Hospital of the Future

A New Role for Leading Hospitals in Europe

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A study by IESE's Center for Research in Healthcare Innovation Management (CRHIM: www.iese.edu/crhim) sponsored by Accenture

In collaboration with

CLÍNIC BARCELONA
Hospital Universitari

KAROLINSKA
University Hospital

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IESE	IESE	IESE	Accenture

Illustrations: Connecting Brains

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Preface

The Center for Research in Healthcare Innovation Management (CRHIM), of IESE Business School, has as its mission increasing the knowledge of healthcare managers and decision makers on managing innovation including health technology, healthcare services, organization and strategy.

The Hospital of the Future study was initiated in 2013, based on collaboration between CRHIM and Accenture.

Over the past few years, the future of hospitals has attracted a lot of attention in many journals and publications, which have often described fascinating high-tech scenarios where technology seems to be the central characteristic of and the leading force for disruption in healthcare. The approach of this study is to give a voice to hospital managers and clinicians about the challenges and the new role of leading public hospitals in a changing healthcare ecosystem.

This study has been published in two formats. For a quick review of the study we recommend the abridged version (available for download online from IESE Insight and IESE Research Publications), which presents the study's main conclusions in the format of 14 key messages and 15 recommendations addressed to hospital managers and professionals, and to healthcare authorities and policy makers.

This document contains the unabridged version of the study and contains an executive summary and the complete methodology, findings and final conclusions, including appendixes with a detailed description of the 76 findings of the study and workshop debates.

Acknowledgments

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1. Executive Summary

A new era for hospitals

Hospitals seem to be in a state of continuous change. Furthermore, the digital age anticipates a transformation of health, with governmental healthcare reforms embracing the idea of disruption in public hospitals.

For several decades, European public hospitals have been a reflection of the healthcare models. Usually the largest and most complex institutions in the system, they have been adapting at different rhythms to new clinical breakthroughs, new healthcare models and management practices, and also to changing conventions and paradigms in healthcare.

The digital society fosters change in healthcare systems and, in particular, challenges hospitals in a new and unprecedented manner. As events in one part of the world can now be instantly known universally, healthcare managers and professionals are continuously facing requests from stakeholders such as politicians, professionals and patients' associations to implement new healthcare models and practices, even if they have not yet proved to be successful.

Study approach

Considering the above challenges, public hospitals in Europe are becoming a critical piece for achieving excellence in the new healthcare puzzle. For the last decades, hospitals have been concentrating highly skilled professionals, healthcare technologies, and interventions, and have also become essential for clinical basic and translational research and for education and training, and some of the new paradigms and interpretations of health might have a tremendous impact on hospital activities and resources, or even the very mission and vision of the hospital.

The main purpose of studying the Hospital of the Future is to understand the potential changes that may impact the public hospital in Europe. This study considers a time frame of approximately 15 years, trying to capture not only the forthcoming changes that are on hospital managers' agendas but also underlying factors and drivers that may arise in the next decade.

Participation of two leading hospitals

At the start of this study, there were already a considerable number of articles and reports available about the future of healthcare and hospitals. Hence the approach of this study has strongly focused on the participation of hospital experts, seeking to gather potential changes to hospitals with the perspectives of executives, managers and clinicians.

Moreover, the study focuses on two leading public hospitals in Europe: Karolinska University Hospital in Stockholm, and Hospital Clínic of Barcelona. Involving two leading hospitals in this study allowed us to approach questions in some depth and also to be able to compare the organizations. A study of one hospital's vision and efforts, while illuminating in itself, gained significance when considered in parallel with the insights at a similar institution. Although each hospital was responding to different events occurring in distinct healthcare contexts, both organizations shared analogous challenges.

The idea behind this approach was simple. If this study could demonstrate that a number of professionals working at different hospitals showed similar forces or drivers or achieved comparable accomplishments, or that a number of health disciplines exhibited the same concept of change, we would have identified a thematic line for change.

These two hospitals were selected for being leading hospitals in Europe, as high-performance organizations with various characteristics: having a proven record of excellent results in safety and quality of services over a long period of time; delivering a wide range and complexity of healthcare services; and acting as the reference hospital for other providers in the community, region or state. These hospitals are also leading organizations in innovation and have demonstrated they adapt well to the required changes. Both hospitals are recognized for the excellence of their professionals and organization by other healthcare institutions.

Moreover, these hospitals were selected as leading institutions and because they have already collaborated in various European projects, enabling them to know each other's strategy and

orientation. Therefore, this potential influence of each hospital on the other allowed a third-party observer to study not only separate insights but also convergent and divergent views.

Participants from both hospitals were selected to find a balance between management and clinical views, and to get a good understanding of the current situation and maintain space to think beyond the existing models, strategies and initiatives.

In order to bring managers and clinician leaders into this discussion, a conceptual framework was developed to represent the diverse topics of significance, extracted from an initial literature review, and covering the hospital context, strategy, leadership, resources, processes, results, risks and opportunities. This conceptual framework served to facilitate the validation and discussion of issues, and also as an opportunity to introduce and debate the relationships between ideas at the individual and group level, and to help discern the nature of changes, which might be clinical, technological, social, political or simply economic.

A new role for leading hospitals in Europe

As the journey of exploration advanced with the participation of hospital and healthcare experts, the glamorous glow and sparkle of terms – such as the digital patient – captured during the literature review gave way to discussions on the real situation and future of hospitals from the professionals' perspective. It was at that moment when hospital managers and leading clinicians from diverse areas and departments were given a voice, that a new theme emerged to communicate many (although not all) of the concepts and discussions: a new role for leading hospitals in Europe.

This emerging theme around a new role for the hospital encapsulates a potential revolution in healthcare, which erases the current hospital boundaries and defines new patterns of relationships of the hospital with other healthcare, and also non-healthcare, institutions.

Conclusions

First, this study presents a list of 76 findings from individual and group interviews, reviewed and validated with online consensus tools and discussed in workshops with hospital participants. These findings identify and describe drivers that are shaping and pushing change in hospitals and illustrate the likelihood of these changes happening as well as the potential impact of these changes on the hospital and the readiness of hospitals to adapt to these changes.

A new role for leading hospitals can be understood as an evolution of the function of leading hospitals within healthcare systems in Europe and also within the health sector and society. The characteristics of this new role are encapsulated in the 14 key messages that reflect and link the most relevant ideas from the findings and workshop debates.

Leading hospitals are expected to evolve in their role as orchestrators of care, within a network of health and social care provision, as facilitators of innovation and research, and as advisers in the redesign of healthcare processes.

Moreover, in this new role, leading hospitals will have to respond to a challenging context, where they will be expected to provide excellent complex care while reducing costs and, at the same time, they will need to develop a new scope of services including personalized medicine and genome-based diagnosis and treatments.

Leading hospitals will also be expected to build and coordinate networks of care and guide in the redesign of processes and services. In this role, they will become more open and distributed for other providers and organizations in the network, and also more connected to patients at home.

Professionals from leading hospitals will prove to be excellent specialists and also credited team-workers and coordinators of care in their network of care. New professional roles will emerge at leading hospitals that will further shape this task and the relationship of leading hospitals with other providers.

Finally, in this new role, leading hospitals will co-develop models and partnerships with various stakeholders at international and local levels, for health and social care provision, teaching and research.

The 14 key messages that summarize and encapsulate these characteristics are:

1. A triple-challenge context for hospitals

Hospitals will strive in a triple-challenge context, with a combination of an increase in healthcare needs, a decrease in resources, and changing social values.

If healthcare expenditure (as a percentage of gross domestic product) continues to decline and the demand for healthcare services continues to increase (considering a population with a higher life expectancy), the need to prioritize public resources will bring back some debates about society's values such as solidarity, individual responsibility, and limits on free and universal access to healthcare services.

2. Smaller and more complex hospitals

Hospitals will become smaller and more complex, focusing on high-value and highly complex services to become highly efficient organizations, without requiring high activity volumes.

Leading hospitals will be providing high-value services that require specialist knowledge or technologies or both, and that require a minimum number of cases or patients to achieve quality, safety and efficiency per unit of service provided.

3. New scope of services

Leading hospitals will embrace new services such as personalized medicine and genomic-based diagnosis. Genomics-based services will move the hospital forward in prevention services, and hospital professionals will support decisions on prediction tests and treatments for potential health problems and not only on confirmed diagnoses.

Leading hospitals will also embark on a broader scope of services such as population health management and chronic care management. These services will be based on a per capita and subscription model and will include a wide range of activities from prevention, diagnosis, monitoring, intervention and remote management of patients.

4. Dual orientation: tertiary and territory

The hospital strategy will combine this focus on complex services as a tertiary hospital, with a dual orientation on the territory, which means also managing the provision of acute services in a catchment area.

First of all, the leading hospital will continue to provide excellent diagnosis and treatment services aimed at patients referred from other centers that cannot provide the same services with an adequate level of quality or at the same cost.

Moreover, the leading hospital will act in a dual role: providing some of the acute services for a catchment area in the community and managing other healthcare services in this area. Hospital leaders will work with other providers in the territory to identify healthcare needs, configure quality services, define safe and efficient processes, train personnel, and monitor process outcomes and health results.

5. Knowledge-driven for service redesign

Leading hospitals' knowledge will play a central role in the knowledge-driven redesign and planning of healthcare services. Clinical knowledge accumulated at hospitals will be used for the redesign of healthcare services. Leading hospitals' knowledge will make it easier for process redesign to start within the hospital without being limited to the hospital walls.

Public health systems will carry out a reconfiguration of services towards efficiency and quality, which must be evidence-based and driven by knowledge. The required knowledge for this redesign could be based at leading hospitals where professionals treat and interact with patients.

6. Open and distributed organizations

Leading hospitals will not be defined by the physical structures and will be organized to deliver services at different locations. The hospital orientation towards services will imply breaking the current boundaries of medical departments and will change the organization to facilitate the

provision of services at different locations, moving – when possible – diagnosis and treatment equipment to local centers, with easier access to patients.

Leading hospitals will reduce their physical resources on the main site, such as ward areas, and will use distributed facilities to get closer geographically to patients, with processes covering not only on-site activities but also home care and providing services at shared facilities with other levels of care.

7. Innovation centers of technology and services

Hospitals will become the reference centers for process and technology innovation and healthcare service design. The hospital will create a good environment for innovation, not only for hospital processes but also to find solutions for supporting innovation for other healthcare providers in the same network.

Healthcare process innovation will include clinical processes and patient flow processes, both inside the hospital and also in the care continuum (including coordination with other stakeholders), applying lean methods to improve the value and efficiency of healthcare services.

8. Research and education as key results

Leading hospitals will continue to be the main centers for research and for the education of new professionals and for new professional roles, which means generating knowledge and capabilities.

The leading hospital will develop networks with other healthcare providers in order to create research networks at a local, regional, national and international level. The leading hospital should develop partnerships, knowledge and activity that serve as the basis for clinical and translational research activities.

9. Risk-sharing models with all stakeholders

Leading hospitals will develop new risk-sharing models with insurers, industry and/or other providers, with a progressive introduction of new methods of payment for treatment – such as payment by results – that will require the hospital to reconsider its revenue model and structure.

10. Professionals in hospital governance

Hospital professionals will participate in the strategy, leadership and governance of the hospital. For real change to occur, the authorities – especially politicians – will let leading physicians play an active role in the redesign of the health system.

Clinicians and other healthcare professionals will participate in strategy design and implementation, with management responsibilities in different units, and their opinion will be very influential on the governance boards.

11. Integrated care and process-oriented teams

Leading hospitals will be organized into process-oriented teams and seek to create integrated care models (either virtually or by merging companies). These integrated care and process-oriented teams will collaborate in the provision of care and will develop new risk-sharing models.

Hospital physicians and managers will consider the whole healthcare provision network as their area of influence and will develop an active role for care management and improvement, not only within the hospital but also for other providers in the network.

12. Connected hospital

The patient experience improvement initiatives will lead to a connected hospital where case managers will reach out to coordinate care for patients at home.

These changes will lead to patients taking a more active role in the design of hospital services and participating in care process redesign activities to consider patients' needs and views. Some groups of chronic patients will be very proactive and will influence the health system in some respects.

13. New professional roles

Hospitals will need health coaches, genetic counsellors, disease-specific case managers, information management experts and "med-engineers." Leadership models in hospitals will consider the involvement of nurses as full partners with physicians.

Hospital managers will excel at stimulating professional development in a scenario where competing on salaries with other organizations or industries might not be an option.

14. Patient-centered innovation

Leading hospitals will systematically redesign the service experience with innovation to become really patient-centered.

The perceived quality of healthcare services will be systematically evaluated and considered for innovation. Communities of patients will have an impact on the redesign of specific healthcare services and will be involved in initiatives for improving hospital processes.

Two hospitals' mind-sets combined

The encapsulation and combination of ideas from the two hospitals might be interpreted as discrepancies for some readers, whereas other readers might find that all the findings are very consistent. Is it possible for a hospital to focus on complex services and, at the same time, become a community hospital? Could conditions change in such a way that this contradiction becomes feasible in the next 15 years? This study leaves room for debate on this issue.

Main recommendations

Finally, a list of recommendations to different healthcare stakeholders has been proposed to encourage decisions and initiatives that would promote positive change or mitigate potential harm or the arrival of a difficult scenario. These recommendations include:

- Playing an active role in helping public administration and society overcome the current challenges of the healthcare system.

- Shifting services to other providers efficiently and carefully, which means also protecting "synergic" hospital services, which are those that may generate more knowledge or new services if kept at the leading hospital than if transferred to other levels or settings.

- Actively involving clinicians in healthcare service redesign, and also incorporating professionals from other disciplines and industries who will work together to innovate and develop new services.

- Involving hospital managers and clinical leaders when planning healthcare services and designing disease management strategies.

- Establishing closer collaboration among different stakeholders in research and education.

- Strengthening links with primary care, mental and social care providers, to build efficient care networks, and in collaboration with healthcare authorities to work towards the creation of integrated care organizations.

- Creating new ICT capabilities and services for healthcare professionals in order to improve connectivity with other players in the extended integrated healthcare network and with patients.

- Promoting patient experience improvement, including patient involvement through patient advisory councils for the redesign of healthcare services.

- Developing new career development plans for clinicians that include not only clinical skills but also leadership, management and communication competencies, which will help achieve the greater impact that the system will require.

- Designing new hospital governance models allowing decisions to be made closer to the level where problems arise, with more actions at the technical level, and only a few at the political level.

- Developing information systems that keep up to date with the development of clinical knowledge in the different specialties, ensuring that new knowledge is rapidly spread throughout the health system.

Leading the new era of healthcare?

We hope that this study contributes to the ongoing debate on the role of hospitals by providing some answers and raising valuable questions for current and future healthcare managers, professionals and policy makers.

It is not clear yet at this stage if hospitals will be able to continue leading the healthcare service chain or whether they will become supporting-role players in a system led by other institutions. We believe that those hospitals that are able to take on board the recommendations provided here will have greater chances of maintaining their leading role.

Study limitations

This study has focused on the hospital perspective and the hospital interaction with other institutions (universities, city councils, start-up companies, etc.). However, it would be interesting to continue this work and understand how potential changes may be perceived by other healthcare stakeholders such as primary care centers, those involved in long-term care, healthcare suppliers, patients' associations, healthcare insurers, industries, and other stakeholders. This may be the focus of a future study by IESE CRHIM.

2. Introduction

2.1. Study Background

For many decades, public hospitals in Europe have functioned as the centerpiece of many European healthcare models, frequently in the archetypal form of a general university hospital.

Public general hospitals have also been the main driver for the progress of medicine and health technologies, and clear examples of such evolution can be seen in many fields such as surgery, imaging and laboratory work.

Today, hospitals still absorb an important part of total healthcare expenditure in most European countries, and they have become a core element in strategic transformation plans in many healthcare systems. Moreover, many healthcare publications and health system strategic plans repeatedly point to a new role for public hospitals, where the hospitals' functions would be aligned much more with other providers in the continuum of care.

Public hospitals, though generally large and complex organizations, have proven to be in a state of constant change, successfully dealing with challenges such as adapting hospital capabilities to provide new services or to perform new clinical techniques.

However, the challenges and opportunities that public hospitals are facing are unprecedented and come from multiple domains, not only economic but also related to advances in healthcare and information technologies and to the expectations of healthcare professionals and the public.

One growing reference for hospital management is the Triple Aim framework, which initially was developed by the Institute for Healthcare Improvement (IHI)[1] for the challenges of the US healthcare system. Healthcare system authorities and policy makers in Europe are increasingly interested in this framework, as are hospital managers. This framework presents three dimensions, which according to the institute should be pursued simultaneously. These dimensions – the Triple Aim – are:

- "Improving the health of populations";

- "Improving the patient experience of care (including quality and satisfaction)"; and

- "Reducing the per capita cost of healthcare."

Public hospitals are a critical piece in the new healthcare puzzle when it comes to achieving excellence. For the past few decades, hospitals have been concentrating highly skilled professionals, healthcare technologies, and volumes of activity. Hospitals have also become essential for clinical basic and translational research and for education and training.

Similarly to the IHI Triple Aim framework, public hospitals share with other healthcare organizations worldwide three simultaneous challenges, a triple aim for operational excellence:

(1) the management of scientific knowledge;

(2) the need to implement agile and effective processes; and

(3) the provision of excellent service, as perceived by the hospital stakeholders, primarily patients and their families.

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[1] "The IHI Triple Aim," http://www.ihi.org/engage/initiatives/tripleaim/Pages/default.aspx, last accessed January 2016.

Figure 1. A "triple aim" for operational excellence

1) Management of Scientific Knowledge

There is no doubt that knowledge in health has exploded, with tens of thousands of articles making their way into Medline every month. It is impossible for a single professional to keep up with this tsunami of knowledge, which needs to be filtered and incorporated into practice. Furthermore, proper practice inside a health institution generates knowledge that also needs to be collected, systematized and disseminated for internal and external use. This management of knowledge, the use and generation of evidence, cannot be left to individual improvisation but requires leading hospitals to play an active role in the creation of processes to generate the knowledge, analyze it, store it and disseminate it. This is particularly difficult as it must be achieved in an environment with many inherent impediments to learning, such as cross-disciplinary work, a culture of solving problems internally, reluctance to show failure, professionals with a strong desire to "get it right," status differences between professionals, powerful individuals, etc.

2) Agile and Effective Processes

The explosive development of knowledge has driven a culture of super-specialization and therefore strong efforts are required to integrate this fragmented organization to provide care for patients with diseases that do not fall neatly into a single specialty. Furthermore, hospital processes cover the whole spectrum of knowledge, as described by Amy C. Edmondson, from very routine processes where there should be no room for uncertainty and variability and improvisation should be minimized, to innovation processes, on the border of the state of the art in medicine, where the goal of care for specific patients is combined with the goal of advancing knowledge, experimenting with new diagnostics and treatments, generating new possibilities, and with tasks that are defined, assigned and improvised on the go.

Between these two extremes (routine and innovative processes) lie most hospital processes, which are highly complex and where old and new tasks interact and where perpetual problem solving is a way of life. This ample spectrum of processes makes two forms of execution coexist – execution as efficiency (where leaders are expected to provide answers and employees to follow directives, where optimal processes can be designed and set up in advance, and where problem solving is rarely required) and execution as learning (where leaders set directions but employees discover the answers, where tentative work processes are set up as a starting point and keep developing in a continuous way, and where fear cripples the learning process).

3) Excellent Service Experience

Patients have evolved from playing a passive to a much more active role, from users to customers who expect to be empowered and able to choose providers. And healthcare institutions have to react to these changes by better understanding the expectations and perceptions of patients and their families, mapping their journeys through the processes, the interactions with different providers, the moments of truth and pain points, and manage them in a continuously improved way. The inclusion of design thinking techniques in the improvement of service operations is already a growing area of interest in hospitals.

