reforms are aimed at enabling the integration of healthcare and social welfare and improving the management of the patient's up-to-date overall medication with the help of the Kanta medication list, amongst other things.

The Kanta Services promote organisational interoperability in many important areas, such as coherent interface models between different information systems; coherent operating model guides and data entry instructions; the coherent implementation of electronic prescriptions including prescription, renewal, dispensation and correction; coherent roles and access rights for professionals in the use of information systems; and integration of the Suomi.fi services into healthcare and social welfare operations. Promoting coherent practices in the production of Kanta data is an ongoing area of development in particular. It includes managing delays in data production, organisational data and the visibility of data to the person.

The Kanta Services implement semantic interoperability through, for example, THL's data content and document structure specifications, as well as related data entry guides and the training of professionals. The code set service for healthcare and social welfare is used to prepare, maintain and distribute common classifications and code sets, such as disease classifications, code sets related to medicines, service classifications, organisational data files, indicator and test structures, form structures and various specialty-specific content. Interoperability is also ensured more broadly through localisation and the adoption of international classification schemes and terminologies, such as the WHO disease classifications ICD-10 (in use) and ICD-11 (in preparation for implementation) for which THL has the national responsibility for maintenance, the Anatomical Therapeutic Chemical (ATC) medicine classification system maintained nationally by Fimea, the FinLOINC physiological measurements code set maintained by THL, and the SNOMED CT terminology. The national specifications will be made more specific in accordance with the HL7 standard for implementation. At the same time, semantically interoperable content ensures the capacity to produce national statistics and data files based on Kanta data. The technical interoperability of the Kanta services is implemented by the Social Insurance Institution of Finland.

The Directive on cross-border healthcare, issued in 2011, aims to ensure EU patients' rights to safe and high-quality healthcare, also across national borders within the EU. These rights are also aimed at facilitating close cooperation between Member States on eHealth services and the treatment of rare diseases. The Directive authorises the Commission to support cooperation between Member States on eHealth services and establishes a voluntary network of Member State authorities (eHealth network) to support the development of common standards for the transfer of data in cross-border healthcare. In addition, eHealth services are a key part of the European Commission's digital single market strategy.

The Commission has worked together with Member States for several years to build an EU-wide voluntary eHealth Digital Service Infrastructure (eHDSI), which enables the cross-border exchange of patient health data — particularly electronic prescriptions and patient health records. A total of 22 Member States are currently participating in the project, which aims to connect eHealth systems to the EU's eHealth infrastructure through a dedicated portal called the National Contact Point for e-Health (NCPeH).

The e-prescriptions in Europe service, i.e. the electronic cross-border prescription service, was introduced as part of the Kanta Services in early 2019. Together with Estonia, Finland was the first European country to launch the service. This enabled the dispensation of Finnish e-prescriptions by pharmacies in other European countries. The dispensation of e-prescriptions from other European countries was introduced in Finland in March 2020. This made it possible for e-prescriptions given in Estonia or Croatia to be dispensed by Finnish pharmacies. Since spring 2024, Finns have had the option of giving consent to the use of their patient data (Patient Summary) by Estonian healthcare providers in connection with their treatment. Finnish Patient Summaries will become accessible in other EU countries gradually according to each Member State's schedule. The European Commission's goal is for Patient Summaries to be in use in most EU Member States by 2026. The longer-term goal is to also enable the cross-border sharing of medical imaging material and laboratory results, for example. Relaying patient data from other EU countries to Finnish healthcare providers through Kanta will be possible starting from early 2025. The information will be displayed to the healthcare professional translated into Finnish. However, it is up to Finnish healthcare organisations to decide when to start using Patient Summaries.

In her State of the Union speech before the European Parliament on 16 September 2020, President of the European Commission Ursula von der Leyen announced a new legislative proposal to create a European Health Data Space. The European Health Data Space (EHDS) will be a key pillar of the strong European Health

Union and is the first common EU data space to emerge from the European strategy for data. In spring 2024, the European Parliament and the Council reached a political agreement on the Commission proposal for the EHDS, which is based on the General Data Protection Regulation (GDPR), the Data Governance Act, the Data Act andthe Network and Information Systems Directive. Upon its entry into effect, the EHDS, as a whole, aims to promote digital innovation in healthcare, improve the use of health data in research and development, and strengthen the status and rights of patients in the management of health data in the European Union. The EHDS creates an EU-level framework and requirements for the management and sharing of health data in Europe, and the Kanta Services must adapt to these requirements to ensure interoperability and participation in the Europe-wide health data ecosystem. For example, the implementation of the EHDS requires the application of the European Digital Identity, which may affect user login and authentication in the Kanta Services in the future.

EU4Health and the Digital Europe Programme (DEP) are European Union initiatives that both promote the digitalisation of healthcare in their own ways: The EU4Health programme focuses on strengthening healthcare and promoting digitalisation in the EU. It supports the development of Member States' health systems, including the deployment of digital resolutions and the sharing of health data. EU4Health provides funding and resources for healthcare digitalisation projects, such as improving the standardisation and interoperability of health data. DEP is an EU funding programme aimed at promoting the digital transformation in various sectors, including healthcare. In the area of healthcare, DEP supports the development and deployment of digital technologies, such as the utilisation of artificial intelligence, a trust ecosystem and digital platforms. DEP provides funding for innovative digital health solutions that improve the availability, quality and efficiency of healthcare services. In sum, EU4Health and DEP are key EU initiatives that together promote the digitalisation of healthcare by providing funding, resources and strategic support for the development and deployment of future digital solutions in Europe.

5.1.3 Steering the development of the Kanta Services

The steering of the Kanta Services is implemented by national steering means, such as regulatory steering, steering by information and financial steering. This includes both the performance guidance of the Finnish Institute for Health and Welfare (THL) and the agreement-based steering of the Social Insurance Institution of Finland (Kela). At the central government level, operational and financial planning combines the goals set by the government and ministries and the operative tasks

of central government agencies. The most important instruments in the related steering activities are the multiannual operational and financial plans of ministries and agencies, the general government fiscal plan, the framework of appropriations issued by the Government to ministries, annual budgets and supplementary budgets, the reporting and auditing of central government finances, and the Government's annual report to the Parliament. Budget expenditure is budgeted by administrative branch into main titles and into classes and items according to the nature of the tasks, organisational structure or expenditures. (Johdatus valtion taloushallintoon)

Financial steering

Funding allocated to the development of the Kanta Services has increased as the services have expanded. Examining the funding of the Kanta Services over different periods, fully comparable data produced using a consistent approach is not available. The review period of the assessment of the Kanta Services starts from 2010. According to the Ministry of Social Affairs and Health, approximately EUR 50 million was spent on the development of electronic medical records and the KanTa project in 2003–2010 (STM 2011). In its 2010 audit, the National Audit Office of Finland estimated that the costs in the development stage in question were higher (NAOF 2011). The Ministry of Social Affairs and Health, the Ministry of Finance, Kela, the Finnish Institute for Health and Welfare and the Association of Finnish Municipalities collectively estimated that the total development costs, including local deployment costs, amounted to approximately EUR 200 million in 2003–2014, of which the share of costs in 2011–2014 was EUR 150 million. (STM 2011)

Between 2011 and 2023, the funding granted to the Kanta item in the budget totalled EUR 281,062,000 in accordance with the spending limits decisions. This funding includes the development of the Kanta Services for both healthcare and social welfare, with the latter having started at a later time and not being the subject of this assessment. There was substantial variance from one year to the next in the spending limits decisions: the funding amounted to EUR 7,000,000 at its lowest in 2019 (budget decision of 21 December 2018) and EUR 41,472,000 at its highest in 2022 (budget of 20 December 2021[9]). The amount of funding in 2022 is partly explained by the capital repayment of Digifinland Oy, the return of unused funding allocations from the Toivo project and the funding for the high preparedness project. It should also be noted that the 2022 spending limits decision also included discretionary government grants to municipalities, joint municipal

9 An additional EUR 5.8 million was granted in the supplementary budgets for 2022.

authorities and other relevant parties to enable the reform of healthcare and social welfare services. In addition to the above, funding has been granted under the Kanta item to the EU epSOS project in 2011–2013 (during the period under review) and the monitoring and assessment of the development of information system services in healthcare and social welfare, which is the responsibility of the Finnish Institute for Health and Welfare.

The Ministry of Social Affairs and Health allocated the responsibility for channelling funding related to the development of Kanta under the item "national information management in healthcare and social welfare" to the operational steering unit of the Finnish Institute for Health and Welfare when the unit was established in 2011. The unit was operational until 2018. In 2019, the channelling of Kanta funding was continued through a cooperation agreement signed with the Finnish Institute for Health and Welfare. The report presented to the the Finnish Institute for Health and Welfare's Kanta steering group, which covers the period ending 31 December 2019, states that the cumulative costs of Kanta development since the start of the operations of the operational unit amounted to EUR 100,187,391. This amount includes the costs of the development of healthcare and social welfare, the promotion of electronic service use and the costs of implementation and steering. This amount includes the costs of the development of healthcare and social welfare, the promotion of electronic service use and the costs of implementation and steering. The operational unit accounted for 31% of the costs, Kela for 58% and government grant projects for approximately 10%. In 2020, a new four-year cooperation agreement was signed with Kela, covering the years 2020–2023. The shares of funding under this agreement consist mainly of personnel costs (63%) and IT costs, including consultancy costs (30%). The rest of the funding covers communications and other expenses.

Under the agreement, the Ministry of Social Affairs and Health annually approves a budget for the development of the Kanta Services, within which Kela allocates resources for development. Kela reports to the Ministry of Social Affairs and Health on the progress of Kanta development and the monitoring of costs. The reporting was initially carried out quarterly, but there has subsequently been a switch to monthly reporting. The actual development costs and the projected costs for the current year are regularly discussed between the Ministry of Social Affairs and Health and Kela.

In addition to the funding described above, Kela's technical maintenance of the Kanta Services is financed by user fees collected from pharmacies and healthcare service providers. The user fees are determined by a Ministry of Social Affairs and Health decree that is valid for two years at a time. The user fees are based on

projected costs. According to Kela, the user fees cover approximately half of the total costs of the maintenance and development of the Kanta Services, and the other half is funded by budgetary appropriations.

EU funding for development has also been occasionally received. For example, support for the development and deployment of cross-border health service functionalities has been received under the CEF funding instrument. Currently, funding is available for EHDS implementation from both the EU4Health and DEP funding instruments.

The Finnish Institute for Health and Welfare prepares cost-benefit analyses related to the Kanta Services in connection with the conceptualisation of new services, for example. These analyses are used for preliminary assessments of the costs and benefits of new features. As the project planning of these development areas progresses, these analyses can be used as a basis for resource allocation when applying for funding. In addition, the Ministry of Social Affairs and Health has submitted to the Ministry of Finance, in accordance with the Act on Information Management in Public Administration (906/2019), requests for comments and responses to the Ministry of Finance's statements related to various Kanta development areas and related changes. This procedure is aimed at anticipating the funding needs presented to general government financial planning.

Regulatory steering

The steering of the Kanta Services has been largely based on regulatory developments relating to information system services. One of the starting points of legislative drafting has been to set binding schedules and transition periods for the deployment of the Kanta Services. However, these schedules have proved challenging for municipalities, joint municipal authorities and private healthcare operators, as there has been no certainty about the completion of the national specifications and the related system requirements. In its 2015 follow-up report, the National Audit Office of Finland noted that delays related to the patient information archive have revealed previously identified challenges in the Ministry of Social Affairs and Health's regulatory model that is tied to specific deadlines. The NAOF suggested that the regulatory model in use at the time had led to a situation in which some of the operational units in healthcare did not operate in accordance with the valid legislation. (NAOF 2011; NAOF 2015) For example, by the end of 2022, only 17 per cent of public sector organisations had implemented the update of key health information structures in accordance with the 2016

specifications. (STM 2024). However, the reasons for delayed deployments are more diverse. The challenges have been addressed, for example, by developing the steering model related to the Kanta Services.

Funding under the Kanta item has been used for long-term development projects of various types. The development of the Kanta Services includes various work stages ranging from content-related and functional specifications to building the technical infrastructure, and from the testing stage to joining and deploying the service. The development of the legislation governing information management has emerged as a clear constraint for development and the deployment of services (see NAOF 2023, for example). In practice, this has manifested in, for instance, delays in deployments in spite of technical readiness due to the lack of legislation laying down the relevant obligations.

Content-related steering

There is an established division of responsibilities in the development of the Kanta Services. The Ministry of Social Affairs and Health is responsible for strategic steering and funding, the Finnish Institute for Health and Welfare is responsible for the planning of development and the specification of the required functionalities, and Kela produces and maintains the Kanta Services. The Ministry and the Finnish Institute for Health and Welfare have a broader steering responsibility that covers information management and digitalisation in healthcare and social welfare. The development of Kanta is also indirectly included in the performance guidance of the Finnish Institute for Health and Welfare, especially with respect to the development and maintenance of classifications, code sets and data structures in healthcare and social welfare. In the Ministry, the performance guidance of the Finnish Institute for Health and Welfare was previously the responsibility of the Steering Department and, starting from 2024, the Strategic and Financial Management Unit.

From a practical point of view, phasing that consists of certain key elements can be identified in the development of the Kanta Services. The Ministry of Social Affairs and Health prepares laws and decrees and plans the content and scheduling pertaining to large-scale components. The Finnish Institute for Health and Welfare is responsible for preparing functional and data content-related specifications in collaboration with Kela and end users. The Finnish Institute for Health and Welfare also supplements the implementation of legislation by issuing regulations such as certification requirements for systems connected to Kanta. Kela, for its part, is responsible for preparing technical specifications together with THL, information system vendors and end users. Kela and information system vendors

are responsible for technical readiness, the process of joining Kanta and testing the production-use content and functionalities in cooperation with other vendors, subcontractors and end users. Responsibilities during deployment and use are divided between Kela and information system vendors. The Finnish Institute for Health and Welfare also has a statutory task related to the implementation of operating models and providing related training to professionals. Kela maintains a customer panel for service development and has invested in service design in recent years to improve the usability of the Kanta Services. The feedback process and change management during development are integral aspects of achieving the objectives of the overall implementation. (STM 2019a)

The operational unit of the Finnish Institute for Health and Welfare organised the steering of Kanta development in the steering group structure of Kanta projects, which included the Ministry of Social Affairs and Health and Kela. The steering group monitored the quarterly planning of Kanta projects and the progress reporting of ongoing projects. The level of accuracy of project review has varied over the years, while efforts have simultaneously been made to streamline the steering model. Reporting was developed for the purpose of monitoring the Kanta Services by adopting a project portfolio tool and producing a situational picture of development using a traffic light model.

The Kanta project steering group discussed the steering of Kanta on 14 February 2020 and identified the need for change, particularly due to changes in financial steering. In connection with this, the responsibility for steering was handed over to the Ministry of Social Affairs and Health, and the information management steering group was established as the Ministry's instrument for ensuring the steering and funding of the Kanta Services. The aim of the new steering model for development and maintenance was to complement the steering model and structures between the Ministry of Social Affairs and Health and Kela, which are based on a cooperation agreement, and the steering model and structures between the Ministry of Social Affairs and Health and Kela and the Finnish Institute for Health and Welfare, which are based on the performance agreement between the two. The task of the steering group was to promote cooperation between the parties involved in the development of Kanta, facilitate decision-making and ensure the consultation of clients and stakeholders in the steering process. The steering group was also responsible for approving the action plan for the development of Kanta and the steering and monitoring of its implementation from the perspective of the project portfolio (STM 2020). The term of office of the information management steering group was limited to two years after the Ministry discontinued the group. Following this change, the project-level monitoring of the development of Kanta has been implemented under a more efficient structure that is smaller than the steering

group and based on a project office formed by the relevant national operators (Ministry of Social Affairs and Health, Finnish Institute for Health and Welfare, Kela, DigiFinland Oy).

Steering by information

From 2021 to 2022, the information management steering group had broad representation not only by the operators responsible for the Kanta Services but also by municipalities and hospital districts. This enabled the effective dissemination of information to regional operators to promote development efforts. In 2022, the steering group was convened with a larger composition in every other meeting and with a smaller composition, consisting only of the national operators, in the alternate meetings. This smaller group of participants then formed the project office for the joint discussion of national digitalisation projects after the information management steering group was discontinued. The information management steering group regularly discussed topics such as the priorities and roadmap of Kanta development, maintained by the Finnish Institute for Health and Welfare and Kela. These topics have been subsequently discussed by the project office from the perspective of the preparatory activities of the national operators. The Ministry ensured the implementation of steering by information for key projects by organising an annual stakeholder event. The Ministry also strengthened online guidance with respect to information management and ensured that the Finnish Institute for Health and Welfare and Kela have their own networks for informing regional operators about the development of Kanta.

5.1.4 The development history of the Kanta Services

The progress of the development of Kanta information system services has varied over time depending on the level of maturity of the services: The first development stage emphasised the *implementation of the basics of semantic interoperability*, which was made possible by many different means. HL7 Finland was established in 1995 and the first national v2 profiles were published in 1997. A significant step was taken in 1999 with the implementation of the new version of the International Classification of Diseases, ICD-10.

The pikaXML technical solution for the referral-epicrisis process was implemented in 2000 and the experimental act on seamless service chains enabled the piloting of regional information systems. The first Finnish HL7 CDA R1 profile was published in 2002. The national health project, which was the first actual development stage of Kanta, began in 2003. The national core data for healthcare was specified at the

same time. This marked the beginning of the *intensive service construction stage* and, in 2004, the Ministry of Social Affairs and Health confirmed HL7 CDA R2 as the standard for the implementation of healthcare documents. The first HL7 v3 messaging profile was released in 2006 for the exchange of messages between patient information systems. The Kanta Services were confirmed by legislation in 2007, and the first Kanta architecture specifications and HL7 medical records specifications for e-prescriptions and the patient information archive were published in the same year. The development progressed to the *service piloting and specification* stage when e-prescription implementation and MyKanta went into production in 2010. The legislative foundation was amended with respect to the information management service in 2011, and the Kanta archive went into production use in 2012. Also in 2012, cross-border e-prescription data exchange was experimented with for the first time between Finland and Sweden as part of the EU epSOS pilot.

After the transition to production use, the development of the Kanta Services was, for a long time, focused on the *expansion of utilisation and continuous service development of services* based on the objectives of the eHealth and eSocial strategy (STM 2014). The first stage of joining the Kanta archive was carried out in 2015 with respect to public healthcare. That same year, the imaging architecture was released and the planning of the personal health record began. The production use of Kelain started in 2016, and the image archive and the personal health record were deployed in 2018. In addition, a licence for SNOMED CT terminology was acquired for Finland in 2018, which enabled the utilisation of the terminology in development work.

By 2018, healthcare operators had joined the Kanta Services to a comprehensive extent, which enabled the utilisation of public and private sector patient data in treatment situations. As the reform of healthcare and social welfare services was under way, the focus of the development of Kanta shifted from the utilisation of data to *digitalisation as an enabling service for the wellbeing services counties*. The goal set in the specifications for 2016, i.e. the deployment of Patient Summaries, had been accomplished by 81% (25/31) of public service providers according to the Kanta reporting[10] for the first quarter of 2024. The rate of utilisation of the Patient Summaries remains low at present (10%).

10 Kanta project portfolio status report Q1/2024, Ministry of Social Affairs and Health Project Office 15 April 2024

In the early 2020s, development based on the European data strategy was closely monitored. With regard to the Kanta standards, for example, the decision was made to increase structuring through the implementation of the HL7 FHIR standard. The first FHIR implementation took place in 2022 and enabled the retrieval of prescription identification data. Otherwise, the early 2020s were characterised by the needs emerging from the global pandemic for the development of the availability and usability of Kanta data and, for example, the distribution of COVID-19 certificates through MyKanta. At the same time, the benefits of the Kanta Services were challenged by the quality and shortcomings of the stored data in particular. Deployments of the Kanta Services have not progressed according to the timetables specified in the applicable legislation.

At present, the development efforts are focused on, amongst other things, enabling the exchange of data between social welfare and healthcare professionals and needs related to data integration; enabling the up-to-date and comprehensive management of pharmacotherapy data by means of the Kanta medication list; developing and maintaining the functioning of the Kanta data platform; preparations for changes related to the introduction of the ICD-11 classification; and promoting personal service use with the help of MyKanta. The range of standards relating to the Kanta Services will be updated so that, in the future, query and storage interfaces will be implemented and the structure of data content will be developed using the HL7 FHIR standard. At the same time, the "Smart on FHIR" implementation will be used to open Kanta interfaces to applications used by individual users. Making Kanta data more structured is aimed at expanding the benefits derived from Kanta data. More advanced patient information systems can combine patient data retrieved from Kanta with the organisation's own data in a customer-specific summary, for instance. In addition, the search functionality can be made more specific with the help of new interface specifications, which makes it easier to find relevant information. Structured data also improves the possibilities for data consolidation and utilising decision support in the work of professionals.

The Kanta Services consist of multiple services that were created at different times, are at different stages of the life-cycle and are characterised by significant service-specific differences in utilisation. For example, the use of the prescription service is very well-established and the use of the patient data archive is growing. The MyKanta service has reached a well-established level of use among citizens, with approximately three million monthly logins. However, Kela sees a great deal of untapped potential in the Kanta Services, for example with regard to the use of services on behalf of another person, which requires healthcare and social welfare organisations to implement the authorisation services provided by the Digital and Population Data Services Agency. In addition, the use of the query and forwarding

service eliminates the flow of paper documentation between healthcare and social welfare organisations and various public authorities. The content of the Kanta Services has been gradually expanded, while the utilisation rate of, and trust in, the services have increased. The use of MyKanta services has grown steadily in particular, but there is still room for improvement with respect to the use of the Kanta Services by professionals. In spite of the growth in the use of the services, their development is perceived as rigid and slow. (STM 2019b) Although the schedules for Kanta deployments have been challenging, the users are generally satisfied with the Kanta Services. However, the development of the services could be more customer-oriented so that the end result would be more appropriate. (NAOF 2023)

5.1.5 The current state of the Kanta Services

The functionalities included in the Kanta Services correspond to the needs of different operators and stakeholders and diverse information management purposes. This assessment examines the key functionalities by stakeholder group, focusing on healthcare services (cf. STM 2019a, 2019b).