And obviously the personnel side of the equation is equally important, although it is not always taken into consideration. Talent is scarce and leading hospitals must provide a satisfactory environment for professionals to develop their careers. This factor involves, among other aspects, processes for personnel recruitment, continuous training, assessment, and rewards. The same techniques that are used to identify and improve patients' pain points can be applied equally to identify and resolve the employees' pain points in the process.

2.2. Purpose of This Study

The Hospital of the Future study aims to identify the fundamental drivers that will define the model of European public academic hospitals in the next 15 years.

Previous publications on hospital management describe the current importance or forecast the potential impact of topics such as: transformation in a digital society, the evolution of demographics, potential changes in political and social values, new leadership and management models in healthcare, declining (or, at least, stagnant) public healthcare expenditure, and the impact of new technologies on knowledge management.

At the same time, the evolution of medicine implies a transformation of the current paradigms of many diseases, with an increasing focus on prediction and prevention, personalized medicine and improving the patient experience.

Undoubtedly, healthcare system leaders and hospital managers are paying careful attention to any information and publications that may help them prepare in the future to deliver the best quality of healthcare services and to improve efficiency.

Yet the perspective of hospital managers and leading clinicians on these issues is scarcely to be found in any publications, especially when it comes to estimating the likelihood of any potential changes and the expected impact on hospitals.

What is more, the question remains as to whether hospitals are preparing for the challenges featured most often in publications or, alternatively, whether they consider other issues to be more relevant for the future of hospitals.

In conclusion, there is interest in grasping how public general hospitals understand current and future scenarios and also how they are getting ready for changing paradigms in healthcare.

For the abovementioned reasons, this study considers a time frame of approximately 15 years and tries to capture not only the forthcoming changes that are on hospital managers' agendas but also underlying factors and drivers that may arise in the next decade.

This study has focused on two leading public hospitals in Europe: Karolinska University Hospital in Stockholm, and Hospital Clínic of Barcelona.

The approach of this study is to present the views of hospital decision makers, such as C-level hospital managers, heads of department and leading clinicians.

Participants also included executives from organizations related to these two hospitals, such as health system policy makers, healthcare technology research executives and entrepreneurs.

At the start of this study, a considerable number of articles and reports about the future of healthcare and hospitals were available. Hence the approach of this study has been very much directed at gathering and comparing ideas from different participants using a structured methodology.

3. Participating Hospitals

This study focuses on two leading public hospitals in Europe: Hospital Clínic of Barcelona and Karolinska University Hospital of Stockholm.

These two hospitals were selected for two main reasons: a) they are leading hospitals that can help significantly when studying challenges and initiatives in a territory, and b) they are hospitals that have distinct yet comparable health system scenarios.

With regard to the first reason, for the findings to be significant the participating hospitals needed to be considered leading hospitals in their territories. The concept of a leading hospital was defined for the purpose of this study and only when clarification was required with participants to distinguish between points of view in relation to other hospitals in the territory.

A leading hospital is considered a high-performance organization in healthcare with the following characteristics:

- Excellence in results: leading hospitals have a proven record of results in safety and quality of service, outperforming their peer group over an extended period.

- Range and complexity of services: leading hospitals provide highly specialized acute treatments, by highly specialized professionals, using high-tech equipment.

- Reference and support role: leading hospitals provide services for specific patients or types of treatment as required by other healthcare organizations in the community, region or state.

- Innovation and adaptation: leading hospitals adapt well to change and react quickly.

- Industry recognition: for the abovementioned reasons and others, other healthcare institutions give special recognition to these hospitals and their professionals.

Figure 2. Location of participating hospitals in the Hospital of the Future study

Karolinska University Hospital
Stockholm (Sweden)

Hospital Clínic of Barcelona
Barcelona (Spain)
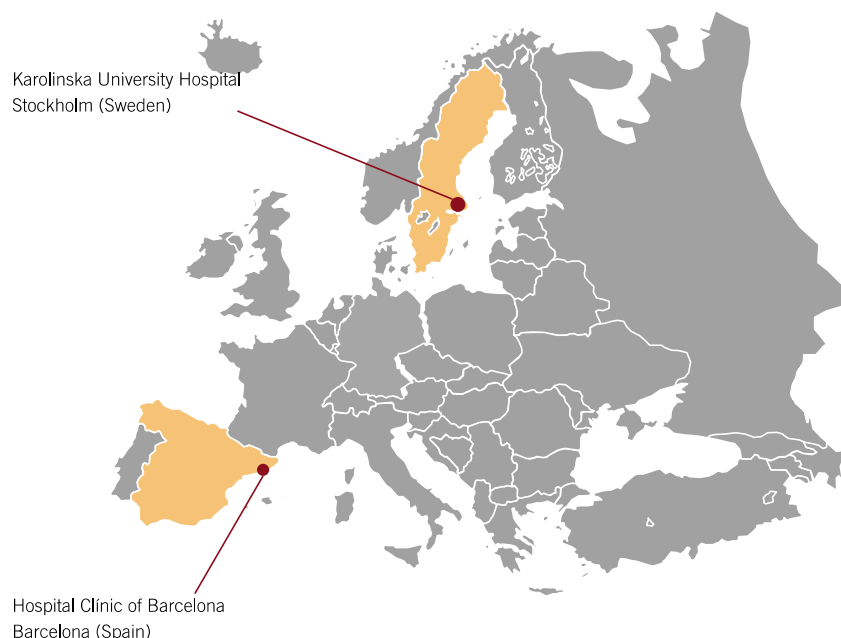
Source: Prepared by the authors.

The second criterion for selecting the participating hospitals was a combination of comparability and diversity. Although the participating hospitals differed in budget and configuration, the study aimed to gain insight by comparing two organizations that had an existing relationship and could therefore analyze differences in initiatives and approaches.

Involving two leading hospitals allowed the study to approach questions in some depth and also to compare the visions of both organizations. A study of one hospital's vision and initiatives, while illuminating in itself, might gain in significance when considered in parallel with the insights of a similar institution. In this regard, Karolinska University Hospital and Hospital Clínic of Barcelona had collaborated recently on various European projects. These projects allowed them to share experiences and knowledge at different levels of the organization, from managerial to frontline projects and experiences. This collaboration has been very useful to the study, making it easier for some participants to recognize and explain differences and also similarities during interviews.

3.1. Karolinska University Hospital

Karolinska University Hospital is one of the largest hospitals in Europe and was inaugurated in 1940 in the Solna district of Stockholm. It is a national and international medical center of reference, with the world's first pacemaker implant being performed in Karolinska in 1958, as well as Sweden's first bone marrow transplant (1975) and Sweden's first liver transplant (1984).

In 2004, Karolinska merged with Huddinge University Hospital to form Karolinska University Hospital. The Huddinge hospital facilities, 20 km south of the Solna hospital, belong to the Huddinge municipality in Stockholm county, with a population of over two million citizens.

In 2014, Karolinska had 1,700 hospital beds, with healthcare activity covering 600 patients in emergency departments per day, 109,000 inpatient admissions, and 1.7 million patient visits, and strong tertiary activity with 6,000 admissions of patients from other counties or countries.

Karolinska had a budget of over €1.7 billion in 2014 and employed more than 15,000 employees, with nurses and assistant nurses (more than 50%) and physicians (16%) being the most numerous disciplines.

Karolinska is a European reference for medical research, publishing 2,200 scientific articles per year (together with Karolinska Institutet), employing 2,500 researchers, and having a budget of €130 million in external R&D.

Karolinska's mandate is to be Stockholm County Council's university hospital, with responsibility for specialized and highly specialized healthcare. This assignment involves having the main responsibility for the County Council's research and student education in partnership with Karolinska Institutet and other universities and colleges.

In 2012, Karolinska was also tasked with planning the business content for Karolinska University Hospital, and deployment of the New Karolinska Solna University Hospital. Construction work began in 2010 for the new hospital, which is expected to open in 2016 and be completed in autumn 2017.

Karolinska's mission is encapsulated in the message "The patient always comes first," and three statements:

- "We deliver safe and high-quality care."

- "We are accessible, efficient and give our patients personalized care."

- "We are a model in research, development and education."

3.1.1. Karolinska University Hospital Organizational Structure

The hospital's role in the Swedish public healthcare system is closer to that of a highly specialized healthcare center. It is structured into seven divisions, with more than 70 areas of activity.

Figure 3. Karolinska University Hospital organizational structure
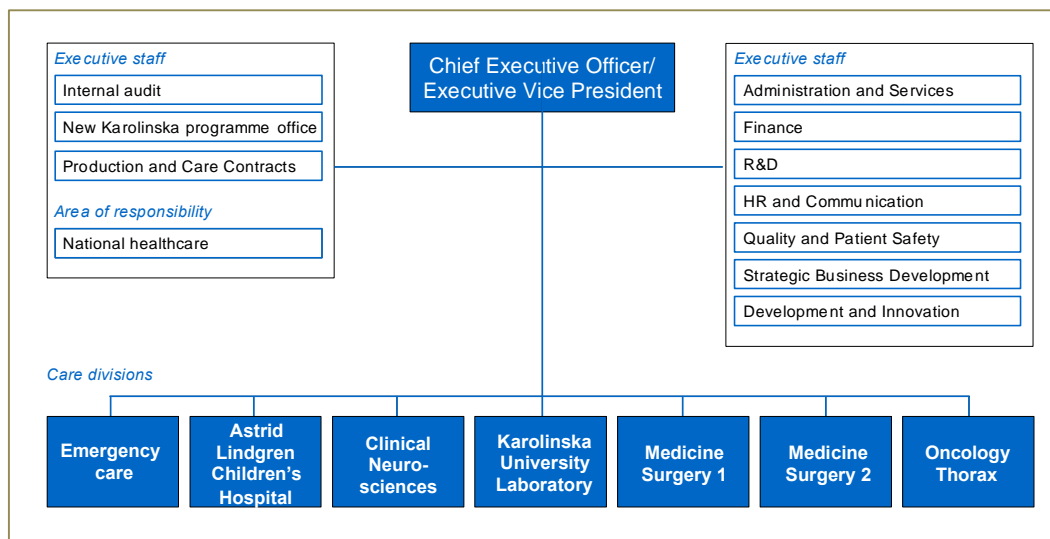
Source: Information provided by the company.

The seven care divisions have around 2,000 employees each on average:

- Emergency Care: 2,500

- Astrid Lindgren Children's Hospital: 2,100

- Clinical Neurosciences: 2,400

- Karolinska University Laboratory: 2,000

- Medicine & Surgery 1: 1,200

- Medicine & Surgery 2: 2,000

- Oncology, Cardiovascular and Respiratory Diseases: 2,200

### 3.1.2. The New Karolinska Solna and the Future Plan

Karolinska Solna is the first new hospital of this size in Sweden in 40 years, and includes the most advanced healthcare technologies and interventions.

It is also Stockholm County Council's largest-ever individual project, the first hospital in Sweden to be delivered through a public-private partnership (PPP), and a major driver in the development of a world-class life science cluster in Sweden.

Due to the expected growth of population in Stockholm by 2020, with life expectancy growing, there is a "Future Plan" that includes an investment of €3 billion in buildings and equipment for the health and medical care structure over the next 10 years. This investment is in addition to investments in the New Karolinska Solna University Hospital.

The Future Plan is being implemented from 2014, and the goals are to expand care through new care choices and new forms of care, formalized with expanded mandates from the county to hospitals and more hospital beds.

Moreover, changes apply to the model of care that will have to be adapted to modern tools and more interaction with the patient-citizen. This vision of the future model of care at Karolinska is based on the network concept, where all healthcare providers work collaboratively in a care network based on e-health, including the family physician, psychiatry, geriatrics, rehabilitation, emergency care hospitals and also specialized care outside emergency care hospitals, and the university hospital (see Figure 4. Karolinska vision of the care network).

Figure 4. Karolinska vision of the care network
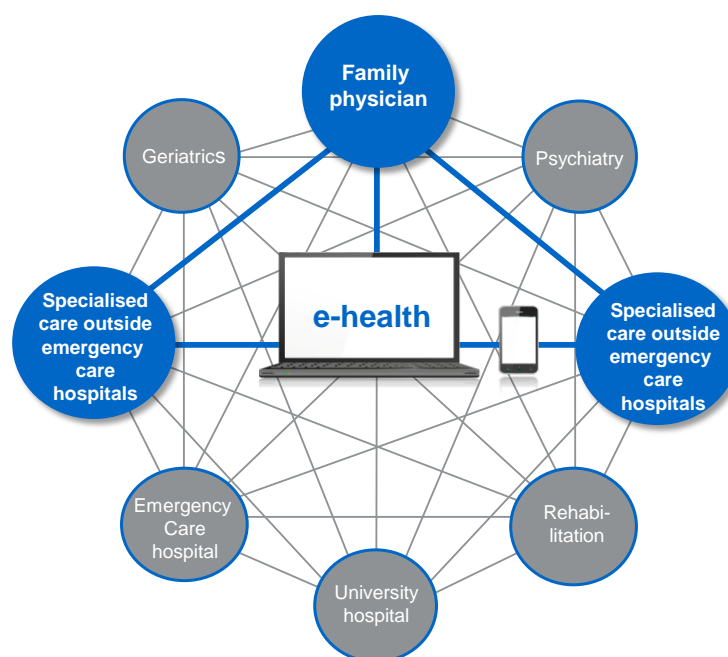
Source: Information provided by the company.

This plan is founded on the change of culture and flow of work that has been carried out during the last years including programs for creating a safety culture, improving leadership and using lean transformation for process improvement and efficiency.

With the goal of increasing patient benefits and eliminating unnecessary activities, Karolinska aims to ensure that evidence-based medicine and efficient methods are applied, creating a collaboration culture for efficient teamwork and more reliable communication and building on lean management to achieve value-based healthcare with patient involvement, to obtain better patient flows, shorter lead times, fewer errors and less waste.

This new flow of work generates results in patient safety and quality but also creates an improved workplace environment based on improved job satisfaction, a balanced workload and adequate training.

The long-term strategies of Karolinska include developing a network of university health services, strengthening the collaboration with Karolinska Institutet, systematically comparing it to the best hospitals, and collaborating and building partnerships to improve not only care but also research, education, development and innovation.

Karolinska has a strong commitment to research and development involving the University Hospital R&D group, Stockholm County Council, Karolinska Institutet, the Royal Institute of Technology and specific groups for R&D in these organizations.

Karolinska R&D includes a joint R&D group for research and education in each clinic and has research groups in many clinical research areas. The hospital R&D group is involved in seven specialty centers to promote the clinical application of basic research and is involved in various research centers, of which several are located on the hospital's premises or close by. These R&D centers gather expertise in a multidisciplinary setting close to everyday clinical practice, stimulating new clinical ideas and the direct implementation of research findings in patient care.

Karolinska also stimulates innovation in healthcare, forming close innovation partnerships, not only with academia but also with industry. These partnerships have played an important role in the procurement of equipment for the New Karolinska Solna University Hospital (NKS). Through an innovative contract structure NKS secures access to the functionality requested over time, rather than the availability of certain prespecified equipment. The procurement contract also includes an innovation partnership, stating a close collaboration between Karolinska and the industrial partner to jointly drive the development of healthcare in various fields. The innovation work at Karolinska is supported by the innovation center and coordinated by development and innovation.

3.1.3. The Public Health System in Stockholm

All Swedish citizens and people with permits to reside in Sweden are entitled to care on equal terms. The health and medical care services are planned and provided under a largely decentralized, taxpayer-funded system, with responsibility shared by the central government, county councils and municipalities.[2]

The state is responsible for overall health policy, while the funding and provision of services lie largely with the county councils and regions. Sweden is divided into 290 municipalities and 20 county councils. However, healthcare is divided into four regions, Stockholm belongs to the Gotland County Council region, and the other three are called regional councils (Halland, Skåne and Västra Götaland), which have assumed responsibility for regional development from the state.

County councils are political bodies whose representatives are elected by county residents every four years on the same day as national general elections. Swedish policy states that every county council must provide residents with good-quality health and medical care and work to promote good health for the entire population. County councils own the majority of primary care centers and almost all hospitals. The main responsibility of Swedish county councils concerns healthcare (around 90% of their activity), but they also deal with other areas such as culture and infrastructure. The municipalities are responsible for the care of older and disabled people.

There is no hierarchical relation between municipalities, county councils and regions, but the city of Stockholm has gained more freedom in this respect through the Health and Medical Service Act (Hälso- och sjukvårdslagen, or HSL), which regulates the responsibilities of county councils and municipalities, and gives local governments some more freedom in regard to healthcare provision.

Patients are free to choose the doctor or medical center, and can access one of the many health centers in the city that offer all kinds of health services by different medical specialists or general practitioners. There are about 14 hospitals in the Stockholm area, and countless doctors' practices in the greater Stockholm area, Karolinska being the largest and considered a center of reference.

Total health spending accounted for 9.6% of GDP in Sweden in 2012, slightly above the OECD average of 9.3%. Health expenditure was mainly funded by public sources (81%), with yearly growing rates in the last decade of 2% to 3%. Although it slowed down from 2008 to 2012, this decline was less pronounced than in many other OECD and European countries.[3] Health expenditure as a percentage of GDP grew from 8.2% in 2000 to 9.6% in 2012 and health expenditure per capita was US$4,106 in 2012.

Only about 4% of the population has voluntary health insurance (VHI). User charges fund about 17% of health expenditure. Patients usually have to pay some fees for visits to professionals, hospitalization and medicines (approximately €9 per day for hospital stays and €15 for primary care visits, and specialist care may cost about €30). However, individual medical costs are capped at an annual limit of 900 Swedish kronor (approximately €96), so once a patient has paid this amount all medical treatments or consultations during the upcoming year will be free of charge.

"Life expectancy in Sweden is high and the country performs well in comparisons related to disease-oriented indicators of health service outcomes and quality of care."[4] Life expectancy at birth in Sweden reached 81.8 years in 2012.

Priority areas of the Swedish healthcare system are chronic disease management, clinical safety and citizens' mobility in the EU. Chronic disease management places significant demands on the system for patients that require monitoring and treatment and, often, lifelong medication.

In early 2011, Sweden enacted a new patient safety law that facilitates the participation of healthcare service consumers (patients, caregivers and family members) when it comes to reporting cases of wrong treatment and influencing healthcare service design and adjustments.

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[2] Information from the official site of Sweden: https://sweden.se/society/health-care-in-sweden, last accessed January 2016.

[3] "OECD Health Statistics 2014. How Does Sweden Compare?"

[4] According to the Health Systems in Transition report on Sweden by the European Observatory on Health Systems and Policies.

The number of acute care hospital beds is 2.6 per 1,000 population, below the European Union (EU) average, and Sweden allocates more human resources to the health sector than most OECD countries, with 3.9 doctors and 11.1 nurses per 1,000 population.

3.2. Hospital Clínic of Barcelona

Hospital Clínic of Barcelona is a university hospital founded in 1906 providing public healthcare services contracted by the public health insurer of the Department of Health of Catalonia, a region of Spain with a population of seven million.

Hospital Clínic serves as the local community hospital for a population of 300,000 inhabitants of a catchment area corresponding to the west of the city of Barcelona, and as a tertiary hospital for highly complex cases, treating patients referred from Catalonia but also from all over Spain and even abroad.

The hospital facilities include a main hospital setting with emergency care for adults and a separate maternity hospital, with a total of 850 beds, 4,500 employees and operating costs of €450 million (in 2010).

The hospital has an activity-based contract with the Catalan public healthcare service insurer (CatSalut) of 46,000 yearly inpatient discharges, 113,000 outpatient first visits and 124,000 emergencies (2010). As a tertiary hospital, the contracts are based on specific programs such as liver transplants and epilepsy surgery.

Hospital Clínic belongs to a trust that also manages three primary care centers in the same catchment area of Barcelona, and has strong alliances with mental health and social care centers in Barcelona.

Hospital Clínic teaching activity covers 1,800 students of the school of medicine, and more than 1,500 students of different postgraduate master's degrees and other courses. The hospital incorporates yearly 85 or so new physicians for a five-year specialist training program (MIR), and a total of 600 internship residents, including temporary fellowships from other schools. The hospital also carries out nursing postgraduate teaching for more than 170 students and other healthcare studies for approximately 250 graduate students. Hospital Clínic has been recognized by the Top 20[5] Spanish hospitals awards in many medical specialties, with distinctions in the hospital management category for the last 15 years.