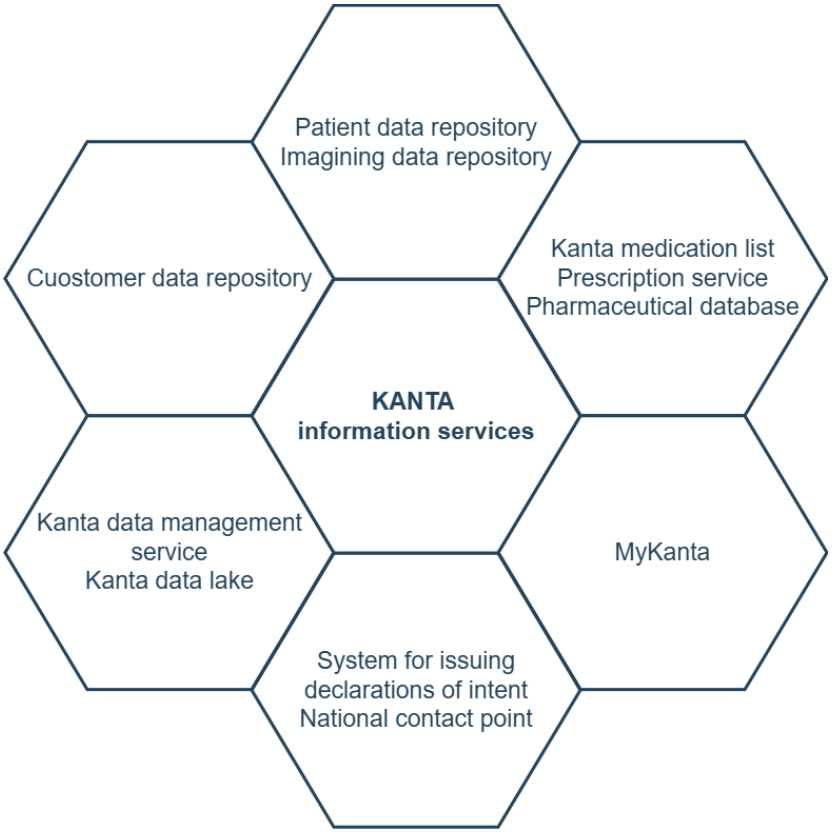
The basic architecture principles behind the development of Kanta were:

1. Kanta refers to a centralised information repository and related information system services, the operational utilisation of which takes place (mainly) through customer and patient information systems.
2. Due to the above, interoperability is built in a heterogeneous environment using standardised interfaces, rather than, for example, a single national information system.
3. All of the Kanta Services are operational 24/7 online systems with response times that enable data to be used without intermediate storage (real-time).
4. The control of access management is mainly decentralised at the regional or local (intra-organisational) and national (inter-organisational) levels.
5. International standards[11] are used in interface implementations, taking into account potential localisation needs.

11 HE 263/2006: Experiences relating to the adoption of information technology indicate that increasing the productivity of a service system with information technology is only possible if common standards and national solutions are applied and only if service processes can be updated and reformed.

In accordance with the constraints of the assessment, the review of the Kanta Services focuses on primary use in healthcare and the Kanta Services available to individuals (see Figure 2).

Figure 4. Kanta services with a focus on the subject area of the assessment.



From the point of view of an individual's activities, the key functionalities of the Kanta Services are as follows: Viewing one's own health data in MyKanta and making use of the data in one's own activities. It is currently possible to view health data in the form of summaries that are based on Kanta data content. In accordance with the objective, the summaries cover diagnoses, critical risk information, imaging tests, laboratory tests, referrals, measurement results, vaccinations, oral healthcare treatment and appointment information, health and treatment plan, information on procedures and any certificates and statements. MyKanta also enables the user to manage the use of their client data by professionals during treatment and service provision, or for other purposes. Denials of consent to data sharing can be set up for prescription data or health data. The user's declarations of intent also include

the opportunity to issue an organ donation testament and a living will. Adding, examining or removing personal health data, i.e. health or wellbeing-related data produced by users themselves, is currently possible via the personal health record function of MyKanta pursuant to the Client Data Act. The wellbeing data currently include weight, height, blood pressure, blood glucose and heart rate. In addition to these types of data, it is possible to store data about the results of various surveys and measurements related to health and wellbeing, as well as medications taken or self-care plans. Individual users can use MyKanta to examine their prescription information and submit prescription renewal requests. They can also print a summary of their prescriptions for the purpose of travelling abroad, for example. Other MyKanta services include viewing the log data stored in the Kanta Services with respect to the use of data or using services on behalf of another person, viewing the data of a child under 10 years of age in the role of a guardian, using the MyKanta services on behalf of another person, subject to authorisation, and data on the user's acknowledgement of having received information about the Kanta Services, which is a precondition for the use of the Kanta Services in one's own activities. At present, it is possible to use the MyKanta services with online banking credentials or a mobile certificate. There is currently no mobile application available for the MyKanta service.

From the point of view of healthcare service operations, the key Kanta Services for healthcare professionals are as follows: archival of patient data and retrieval of data from the archive (including referrals and epicrises), key health information in the information management service (i.e. summaries), archival of old documents and retrieval of old patient data, retrieval and viewing of prescriptions and the storing, correction, cancellation and renewal of prescriptions (prescription services can also be managed without a patient information system via Kelain) and the archival and retrieval of imaging data. The Kanta query and forwarding service can be used to retrieve specified certificates and forms or forward them from the organisation's information system directly to Kela and the Finnish Transport and Communications Agency. The archive manager's user interface includes, amongst other functions, a view of, and tools related to, corrected and removed medical record entries, and functions related to outsourced services (the service provider's right to access the patient data of the party that orders the service). In pharmacy operations, the key services include, in particular, the retrieval and viewing of prescriptions, entering paper-based and telephone prescriptions into the system, entering data on the dispensation of medicines, cancelling prescriptions and submitting prescription renewal requests.

The national contact point enables the cross-border forwarding and receiving of patient data in accordance with the European implementation. Finland has implemented e-prescriptions and the Finnish implementation of the Patient Summary was approved for production use on 21 May 2024.

5.2 Results from the empirical data

The collection of empirical data for the assessment was limited to three assessment themes: the current state of the Kanta Services, the current development of the services, and the future of the services. The current state was examined particularly in the light of the directions of development so that development priorities could be established. The assessment also focused on the benefits of the Kanta Services and identified development needs. The empirical data was collected in a diverse manner using a questionnaire and interviews. The respondents included representatives of various stakeholders, such as healthcare professionals, developers and the public authorities.

5.2.1 The current state of the Kanta Services

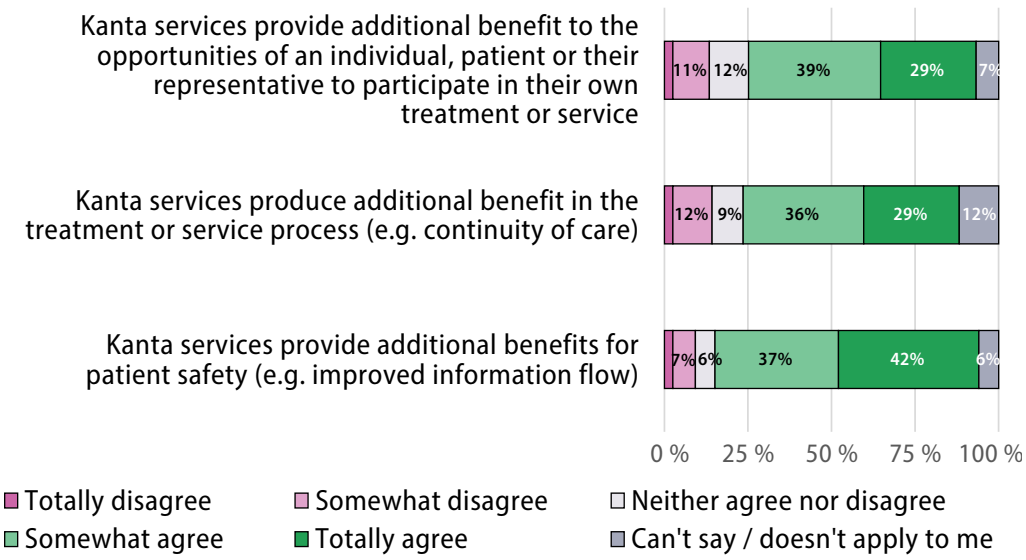
According to the data, the Kanta Services, such as the patient information archive, prescription service and MyKanta, are well-known and held in high regard. Kanta has successfully created an extensive national data repository and enabled the long-term archival of data. A centralised repository for health data was an innovative concept a decade ago, even in international terms. One feature that is perceived as particularly successful is e-prescriptions, which enables a smooth service process between the healthcare system, the pharmacy system and the customer, regardless of location.

The Kanta Services have significantly promoted the development of digital information system infrastructure in healthcare, enabling the exchange of data between different participants and improving the effectiveness and safety of care and services. Up-to-date information has helped to avoid the duplication of examinations and procedures. MyKanta provides citizens with the opportunity to manage and view their health data within the scope of the available data content.

The development of the Kanta Services has also promoted the standardisation and interoperability of data through nationally coherent approaches and specifications and the implementation of data structures, code sets, classifications and terminologies. This development effort has promoted the harmonisation of data protection and information security requirements in healthcare.

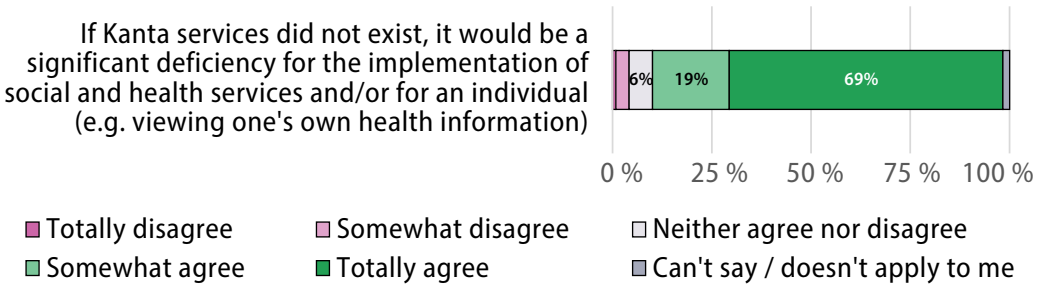
The respondents characterised the development of the Kanta Services as having been long-term and systematic for 15 years now. These choices have guided the national and regional development of digitalisation in healthcare. In Finland, a strategic choice has been made to steer the Kanta Services through legislation, which has influenced the development and renewal of the legislation governing information management in healthcare and social welfare. According to the data, the Kanta Services are useful and necessary. The majority of the survey respondents indicated that they somewhat agreed or completely agreed with the statements that the Kanta Services improve patient safety through the exchange of information, promote the continuity of care and increase the opportunities for patients and their representatives to participate in treatment or services (Figure 5).

Figure 5. The additional benefit generated by the Kanta Services in healthcare.



A clear majority of the survey respondents indicated that they somewhat agreed or completely agreed that the absence of the Kanta Services would be a significant deficiency with respect to the implementation of healthcare and social welfare services and/or for an individual (Figure 6).

Figure 6. The absence of the Kanta Services from the perspective of healthcare and social welfare services and the individual.

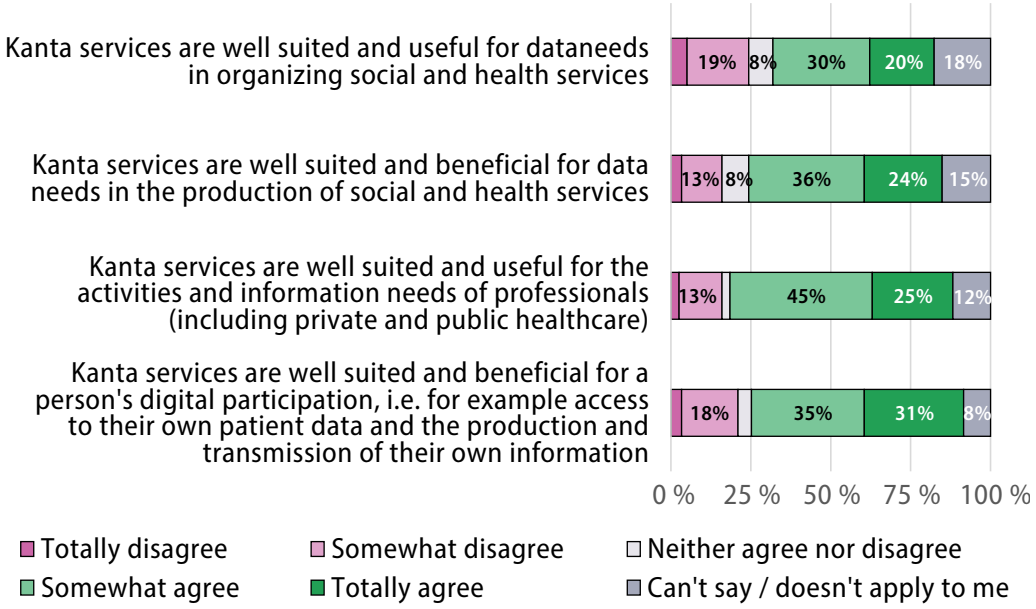


According to the data, the Kanta Services have many benefits for the organisers and providers of healthcare services. Individual patient data is accessible between different wellbeing services counties and healthcare organisations, which improves the quality and cost-effectiveness of services. Kanta also facilitates the forwarding of statements and certificates, such as the availability of COVID-19 certificates for customers. The mobility of data promotes the formation of an overall picture of the patient's situation, which improves the continuity of care and the service chain. This enables the viewing of previous health data, ensuring that pharmacotherapy is up-to-date and reduces the duplication of examinations, which leads to savings in resources.

Patients can use MyKanta to view and manage their health data, which reduces the contacting of service providers and saves time for healthcare professionals. The development of the Kanta Services has promoted the integration of healthcare and social welfare services by improving the coordination of services for the elderly, for example. Long-term storage within the Kanta Services also reduces the need for the local archival of data, and the management of data sharing has been implemented as part of the Kanta Services. The Kanta Services also provide several benefits from the perspective of the individual user. They can use MyKanta to view their patient data, manage their use and request the renewal of prescriptions without having to separately contact their healthcare provider. The personal health record in MyKanta provides them with the opportunity to store and share their health and wellbeing data, and it reduces the need to remember the names of prescription medications or the dates of procedures, for instance.

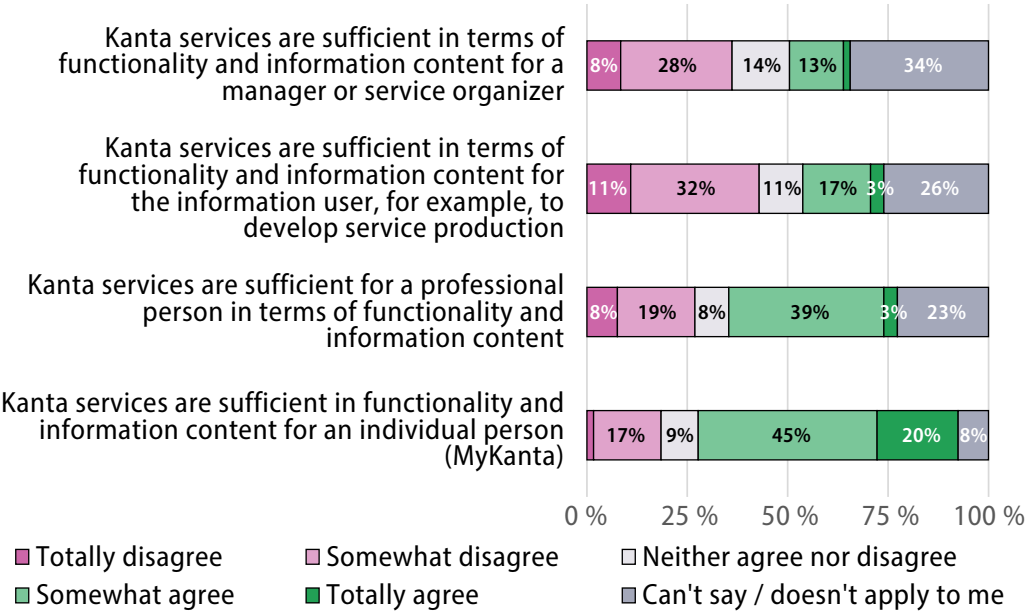
The suitability of the Kanta Services to the needs of different user groups was examined by means of the survey and the interviews. A majority of the survey respondents indicated that they somewhat agreed or completely agreed with the statement that the Kanta Services are well-suited to, and generate benefits for, the organisation of healthcare and social welfare services, the provision of healthcare and social welfare services, the activities of professionals and information needs. This applies to both private and public healthcare, independent practitioners and the digital inclusion of individuals, such as access to their data and the production and sharing of data (Figure 7).

Figure 7. The suitability to, and benefits of, the Kanta Services the different needs in healthcare and social welfare services.



The survey also examined the respondents' views regarding the extent to which the Kanta Services currently correspond to the needs of different user groups in healthcare. The responses revealed varying opinions regarding the adequacy of the functionalities and information content of the Kanta Services for different user groups: professionals and citizens felt that the functionality and data provided were more adequate, while the managers of healthcare services and the users of data, such as the developers of service production, felt that they were less adequate (Figure 8).

Figure 8. The adequacy of the functionalities and data content of the Kanta Services for different needs in healthcare services.

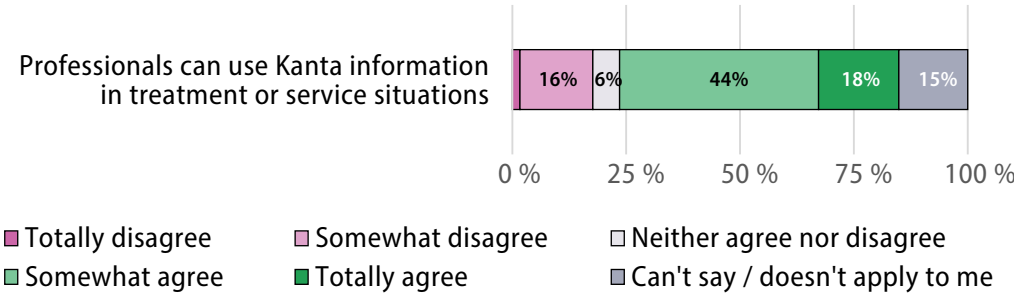


User needs were examined from the perspectives of organisation and management, production, professionals and customers. With respect to organisation and management, Kanta currently does not fully meet the needs of information management, which limits the efficient organisation and management of services. In the production of healthcare services, however, Kanta supports efficiency by offering interoperability that enables the use of immutable data in different organisations. From the perspective of professionals, the Kanta Services support treatment and patient safety in diverse ways by providing data about patients' past appointments, treatments and prescriptions. Kanta serves as a centralised bridge between different systems, reducing the need for separate interfaces and integration. Although Kanta cannot replace a patient information system, it complements it as a key part of a professional's toolkit. However, the usability of the data in the systems used by professionals is a challenge, which slows down the use of Kanta data. Effective usability requires collaborative development with patient information system vendors and service providers to ensure that the integration and use of Kanta data is seamless as part of broader information system development.

From an individual's point of view, it was noted that, for many, MyKanta is the only digital health service they use. The benefits of the MyKanta service were described as, for example, engaging the patient's participation in their treatment based on the availability of data on their health. However, it was noted that MyKanta currently does not allow the exchange of information between patients and professionals (excluding the renewal of prescriptions). There are also various nationally unresolved issues regarding the use of information produced by the individual user, such as prioritised information and its format from the perspective of interoperability. The data revealed areas requiring development with regard to the usability of MyKanta, particularly the structuring of the data in the service (the discoverability of data). It was also pointed out that even if information on the patient is entered in a patient information system, it is visible in MyKanta (information on allergies or past vaccinations, for example).

The usability of the Kanta Services was one of the key themes of the assessment. The survey examined the respondents' views on how effectively professionals are able to utilise Kanta data. The majority of the respondents indicated that they somewhat agreed or completely agreed that professionals are able to utilise Kanta data in the context of treatment or service provision (Figure 9).

Figure 9. The professional's ability to utilise the Kanta Services.

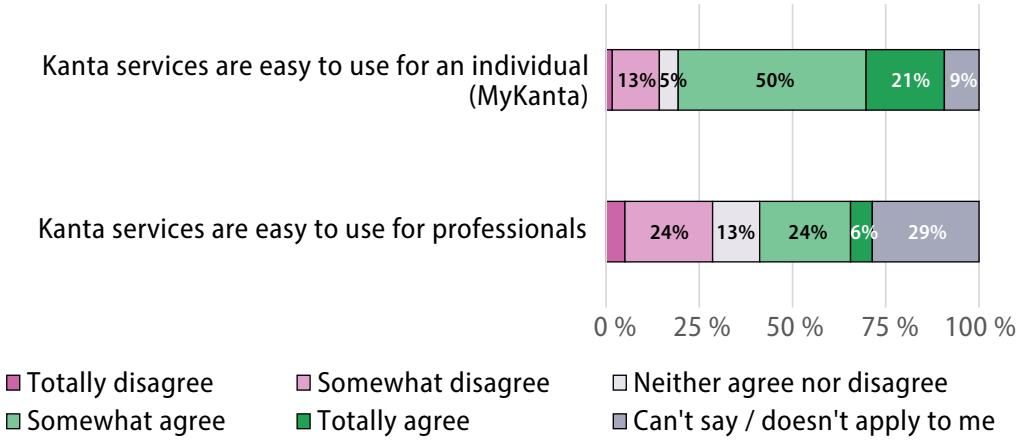


The answers to the open-ended survey questions and the interviews did not provide any indications of professionals not making any use of Kanta data at all in the context of treatment or service provision. The interviews also revealed that the actual extent of the use of Kanta is quite significant. The MyKanta service, for instance, has over 3.6 million users. The total number of logins to MyKanta in 2023 was 34.5 million, and approximately 3.5 million prescription renewal requests were

submitted via the service.[12] In the interviews, it was stated that treatment data from another healthcare organisation is retrieved from Kanta five million times per month, for example. It was indicated in the interviews that if the data was not usable at all, it would not be retrieved at the volumes it currently is.

The survey also examined the respondents' views regarding the ease of use of the Kanta Services (Figure 10). The majority of the respondents indicated that MyKanta is easy to use for individuals. The views concerning use by professionals were more divided: a much smaller proportion of the respondents characterised the Kanta Services as easy to use.

Figure 10. The ease of use of the Kanta Services for different users.

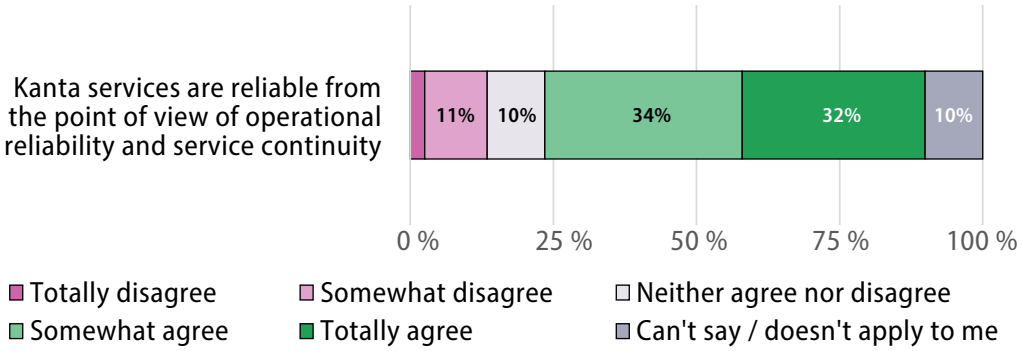


The data reveals that it is often unclear to the users what proportion of the experience of poor usability is directly attributable to the Kanta system, such as the search features, and what proportion is due to a separate patient information system. Ease of use largely depends on how the professional uses their own patient information system, and the efficient use of Kanta data depends on how well the patient information system supports the nationally specified data structures and coherent code sets.

12 More detailed information on the current number of users is available on the Kanta/ Statistics page, https://www.kanta.fi/en/statistics

The survey investigated the respondents' views on the reliability of the Kanta Services. A clear majority of the survey respondents indicated that they somewhat agreed or completely agreed that the Kanta Services are reliable in terms of their operation and service continuity (Figure 11).

Figure 11. The reliability of the Kanta Services from the perspective of operational reliability and service continuity.