Hospital Clínic has a long tradition of research and innovation that make it a benchmark institution, operating through the organizations IDIBAPS (August Pi i Sunyer Biomedical Research Institute) and ISGlobal (Barcelona Institute for Global Health).

IDIBAPS is a public research center dedicated to translational research in the field of biomedicine. It aims to integrate state-of-the-art basic research and quality clinical research in order to acquire and transfer knowledge regarding the main health problems present in our society, with the final purpose of improving their prevention and treatment. IDIBAPS staff consists of more than 460 principal investigators, making IDIBAPS one of the most powerful translational research centers in Spain.

The research activities of the institute encompass 59 top-level research teams, which are divided into five different areas of activity: Area 1: biological aggression and response mechanisms; Area 2: respiratory, cardiovascular, and renal pathobiology and bioengineering; Area 3: liver, digestive system, and metabolism; Area 4: clinical and experimental neuroscience; and Area 5: oncology and hematology.

During 2013, IDIBAPS funding totaled more than €24 million, and IDIBAPS researchers published 1,005 original articles in high-impact scientific journals, with 72% of the original papers published in journals pertaining to the upper quartile of impact in their respective fields. Scientific production at IDIBAPS continues to grow in volume as well as in quality. The number of reviews (148), editorials (40) and clinical guidelines (38) that the institute's researchers either led or participated in during 2013 is another indicator of their strong influence in the scientific community.

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[5] Top 20 is a recognized assessment program of Iasist that publishes a yearly benchmark on hospitals in Spain based on quality, operational and efficiency indicators.

ISGlobal is the fruit of an innovative alliance between academic, government, and philanthropic institutions to contribute to the efforts undertaken by the international community to address the challenges in global health.

ISGlobal provides a hub of excellence dedicated to scientific research and the provision of healthcare. The institute, which originated in a joint initiative of Hospital Clínic of Barcelona and the University of Barcelona, has amassed over 30 years of experience in the field of global health. The pivotal mechanism of its work model is the transfer of knowledge generated by scientific research to practice, a task undertaken by the training and policy and global development departments.

3.2.1. Hospital Clínic History and Organization

Originally founded as a teaching hospital and a charity hospital for the poorer classes, the hospital has been remodeled over the years. Since 1996, the Prisma Project involved a redesign of the hospital organization into nine institutes and two support centers, each led by a doctor and grouping different specialties.

One of the goals of this organization was to become more patient and process-oriented, and ensure services and resources were organized to best meet patients' needs. Institutes and centers are led by a doctor to promote efficiency and participation of physicians in the management of services, budgets and resources.

In 2013, the structures of the Hospital Clínic institutes were (see Figure 5. Hospital Clínic organizational structure):

1. Clínic Institute of Digestive and Metabolic Diseases (ICMDiM), including general and digestive surgery, gastrointestinal surgery, dietetics and endocrinology, gastroenterology, and hepatology. With 5,900 hospital discharges (inpatient and ambulatory), 12,080 new ambulatory episodes, and a direct budget of €26.3 million.

2. Clínic Institute of Nephrology and Urology (ICNU), including nephrology and renal transplantation, and urology. With 3,028 discharges, 4,076 new ambulatory episodes and a direct budget of €13.2 million.

3. Clínic Institute of Ophthalmology (ICOF), with only one specialty: ophthalmology. With 2,628 discharges in 2013, 6,754 new ambulatory episodes and a direct budget of €4.1 million.

4. Clínic Institute of Medical and Surgical Specialties (ICEMEQ), including orthopedic surgery, plastic and maxillofacial surgery, stomatology, otorhinolaryngology, rehabilitation and rheumatology. With an activity of 5,692 discharges and 17,438 new ambulatory episodes, and a budget of €16.5 million.

5. Clínic Institute of Neurosciences (ICN), including neurosurgery, neurology, psychiatry, psychology, child and adolescent psychiatry. With 2,718 discharges, 11,025 new ambulatory episodes, and an €18 million budget.

6. Clínic Institute of Internal Medicine and Dermatology (ICMiD), including dermatology, infectious diseases, autoimmune and systemic diseases, and general internal medicine. With 3,178 discharges, 12,030 new ambulatory episodes, and a budget of €15 million.

7. Clínic Thorax Institute (ICT), including cardiovascular surgery, thoracic surgery, cardiology and pneumology. With 5,453 discharges, 11,108 new ambulatory episodes and a budget of €36 million.

8. Clínic Institute of Gynecology, Obstetrics and Neonatology (ICGON), including gynecology, maternal-fetal medicine, and neonatology. With 7,381 discharges, 11,852 new ambulatory episodes and a budget of €18.7 million.

9. Clínic Institute of Hematological and Oncological Diseases (ICMHO), including hematology, oncology, and radiotherapy. With 1,959 discharges, 4,225 new ambulatory episodes and a budget of €12.7 million.

10. Biomedical Diagnostic Center (CDB), including pathology, microbiology, immunology, biochemistry and molecular genetics, hemotherapy and hemostasis. With an activity of more than 5.5 million laboratory tests, 42,000 biopsies, and 30,000 blood transfusions, and a budget of €29 million.

11. Clínic Center of Diagnostic Imaging (CDIC), including radiology and nuclear medicine. With an activity of more than 346,000 imaging examinations and a total budget of €16.4 million.

The other hospital units and medical specialties are managed by the medical director and include the accident and emergency department, the surgical area, anesthetics and pharmacy departments, transplants, international health, and the assessment, support and prevention unit. In 2013, the activity of this medical directorate corresponded to 3,309 patient discharges, 12,395 new ambulatory episodes, 22,653 surgical interventions, 110,907 emergency visits and a direct budget of €47.9 million.

Since the creation of the institutes, some medical specialties have been reassigned from one institute to another in order to improve efficiency and adjust the organization towards patient needs, so the model is evolving and continuously adapting.

Every institute (or center) has a leading team composed of three people: an institute director (usually a physician), a nursing director, and an economic director. These 11 institute directors report directly to the hospital CEO on the Hospital Management Committee.

The Hospital Management Committee includes the 11 directors of institutes/centers and the executive leadership team. The executive leadership team is composed of the CEO, the medical director, the CFO, the executive nursing director, and the head of strategy and planning.

Figure 5. Hospital Clínic organizational structure

ICMDiM Institute of Digestive and Metabolic Diseases • General and Digestive Surgery • Gastrointestinal Surgery • Dietetics and Endocrinology • Gastroenterology • Hepatology	**ICNU** Institute of Nephrology and Urology • Nephrology and Kidney Transplantation • Urology **ICOF** Institute of Ophthalmology • Ophtalmology	**ICEMEQ** Institute of Medical and Surgical Specialties • Orthopedic Surgery and Trauma Centre • Plastic and Maxillofacial Surgery • Stomatology • Otolaryngology • Rehabilitation • Rheumatology
ICN Institute of Neurosciences • Neurosurgery • Neurology • Child and Adolescent Psychiatry and Psychology • Psychiatry • Psychology	**DME** Medical Directorate • Accident and Emergency Dpt • Surgical Area • Anesthesia • International Health • Preventive Medicine • Pharmacy • Assessment, Support and Prevention Unit	**ICMiD** Institute of Internal Medicine and Dermatology • Dermatology • Infectious Diseases • Autoimmune and Systemic Diseases • General Internal Medicine
ICT Institute of Thorax • Cardiology • Cardiovascular Surgery • Thoracic Surgery • Pneumology	**ICGON** Institute of Gynecology, Obstetrics and Neonatology • Gynecology • Materno/Fetal Medicine • Neonatology	**ICMHO** Institute of Hematological and Oncological Diseases • Hematology • Oncology • Oncological Radiotherapy
CDB Biomedical Diagnostic Centre • Pathology • Microbiology • Immunology • Molecular Biochemistry and Genetics • Hemotherapy and Hemostasis		**CDIC** Imaging Diagnostic Centre • Nuclear Medicine • Radiodiagnostics

Source: Prepared by the authors.

Since 2004, the Reform of Specialist Care (RAE) program endorsed the idea of some hospital specialists moving once a week to primary care centers to visit patients and advise and work side by side with general practitioners.

Barnaclínic is a healthcare center linked to Hospital Clínic devoted to the provision of private healthcare, where some professionals of Hospital Clínic can provide their services to private patients.

3.2.2. Hospital Clinic's Vision, Mission and New Strategic Plan

Hospital Clínic of Barcelona is a public university hospital, with a dual orientation (as a reference center for a catchment area in Barcelona and a tertiary hospital for regional and national patients), with the aim of promoting networking partnerships and becoming a leader with a commitment to excellence in four fields: patient-centered care, research, innovation – as the main driver for change – and teaching.

Dual orientation:

- Hospital Clínic is a community hospital, for a catchment territory corresponding to the west of Barcelona (in Catalan "Barcelona Esquerra"), with a population of 540,000 inhabitants, and acute care services are organized in combination with other medium-size acute care hospitals in the area.

- The hospital is a medium and high complexity and very high (tertiary) reference center for the catchment area, and a tertiary hospital for different pathologies and interventions, as defined by the Department of Health in Catalonia, and also at the Spanish and international level.

Leadership commitment and will to create networks of partners:

- Hospital Clínic has been creating for the last years strategic alliances with other providers in Barcelona Esquerra to solve the most prevalent problems of care and the chronicity burden in the territory.

- For medium and high complexity services, Hospital Clínic is creating networks with hospitals in other areas of Catalonia and centering at the hospital facilities those processes that require specialized technologies or professional skills.

- At the international level, Hospital Clínic is promoting networks of partnership with top hospitals and universities for innovation and research.

With a vocation for excellence in patient-centered care:

- Hospital Clínic is implementing new multidisciplinary units centered on or around pathologies, developing information systems to support and improve clinical decisions and ensuring that decisions are made according to evidence and the evaluation of health outcomes.

- Hospital Clínic is advancing in the evolution of reactive medicine towards a preventive, predictive, personalized and participative medicine (P4 medicine).

- Devoted to continuous improvement and transformation of care practices, especially, with the development of new professional roles, adapted to current and future needs. As an example, Hospital Clínic is defining new roles for nurses in chronic disease management programs led by the hospital.

With a commitment to medical education, as a university hospital, and leader in research, innovation and teaching activities, and as a socioeconomic driver for progress:

- Hospital Clínic is promoting excellence in research and innovation as drivers for change and the improvement of quality of care. Empowering research as the basis for innovation and a key element to achieve optimal health results.

- Hospital Clínic is committed to training excellence, to train the best healthcare professionals, and as a reference center in postgraduate education.

Finally, Hospital Clínic relies on the wide participation of hospital professionals, ensuring their implication in management and governance of the hospital, creating accountability mechanisms and communicating with transparency to all stakeholders, both internal and external, and especially to healthcare professionals and the Department of Health. Hospital Clínic endeavors to keep a sustainable hospital and promote new financial sources, which are complementary and synergistic with the hospital's public health activities.

3.2.3. The Public Health System in Barcelona

Healthcare in Spain is a free and universal coverage model, almost fully funded from taxes and predominantly within the public sector.

In 2002, the public health system in Spain completed a transition started in the 1980s, from a centralized model of legislation, planning and provision of health services, to a decentralized model where health competences are delegated at a regional level (autonomous community).

The central government (the national health service or Servicio Nacional de Salud) maintains responsibilities for basic legislation and coordination such as defining services included in public healthcare and managing the catalog of pharmaceutical services.

Regional governments have autonomy and responsibilities for purchasing and defining the service provision of healthcare services, accreditation and planning of provider centers, public health and quality evaluation, with independent agencies.

The regional government in Catalonia was the first region to assume these responsibilities, and decided on a configuration of healthcare service provision including hospitals with different types of ownership (non-profit foundations, council, private, etc.).

Healthcare is an important industry in Barcelona and Catalonia with strong relationships with many other industries. Current health priorities established in the Catalan Health Plan for the 2011-2015 period include five pillars for transformation of the care model (with an orientation towards improving chronic disease management), improving resolution (especially at primary care level) and accessibility, quality in high specialization, becoming patient-citizen-centric, and integration of healthcare and social services.

In Catalonia, in 2013, total health spending (public and private) accounted for 8.7% of GDP, worth approximately €3,000 per capita. One out of every four citizens has voluntary private health insurance to complement public health services, usually to get faster access to specialized services or to be able to choose specialists.

The chronicity burden is one of the biggest issues in Barcelona, the fertility rate in Catalonia is one of the lowest in the EU, and the inflow of migrants – especially in the decade 2000-2010 – had a demographic impact in rejuvenating a population that was otherwise rapidly ageing.

Total health spending accounted for 9.4% of GDP in Spain in 2013 (latest year available), slightly above the OECD average of 9.3%. In Spain, 73% of health spending was funded by public sources in 2011, very close to the average of 72% in OECD countries.[6]

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[6] OECD Health Data November 2014. More information available at http://www.oecd.org/health/healthdata, last accessed January 2016.

4. Research Methodology

The Hospital of the Future study is based on a qualitative research methodology that includes literature reviews, individual and group interviews and online surveys. The tools and techniques used during the study are aimed at identifying, classifying and understanding the fundamental drivers that will define the model of European public academic hospitals in the next 15 years.

The goal was to obtain the views of hospital decision makers, such as C-level hospital managers, heads of department and leading clinicians from two leading public hospitals in Europe, Karolinska University Hospital in Stockholm and Hospital Clínic of Barcelona. Participants also included executives from organizations related to these two hospitals such as health system policy makers, healthcare technology research executives and entrepreneurs.

Activities with both hospitals were performed in parallel and with no specific interaction between both hospitals, so as to compare findings from both organizations. However, in the last years, Hospital Clínic of Barcelona and Karolinska University Hospital have established various collaboration activities to share experiences and knowledge at different levels of the organizations, from manager to frontline-level projects and experiences. This collaboration has been very useful for this study, making it easier for some participants to recognize and explain differences and also similarities during interviews.

The study can be described (as shown in Figure 6) in six phases:

- Phase 1: Literature Review

  The literature review included search terms related to health system and hospital management, and included concepts such as clinical processes, hospital roles, hospital resources, healthcare innovation, physician careers, healthcare process improvement, and clinical leadership. The sources for review included magazines, articles and reference books of the CRHIM department, and a final selection of 53 articles (see Appendix 2. Literature Review Articles), from hospital management journals to healthcare consulting articles and healthcare forums.

  The main outputs of the literature review were: the HoF conceptual framework (explained later in this chapter) and the list of questions for individual interviews (see Appendix 4. Questions for Individual Interviews).

- Phase 2: Initial Individual Interviews

  After the literature review, a list of potential hospitals for interviews was considered and, finally, Hospital Clínic of Barcelona and Karolinska University Hospital were contacted and kindly agreed to participate in the study.

  After an initial presentation of the study to a hospital representative, a list of candidates was selected and individual interviews were arranged, prepared and performed by professors of IESE CRHIM. These interviews were recorded for later analysis.

- Phase 3: Preliminary Findings

  This phase included mapping ideas, analysis and filtering to obtain the preliminary findings of the study. The first step was to generate individual mindmaps from each interview, integrating notes from the various interviewers, and also reviewing audio recordings. The next step was consolidating all the interview mindmaps in a global mindmap for each hospital following the HoF conceptual framework. Finally, mindmaps were reviewed and ideas connected to define a list of more than 100 sentences, of which a list of 76 preliminary findings was filtered.

  During this analysis, the literature review was extended to include concepts brought up during interviews that needed further examination to develop adequate findings such as hospital capacity planning, financing healthcare, health information technology, leading healthcare organizations, patient experience and hospital staffing, hospital procurement and outsourcing.

- Phase 4: Validation of Findings With Online Questionnaire

  In order to validate and adjust ideas from individual interviews, it was decided to prepare and perform an online questionnaire to present and rank ideas with interviewees from both hospitals, and also extend it to new participants in the study.

  The concept of the leading hospital was necessary to validate findings with participants so they could differentiate the evolution, strategy and role of other large academic public hospitals in their territories from those of their own hospital.

- Phase 5: Presentation and Adjustment of Findings in Workshops

  Results from the online questionnaire were consolidated and analyzed, and presented in a workshop to Hospital Clínic participants. During this workshop, all the participants had a view of their individual contributions compared to the group results. After the workshop at Karolinska University Hospital, a reminder was sent to participants who had not been able to submit their opinions before the workshop and the period for participation was extended.

- Phase 6: Final Conclusions and Recommendations

  During this final phase, the results of the online questionnaire and workshop were analyzed using cluster techniques to find hidden patterns amongst findings and/or participants' perspectives.

  Findings were combined and associations made to present the final list of the 14 key messages of the study that encapsulate the preliminary findings and results from the workshops. Finally, a list of recommendations accompanying the study was developed by compiling notes and comments from interviews and workshops.

Figure 6. Methodology of HoF study in one page
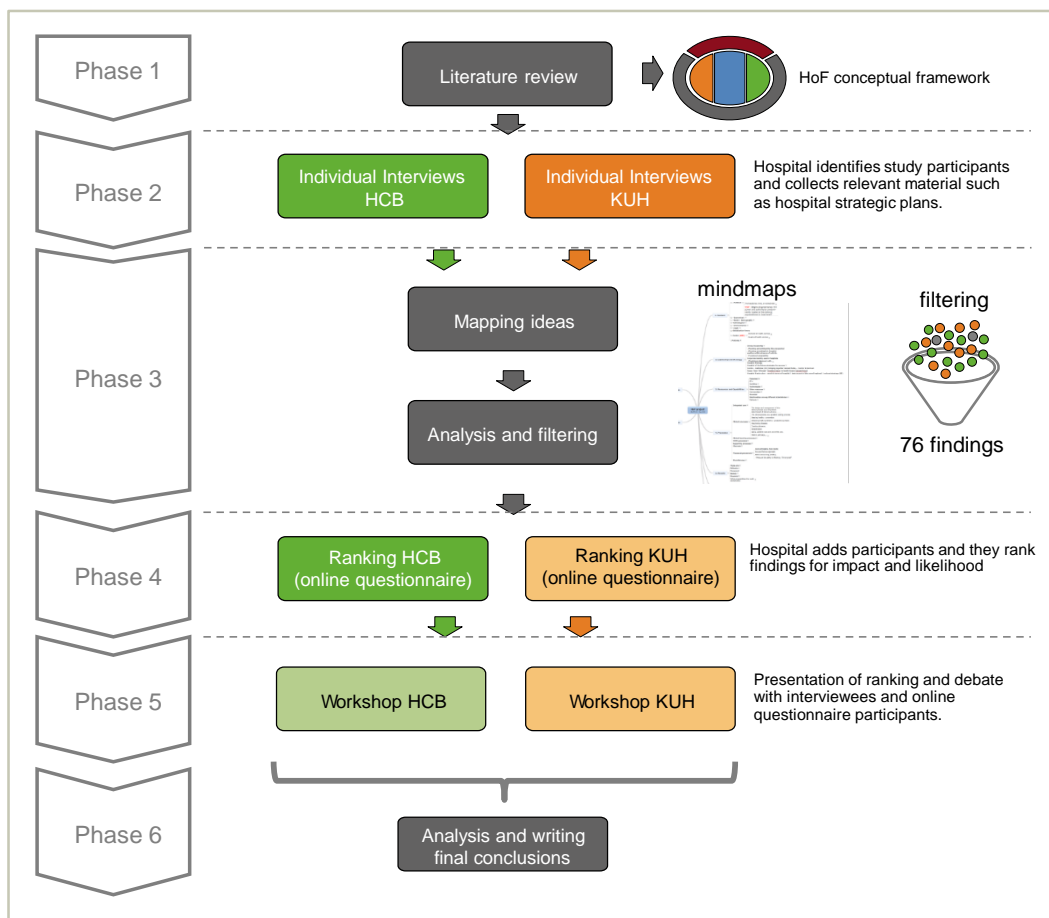
Source: Prepared by the authors.

The interaction with participants at Karolinska and Hospital Clínic was carried out separately and in parallel. The activities with Hospital Clínic were usually performed first and later with Karolinska, allowing the study tools and techniques to be adjusted and improve interactions with Karolinska given the results of each phase with Hospital Clínic.

4.1. Phase 1: Literature Review and the HoF Conceptual Framework

As described before, HoF is a qualitative research study based on a literature review and interviews with hospital decision makers, such as hospital managers, heads of department, clinicians and other executives from organizations related to the participating hospitals.

In order to classify and arrange these topics and findings from the literature review, a HoF conceptual framework has been defined that builds upon the previous InnPact study.[7]

The CRHIM InnPact study defines an assessment framework for the evaluation of health innovation that includes all health sector stakeholders (360 degree view) based on eight criteria: value to the stakeholder, cost to the stakeholder, channel to the stakeholder, relationship with the stakeholder, processes, capabilities, strategies and context of the innovation.

Avedis Donabedian defined a framework for examining health services and evaluating the quality of care that is flexible enough to apply to many situations. The Donabedian Model is composed of three categories: structure (which includes all the factors that affect the context in which care is delivered), process (which includes diagnosis, treatment, preventive care, and patient education) and outcome (which includes all the effects of healthcare on patients or populations).

Based on the previously mentioned InnPact assessment framework and the Donabedian Model, the HoF conceptual framework is structured in five main dimensions to classify the diverse findings for the HoF study:

1) Context: including political, financial, social, demographical, technological, legal, and society drivers. The context is analyzed using a PESTEL framework, which includes the following six macro-environmental factors for scanning components: political, environmental, social and demographics, technological, economic, and legal; and it adds market (patients' view) and globalization forces.

2) Strategy and Leadership: including strategic initiatives for success, such as clinicians' leadership, innovation, strategies for mergers and alliances.

3) Resources and Capabilities: including management of key resources (human resources, ICT, facilities, healthcare technologies and financial resources) and capabilities.

4) Processes: including topics such as clinical processes, integrated care, HR processes, support processes, process improvement and learning and decision support.

5) Results: including topics such as patients' results, personnel results, society's results, financial results and value propositions for each stakeholder.

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[7] The InnPact study is available at http://www.iese.edu/en/faculty-research/research-centers/crhim/, last accessed January 2016.

Figure 7. Hospital of the Future conceptual framework

Source: Prepared by the authors.

4.2. Phase 2: Individual Interviews

HoF individual interviews served to identify the current change drivers and ongoing strategic initiatives of the two hospitals, and to identify latent (in preparation) and GAP (potential future) change drivers and initiatives (see Figure 8. Individual interviews' methodological approach).

The HoF study carried out 30 individual interviews, which were based on an initial set of questions structured following the HoF conceptual framework concepts and tailored to each interviewee's individual responsibilities, experience, knowledge and interests.

A large number of contributions of different types (observations, predictions, hypotheses, drivers, opportunities, risks, personal views, etc.) have been collected. These contributions have been classified according to the HoF conceptual framework into individual and structured mindmaps.

Contributions have been associated with more than 100 different concepts, which have been organized and matched amongst participants.

Figure 8. Individual interviews' methodological approach
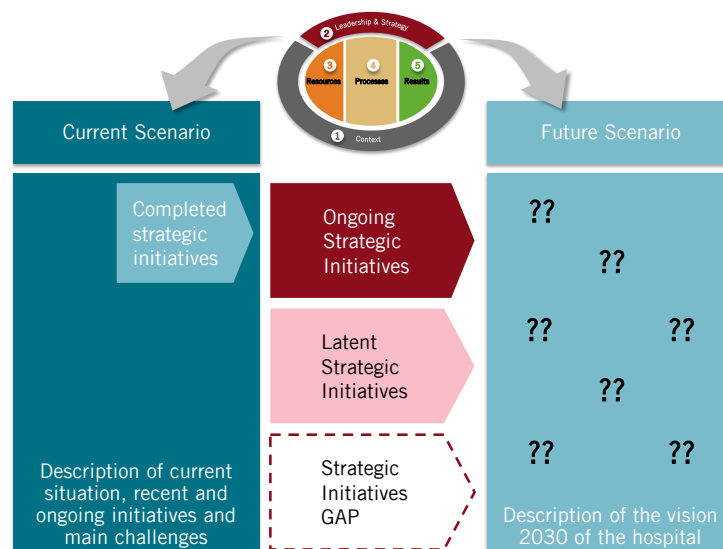
Source: Prepared by the authors.

Interviews were performed by professors of IESE CRHIM generally onsite and only once by videoconference. Interview notes were taken online and audio was recorded for later analysis.

4.3. Phase 3: Preliminary Findings

Each one of the individual interviews was analyzed and represented in an individual mindmap using mindmapping software that enabled the team to collaborate online on the maps' development. The interview mindmaps captured the structure of conversations, including questions and answers and related concepts mentioned.

As the analysis of the Hospital Clínic interviews preceded some of the individual interviews of Karolinska, all new questions that came up during the interview and were not included in the initial bank of questions were also highlighted in the mindmap so as to identify and update the list of questions for use in later interviews.

All mindmaps for each hospital were then consolidated into a large mindmap for Hospital Clínic and another mindmap for Karolinska. Mindmap nodes contained notes and each interview participant's name, so as to be able to trace them back to the original sentence. Concepts were identified using icons to show graphically whether the concept was positive, negative or neutral from the participant's perspective.

Figure 9. Part of the mindmap showing analysis of nodes
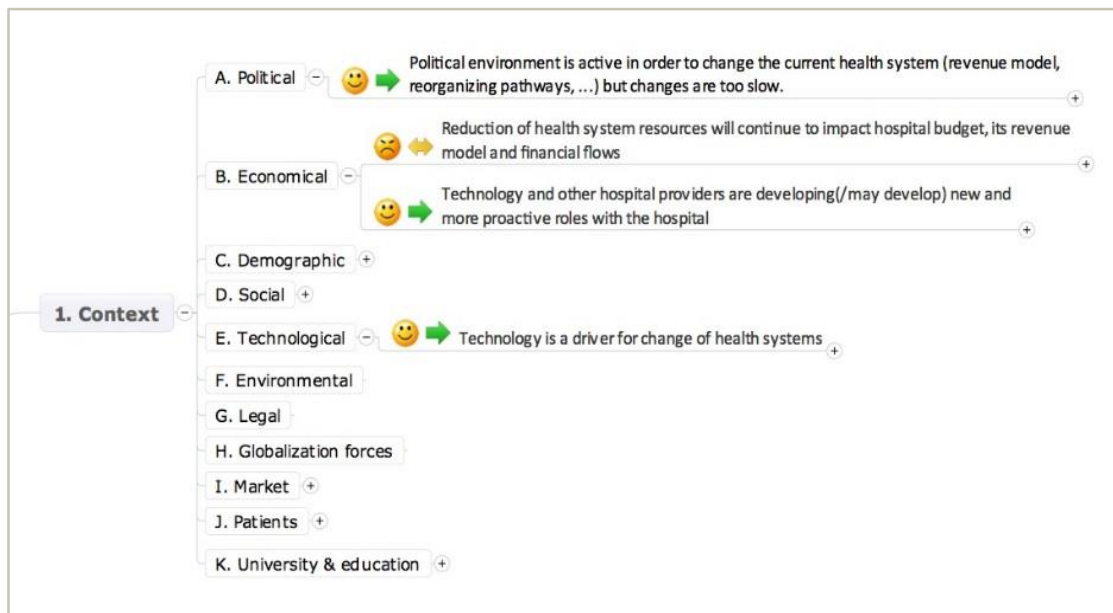
Source: Prepared by the authors.

The mindmap for Hospital Clínic can be seen in "Figure 10. Mindmap structure example of HoF interviews' concepts" with a close-up of some of the nodes of the mindmap.

Figure 10. Mindmap structure example of HoF interviews' concepts
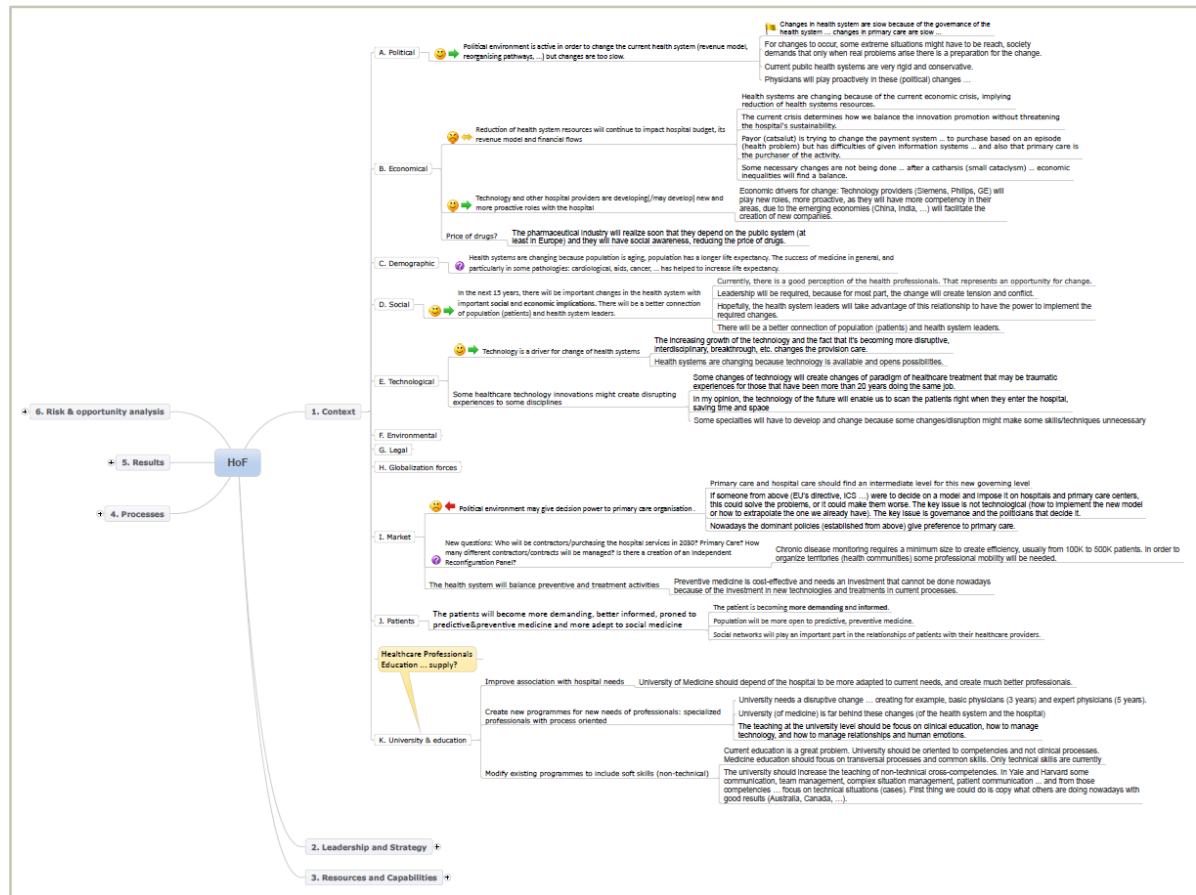
Source: Prepared by the authors.

More than 100 ideas were developed into sentences, and three types of sentence were coined:

- Sentences describing potential scenarios for the hospital in 2030: What is a reality today or will become a reality then? What would hopefully happen? What will be needed to reach such a scenario? What is a possible destination?

- Sentences describing the journey of the leading hospital from its current situation to 2030: How will we do it? What will we need to achieve this? What will need to be changed or improved along the way? What may happen and will it imply a new challenge for the hospital? What things are not clear along the journey? What pressures will the hospital come under?

- Sentences describing drivers for the leading hospital: What political forces are pushing the hospital that way? What expectations of patients or professionals need to be considered? How will technology change the current balances? What legal or regulatory forces will facilitate or hinder the journey or destination? What new motivations will arise?

These sentences included issues from all dimensions of the HoF conceptual framework (context, strategy, resources, processes and results) plus a section of comments on "risks and opportunities for the hospital."

The comments on risks and opportunities were mainly related to patients' active role and governance forces in the health system, and these ideas were finally classified in the context dimension, creating a division of context dimension into three subdimensions: 1A for demographics, economic and social forces, 1B for healthcare system forces and 1C for the role of the leading hospital (the expectation from the context).

The different sentences were homogenized, compared, and filtered to create self-contained and clear statements. Also, to facilitate their comprehension, a detailed description was added to each statement, containing two or three paragraphs.

The final list resulted in 76 findings that cover a wide range of concepts unveiled during individual interviews. The goal of describing these 76 preliminary findings was to validate whether the journey, scenario or force described in the statement was confirmed and validated by the larger group in an online questionnaire.

4.4. Phase 4: Validation of Findings With Online Questionnaire

HoF individual interviews were very productive with abundant ideas and contributions that required validation and rating by the study participants using an online questionnaire.

The online questionnaire contained a selection of 76 preliminary findings; each finding was presented as a statement with a brief description. Participants in the online questionnaire were the same individual interviewees plus additional participants.

An initial selection of preliminary findings was selected and arranged corresponding to the five dimensions of the HoF conceptual framework explained earlier.

As the context dimension included 26 findings, these were separated into three subdimensions of context: 1A) social, demographical and market, 1B) healthcare system contextual factors; and 1C) hospital role within the healthcare system. These dimensions were also used in the following analysis and in the workshops' presentations.

Thus, the final list of preliminary findings included 76 items classified into:

- D1A: Market and demographic forces: 10 findings

- D1B: Health system: 9 findings

- D1C: Hospital role: 6 findings

- D2: Strategy and leadership: 14 findings

- D3: Resources and capabilities: 14 findings

- D4: Process management: 13 findings

- D5: Results management: 10 findings

Questionnaire respondents were asked to review each preliminary finding and rate the impact on the hospital and likeliness of each finding. Likeliness was described as the probability of the event happening for findings related to the hospital context, or likeliness of succeeding for findings related to hospital initiatives in strategy, resource management, process management and results management.

Each finding included a finding title, a description and the ranking. A scale of 1 to 4 was used for ranking (or rating) both likeliness and impact on the hospital. Likeliness was rated from "very unlikely" to "very likely" and impact was rated from "very low" to "very high."

These categories for rating likelihood and impact were presented in each online questionnaire page. For each dimension the ranking was similar but contained specific descriptions of the values.

Likelihood of a scenario happening, or likelihood of the hospital succeeding with an initiative:

a. Very Likely: will most certainly happen/succeed

b. Likely: will probably happen/succeed

c. Unlikely: may happen/succeed

d. Very Unlikely: is not going to happen/succeed

Impact on the hospital:

1. Very High: strategic changes or transformation of hospital's configuration, services or processes

2. High: important changes for hospital professionals, resources or services

3. Low: modifications of some hospital processes or resources

4. Very Low: minor adjustments in hospital processes and resources

Given the high number of questions included (76), in order to facilitate completion, colors and different categories – from (a) to (d) versus from (1) to (4) – were used to help respondents separate impact and likelihood with ease.

The online questionnaire items were not configured as mandatory, meaning that a user could decide to leave one specific finding unanswered and move to the next items.

Likelihood and impact were colored differently in the questionnaire to facilitate a rapid response. Comment boxes for each finding were included to allow respondents to clarify and expand concepts for each finding in an open text format.

Figure 11. Example of a finding presented in the online questionnaire

Source: Prepared by the authors.

A total of 52 participants were invited, and 28 responses were collected, 16 for Hospital Clínic and 12 for Karolinska. The survey was delivered electronically using individual usernames and passwords sent by e-mail to each participant. The survey could be partially completed, and saved for later completion at a different time or on another day.

Participants from each hospital had approximately three weeks to complete the survey from receiving the invitation e-mail message. The response rate was higher in Hospital Clínic, possibly thanks to specific individual reminder messages being sent.

The online questionnaire was sent first to Hospital Clínic participants (April 2014), and some minor corrections were made to specific points that were not easily understood by respondents. In particular, some considerations were added to the introduction to guide participants on rating likelihood and impact.

Hospital Clínic participants responded with an unintended correlation of likelihood and impact. Therefore, clarification was needed to clearly separate both concepts, including an example, such as that the development of a technology that cures an oncological disease in just one visit to the hospital is very improbable (if possible at all) but, if that happened, its impact would be very high for the hospital.

Also, "likelihood" and "willingness" needed to be differentiated. The study aimed to understand the probability of changes happening to the contextual forces, so participants needed to rate the chance of any finding happening and not how interesting or desirable these changes might be for the hospital.

Finally, participants were asked to consider the impact on the hospital both positively or negatively. The study tried to identify changes that might have a strong impact on the hospital regardless of whether it would be very positive and/or aligned with the hospital's goals or very negative and/or misaligned.

Participants from Karolinska University Hospital were invited to complete the online questionnaire in May 2014.

Results of the online questionnaire were presented at a workshop in each hospital, and participants were allowed to change their answers during and after the workshop both manually (and handing in the results) and also online. Post-workshop changes were not significant except for some corrections that impacted correlation in context findings, where likelihood was considered very low.

4.5. Phase 5: Validation of Findings in Hospital Workshops

Group workshops with study participants were performed to present finding rankings (from the online questionnaire), discuss them with the group and adjust these findings.

Each workshop's duration was 2.5 hours each and the agenda included the presentation and discussion of findings by the IESE CRHIM team using slides and a poster that represented the most relevant findings ordered by participants' rankings.

Workshop dynamics included presenting and discussing each dimension's findings and comments gathered using the online questionnaire. After presenting each dimension's results, participants were asked to confirm or refine conclusions for that dimension.

Each participant was handed a copy of his/her results and the group results, as can be seen in "Figure 12. Example of a page of workshop material handed to participants," to enable the participant to compare his/her answers for each finding and also see the distribution and the graph for results.

Global results for each hospital were presented in different graphs so as to generate debate and discussion not only on one specific finding but also to show potential links for different findings, to articulate logical explanations or spot inconsistent perspectives (examples in Figure 28 and Figure 29).

Figure 12. Example of a page of workshop material handed to participants
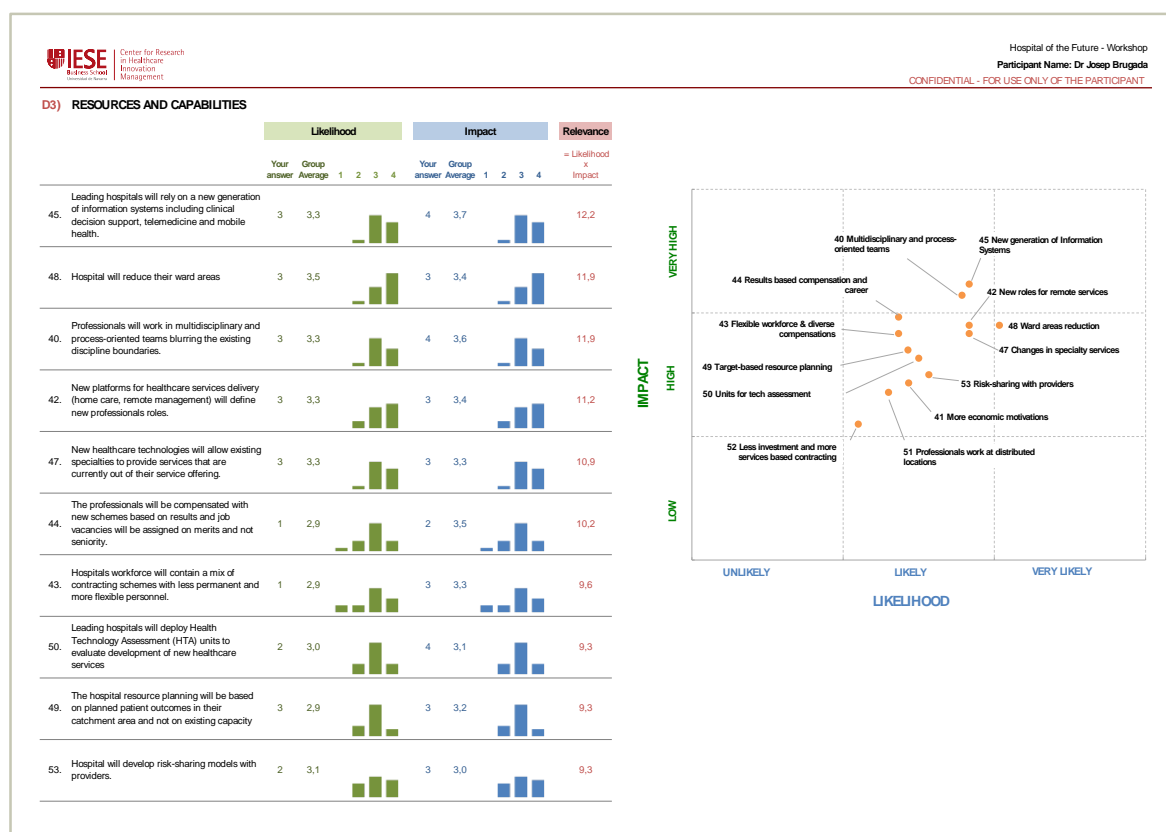
Source: Prepared by the authors.