The respondents' views on the reliability of the Kanta Services varied in the descriptive data. Although Kanta was generally perceived as reliable, there were also concerns expressed with regard to operational reliability, especially relating to delays in the transfer and archiving of data and connection problems that led to professionals having to wait during the course of their work. However, it is difficult for users to determine whether these problems are caused by the Kanta Services or, for example, the patient information system in use. As an individual Kanta service, the prescription centre stood out as a fast and reliable solution.

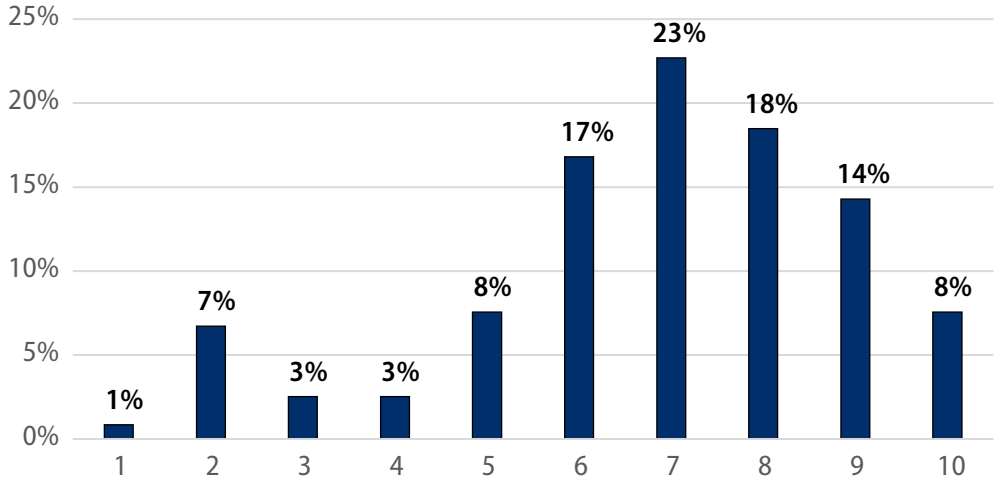
The survey also sought to identify areas of Kanta service development in which the objectives have not been achieved. The data pointed to challenges related to usability as a significant theme. Many of the respondents felt that the content and functionalities required by healthcare professionals have not always been appropriately prioritised. Some also expressed the view that data protection issues were interpreted overly cautiously in the development of the Kanta Services, which complicates the efficient utilisation of Kanta data. Although the data indicated that content and functionalities have been developed to address the needs of professionals, the related deployments in patient information systems have not progressed according to plan. This is partly due to the regional allocation of resources and delays in integration testing. The assessment also found that

communication to healthcare organisations concerning new functionalities and regulatory changes has been insufficient, which affects the progress of development efforts. The concrete impacts of the changes made to Kanta are also not always comprehensively understood. According to the data, the roadmap and focus areas of the development of Kanta are not very clear.

The data indicated that one significant area of deficiency concerns the development of the MyKanta personal health record and related health and wellbeing applications. Kanta does not currently support the sharing of health application users' personal information or the transfer of patient data to the users' own applications. No health or wellbeing applications are currently connected to the personal health record. The data also showed that the private sector software development market has yet to be utilised in Kanta development; for example, with respect to the development of a mobile MyKanta application.

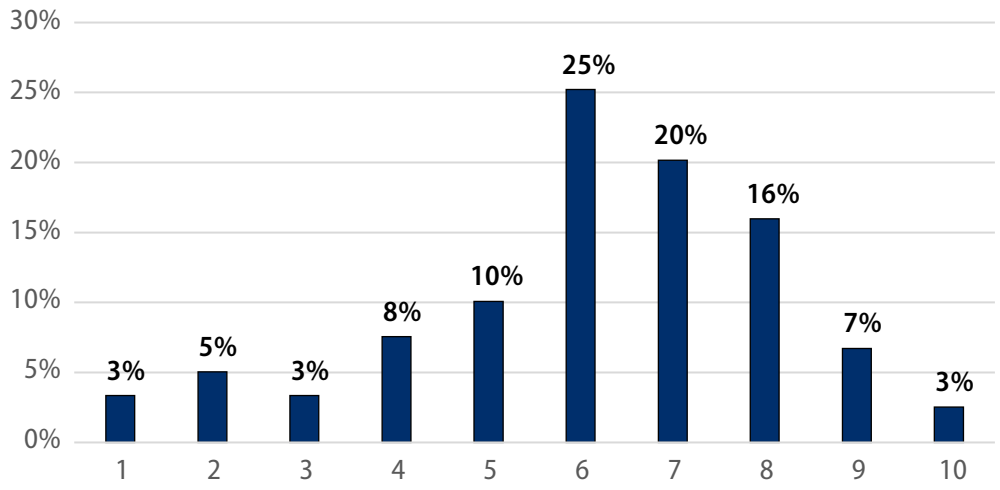
Finally, the survey examined the respondents' views regarding the extent to which the Kanta Services correspond to the expectations and goals set for the development of the services. The survey respondents gave an average score of 6.1 (on a scale of 1–10, where 1 = "to a very small extent" and 10 = "to a very large extent) for the statement "The Kanta Services correspond to the expectations or goals set for their development. Figure 12 shows that most of the respondents were more in agreement than disagreement with the statement.

Figure 12. The extent to which the Kanta Services correspond to the expectations and goals set for their development.



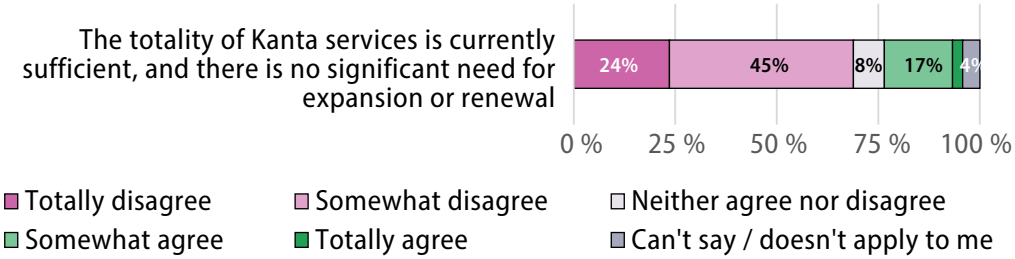
The survey examined the respondents' views regarding the Kanta Services' impact on the implementation of healthcare services (Figure 13). The respondents gave an average score of 6.8 on a scale of 1–10, where 1 stands for "very small impact" and 10 stands for "very large impact". Figure 11 shows that a clear majority of the respondents were more in agreement than disagreement with the statement.

Figure 13. Improving the efficiency of the implementation of healthcare services with the Kanta Services.



The survey examined the respondents' views regarding how adequate the current set of Kanta Services is. The majority of the survey respondents indicated that they completely disagreed or somewhat disagreed with the statement that the current set of Kanta Services is adequate and there are no significant needs for expansion or renewal (Figure 14).

Figure 14. The adequacy of the current set of Kanta services and the need for expansion.

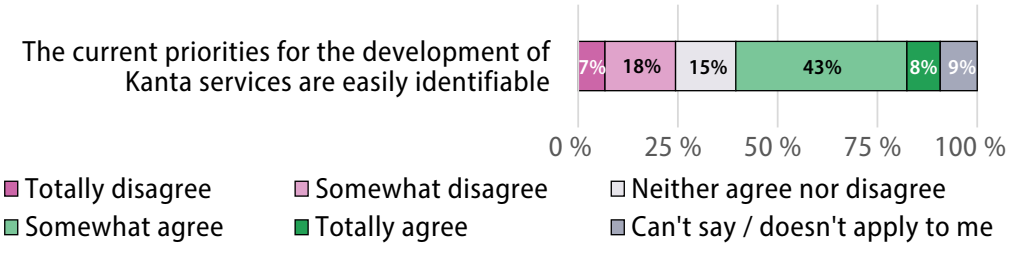


The interviewees' opinions varied about the adequacy of the current set of services. Some of the interviewees recognised the need for renewal and expansion, particularly from a technological perspective, such as the development of Kanta interfaces and the document structure, as well as from broader perspectives related to data content. At the same time, some expressed the opinion that the current set of Kanta services functions adequately as a national healthcare infrastructure. The future of the Kanta Services was also discussed in the interviews, particularly with respect to the development of data content and the potential transition to a data model-based storage structure.

5.2.2 The current development of the Kanta Services

The assessment investigated the respondents' views on the extent to which the development priorities of the Kanta Services are recognised. Approximately half of the respondents indicated they somewhat agreed or completely agreed that the current development priorities of the Kanta Services are easily recognisable (Figure 15).

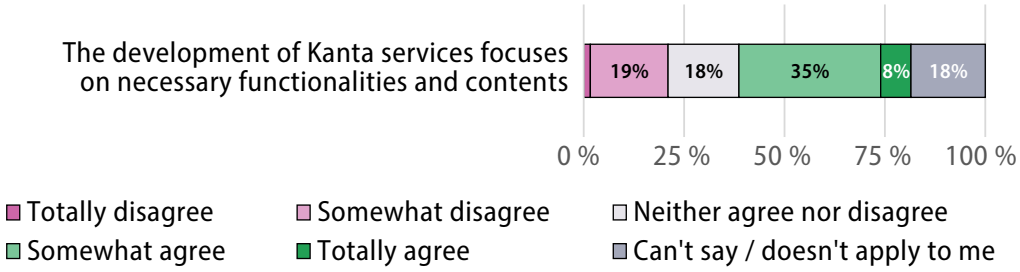
Figure 15. Recognisability of the development priorities of the Kanta Services.



Although the survey data indicates that the development priorities of the Kanta Services are fairly well recognised, the interviews painted the opposite picture. Several of the interviewees were of the opinion that there is no clear overall picture of development, and that the overall strategy or roadmap for the Kanta Services is not recognised. In regional activities, the need for a coordinated overall picture was identified as a development area in order to make the national roadmap and regional implementation better synchronised. In the absence of an overall picture, the perception was that it is difficult to monitor the development of the Kanta Services. The differences in opinions evident in the data may be partly due to the fact that the survey included a significantly larger number of information system vendors who are likely to follow the development of the Kanta Services more closely.

With regard to the development areas of the Kanta Services, slightly less than half of the respondents said they completely agreed or somewhat agreed that the development of the Kanta Services is focused on the necessary functionalities and content (Figure 16).

Figure 16. The extent to which the development of the Kanta Services is focused on the necessary functionalities and content.



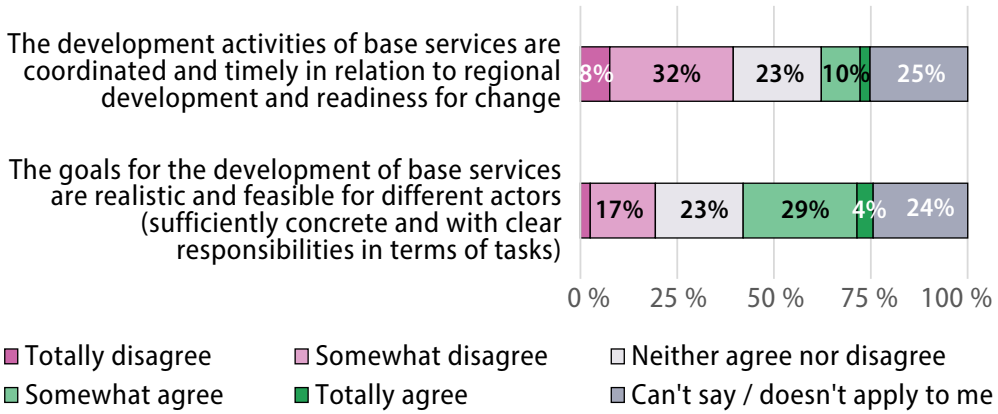
The assessment data indicated that the development of Kanta has been partially successful in prioritising those needs of professionals that are perceived as useful. Nevertheless, development as a whole is perceived as fragmented, and there is a need to strengthen the prioritisation of development areas at the national level. The respondents expressed a wish for clearer focus based on analysis, particularly with regard to placing an emphasis on cost-benefit analyses and needs identified by professionals. In the current situation, it should be taken into account that several areas are being developed at the same time, which slows down the progress of

individual development projects and leads to resources being spread between different directions of development. For this reason, the existing development projects should be completed before starting new ones.