The main results for all of the group were presented in a large poster on the wall so people could compare and link ideas amongst different dimensions of the study (the example of the poster for Hospital Clínic can be seen in "Figure 13. Poster for results of online questionnaire for Hospital Clínic").

Figure 13. Poster for results of online questionnaire for Hospital Clínic
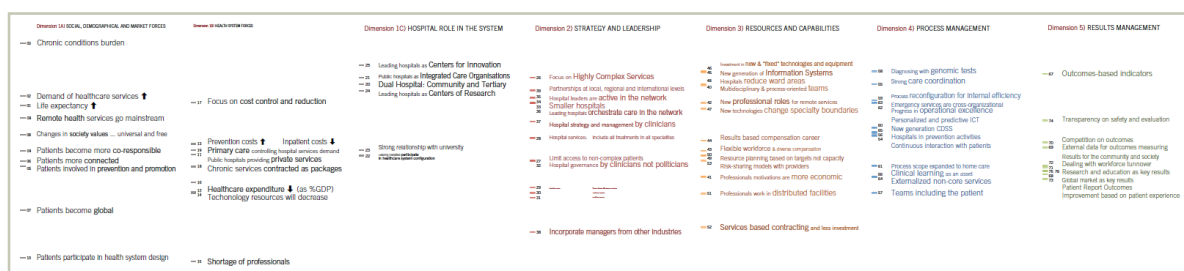
Source: Prepared by the authors.

Comments from workshop participants were written down and audio was recorded and later reviewed.

4.6. Phase 6: Final Conclusions and Recommendations

The ideas from the workshop were classified so as to generate the final 14 key messages that assemble the most relevant ideas from the 76 findings and other new ideas generated during the workshops.

The 14 key messages were cross-linked in a matrix with the 76 findings to check that the most relevant findings were incorporated in at least one concept of the 14 key messages, and also to balance the key messages according to the findings debated at the workshops (see Figure 14. Matrix relating key messages to study findings).

Figure 14. Matrix relating key messages to study findings

Column key messages:
1. A triple-challenge context
2. Smaller and more complex hospitals
3. New scope of services
4. Dual hospital: tertiary and territory
5. Knowledge-driven services redesign
6. Open and distributed organizations
7. Innovation centers of technology and services
8. Research and education as key results
9. Risk-sharing models with all stakeholders
10. Professionals in hospital governance
11. Integrated care and process-oriented teams
12. Connected Hospital
13. New professional roles
14. Patient-centered innovation

|	Finding short text	Rel.
D1A	01 Life expectancy grows	11,4
	02 Demand services increase	12,5
	03 Chronicity costs increase	12,0
	04 Co-responsible patients	10,2
	05 Proactive patients	8,3
	06 Connected patients	10,0
	07 Global patients	7,6
	08 Social values change	7,5
	09 Remote health services	10,1
	10 Patients in the design of healthcare	6,4
D1B	11 Providing private services	8,2
	12 Expenditure as %GDP will decrease	6,9
	13 Preventive costs increase and inpatient decrease	8,5
	14 Technology resources will decrease	7,6
	15 Shortage of available professionals	8,1
	16 Mental health changes levels of care	8,4
	17 Focus on cost reduction and control	9,9
	18 Contracting packages for chronic services	8,7
	19 Primary care controlling hospital services demand	8,7
D1C	20 Dual hospital	10,5
	21 Integrated Care Organisations	10,3
	22 Participation in healthcare configuration	9,5
	23 Relationship with university	10,1
	24 Centers of research	11,2
	25 Centers for innovation	11,8
D2	26 Focus on complex services	12,6
	27 Limit access to non-complex patients	10,0
	28 Wide treatments in all specialties	8,8
	29 Integrated CDM services	9,2
	30 Monitoring services	10,3
	31 Mediation services	7,8
	32 Governance by professionals	8,9
	33 Orchestrating care in the network	11,1
	34 Smaller hospital with less patients	11,3
	35 Leaders active in the network	9,5
	36 Organization oriented to diseases/patient groups	11,6
	37 Clinicians in the strategy	9,7
	38 Incorporate managers from other industries	8,2
	39 Partnerships at a various levels	11,5
D3	40 Multidisciplinary and process-oriented teams	12,2
	41 More economic motivations	7,4
	42 New roles for remote services	12,4
	43 Flexible workforce & diverse compensations	8,9
	44 Results based compensation and career	9,0
	45 New generation of Information Systems	12,8
	46 Investment in high-tech "fixed" equipment	11,0
	47 Changes in specialty services	11,0
	48 Ward areas reduction	11,0
	49 Target-based resource planning	9,8
	50 Units for tech assessment	10,0
	51 Professionals work at distributed locations	8,1
	52 Less investment thanks to services contracting	7,3
	53 Risk-sharing with providers	8,6
D4	54 Interaction with patients	9,5
	55 Strong care coordination	11,0
	56 Hospitals in prevention activities	8,9
	57 Teams including the patient	9,9
	58 Diagnosing with genomics tests	11,6
	59 Reconfigure processes for internal efficiency	10,7
	60 Personalized and predictive ICT	10,8
	61 Process scope expanded	9,6
	62 Progress in operational excellence	10,8
	63 Emergency services are cross-organizational	11,6
	64 Extenalized non-core services	9,9
	65 New generation of CDSS	9,8
	66 Clinical learning processes as an asset	9,0
D5	67 Outcomes-based indicators	11,8
	68 Patient Reported Outcomes	9,3
	69 External data for outcomes measuring	9,5
	70 Competition on outcomes	10,5
	71 Dealing with workforce turnover	9,0
	72 Results for the community and society	8,8
	73 Improvement based on patient experience	9,9
	74 Transparency on safety and evaluation	10,9
	75 Research and education as key results	8,5
	76 Global market as key results	7,9

Source: Prepared by the authors.

Another analysis performed was a cluster analysis. The participants' response to the results of preliminary findings presented in workshops was very satisfactory in terms of clarity of presentation and level of analysis. However, one participant from Hospital Clínic proposed that a cluster analysis be performed to identify any hidden relationships between findings.

After the Hospital Clínic and Karolinska workshops, the results from both online questionnaires were processed using statistical tools for cluster and factor analysis. The variables studied included likelihood, impact, relevance of findings and participants. Given the relatively small sample size, after performing various tests, it was concluded that inferences of relationships among findings were impossible to determine with the current sample. However, some inferences of relationships among the points of view of different participants can only be considered from a factor analysis of relevance data, which shows how the point of view of managers more related to strategic development and innovation appears in the statistical analysis with a point of view separated from heads of department and managers who are on the frontline. A dendrogram graph is shown in "Figure 15. Cluster analysis of participants' results" – some outliers were removed from this analysis.

Figure 15. Cluster analysis of participants' results. Dendrogram of participants (relevance)
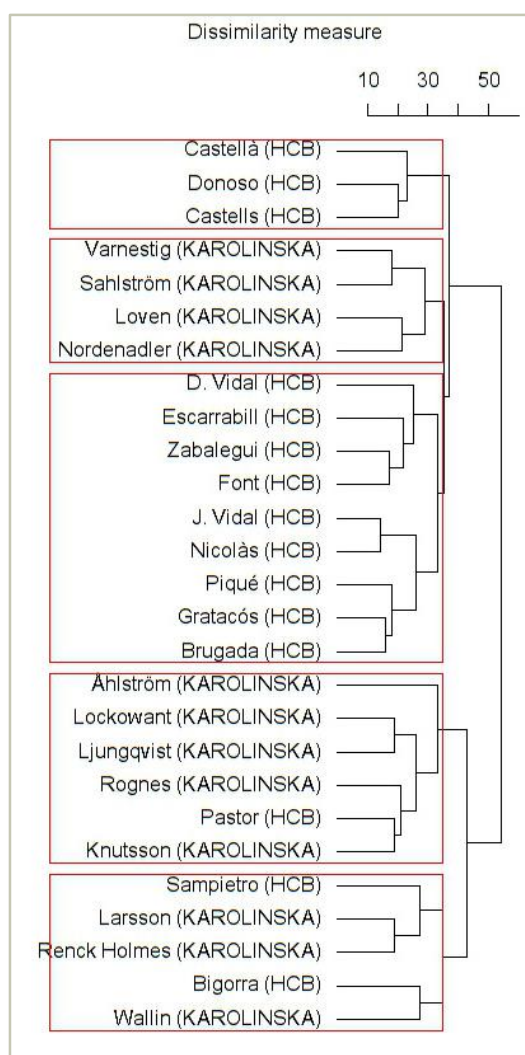
Source: Prepared by the authors.

Finally, a list of recommendations was developed by IESE CRHIM to propose hospital managers and health system policy makers carry out specific actions that could improve the efficiency and success of initiatives in the journey of the leading hospital towards the new role of innovation, results orientation and adaptation to new society expected by 2030.

5. Study Results

5.1. Literature Review

There is extensive previous work on hospital management. The literature review's main goal was to identify concepts and questions regarding the depiction of current trends and future scenarios for clinical process management, healthcare networks of provision, hospital resource management, and innovation in hospital management and services and clinician leadership.

More than 70% of the articles and documents selected from the literature had been published between 2009 and 2014, and the oldest document included in this review (*The Hospital of Tomorrow*, 1992, World Health Organization) included concerns for the hospital of the 21st century that could still be useful nowadays, especially when mentioning the strategic importance of improving collaboration outside the hospital.

Some of the reviewed articles addressed a similar purpose to that of the study, with emphasis on the image conceptualization of the hospital, "What will the hospital of the future look like?", while other articles described innovative answers and drivers for change.

Hence, during the process of gathering concepts from the literature review, the purpose of the study was refined and the framework created so as to help discussion with participants and structure all findings and study work.

The literature review opened many different topics or lines of inquiry for later interviews. The next chapters describe the topics identified in the literature review, using the HoF conceptual framework structure. The contextual factors are developed to enable an understanding of the scenario described by the different topics, whereas the other items in the rest of the dimensions are merely mentioned in order to present topics for discussion.

5.1.1. Context for the Hospitals

The contextual factor is studied using a PESTEL framework for scanning the macro-environment of the hospital, and also adding factors for describing changes in patients or citizens (i.e., the market).

The political factor considers how governments at different levels and political parties may influence or impact the hospital's model and strategy, and finally its sustainability and success in the next years.

In the last years, due to the economic crisis, most governments in European countries have dedicated less of the budget (as a percentage of GDP) to welfare, thus potentially increasing inequality. Citizens' expectations might create political pressure to maintain the facilities and personnel, especially on politicians setting out plans for healthcare systems' transparency and accountability.

There will be increasing pressure on healthcare providers to demonstrate quality and financial outcomes in a publicly accountable and transparent way, with public healthcare providers concerned about the shifts in hospital governance and also healthcare system planning decisions at local, regional and national levels that could affect hospital operations.

Consequently, hospital strategy is incorporating national, regional and local health policies into the hospital objectives, and also hospital performance improvement initiatives. These two lines of management are separated, one being subjective and value-based, and the operational one being more objective. However, the challenge for hospital managers is to integrate and align these two logics into a coherent and effective strategy. This challenge becomes acute when policies are newly established or changed by health system authorities focusing on short-term goals.

The economic factor shows how recession and the financial crisis have placed special pressure on hospitals for cost control in operations. Some of these budget cuts for public hospitals in Europe have been implemented through new contract and reimbursement models by the public healthcare insurance organization, which increases the risk for the healthcare provider (i.e., the hospital) based on outcomes or results, but with minimum – if any – bonuses or incentives for best performers.

Health system investment in new health technologies and equipment have also declined, and the healthcare industry partners of the hospitals such as health technology companies have also struggled during the economic crisis, so their investments in new hospital equipment are more carefully estimated and evaluated.

Also, ageing populations may place heavier financial burdens such as taxes on younger generations. This might turn into a deterioration of the quality of government services in general and healthcare as one of the main governmental budget chapters.

In the social and demographic factor, the initial review shows how both the number of patients requiring hospital services and new types of healthcare services are growing.

The population in Europe is becoming older, but healthier lifestyles are also becoming more common. Increases in population longevity will test the hypothesis of compression of morbidity, which states that the burden of lifetime illness may be compressed into a shorter period before the time of death, if the age of onset of the first chronic infirmity can be postponed.

Yet, the question is to what degree citizens will accept an active influence over their individual lifestyles, what role the hospital should have in promoting healthier lifestyles, and whether healthy living will be a minority choice or a generalized civic duty and individual aspiration.

The growth of consumerism, a social movement promoting and representing user interests in health services, may generate increasing demand for hospital services but that may not be translated directly into more hospital beds, but a new approach may be placed on convenience and speed of hospital services.

Society's values and attitudes towards hospital services and healthcare, in general, may be changing, according to some studies. The increasing demands for health and care services may need to pay close attention to the relational aspects of care, particularly dignity and respect, to maintain public expectations and satisfaction.

The majority of the European population currently supports the current models of tax-funded healthcare and sees health as an area that should be prioritized in government spending decisions. However, surveys of younger generations show that current high levels of support for present health system models may not be maintained, and the current public agreement that treatments should be available to everyone might change. On the contrary, there may be increasing support for social care provision, as a growing proportion of the population has either direct or indirect experience of social services and appreciates their value.

Bearing these changes in mind, the attitudes towards solidarity in healthcare services, understood as the willingness of individuals to share the population's health risks, may decrease or be conditional upon certain factors. A high degree of solidarity is likely when sharing risks is perceived to be cost-effective and fair, and the benefits of this model are transparent and appreciated.

Workforce shortages have persistently overwhelmed hospitals over the last several years, being ranked among the top issues confronting hospital management. The staffing challenge is widespread across healthcare professions, with nurses and therapists in short supply. Additionally, this shortage of professionals contributes to a decrease in service quality and staff satisfaction, as reported by hospital managers.

The technological factors include a widespread use of ICT and two areas of influence for new IT and medical technologies: within the hospital setting and technologies outside the hospital facilities.

The persistent introduction of high-cost medical technology may also imply the need for special training and a superspecialization of medical knowledge and a new fragmentation of medical services into subspecialties or a mixing of current specialties.

Use of ICT will be widespread, as an instrument for hospitals for streamlining logistical and organizational processes and optimizing use of resources.

Mobility solutions applied to health may have a tremendous impact on the delivery of hospital services, for example, with the "quantified self" movement where patients constantly send remote physiological data for monitoring. However, the information governance of this data in some European countries is still unclear, and answers remain open to questions such as: Who will take responsibility for collecting and analyzing monitored health data? Will the majority of the population agree and consent to their personal data being used for secondary purposes such as research or healthcare service planning?

New medical and information technologies will facilitate teleworking by hospital professionals in new settings, and deliver new home care that was not possible before, for example for teleradiology, teledermatology, telehealth consultation and telemonitoring of chronic patients.

Technology innovation might come from within the hospital organization or outside. The hospital will require new references to evaluate the funding of new technologies and innovation, both to be acquired or to be developed internally, and also to evaluate how to shift technology innovation from an investment fixed cost (CAPEX) to a variable operational cost (OPEX).

Population management tools could help patients' needs to be anticipated, and hospitals and health systems may develop new methods and tools to manage and monitor the whole pathway of disease, supporting patients in their own homes.

New medical technologies such as molecular diagnostics, genomics, pharmacogenomics, personalized medicine, regenerative medicine and medical imaging might prove to be the way forward.

In the environmental factor, climate change will imply changing patterns of healthcare needs, including exacerbations of chronic diseases. In the short and medium term these changes may be modest, but there is a large degree of uncertainty in long-term predictions.

The increased scarcity of resources may have a bigger effect in the medium term, with an impact on older people on low incomes, for whom rising prices of energy and food may have important health consequences.

Also, a broader view on determinants of health may be pessimistic, as educational levels and housing conditions may not maintain the positive trajectories of the last century. Therefore, there may be a significant implication for health inequalities, making it less likely that the current gap in life expectancy between rich and poor will be closed.

In the legal factor, European governments are not only playing the traditional regulatory role in the health sector – establishing processes and rules to ensure that the system functions, such as payment systems and minimum standards of provision – but are also shifting towards using regulation as a tool to achieve the short-term goals of the health system.

Therefore, there are opportunities for politicians to change and adapt existing regulations and prepare a modern healthcare system for the future that are being lost by focusing on using regulations for short-term goals. From a "business as usual" situation, politicians have been unable – or unwilling – to envisage and define any alternative scenarios that help achieve progress in some of the traditional challenges of hospitals such as consolidating governance models where physicians and other healthcare professionals participate at all levels, developing clinical directorates, adapting professional boundaries and responsibilities to new needs, establishing new reimbursement models with fair risk – and profit – sharing, and facilitating public-private partnerships.

Instead, to the external observer, at the local and national level, politicians seem more interested in developing corporate control, supervision and accountability of hospitals through a variety of monitoring committees than developing legal instruments that may help consolidate current hospital practices that have proved beneficial both for patients and hospital professionals.

The diversity of approaches to healthcare regulation illustrates the difficulty of governments in balancing concepts such as efficiency, equity, and accessibility of healthcare, with others such as decentralization, market competition, and pluralism, especially when operating at local, regional and national level.

As a result, some articles show an increasing lack of confidence among hospital managers – and healthcare professionals – in the ability of governments to lead the health system development and prepare new laws for current health system challenges.

At a European level, there are new directives that have an impact in areas such as cross-country mobility of citizens, improving the prevention of health problems linked with environmental, social and work-related determinants of health – for example, strengthening occupational health services to prevent health problems of a psychological and psychosocial character, which may become increasingly common in the new European society with a growing number of self-employed, short-term and casual workers.

Professional shortages will lead to the redefining of professional boundaries, and new forms of professionals that may emerge will need regulations for accreditation of the new professional practice, training and education, such as a redefining of the current responsibilities of registered nurses and nurse assistants, so they can take over some traditional physicians' activities.

Finally, the market factor is an addendum to the PESTEL factors analysis to describe the contextual forces related to changes in the values, interests and habits of patients as consumers of hospital services.

From the coverage perspective, the healthcare services "market" might be segmented into three tiers of patients: those who have complementary private insurance or can pay to get more than the public health services; those who will have some insurance and will pay out of their own pockets for required services; and finally those who cannot pay for non-public health services. Even though this segmentation into three tiers will not directly impact hospital services, the hospital needs to make different value propositions for different market segments of patients.

There are two groups of patients that may require a different service mix: chronic patients and acute patients. Chronic patients who gravitate around the hospital may be characterized by limited autonomy, cognitive problems, multimorbidity, or chronic-complex diseases such as cancer or immune diseases. Acute patients might require expert diagnosis and expert protocolization and personalization of treatments, which may require high-technology interventions.

Patients as consumers may no longer be so "patient," and may demand convenience, responsiveness and greater consideration as customers.