When asked to name less important areas of development, the respondents suggested personal digital services, for which regional development or market-driven innovation could be utilised while ensuring interoperability with the national information system services. The respondents also mentioned development areas related to the personal health record and small projects targeted at the needs of special groups, which benefit a limited user base. Development areas with a low cost benefits and impact, should be assigned a lower priority. The key is to identify the decisions and justifications required for the development of the areas in question. In general, no added value was seen in storing information managed by another public authority, such as certificates, in Kanta. Including day-to-day healthcare entries in Kanta data was perceived as unnecessary, as their value decreased over time. Diverging views were expressed with regard to storing wellbeing data in Kanta.

Nearly half of the respondents felt that the development measures of the Kanta Services are not coordinated and timely in relation to regional development and readiness for change. Only a minority agreed with the statement in question. Approximately one-third of the respondents found that development goals of the Kanta Services are realistic and feasible for different operators when it came to sufficiently concrete tasks with clearly assigned responsibilities (Figure 17).

Figure 17. Coordination and timeliness of development measures for the Kanta Services, the extent to which the development goals are realistic and feasible from the perspective of regions and operators.



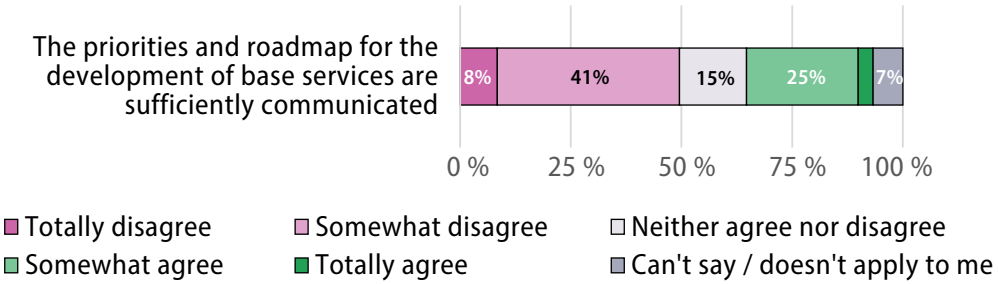
Based on the data, the development measures for the Kanta Services are currently perceived as burdensome in the wellbeing services counties, and improvements in their coordination and timing are desired. Both the survey respondents and the interviewees pointed out that the wellbeing services counties' readiness to deploy new Kanta functionalities within the targeted timeframe are weak in some cases, even when looking only at new functionalities that are legally required. The respondents highlighted the need for better timing and regional readiness with regard to the deployment of new Kanta functionalities. Engaging system vendors' participation in planning also emerged as an important factor.

The slowish deployment of new data structures poses challenges to the scope and comparability of Kanta data. Improving the quality of data in secondary use would require the wellbeing services counties to make progress towards implementation in accordance with the Kanta specifications. Data is presently transferred using the outdated specifications, even though everyone should now be using the 2016 specifications. This increases the systems maintenance costs of the wellbeing service counties because they still need to process outdated data. Different kinds of operators are expected to deploy Kanta data content more efficiently and ensure simultaneous deployment. This requires stronger incentives, as well as monitoring and concrete sanctions.

The development process of the Kanta Services is perceived as slow and the deployment of extensive development packages is often delayed. Having to wait for the testing of production-ready features is a particular cause of scheduling problems. The data highlights the need to increase the agility of development, for example by phasing and piloting new functionalities first on a smaller scale regionally. The development approach that requires all problems to be solved first, combined with the simultaneous rigidity of legislation and legislative reforms were characterised as a combination that poses challenges to rapid progress in development.

The assessment examined views concerning communications related to the development of the Kanta Services. Slightly more than half of the respondents indicated they disagreed somewhat or disagreed completely with the statement that the development priorities and roadmap of the Kanta Services are sufficiently communicated (Figure 18).

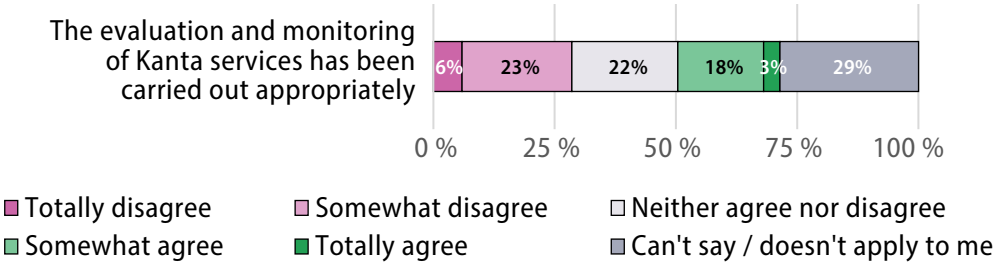
Figure 18. Communications on the development priorities and roadmap for the Kanta Services.



The data revealed challenges in communications concerning the development of Kanta at both the strategic and operational levels. At the strategic level, establishing an overall picture of development was unclear. At the operational level, communications on the development of Kanta were characterised as partially insufficienit, especially due to the implementation of legislation and the inadequacy of regional resources, which complicates the monitoring of development occasionally. The respondents expressed a wish that communications on the development of Kanta would become clearer and more proactive, although some improvements have already been observed in recent times.

The assessment examined the respondents' views regarding the assessment and monitoring of the Kanta Services. Approximately one-third of the respondents felt that the assessment and monitoring of the Kanta Services has not been carried out appropriately, while approximately one-third expressed the opposite view (Figure 19).

Figure 19. The appropriateness of the assessment and monitoring of the Kanta Services.

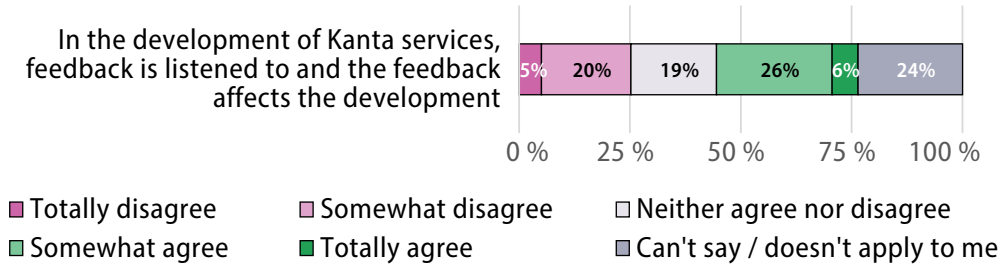


The data did not highlight broad observations pertaining to the assessment and monitoring of the Kanta Services. The present assessment of Kanta information system services was considered to be a very good thing, and the respondents wished that similar assessments and reviews would be implemented regularly in the future. The responses indicated a lack of awareness of the monitoring of Kanta carried out by the Finnish Institute of Health and Welfare.

With respect to the coordination of the development of Kanta, the data also highlighted the Kanta steering and funding model. The current governance and steering structure was characterised as complex in the data. According to the respondents, the multi-party steering and funding model for the development of Kanta, which is jointly implemented by the Ministry of Social Affairs and Health, Kela and the Finnish Institute for Health and Welfare, is unclear. The formation of the current funding model was discussed in the interviews. It was not completely clear to the respondents how the funding is formed and allocated. Although Kanta's steering model and financial steering are based on legislation, the data suggested a need for the clarification of responsibilities with respect to steering.

The assessment examined the respondents' views regarding the processing of feedback on the development of Kanta. Approximately one-third of the respondents indicated they somewhat agreed or completely agreed with the statement that feedback is heard in the development of the Kanta Services and that feedback has an impact on development (Figure 20).

Figure 20. Openness to feedback the impact of feedback in the development of the Kanta Services.



Feedback should take the form of an interactive exchange of information, which would better support development cooperation than the unilateral provision of information about changes. Engaging the participation of the users of the services in the development work should be enhanced further. For example, user surveys of physicians, nurses and medical secretaries, who are active users of Kanta data, would be valuable and also help maintain customer orientation.

Closer cooperation with the wellbeing services counties makes it possible to influence the system vendors responsible for the systems used in the wellbeing services counties so that the systems are developed to be more interoperable with Kanta. The respondents expressed a hope that cooperation with the wellbeing services counties be expanded from the current level. They also suggested that the national operator should have designated regional contact persons to enhance and maintain interaction.

According to the data, clearer cooperation structures are needed for the development of the Kanta Services. This could involve the participation of the national operators, public and private service providers, the producers of information system services and other solution developers, also taking into consideration the customer-oriented perspective in service development. The data indicated a need for more interactive and participatory work, such as regular surveys and data collection, information events, discussion events, workshops and citizens' forums, for example.

The assessment examined what kind of insight and data the further development of the Kanta Services should be based on. The data highlighted a broad need for diverse information based on understanding the users' needs, national and international assessments and empirical evidence. In addition, information obtained from cost-benefit analyses and impact assessments should be used more extensively in the development of Kanta.

5.2.3 The future of the Kanta Services

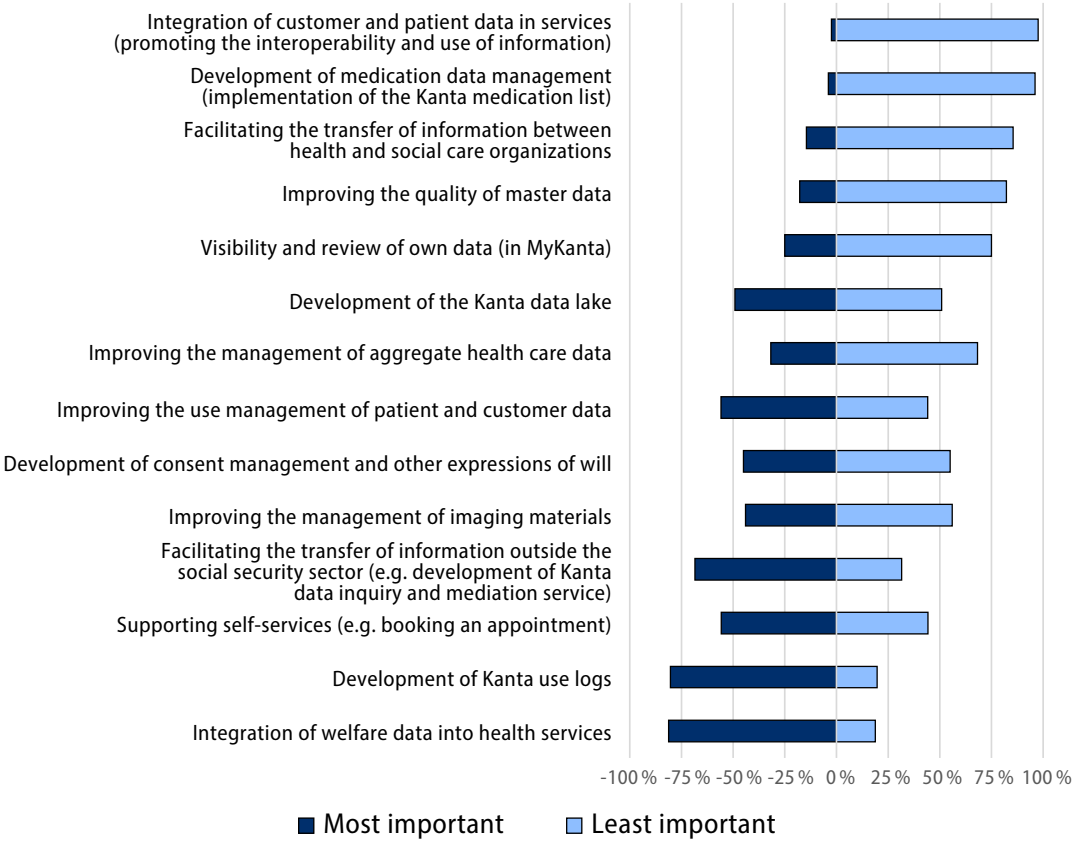
The future of the Kanta Services was assessed on the basis of the interview data. The interviews highlighted the view that the role of Kanta in the future should be conceptualised using different scenarios that are based on previous strategic choices. The interviewees expressed significantly varied opinions regarding Kanta's relationship to regional development, the operating logic of services and the use of new technology, for example. On the whole, the interviews demonstrated the need

for a clear national and regional role for Kanta as well as long-term development priorities to which all of the parties involved in the development of Kanta Services can commit.