Patients are organizing themselves, thus becoming a counterforce to both healthcare providers and health insurers. Healthcare providers will need to develop prompt and effective communication for patients who are better informed of their illnesses, the possible treatments and their rights.

Current lack of performance transparency prevents matching patients' needs – demand for health services – with an efficient supply of services.

The demand side is characterized by a growing burden of disease (ageing populations, unhealthy lifestyles that drive preventable chronic diseases) and higher patient expectations. Patient expectations are growing after basic needs are met, to cover higher needs in Maslow's hierarchy, mainly because value consciousness is limited by lack of price signals and incentives.

On the supply side, health services show a suboptimal allocation of resources, where incentive systems do not always reward value creation, and payment systems offer little financial incentive for patients to minimize healthcare system costs, i.e., by adjusting their demands. Also, on the supply side, increasing capacity may sometimes induce extra demand for services and needs self-control.

Finally, introducing or innovating with new therapies and new options of care might raise the cost of care, so market forces need to be persuaded to induce innovation that focuses on value (outcomes divided by cost) and not only outcome generation.

5.1.2. Leadership and Strategy

This topic covers the literature review findings on hospital strategic issues and trends as well as the participation of clinicians in the leadership of healthcare institutions.

Clinician leadership is at the forefront of various health reforms and programs, emphasizing the individual development of the physician, as a hybrid of clinician and manager, combining the skills required for heads of medical departments.

However, clinician leadership also extends deeper in the organization, usually without any formal authority or leadership job description, to frontline physicians whose primary work is patient care, the main reason being that the success of healthcare reforms greatly depends on their everyday decisions.

There are challenges for this development of the physician as a leader since most clinicians were trained as individualists and don't necessarily share the goals of the organization, and the many tensions and tasks that

leaders in healthcare organizations should address – such as balancing evidence-based medicine, raising patients' health and multidisciplinary care goals to the board, and improving system performance – might portray this role as highly uninviting.

New models of clinician leadership are based not on formal authority but on behavior, "leading by example," and the hospital should then create a culture that promotes collective action, creating professional pathways for preparation of clinicians willing to make leadership a career option, and encouraging and supporting unit-level and frontline clinical leadership, with authority to make microsystem changes.

Leadership in a clinical environment might require bringing out the special contribution of each professional, facilitating the joint creation and improvement of care, such as in the collective genius case of Pina Bausch.

Regarding hospital strategy, it is clear that many strategic decisions taken in different fields can have a long lead time before the effects become visible, so healthcare managers need to make decisions anticipating probable changes, such as firmly established trends in population age, chronic diseases, workforce and societal value changes.

It is also critical for hospital managers to be prepared to recognize and adapt to unanticipated events of significance, both in the healthcare system and even at a greater societal level, that might impact the strategy, such as the collapse of regimes in Eastern Europe in the late 1980s.

Disruptive innovations are difficult to predict and can change significant aspects of how care is delivered, and hospital strategy is complicated even more by the diverse needs of those using healthcare systems. Therefore, hospital managers need clinician collaboration to determine the different options for how healthcare services can be provided and what the most appropriate and cost-effective solution might be in the future, also considering the hospital position on the various streams of activity, the hospital's technology readiness, and how prepared it is to fulfill current and future demand for services.

The hospital planning process might get further complicated by the involvement of national and local politicians, and the fact that the technology of medicine changes at a much faster pace than the lifespan of many of the healthcare equipment investments.

There are recent experiences in hospital planning as part of a greater and structured process of a regional master plan, an instrument that facilitates an integrated approach to urban regeneration, the stimulation of local economies and the location and functions of hospitals. Master planning can provide a clear vision for sustainability policies and help conform not only to local and national but also to EU principles and health strategies.

Hospitals need to reorganize their delivery systems to meet the demands of the community. The C-level hospital will need to be tightly aligned with a critical mass of physicians.

Physician alignment with hospital strategy proves to be more critical than ever. Engaging physicians as full hospital partners in the journey ahead is a top priority. Hospitals need to get in sync with physicians, whose incentives and views may be very different from those of managers. Alignment strategies may include participation of physicians in hospital governance. Earlier attempts at hospital-physician alignment show that excluding physicians from governance roles tends to create hospitals that might alienate physicians and impact negatively on a hospital's efficiency. The very first lesson from the past is to understand that shared management responsibility is essential, and ensuring that all healthcare disciplines contribute to hospitals' governance means that clinicians must be given some control over practice and must be provided a voice in the future direction of the hospital.

Alignment strategies may also include sharing financial risk in an accountable care organization, where leading physicians will participate to translate the hospital's strategic initiatives and goals into clear, aligned and agreed objectives at the unit levels of the organization and share the risks and benefits of the hospital's performance.

The strategies for success of the hospital of the future might include changes in size, configuration, workforce or reimbursement models. Even the name "hospital" is considered to require adaptation in the near future, such that some studies refer to the transition from the "ill house" (Krankenhaus, in German) to the "health house" (Gesundhaus). Hospital strategy might become centers bringing together health related fields, and not only healthcare provision and research.

In times of crucial change, hospitals need a highly motivated workforce with energy, ideas and commitment if they want to subsist and be successful. Workforce management[8] will become a strategic initiative requiring professionals with appropriate skills and capabilities to embrace new technologies that enable a step change in productivity, but also with skills to support new ways of working including working in multidisciplinary teams, problem solving, innovation and creativity in a changing environment.

Workforce flexibility will be required, related to adaptability to varying job functions, and also adaptability to different contracts and incentive models.

Risk sharing between hospitals and their suppliers is becoming a reality. Some accountable care organizations have active programs that share risks with pharmaceutical, biotechnology and medical device manufacturers, based on service use, patients' adherence and health results, amongst other indicators.

For example, medical device manufacturers are beginning to take risks for products such as pacemakers and other implantable devices, based on meeting certain performance quality criteria or even process goals such as patient readmissions for heart failure for cardiac devices.

Finally, in the hospital strategy review, strategic alliances between non-competing hospitals and even cooperative ventures by different hospitals are emerging as a trend to facilitate research and innovation in the market.

5.1.3. Resources and Capabilities

The ideas captured during the literature review, related to resources and capabilities matters, and used for later discussion and analysis in interviews, have been classified into three management topics: workforce management, information technology management and facilities management.

Workforce management has been already addressed in the strategy and leadership dimension, as it has become a strategic issue for hospitals.

There are various workforce trends that might have a significant impact in the future of hospitals, such as the feminization of the hospital workforce, an important trend that is expected to continue in the near future in European healthcare. This trend has implications for the organization of clinical work, as women are more likely to take career breaks or to work part-time.

Moreover, an ageing healthcare workforce means that health institutions need to find new ways to adjust the jobs to experienced professionals, and to increase the recruitment and retention of professionals, especially with a projected shortage of healthcare staff in disciplines such as nursing and the less "attractive" medical specialties.

These trends might make hospitals dependent on foreign healthcare workers, and lead to the development of international (and also local) ethical recruitment and retention programs.

Many articles refer to new technologies impacting the development of new professional roles and changing the workforce mix of disciplines (physicians, nurses, technicians) in various units. Therefore, there seems to be a need for strengthening nursing and technical professions, and increasing the workforce skill mix so the hospital has a sustainable workforce.

Changes in the workforce mix mean enabling up workers of various disciplines, which will require the restructuring of relationships with physicians regarding the delegation and distribution of responsibilities.

Some trends show that hospitals might develop special relationship models with specific top expert professionals, even creating hospital-physician joint ventures. The physician motivations include generational and lifestyle issues, and the willingness to advance in research in a specific domain of expertise, and the hospital motivations include meeting the demand for services and offering convenience and quality of service.

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[8] Workforce management is also addressed in the following *Resources and Capabilities* dimension subchapter.

The second area is information technology, where the persistent introduction of high-cost medical technology and pharma will require a new generation of hospital-based health technology assessment units, capable of responding to management questions for prioritization of initiatives and alternatives.

Hospital clinical applications are becoming more intuitive, adaptable, and helpful to connect doctors to other colleagues and to patients, and information systems are viewed as fundamental to the hospital's future.

Some new trends seem promising in healthcare and also impact the hospital such as remote monitoring of chronic (and also healthy) patients, including quantified self-movement, with the development of sensors (worn on or implanted in the body) that allow patients to constantly monitor their physiological parameters. Heart rate, blood pressure, sleep patterns, blood glucose, oxygen content of the blood, temperature, amount of exercise, and moods are just some of the parameters that can be monitored and shared with a wellness coach or physician.

Health 2.0 concepts promise an improvement of healthcare interactions, from the use of social media by patients and communication with healthcare professionals.

The thousands of medical and healthy living applications available for smartphones present an opportunity for changing the current process and the management of information by hospitals. Still, it is difficult to predict how digital health might transform the healthcare industry.

Healthcare applications for professionals are increasingly integrating decision support systems based on artificial intelligence and big data models and analysis. The vast amount of clinical data captured during the thousands of healthcare episodes treated in a hospital might be used in new ways to improve future care processes.

The healthcare robot movement is speculating about what kind of physicians will soon be replaced by computer programs and robots, and artificial intelligence experts predict that medical diagnosis kiosks will soon be triaging patients in developing countries.

The last topic in resources and capabilities management to be considered is facilities management. Hospitals, being physical places where patients are cared for, usually have large facilities for the diverse streams of activities performed. In order to become more effective, hospitals might integrate facilities virtually or literally in different settings.

However, hospitals will also try to shift from a physical to a "virtual" hospital, trying to use other facilities and remote monitoring technologies to perform activities currently done at the hospital, with families becoming caregivers integrated into the team.

Medical conditions able to be addressed by technology-enabled home care are usually chronic, may be prevented or addressed by protocols, and usually are non-intensive. Suitable patients are encouraged to become "mobile patients" (but with continuous home monitoring) as early as possible to reduce the need for beds and other facilities.

This trend to keep patients at home implies fewer facilities and more flexibility for the hospital, so it will require having more flexible rooms adaptable to different medical specialties for the more "intensive" interventions. Hospital rooms might be converted to an ICU to escalate or de-escalate as necessary, and the hospital might comprise four different areas: hot floor, hotel, factory, and office.

Flexibility of hospital facilities incorporates bionic architecture principles, a movement for the design and construction of expressive buildings whose layout and lines borrow from natural (i.e., biological) forms – modules, cell architecture, diversity, multifunctionality. Hence, hospitals may require not so much construction but careful planning for a smaller, easier-to-maintain building, with the centralization of important functions and taking into account the process orientation.

New operating theaters will become state-of-the-art, using the best of the best from other industries, for improved lighting, telecom, robotics, etc.

Hospital facilities are re-examined in order to become "buildings that heal" and not only where patients are healed, with a flow of air that reduces hospital infections, improved lighting spaces, vital energy through natural gardening, cultural activities for the mind and spirit, and in general, becoming esthetic and attractive spaces and atmospheres.

5.1.4. Process Management

New trends in healthcare process management include changes in perspectives of process management, such as integrated care, new models and approaches for process improvement, such as patient experience, and the impact of new healthcare technologies and also information technologies on healthcare processes.

Integrated care models foster the blending of processes between different levels of healthcare (primary, secondary, mental health) or mixing healthcare with community care processes.

From the perspective of the patient (i.e., the citizen or customer), integrated care enables healthcare and community services to be more consistent and better coordinated, resulting in higher quality and improved satisfaction. From the healthcare providers' perspective, integrated models bring not only higher-quality services but may provide more efficient care and that means also helping to control healthcare expenditure, so the models become a driver for the implementation of integrated care models in many healthcare systems.

Still, integrated care brings up questions on structural versus virtual integration of institutions, and whether healthcare organizations are ready to integrate models or they need to step up enablers such as patient self-care initiatives, clinical leadership and team co-responsibilities, and more flexible information systems that facilitate the integration of processes and information.

Hospital clinical process management trends show a greater orientation to outcome management, with an emphasis on keeping the population healthy with hospitals involved in prediction and prevention activities in a more proactive role.

Some trends identified the impact of process management as being related to shifts in care delivery settings and participating actors. Hospitals are finding new ways of delivering care, involving patients and families in the care processes, sometimes to free physicians and nurses but also to improve quality of care. New information and communication technologies make self-monitoring safe and effective for numerous disease states and also help shift some care activities to patients' homes or to local care provider settings.

Process management is relying on patient pathways and a new generation of information systems with rules-based engines that apply evidence-based protocols and best practices. Expert physicians and other professionals would use their skills in processes where there is greater uncertainty and they need the best problem-solving skills for diagnosis or treatment.

Hospital clinical pathways are adapting to new approaches in ageing, geriatric care and end-of-life care and new healthcare technologies, such as minimal invasive surgery, genomics and personalized medicine.

Process management is increasingly recognizing clinical learning processes as a hospital asset, with institutions giving greater importance to a culture that fosters development, proper capture and storage, and adequate dissemination and application of clinical knowledge, both internal and external, i.e., learning from others as well.

In parallel with clinical process management, some articles show an increasing concern for human resource management processes such as recruitment, evaluation, and professional development.

Careful application of process re-engineering techniques has brought new hospital department services such as one-stop services, and helps hospitals configure facilities by splitting between active and hotel areas. There are efficiencies in these new models in reducing waiting areas, increasing the volume of activity in ambulatory care, with fewer beds and diminishing average stays.

The pressure on hospitals for safety and efficiency shows an increasing application of process improvement techniques and principles such as lean, combined with a focused factory approach and an emphasis on better process accounting.

Personalized medicine as opposed to current population management might shape changes in process management, when drug treatment and disease screening stop following a one-size-fits-all approach that sometimes leads to overtreatment and unnecessary expense.

Genomics and genetic testing will allow hospitals to individualize the treatment for each patient, and also patient experience may push significant changes in process management and service design. Customer experience

may be shaped by a desire for "on-demand" healthcare, with new processes considering telemedicine, mobile health and social media as new tools to integrate in the clinical pathway at the patient's will.

Improving hospital process management trends include investing in understanding patients as customers and their preferences, focusing not only on safety and efficiency but also on process transparency and convenience, taking advantage of the multiple access points in the health system that the patient perceives, and opening up channels for easy and systematic customer feedback.

Finally, changes in process management to improve and adapt to patient expectations need the complicity of healthcare teams. Therefore, pioneer hospitals in patient experience programs are granting their employees authority and developing their skills to understand and improve the patient-customer experience.

Hospital process management might become more customer-centric, applying human-centered design techniques and some systemic views that may have an impact on the hospital business model.

5.1.5. Results Management

The following items were listed in the literature review for results management and value creation:

Hospital results have been linked lately with population health. The "triple aim" initiative, launched by the Institute for Healthcare Improvement in 2007, encouraged hospitals to simultaneously focus on three goals: population health, increased quality, and reduction in the healthcare cost per capita.

In the pursuit of these three goals, hospitals have intensified programs such as disease screening and chronic disease management that have the greatest impact on overall health indicators.

In order to be successful, hospital management should expand accountability to different levels of the hierarchy, creating models that facilitate transparency in the communication of patient outcomes, financial results, and benefits to the community for each program or improvement.

Hospitals are reviewing their value creation and value proposition for each stakeholder, reformulating what the value delivered to the patient is, which problems the hospital is helping to solve and which specific patient needs are being satisfied at the hospital.

Also, hospitals are envisioning new bundles with a healthcare services package adapted to each patient group, classifying patient segments by age group and medical condition.

Hospitals are formulating service models mixing different value propositions where value creation elements may not only be cost reduction, performance, accessibility and risk reduction (traditionally the interest of the healthcare services payer/insurer) but also with value propositions for service customization and convenience.

Moreover, hospitals are considering the patients' perspective and starting to question patients' expectations in order to monitor and measure the patient experience systematically.

From the payers' perspective, hospital activities are being measured by their contribution to health results using improvement to quality of life or improvement to the quality-adjusted life years in some integrated care programs.

From the internal perspective, according to recent publications, results on hospital personnel, for improving the retention and satisfaction of clinical staff, might become increasingly critical. Also, hospitals might need to do more with fewer personnel, adding to the need to promote staff comfort and satisfaction.

The social and economic role of hospitals is also an important indicator to monitor hospital results, due to hospitals' importance in the national economy and their contribution to education and employment in local economies.

In the financial area, revenue cycle inefficiencies might be impacting hospitals' cost structure, where workforce and infrastructure costs are still the larger concepts.

Though hospitals seem to search for economies of scale, some experts point to the simultaneous creation of economies of scope, where accumulated knowledge and skills facilitate the provision of a new service with comparatively reduced costs or are helped by reusing advanced technologies.

Last, but not least, financial results of the hospital are considered. Public hospitals' sustainability might be impacted by deteriorating clinical revenues. Public hospitals are undergoing changes in reimbursement models from fee-for-service reimbursement towards value-based payments that reward positive outcomes and efficiency. However, these new value-based models are still in their infancy, and hospitals are undergoing continuous changes that make it difficult to select which process measures are the best indicators.

Hospitals' and payers' relationships are increasingly incorporating different revenue models, so hospitals are exploring new pricing mechanisms and types of revenue streams.

Some countries are planning to include the cost of capital (hospital investments or infrastructure) in output pricing mechanisms. Whether this model or a life-cycle costing model is applied is still an open question in many countries. However, the practical implication might be that pricing will be a strong incentive to have hospital buildings with "shrinkage and growth" flexibility.

The hospital facilities' flexibility, permitting fluctuations in care activity volume, will enable the hospital to adapt to pricing volatility in order to sustain hospital financial results. A hospital's approach to facility management will create the optimal facility, as inflexible hospital floor space could represent a disadvantage for the hospital from a competitive point of view, and a financial hurdle.

According to some hospital management studies, the "high-volume focus hospital" model might be the prevailing success model, as it helps diminish the cost of disease-specific surgeries, with best outcomes, and patient experiences, and return significant financial advantages to owners.

However, other studies recommend that hospitals deconstruct their activities operationally into two different business models – solution shops and value-adding process activities – by creating *hospitals within a hospital* or by building distinct facilities. Each business model must be organized differently, with separated cost accounting and pricing systems, otherwise they may "simply expect to be liquidated through disruption."[9]

5.2. Interview Findings

First of all, this chapter includes the topics from interview analysis – called preliminary findings – structured according to the HoF dimensions.

Later, the chapter presents the global results on the relevance, impact and likelihood of these preliminary findings, obtained with the online questionnaire.

Finally, the chapter includes a description of the results on the preliminary findings' relevance in each dimension and comparisons of results of both participating hospitals in each dimension.

5.2.1. Preliminary Findings

As explained in the methodology, the study used a list of 76 preliminary findings in order to present participants with a list of concepts in order to validate and understand the importance or relevance of each finding, according to the group of experts interviewed.

These 76 findings were classified and balanced into the seven dimensions defined in the HoF conceptual framework:

- 10 findings for dimension 1A: Market and demographic forces

- Nine findings for dimension 1B: Health system contextual forces

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[9] C. M. Christensen, J. H. Grossman and J. Hwang (2009). *The Innovator's Prescription*, New York: McGraw-Hill.

- Six findings for dimension 1C: Hospital role in the health system

- 14 findings for dimension 2: Strategy and leadership

- 14 findings for dimension 3: Resources and capabilities

- 13 findings for dimension 4: Process management

- 10 findings for dimension 5: Results and value management

The following table includes a short description of these findings. "Appendix 5. Detailed List of Findings" contains the finding title and detailed description.