The data shows that the Kanta Services have developed as a result of a long development path and they play a key role in the current service system, especially due to the structural reforms in healthcare and social welfare services. Although the benefits of Kanta implementation are widely recognised, the impact of the reforms sets expectations for the further development of the services. According to the data, it is important to clarify the direction of the development of the Kanta Services, especially from the perspective of information management in regional healthcare. Based on the responses, different approaches are proposed, such as defining the objective of the digitalisation of healthcare or drawing up broader scenarios for the development of Kanta in order to identify best practices and solutions to be acquired from the market.

The particular future development priorities emphasised by the respondents (Figure 21) included the integration of client and patient data into healthcare and social welfare services, improving the management of pharmacotherapy with the help of the Kanta medication list, and facilitating the transfer of data between healthcare and social welfare operators. Enhancing the quality of Kanta data and improving the visibility of the user's own data in MyKanta were also highlighted as key areas of development. The areas of development that were perceived as the lowest priorities were the integration of wellbeing data into healthcare and social welfare services, the development of Kanta usage logs and facilitating the disclosure of data outside the healthcare and social welfare sector.

Figure 21. Assigning priorities to different development areas of the Kanta Services.



The future benefits of the Kanta Services were assessed in accordance with the framework. The respondents stated that they expect the Kanta Services to generate broader benefits than they currently do, particularly as the services are developed and the data content is expanded. As they are expanded in the future, the Kanta Services will enable the straightforward examination of the patient's overall situation, which promotes the quality, effectiveness and safety of care. The respondents also emphasised the need to accelerate the deployment of Kanta features and data content that have already been developed. Kanta is also expected to make the work of professionals more efficient by reducing their workload, especially with respect to the retrieval and forwarding of information. Access to patient data, forwarding certificates and managing one's own data — in which usability plays a key role — will also be beneficial to the users of the Kanta Services in the future. In addition, the Kanta Services can provide centralised and cost-efficient information system services for regional development areas. In the future, it will also be possible to use the Kanta data repository to support service system

and population-level analyses and research. Kanta is also perceived as a growing national contact point in international services, such as the use of e-prescriptions and the European Patient Summary when the relevant obligations are established by the EHDS regulations. Although Kanta interfaces have already been opened up, the assessment data highlighted the need to apply innovative approaches in this area in the near future, which refers to the potential of the Kanta infrastructure to support solutions that have been developed quickly.

In the future, the added value of the Kanta Services for different operators could be significantly increased by the development and opening up of interfaces, improving the quality of data and utilising the data for knowledge management and secondary purposes. Concrete development suggestions also emerged from the interview data, such as supporting the work of healthcare professionals by expanding the Kanta data content, which would enable the better utilisation of patient-specific summaries. Needs were also identified with regard to improving the efficiency of Kanta messaging between different healthcare operators and developing the international exchange of data with respect to new data content, such as laboratory and imaging tests and epicrises.

At the end of the data collection, the respondents were asked for suggestions on new development needs and opportunities for the Kanta Services of the future. Integrating artificial intelligence into the services to enable more effective utilisation of the data was brought up as a suggestion. AI could be used to cost-effectively produce data necessary for professionals from large quantities of patient data content, improve the discoverability of data and enhance analyses with regard to predicting service needs, for example. For individual users, AI could provide various summaries of their health data and support the maintenance of health by means of various assessments. AI could also facilitate the classification of data and the management of structured data. The future development of Kanta is aimed at ensuring the accessibility of digital services for all user groups, thereby promoting inclusion and equality.

6 Conclusions and discussion

The preparation of the Ministry of Social Affairs and Health's strategy for digitalisation and information management emphasised changes in the operating environment and the significance of the digital transformation. The rapid development of health technology and new innovations have a significant impact on the life-cycle of information system services, providing opportunities for service renewal. In these circumstances, the Ministry identified the assessment of Kanta information system services as a vital task.

The main objective of this report is to provide a multi-perspective assessment of the national Kanta information system services based on an analysis of previous development history and with a focus on the digitalisation of healthcare. The assessment focused on the primary use of patient data in Kanta for healthcare services and the MyKanta service process. The assessment was focused on functionalities and their opportunities and shortcomings rather than technical solutions. The report does not cover the clarification of the roles and responsibilities of national and regional operators, which is to be addressed separately as part of the Ministry's coming preparation for a vision of healthcare digitalisation.

The implementation of the assessment was scheduled to take place over a period of 3–4 months in spring 2024, but the amount of external expert input turned out to be lower than planned due to procurement-related reasons. For this reason, officials from the Ministry of Social Affairs and Health carried out the assessment to a large extent alongside their other duties. As the assessment progressed, constraints related to the available data were identified, particularly with respect to the extent to which the source data covered the costs and steering of Kanta development, and the quality of the documentation of the interviews. The effects of these constraints should be taken into account in the interpretation and use of the report.

The costs, steering and prioritisation of development

Although this assessment was not primarily focused on assessing costs, this theme was examined as part of the steering of Kanta development. The cost analysis was mainly based on the available data, with audits carried out by the National Audit Office of Finland Office (VTV) providing additional information for a broader

understanding of how the costs are formed. The allocation of costs and resources in Kanta development and the approaches concerning the steering model have varied between 2010 and 2024. Initially, the Ministry of Social Affairs and Health held a key role in steering. The role was subsequently shared between the Finnish Institute for Health and Welfare and Kela. Reporting of the use of funding varied between periods, which made it difficult to compile comparable data for an overall assessment. Funding from Kela was allocated to resources for implementation work and communications concerning development work, amongst other things. The role of the Finnish Institute for Health and Welfare included the costs of the operational unit, including payroll costs and, in some of the years under review, discretionary government grants to support regional development, for instance. It should be noted that the resources used by the Finnish Institute for Health and Welfare for Kanta development could not be precisely determined on the basis of the available data, as part of the development work was carried out within the framework of internal budgeting.

The annual amounts of funding granted from the central government budget have varied significantly, ranging from EUR 7 million to EUR 40 million. When examining the multi-year development of Kanta, it can be observed that, at the annual level, the funding allocated to the Kanta services has not been merely used for the development of Kanta infrastructure, but also for some other related development items. The available data does not reveal a single clear reason for part of the funding being left unused. The COVID-19 pandemic created a clear exceptional situation for the development of Kanta in this respect, as the focus of expert work quickly shifted to the development of information management solutions required by the pandemic response. When looking at the big picture, it might have been necessary to assess the development goals and available resources in more detail at the level of individual years.

There has been an intensive period of national information system infrastructure development in Kanta development, which has led to the successful creation of national digital healthcare infrastructure and prioritised data content. This development stage is now coming to an end as Europe moves from the preparatory phase to mandatory implementation in the development of digital health. In the future, new challenges must be solved in the national development efforts, including the disclosure management requirements of the EHDS Act, providing individual users with extensive access to their patient data, and managing new data content, such as imaging data. These changes will also create pressure on the funding of Kanta development as the need arises to adapt to the new requirements stemming from the EHDS regulations. This may create challenges with respect to development needs at the national level, as legislative changes must be prioritised

over other potential needs and the resources for development are limited. Finland has been proactive in the use of European funding since 2019, which has already enabled the implementation of cross-border healthcare services.

The steering of the Kanta Services has mainly been based on the development of the legislation governing information management, and one of the key challenges has been the setting of deployment schedules and transition periods. The scheduleds have had to be changed on many occasions. One concrete example is the deployment of key data necessary for treatment. By spring 2024, only 17 per cent of public sector organisations had made progress on this in accordance with the 2016 specifications. The challenges associated with deployments are complex. The renewal of the steering structures has been identified as one solution to these challenges.

The recurring stages of Kanta development and established division of duties between the national operators were identified in this assessment. The Ministry of Social Affairs and Health has been responsible for strategic development goals and legislative work. The Finnish Institute for Health and Welfare has prepared the content-related requirements and instructions for professionals, while Kela has taken care of the implementation of the services and testing the technical requirements related to their deployment in cooperation with regional operators. The roles of other national operators in the development of Kanta are largely based on their respective duties. Examples of these other operators include the National Supervisory Authority for Welfare and Health (Valvira), the Finnish Medicines Agency (Fimea) and the Digital and Population Data Services Agency (DVV).

The steering of development has been approached in different ways during the period under review. Initially, the operational unit under the Finnish Institute for Health and Welfare was established to steer information management. The aim was to implement a more comprehensive model for the steering and monitoring of development. The late 2010s brought a shift to a new steering approach, with the Ministry of Social Affairs and Health assuming responsibility for the strategic planning and steering of national information system services, including the allocation of funding to development projects. This marked a partial return to the model applied in the early days of Kanta development, when the Ministry had the primary responsibility for steering. The reporting of development funding was transferred from the Finnish Institute for Health and Welfare to Kela in connection with this change. The Ministry began to develop new steering models and carried out scenario planning to evaluate the future of Kanta development (STM 2019a; 2019b). Various steering models, such as structures based on specifically appointed steering groups, were experimented with, but they were subsequently

discontinued. Issues related to the development of steering are still key priorities for the Ministry's digitalisation and information management unit. Steering is carried out with a portfolio-based approach as part of the Ministry's project office for information management. In addition, the performance guidance of the Finnish Institute for Health and Welfare has been transferred to the Ministry's Strategic and Financial Management Unit. According to the assessment, the steering of Kanta and the steering of information management in the wellbeing services counties operate as separate entities. Improving dialogue between the steering structures could promote the achievement of broad-based information management objectives.

The successes and potential failures of the steering structures used in different periods were a topic on which not much source data was available, such as assessment data on steering activities. One of the conclusions of this assessment is that the assessment of the effectiveness of different steering structures should be strengthened. This is particularly important in the well-managed and long-term development of national information system services based on strategic goals.

With respect to the strategic objective, the assessment shows that Finland has set strategic targets at an early stage and started to put them into action. The key choices in national information management in healthcare were identified at the beginning of the 2000s. At that time, the decision was made to implement an electronic patient information archive and a supporting code set service, as well as an electronic prescription centre. The Based on these previous choices, the eHealth and eSocial strategy emphasised the exchange of data and enabling multidisciplinary cooperation through national information system services. The implementation of the strategy was monitored under the STePS and STePS 2.0 projects[13] of the Finnish Institute for Health and Welfare.

The Ministry also carried out an interim review of the eHealth and eSocial strategy, which found that the goals of the strategy had been appropriate. At the same time, the interim review identified areas requiring further improvement, particularly with respect to the commitment of management. Published in late 2023, the strategy for digitalisation and information management extending to 2035 emphasises the individual's participation in healthcare services and enabling these activities by means of a strong foundation of data. This strategy is aligned with the key strategic

13 Finnish Institute for Health and Welfare, Monitoring Digital Healthcare and Social Welfare. https://thl.fi/en/research-and-development/research-and-projects/monitoring-digital-healthcare-and-social-welfare?redirect=%252Ffi%252Ftutkimus-ja-kehittaminen%252Ftutkimukset-ja-hankkeet%252Ftutkimukset-ja-hankkeet-aiheittain%252Ftiedonhallinta-sosiaali-ja-terveysalalla-tutkimukset-ja-hankkeet

objectives of the future European Health Data Space. In the implementation of the latest strategy, monitoring has been strengthened by indicators prepared by the Ministry, and the key goals are promoted as part of the digitalisation programme that is consistent with the Government Programme. The long time frame of the strategy, particularly in the changing environment of digitalisation in healthcare and social services, requires continuous assessment. With this in mind, this assessment recommends that the timeliness and goals of the strategy be re-evaluated when the term of government changes.