Table 1. List of 76 preliminary findings

#	FINDING SHORT TITLE
■ D1A: Market and demographic forces	
01	Life expectancy will continue to improve.
02	Citizens' demand for healthcare services will increase.
03	Chronic conditions will represent the greater part of healthcare costs.
04	Citizens will be more co-responsible and participative in their healthcare.
05	Citizens will increase participation in prevention and predictive healthcare initiatives.
06	Health literacy will increase and patients will be more connected with healthcare professionals.
07	Citizens-patients will become global, seeking quality healthcare services locally or abroad.
08	Society's values will change, limiting free and universal access to healthcare services.
09	Citizens' use of remote health management services will be widespread.
10	Citizens-patients will get involved in the design of the healthcare system.
■ D1B: Health system	
11	Public healthcare organizations will be allowed to provide a combination of public and private health services, using the same professionals and/or facilities for both services.
12	Healthcare service expenditure will decrease as a percentage of gross domestic product.
13	Healthcare service expenditure will increase for preventive services and decrease for hospital curative (ambulatory and inpatient) services.
14	Equipment and healthcare technology resources assigned to public hospitals will decrease or at least not increase.
15	There will be a shortage of physicians and nurses available for hospitals.
16	Mental health conditions will cause paradigm changes in the healthcare system configuration, modifying the current levels of care.
17	Healthcare systems will focus on cost reduction and control.
18	The health insurer will contract chronic disease management services as a whole package that may include monitoring, treatment and management.
19	Primary care centers will have a more important role in generating demand for hospital services.
■ D1C: Hospital role	
20	Leading hospitals will be required to provide both a complete range of services for the community and also highly complex services.
21	Public hospitals will be expected to integrate primary, long-term and/or social care services to become integrated care organizations.
22	Leading hospitals will participate in decisions on the configuration of the healthcare system related to acute and non-acute services.
23	Leading hospitals will strengthen teaching activities with the university.

#	FINDING SHORT TITLE
24	Leading hospitals will continue to be the main setting for healthcare research activities.
25	Leading hospitals will become the main setting for healthcare service innovation.
■ **D2: Strategy and leadership**	
26	Leading hospitals will focus on highly complex services and will shift some routine care services to other healthcare providers.
27	Leading hospitals will focus on highly complex patients, limiting access to hospital services to less complex patients even in the A&E department.
28	Leading hospitals will provide a wide range of treatments and services in all specialties as long as they have economies of scale.
29	Leading hospitals will provide integrated chronic disease management services.
30	Leading hospitals will provide monitoring services directly to patients with chronic diseases integrated with treatment services.
31	Leading hospitals will provide mediation services for healthcare treatments in the community.
32	Leading hospitals' governance will be driven by professionals and not by politicians.
33	Leading hospitals will participate in networks of healthcare provision in the community, orchestrating care coordination of health services.
34	The hospital will become smaller with fewer physical resources and fewer patients on-site.
35	Hospital leaders will have an active role in the network of healthcare provision.
36	Leading hospitals will be organized into disease process units with increased orientation to patient groups with common conditions.
37	Leading hospitals will enable clinicians and other healthcare professionals to participate in strategy definition and hospital management.
38	The leading hospital's senior management will incorporate managers from other industries with little or no healthcare background.
39	The leading hospital will create and foster different partnerships at a local, regional and international level with different roles.
■ **D3: Resources and capabilities**	
40	Professionals will work in multidisciplinary and process-oriented teams, blurring the existing discipline boundaries.
41	Professionals will be more motivated by short-term, monetary, and reputation recognition than by organizational and societal motivations.
42	New platforms for healthcare service delivery (home care, remote management) will define new professional roles.
43	Hospitals' workforces will contain a mix of contracting schemes with fewer permanent and more flexible personnel.
44	The professionals will be compensated with new schemes based on results and job vacancies will be assigned on merit and not seniority.
45	Leading hospitals will rely on a new generation of information systems including clinical decision support, telemedicine and mobile health.
46	Leading hospitals will focus their investment on healthcare equipment and technologies for services that cannot be easily located in other healthcare levels.
47	New healthcare technologies will allow existing specialties to provide services that are currently out of their service offering.
48	Hospitals will reduce their ward areas.
49	Hospitals' resource planning will be based on planned patient outcomes in their catchment area and not on existing capacity.
50	Leading hospitals will deploy health technology assessment (HTA) units to evaluate the development of new healthcare services.
51	Hospitals will use more distributed facilities to get closer geographically to patients.
52	Hospitals will decrease investments in equipment and facilities and will have more rented or service-based resources.
53	Hospitals will develop risk-sharing models with providers.
■ **D4: Process management**	
54	The hospital will increase interaction with patients, creating a continuous relationship.
55	Leading hospitals will have strong process integration (care coordination) with other health and social care levels.
56	Healthcare will be more proactive, and leading hospitals will participate in anticipation activities (prediction, prevention).
57	Clinical processes will be organized around teams with patients as a team member.
58	Leading hospital diagnostic services will integrate information from genomics tests.
59	Leading hospitals will reconfigure their processes and structures to foster internal operational efficiencies.
60	Hospital processes will be based on new information technologies for personalized and predictive services.
61	Hospital processes will expand to cover home and other care settings.
62	Leading hospitals will make a significant advance in operational excellence.
63	Hospital emergency units will be integrated with external units from other healthcare providers as a cross-organizational service.
64	Hospitals will externalize non-core and support services.
65	Health process management will be based on a new generation of clinical decision support systems.
66	Leading hospitals will formalize clinical learning processes as valuable assets of the organization.

#	FINDING SHORT TITLE
■ **D5: Results management**	
67	Leading hospitals will use new indicators based on outcomes rather than activity.
68	Leading hospitals will use indicators based on patient-reported outcome measures.
69	Hospitals will access data outside the hospital to measure results on patients.
70	Leading hospitals will compete on outcomes, delivering the best possible health outcomes at a given cost.
71	Hospitals will have to deal with an increasing personnel turnover with new compensation schemes and other motivational initiatives.
72	Hospitals will continue making an important contribution to the economy of the community and will expect society to be involved with the hospital development plans.
73	Patient experience will be evaluated and used systematically to improve hospital services.
74	Leading hospitals will drive transparency on safety and evaluation of outcomes.
75	Hospitals will further develop research and education activities that will become more significant sources of income.
76	Leading hospitals will develop international service offerings to become less dependent on local health system contractors.

5.2.2. Global Results

The results for the evaluation of the 76 preliminary findings are shown in Figure 16. This matrix represents the average impact and likelihood for each one of the 76 findings on a 1-4 scale.

A majority of findings' averages are positioned in the cell corresponding to high impact and high likelihood, (between 2.5 and 3.5 values). Only 20% of findings' averages are out of this rectangle, and most are positioned in the higher impact or higher likelihood areas.

This concentration of findings is not unintended, as findings are selected as the most relevant concepts from literature reviews and individual interviews. Findings were selected according to their potential relevance by the study IESE CRHIM team, hence it was expected that participants would confirm the high probability of them happening in the future and that these findings would have a high impact.

Therefore, the following analysis of study findings is focused on comparing findings within this highly relevant area and understanding differences in distribution findings.

Figure 16. Matrix of impact vs. likelihood of preliminary findings for global results (including Karolinska and Hospital Clínic)
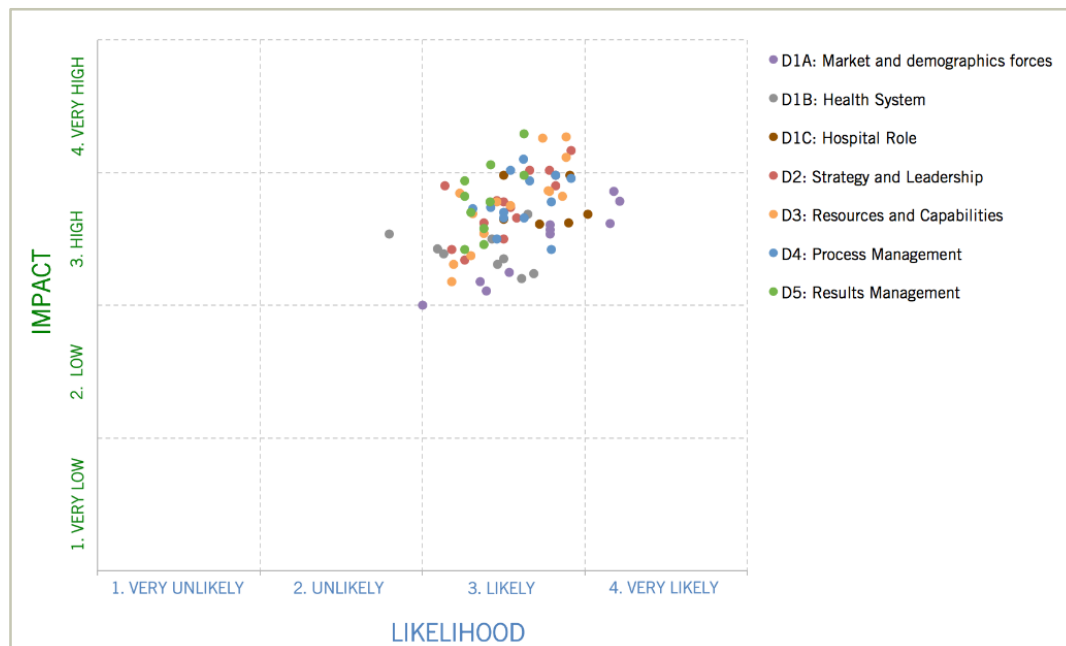
Source: Prepared by the authors.

When the results of findings' averages are shown in a 3×3 close-up area of likely probability and high impact, the resulting chart shows how starting contextual findings are considered as being most probable (findings 01, 02 and 03) but findings that are considered as having the most impact on the hospital correspond to other dimensions different from context, such as strategy, resource management, and outcome-based indicators (such as findings 67, 40, 45 and 26).

From this initial figure it can be deduced that, in general, study participants consider that contextual forces might be probable but the hospital initiatives on results, resource management and strategy focus will be the concepts that will have the higher impact on the hospital.

Figure 17. Close-up of the area of high impact and high likelihood for preliminary findings
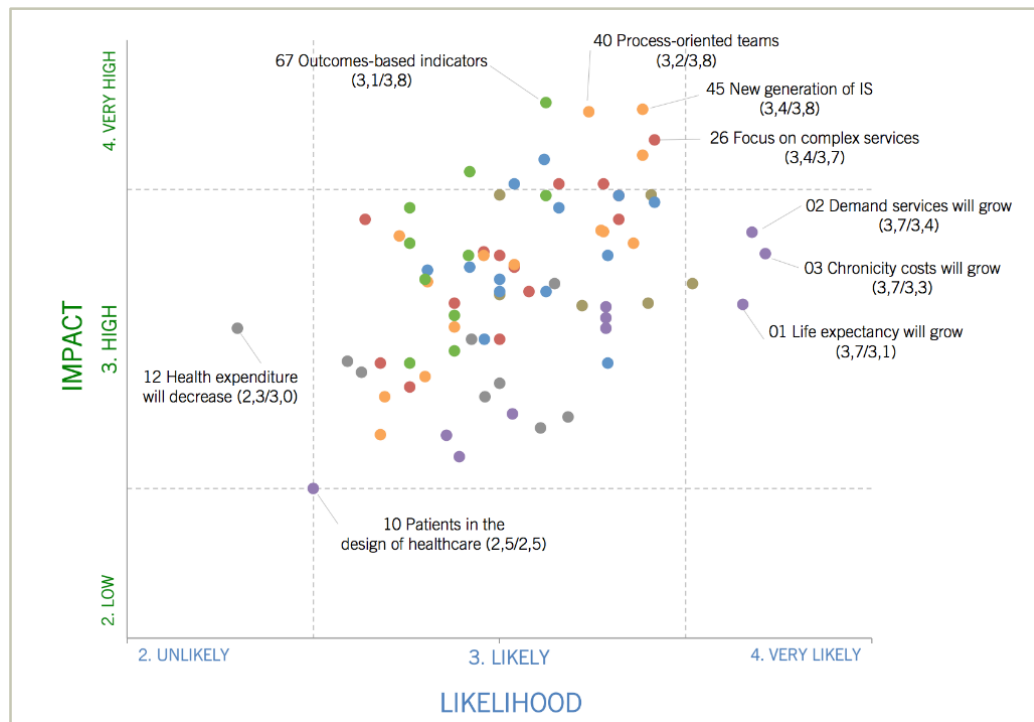
Source: Prepared by the authors.

In order to facilitate the analysis and comparison for each finding, we introduced the term "relevance" as the multiplication of likelihood and impact, in order to have one single measurement to represent all findings.

The resulting graph for relevancy is shown in Figure 18, where dimensions are structured in columns and the top value of relevance is finding 45 "New generation IS," and the lowest value is finding 10 "Patients design healthcare."

Figure 18. Relevancy results for Hospital Clínic and Karolinska for 76 findings
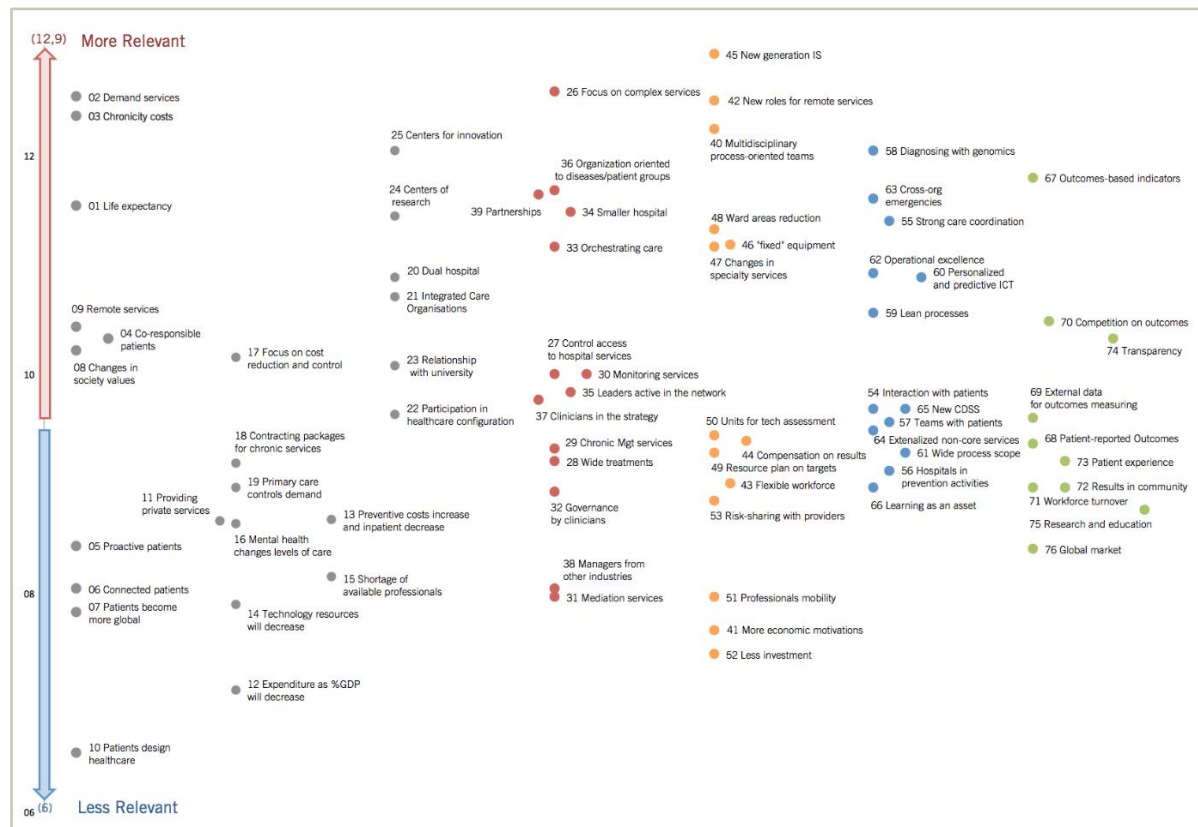
Source: Prepared by the authors.

The 10 preliminary findings that are most relevant are:

- Finding 45 (D3) "Leading hospitals will rely on a new generation of information systems including clinical decision support, telemedicine and mobile health."

- Finding 26 (D2) "Leading hospitals will focus on highly complex services and will shift some routine care services to other healthcare providers."

- Finding 02 (D1A) "Citizens' demand for healthcare services will increase."

- Finding 42 (D3) "New platforms for healthcare service delivery (home care, remote management) will define new professional roles."

- Finding 03 (D1A) "Chronic conditions will represent the greater part of healthcare costs."

- Finding 40 (D3) "Professionals will work in multidisciplinary and process-oriented teams, blurring the existing discipline boundaries."

- Finding 58 (D4) "Leading hospital diagnostic services will integrate information from genomics tests."

- Finding 25 (D1C) "Leading hospitals will become the main setting for healthcare service innovation."

- Finding 67 (D5) "Leading hospitals will use new indicators based on outcomes rather than activity."

- Finding 36 (D2) "Leading hospitals will be organized into disease process units with increased orientation to patient groups with common conditions."

These most relevant findings show a demanding context for healthcare, where leading hospitals need to continue serving as centers for innovation and research, with a clear focus on highly complex services, becoming smaller organizations and organized towards disease management. In terms of resources, processes and value generation, leading hospitals will rely on a new generation of clinical information systems and new roles and multidisciplinary teams will be required for orientation towards a strong care coordination, and outcome-based indicators will become the critical initiative for generating results.

For each hospital the relevancy graph was presented in the workshop and relationships made to focus on specific links among concepts (see examples in Figure 29 and Figure 30).

The global results for all preliminary findings show differences in terms of the consideration of the impact and likelihood of findings depending on the dimensions studied.

In terms of impact and likelihood, and averages for each dimension, the results for both hospitals compared showed great similarity in terms of the average of each dimension.

Table 2. Average results of impact and likelihood for preliminary findings by hospital and dimension

Dimension	Hospital Clínic of Barcelona		Karolinska University Hospital		Global results (Clínic + Karolinska)	
	Likelihood	Impact	Likelihood	Impact	Likelihood	Impact
■ D1A: Market and demographic forces	3.2	3.0	3.2	2.9	3.2	2.9
■ D1B: Health system	2.9	3.0	2.8	2.8	2.9	2.9
■ D1C: Hospital role	3.4	3.3	3.1	3.2	3.3	3.3
■ D2: Strategy and leadership	3.0	3.2	3.0	3.3	3.0	3.3
■ D3: Resources and capabilities	3.1	3.2	3.0	3.3	3.0	3.3
■ D4: Process management	3.1	3.3	3.1	3.3	3.1	3.3
■ D5: Results management	2.8	3.3	3.0	3.2	2.9	3.3

The findings relating to dimension *D1C: Hospital role*, especially the average likelihood of Hospital Clínic results (as highlighted in Table 2) and to the role of the hospital within the healthcare system were considered important issues to discuss in workshops with hospital participants.

The representation of these results shows a similarity of results in both hospitals, as can be seen in Figure 19, where the average for each hospital is in a similar area of the matrix of impact vs. likelihood. The hospital role average for Hospital Clínic appears in the top right area of the figure, as the most relevant for Hospital Clínic.

In this figure, Karolinska University Hospital's average results are displayed in squares and those of Hospital Clínic of Barcelona in triangles, and the average would be at the line connecting both points.

Figure 19. Global and hospital results for likelihood and impact
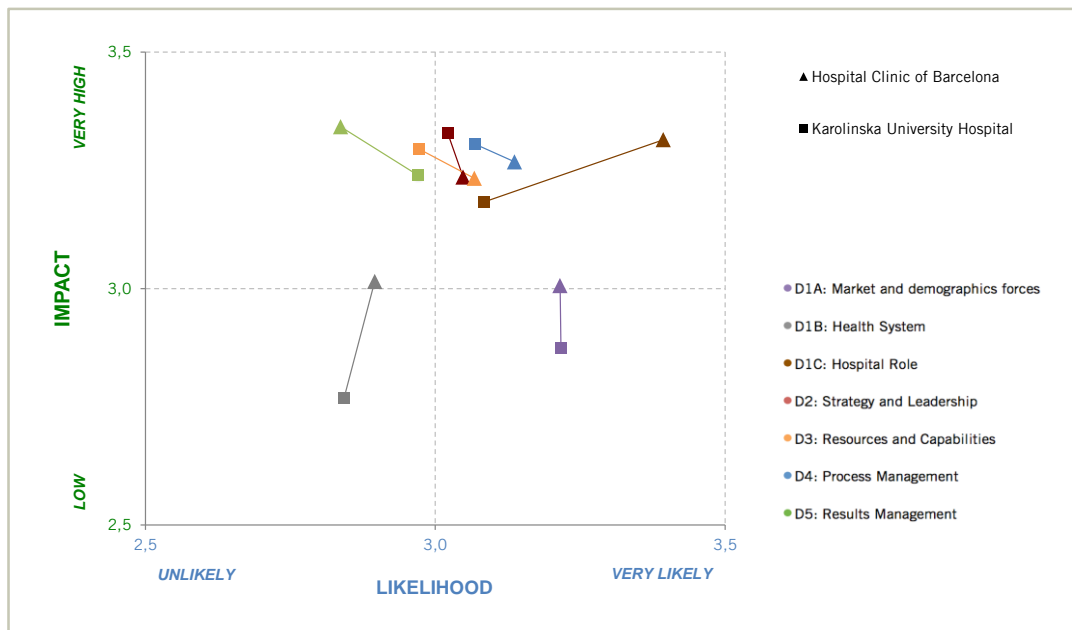
Source: Prepared by the authors.