With respect to the prioritisation of development needs, the data enabled the identification of unresolved issues with regard to the development of the Kanta Services. The development of the personal health record has been in an unclear stage for a long time in Finland. However, the upcoming European Health Data Space (EHDS) regulations may provide a significant impetus for further progress based on the groundwork done nationally. The aim of the EHDS regulations is to improve the availability and mobility of health-related data throughout the EU, which could harmonise and strengthen the development of the personal health record in Finland. Citizens can already use the Kanta Services to examine, control and share their health data, which corresponds to the EHDS goals. This development not only enables better opportunities for the individual's participation in their healthcare, but also greater efficiency in the provision of healthcare services and improvements in quality. Finland's head start with the implementation of the Kanta Services and MyKanta offers a potential national-level solution option for the fulfilment of the EHDS requirements that is more controlled in terms of its cost impacts. Taking into account the transition periods stipulated by the EHDS act, an important decision to be made in the coming years with respect to the development of Kanta will be whether the EHDS requirements will be implemented as centralised solutions or in a decentralised manner through regional resolutions. The key is to ensure that citizens get the best possible benefit from their health data as a reliable service at both the national and EU levels, within the targeted time frames.

The current state and future of the services

An examination of the development history of the Kanta Services reveals a long-term and layered approach, which significantly affects how changes can be implemented in a controlled manner in practice. Strategically successful choices were made in the early stages of Kanta development, such as the use of international standards and classifications in the national implementation. This will make the upcoming transition to the implementation required by EHDS easier and promotes national interoperability through standardised data content solutions

and interfaces. In addition, controlling access management in the national and regional implementation and the decentralisation of operational use into regional systems are key factors. The operational reliability of the Kanta Services as 24/7 systems enables the real-time utilisation of data in services, which is crucial for the effectiveness of healthcare.

According to the experts who participated in the assessment, Kanta has been successful in building a digital infrastructure for healthcare services. The Kanta Services make the data of individual patients accessible to healthcare professionals between different wellbeing services counties and organisations. Kanta data enables the formation of an overall picture of the patient, which promotes higher quality, safer and more effective care. Going forward, the Kanta Services could also support the better utilisation of data produced by individuals, thereby further improving patient safety and the effectiveness of care. Centralised national solutions reduce the need for the development of local long-term archival and related solutions, and they have produced a coherent solution for managing patient data disclosures. At the same time, better availability of data improves the cost-efficiency of services.

Kanta has significant benefits for individuals. People can use MyKanta to view certain parts of their patient records and manage the use of their patient data. The prescription service allows people to request the renewal of their prescriptions without having to contact the healthcare organisation separately. On the whole, the experts whose participation was engaged in the assessment indicated that the absence of the Kanta Services would be a significant weakness for the implementation of healthcare services and for individuals.

Kanta has become one of the most important brands in Finland[14]. The number of users of the Kanta Services has increased continuously. Over the past five years, the number of patient data retrievals through the Kanta Services has grown tenfold (Kela 2024). On average, healthcare professionals retrieve another organisation's patient data from the Kanta Services five million times per month. Data is retrieved from organisations' own data files nine million times per month. The growth reflects the key role of the Kanta Services in the day-to-day use of patient data by professionals.

14 Kanta.fi is still Finland's third most highly valued online brand, https://www.kanta.fi/en/system-developers/notice/-/asset_publisher/uMVbfLjlW7Gq/content/kanta-fi-edelleen-suomen-kolmanneksi-arvostetuin-verkkobrandi

Challenges related to development

In the data, the key challenge that was identified with respect to the use of the Kanta Services was usability, especially from the perspective of professionals. Usability issues arise with regard to retrieving data from Kanta and the returning of data to the organisation's own patient information system, for example. The utilisation of Kanta data is significantly influenced by the extent to which the patient information system is able to utilise the nationally specified data structures and coherent code sets, and present the returned data to the professional. With respect to the assessment of the usability of MyKanta, the collection of empirical data was not specifically targeted at patient groups. Instead, MyKanta was assessed on the basis of the responses given by the experts whose participation was engaged in the assessment. This may cause a distortion in the assessment of the challenges, as different patient groups may have different perceptions of the usability of the service, for example.

Based on the empirical data, the Kanta Services are reliable from the perspective of healthcare services. However, the data also included mentions of challenges related to delays in the transfer and archival of data, which sometimes leads to waiting for healthcare professionals. The electronic prescription solution was highlighted as an individual Kanta Service that works quickly and reliably.

Development goals and development cooperation

Based on the assessment data, it can be observed that the development of Kanta has partially succeeded in prioritising the needs that professionals consider necessary and most beneficial. However, based on the data, the overall picture of Kanta development is not clear. The overall strategy or roadmap for the Kanta Services is not widely recognised. Based on the responses included in the data, this shortcoming makes the development of Kanta more difficult to predict, implement and monitor.

The assessment revealed that delays in the deployment of new data structures have a negative impact on the quality of Kanta data. Patient information systems still use structures that correspond to outdated specifications, which causes quality deviations as well as cost impacts.

The respondents highlighted closer development cooperation between the wellbeing services counties' own information system solutions and the Kanta Services as an important area with respect to the development and interoperability of healthcare information systems. The respondents emphasised the need to better engage the wellbeing services counties and their system vendors in promoting

Kanta interoperability. This could significantly improve the interoperability of healthcare information systems and thereby promote seamless services between different operators. The suggestion for the national operator to have designated regional contact persons is also indicative of the need to enhance interaction and the exchange of information between different levels. This practice could make it easier to take local needs into account while ensuring better alignment between the national development goals and regional practices. At the same time, the view reflects the need to continuously develop healthcare information systems to better meet the needs of users and leverage the opportunities presented by digitalisation.

The future

In the assessment, the current benefits of the Kanta Services were characterised as significant, which contributed to the future of the services being largely envisioned on the basis of the current situation. Many of the respondents emphasised that certain Kanta content and functionalities are worth keeping. The analysis of the how the interoperability of Kanta is constructed highlights the development history and the layering and complexity of the set of information system services that has been formed. This is based on technical implementation, data standards and service architecture, for example. From the perspective of change management, dependencies on regional and local implementations make changes in direction demanding, especially in terms of the cost impacts. These factors should be examined as potential constraints and conditions regarding the future development of Kanta.

The future development suggestions for the more effective utilisation of the Kanta Services included the integration of artificial intelligence, which could enable more cost-effective production of the data needed by professionals from the extensive range of Kanta content. Artificial intelligence could also facilitate the classification of data and the managing of structured data. This would call for expanding the current Kanta data in accordance with the existing specifications. This type of development could lead to greater efficiency for professional by freeing up time previously spent on consolidating and processing data, thereby reducing their workload. From the perspective of an individual, the future benefits of the Kanta Services are related to expanding access to patient data, which strengthens Finnish patients' control over data not only in Finland but also with respect to treatment received in other EU Member States.

The assessment data indicated expectations for activities enabled by the opening up of Kanta interfaces and the implementation of innovative solutions enabled by Kanta infrastructure. One of the identified preconditions for future development

was the assessment that is about to begin in the Ministry concerning the data model that is used in the Kanta Services and based on the needs of primary use. The development of the data model could promote the renewal of the storage, processing and use of Kanta data.

Based on the assessment data, there are multiple potential paths of development when it comes to the role of Kanta information system services in the development of digitalisation in healthcare and the interoperable information system services of the future. Kanta can serve as not only a tool for storing and sharing data but also an active development platform that enables the creation of innovative solutions and services. It can evolve from a simple data repository into a dynamic ecosystem that supports extensive cooperation and use of data between different operators.

The respondents identified the strengthening of the steering of Kanta development and improving the transparency of cost development as key measures for collectively promoting the future development of the Kanta Services. Enhancing these measures can promote the effective utilisation of the Kanta Services and their development in the changing environment of healthcare and social welfare services.

7 Proposals for further actions

Digital healthcare services and Kanta information system services have been developed significantly over the past decade. However, in order to monitor and assess multi-year development more effectively, it is important to critically examine the different areas of development and identify opportunities for improvement therein. Proposals for further actions, based on the data from the Kanta assessment, are presented below.

Firstly, *the total costs of funding and the allocation of resources* should be made available in a more transparent manner. This would enable better monitoring of development and provide comparable data between different years. It is important for the monitoring of the allocation of funding to be based on clear information on the justifications and purposes of the use of funding. Although the content of the government's spending limits decisions is readily available, more comparable information would be needed on the detailed allocation of funding. This type of information could be used to produce a time series that would specify what has been produced through the allocation of resources in different periods. This would enable the future assessment of the results of service development and facilitate the prioritisation of development needs.

Secondly, *information management legislation* plays a significant role in the long-term implementation of national information system services. However, the assessment identified practical challenges in the implementation of legislation that have led to delays in the schedules. In the coming years, mandatory EHDS regulation will have an impact on the development and implementation of national legislation on information management. The implementation of legislation could be made smoother and the anticipation of changes could be improved by enhancing the assessment of the impact of legislative changes in a collaborative manner, taking the perspectives of different stakeholders into account.

Thirdly, the *approaches to national steering* have varied between different periods, and different models have been experimented with in recent years. Based on the assessment data, it is key to further strengthen the strategic perspective of the overall development of information management. In this, it is important to consider

the role of the Kanta Services as a continuous service in healthcare, where the choices made during the development history of the services create constraints and conditions for their future development.

Fourthly, the *prioritisation of Kanta development areas* must be further enhanced when it comes to decisions on the direction of future development. The assessment data indicates that many areas are being developed at the same time, which means that progress in the individual development areas is slow as resources are divided between them. It would be important to complete existing development projects before starting new ones. Applying an analytical approach based on cost-benefit analyses of development areas and the needs identified by professionals could improve the allocation of resources.

Fifthly, the *deployment of Kanta data content and functionalities* should be promoted through the renewal of the steering mechanisms and enhancing development-related communication and cooperation models. It is essential to ensure that the organisations that implement changes make simultaneous progress with deployment, which would, for example, reduce costs related to the test environment.

Sixthly, the assessment of the strategic goals of Kanta development and the *monitoring and assessment of the effectiveness* of the services that have already been implemented are identified as areas for development. Enhancing the use of data in the patient information systems used by professionals requires collaborative development between patient information system vendors and service providers. The system-level usability of Kanta data should be identified as part of information system development as a whole.

Seventhly, the assessment data indicates that *closer cooperation between the wellbeing services counties and the Kanta Services* regarding the development and interoperability of healthcare information systems should be promoted. The measures proposed include the organisation of regular cooperation forums and workshops, the appointment of regional contact persons, the coordination of development projects and enhancing communication related to development projects, and the further development of the Kanta communication strategy. These can help support the development of digitalisation in healthcare so that it better corresponds to user needs, and enable more seamless flow of information between different operators in healthcare.

Finally, to sum up, it can be stated that Kanta information system services have a multidimensional and still-developing future role in the overall digitalisation of healthcare and information system services. The full potential of Kanta can only be leveraged if its development takes into account both the technological possibilities and the operational needs and goals, as well as the assessment of results. The seven proposed measures presented above could contribute to ensuring that the Kanta Services correspond to the existing and future needs of the service system, professionals and individuals.

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