The average results of relevance (calculated as the multiplication of impact and likelihood) are:

Table 3. Average results of relevance for preliminary findings by hospital and dimension

Dimension	Relevance			
	Global	Clínic	Karolinska	Difference (Clínic – Karolinska)
■ D1A: Market and demographic forces	9.3	9.7	9.2	0.5
■ D1B: Health system	8.4	8.7	7.9	0.8
■ D1C: Hospital role	10.9	11.2	9.8	1.4
■ D2: Strategy and leadership	9.9	9.9	10.1	−0.2
■ D3: Resources and capabilities	9.9	9.9	9.8	0.1
■ D4: Process management	10.2	10.3	10.1	0.2
■ D5: Results management	9.6	9.5	9.6	−0.1

The difference between both hospitals is considerable for hospital role, as the study reveals – Hospital Clínic participants put strong focus on this. Also, the contextual dimensions 1A and 1B show how the Hospital Clínic participants clearly consider these findings the most relevant, especially in terms of the impact on the hospital.

The detailed results of analysis for each one of the 76 preliminary findings are shown in Figure 20, where the average for impact and likelihood can be observed in the projections of the results in the vertical axis and horizontal axis.

Figure 20. Global results in matrix and projected dimensions
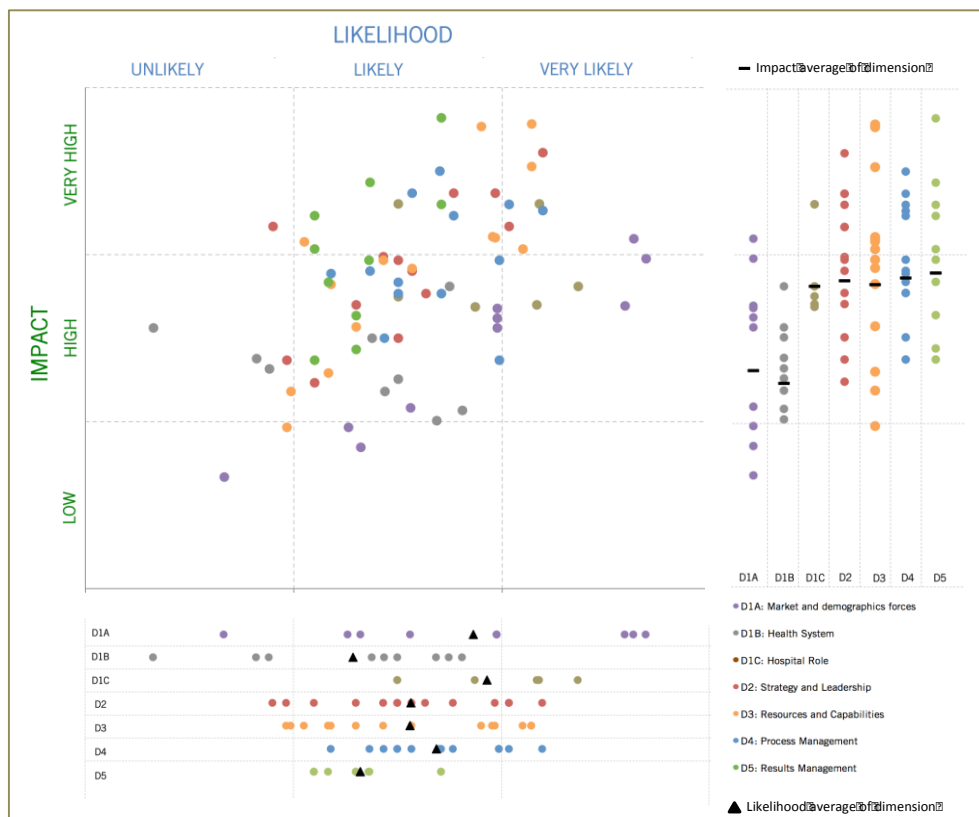
Source: Prepared by the authors.

The projections on the impact (vertical) axis show a similarity in the averages for dimensions D1C to D5, with some of the impact findings highlighted in the top right corner.

Similarly, projections on the likelihood (horizontal) axis show that the findings for dimensions D1A and D1B cover a wider range than findings for other dimensions, such as results management (D5), where all findings appear to have similar levels of likelihood of happening.

In the following sections, detailed results are presented for each finding.

5.2.3. Results for Dimension 1A – Demographics, Social and Economic Contextual Forces

In the next 15 years, substantial changes in demographics on the one hand and social values on the other hand may represent important forces to consider for the healthcare system. The results in dimension 1A focused on these social, demographic and market changes such as demand for healthcare, participation and the values of patients and citizens regarding the healthcare systems.

Figure 21. Results for dimension 1A including social, demographic and market contextual forces[10]
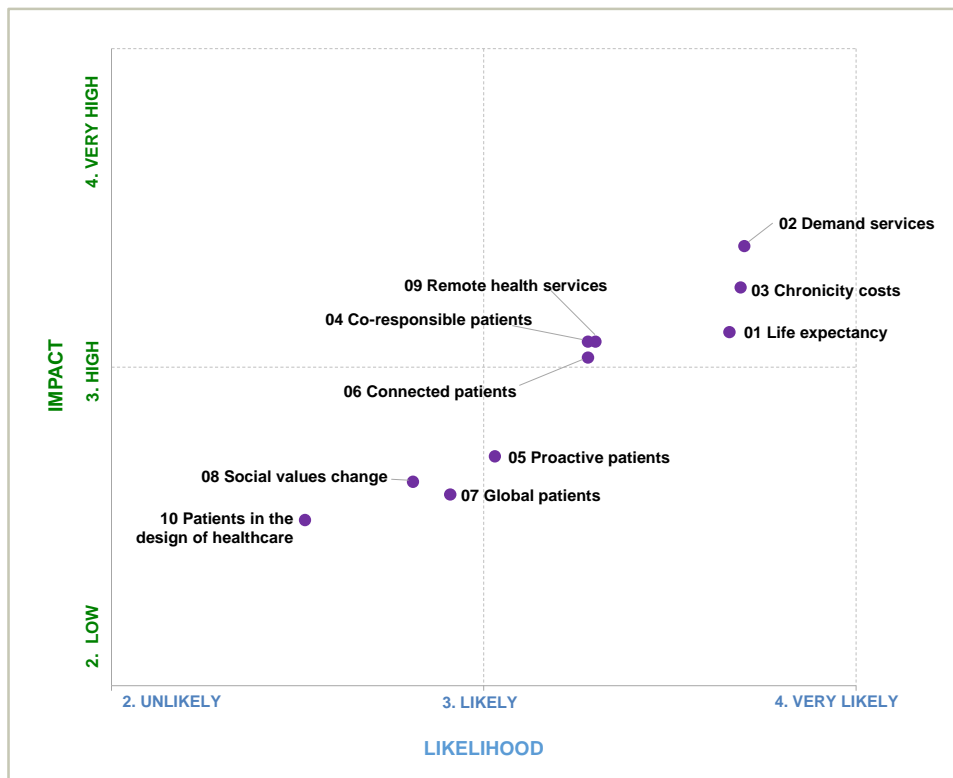
Source: Prepared by the authors.

This graph shows a clear separation of a group of the most relevant findings in the top right area including findings 02, 03 and 01 related to healthcare service demand and demographics. Then there is a second group with findings 04, 06 and 09 related to patients' roles. Finally, the finding of patients' participation in the design of the healthcare system appears in the lower left corner, as the least relevant finding.

There are some differences in hospitals' perception of the increase in demand for healthcare services and also regarding the significance of the burden of chronic conditions for healthcare expenditure. However, both hospitals agreed that it is very likely that citizens will demand more healthcare services, not only for the elderly but also for the middle-aged population, for whom new types of services more linked to health preservation will be demanded.

However, as noted by some participants, the real impact of the contextual forces on the hospital will also depend on the model of governance of leading hospitals and their public or private status. If public healthcare providers will not be able to afford universal healthcare services, the impact on the hospital of this increase in demand will be limited.

Healthcare professionals may play a role in modulating this demand, by educating and focusing on best value in healthcare, understood as the best results relative to costs.

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[10] Note: The values represented in the figures are based on numbers to more decimal places than those shown in the tables, which use fewer decimal places for clarity.

## Table 4. Results for dimension 1A ordered by relevance from greatest to lowest

	Likelihood			Impact			Relevance		
		Clínic	Karolinska		Clínic	Karolinska		Clínic	Karolinska	dif.
02. Citizens' demand for healthcare services will increase.	3.7	3.6	3.8	3.4	3.3	3.5	12.3	11.6	13.4	−1.8
03. Chronic conditions will represent the greater part of healthcare costs.	3.7	3.9	3.5	3.3	3.5	3.0	12.2	13.6	10.5	3.1
01. Life expectancy will continue to improve.	3.7	3.6	3.8	3.1	3.1	3.1	11.4	11.2	11.6	−0.3
09. Citizens' use of remote health management services will be widespread.	3.3	3.3	3.3	3.1	3.3	2.9	10.2	10.8	9.5	1.3
04. Citizens will be more co-responsible and participative in their healthcare.	3.3	3.2	3.4	3.1	3.0	3.2	10.1	9.6	10.8	−1.3
06. Health literacy will increase and patients will be more connected with healthcare professionals.	3.3	3.3	3.3	3.0	3.1	3.0	10.0	10.1	9.8	0.4
05. Citizens will increase participation in prevention and predictive healthcare initiatives.	3.0	3.1	3.0	2.8	2.9	2.5	8.3	9.0	7.5	1.5
08. Society's values will change, limiting free and universal access to healthcare services.	2.9	3.1	2.5	2.7	2.9	2.3	7.7	9.2	5.8	3.3
07. Citizens-patients will become global, seeking quality healthcare services locally or abroad.	2.9	2.8	3.0	2.6	2.6	2.6	7.5	7.4	7.8	−0.4
10. Citizens-patients will get involved in the design of the healthcare system.	2.5	2.4	2.7	2.5	2.4	2.7	6.3	5.6	7.1	−1.5

Regarding life expectancy, participants made the point that life expectancy will not have a significant impact on the hospital, as the healthcare costs are mainly concentrated on the last year of life, and this will most likely be of the same character even if the person is older.

Regarding patient co-responsibility, literacy, and participation in healthcare systems' definition, there are some differences, with Karolinska participants believing that patients' involvement will be higher and the impact on the hospital more important. The benefits of patient empowerment may be diminished if the hospital is not aware of its potential and fails to prepare resources adequately, and the cost of losing this opportunity may have an impact on the hospital in the medium to long term.

5.2.4. Results for Dimension 1B – Healthcare System Contextual Factors

European health systems are planning important changes to economic terms and policy. These changes may impact the healthcare ecosystem and particularly the hospital. The findings in dimension 1B focused on the factors that may influence the role and strategy of the hospital.

Figure 22. Results for dimension 1B – healthcare system contextual forces
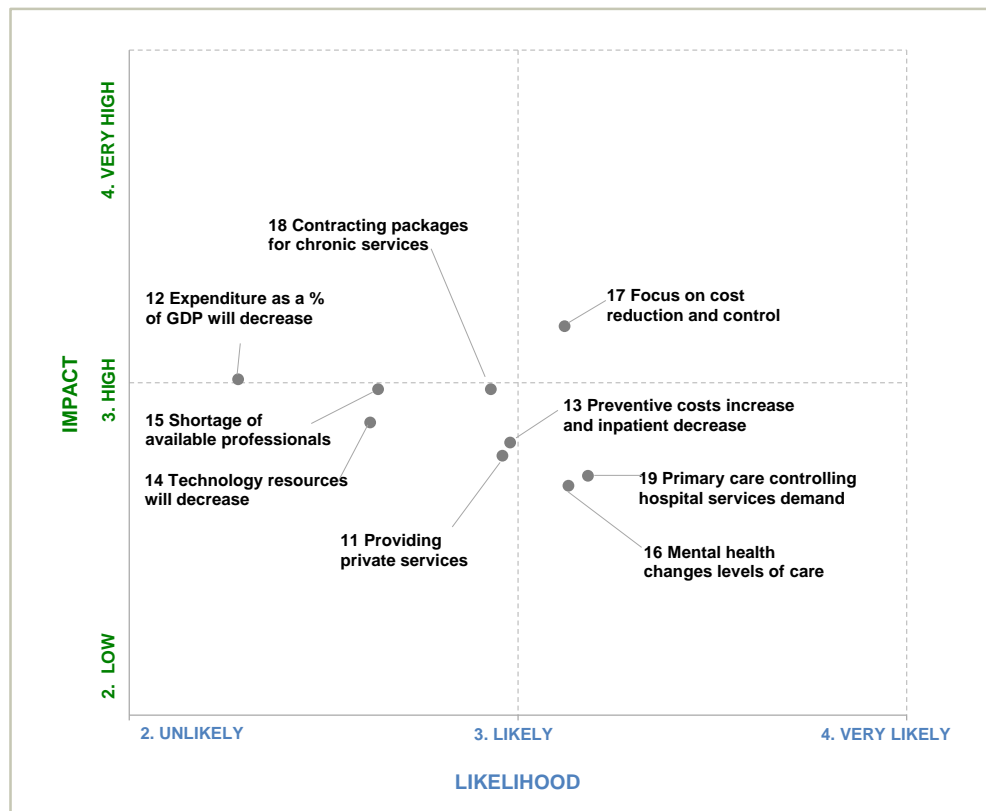
Source: Prepared by the authors.

Healthcare system contextual forces show hospitals' perception of the healthcare system changes, and how these changes may impact the hospital, regardless of whether change is positive or negative for the hospital. The graph shows two findings clearly separated from the group. In the first one, in the top right area, the focus on cost reduction and control seems to be very likely and to have an impact on the hospital. In the left area (finding 12) the expenditure decrease as a percentage of GDP appears less likely but, if that decrease finally happens, then there would be a high impact on the hospital.

There is a big difference between the two hospitals' perspectives on the impact on the hospital of a shortage of physicians and nurses. This point was considered by the Barcelona participants as not having a strong impact on the hospital because, as a leading center, Hospital Clínic would be able to gather together and attract the best professionals. In Karolinska, there was significant concern about this issue, especially for nurses who have been offered better professional opportunities in other hospitals in the Stockholm area.

The focus on cost control and reduction was particularly stressed in Hospital Clínic interviews and results. The impact of cost control was generally seen as positive at Karolinska, also for the quality of results. However, at Hospital Clínic there were opposing opinions on the impact on the hospital of this focus of the healthcare system. On the one hand, it was considered it might slow down new therapies or technologies, but on the other it was considered it could influence healthcare professionals' practice and make doctors more interested in searching for the best value, i.e., the best results per euro spent.

Table 5. Results for dimension 1B ordered by relevance from greatest to lowest

	Likelihood			Impact			Relevance		
		Clínic	Karolinska		Clínic	Karolinska		Clínic	Karolinska	dif.
17. Healthcare systems will focus on cost reduction and control.	3.1	3.4	2.8	3.2	3.3	3.0	9.9	11.3	8.5	2.8
18. The health insurer will contract chronic disease management services as a whole package that may include monitoring, treatment and management.	2.9	2.9	3.0	3.0	3.1	2.8	8.8	9.0	8.5	0.5
19. Primary care centers will have a more important role in generating demand for hospital services.	3.2	3.3	3.1	2.7	2.9	2.5	8.6	9.6	7.7	1.9
13. Healthcare service expenditure will increase for preventive services and decrease for hospital curative (ambulatory and inpatient) services.	3.0	3.1	2.8	2.8	3.1	2.5	8.4	9.8	7.1	2.7
16. Mental health conditions will cause paradigm changes in the healthcare system configuration, modifying the current levels of care.	3.1	3.0	3.3	2.7	2.8	2.6	8.4	8.4	8.4	0.0
11. Public healthcare organizations will be allowed to provide a combination of public and private health services, using the same professionals and/or facilities for both services.	3.0	3.0	2.9	2.8	3.1	2.4	8.2	9.4	7.0	2.4
14. Equipment and healthcare technology resources assigned to public hospitals will decrease or at least not increase.	2.6	2.7	2.5	2.9	2.9	2.8	7.5	8.0	7.1	0.9
15. There will be a shortage of physicians and nurses available for hospitals.	2.6	2.2	3.1	3.0	2.5	3.5	7.9	5.4	10.8	-5.4
12. Healthcare service expenditure will decrease as a percentage of gross domestic product.	2.3	2.5	2.1	3.0	3.3	2.8	6.8	8.1	5.7	2.3

5.2.5. Results for Dimension 1C – Role of the Leading Hospital Within the Healthcare System

In the next 15 years, the expected role of the hospital – as perceived by the participating experts in the study – will include not only the leading hospital as a center for innovation and research but also the role of the hospital in the system will change, with the configuration of a dual hospital model, providing value to the healthcare system with highly complex interventions as well as managing a catchment area (territory).

Also, the assimilation of the hospital into an integrated care organization and its participation in the redesign of healthcare services (not only acute services) seem very probable, and would have a considerable impact on hospital strategy.

Figure 23. Results for dimension 1C – role of the leading hospital
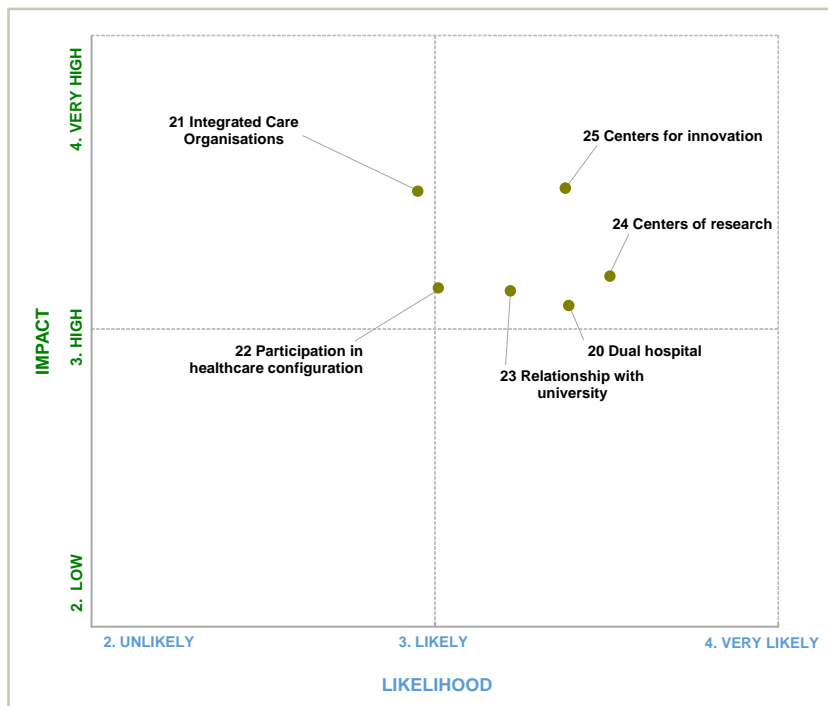
Source: Prepared by the authors.

The dual hospital model had a different response in Hospital Clínic and Karolinska in terms of the impact on the hospital. We believe that Hospital Clinic had decided to advance in this model some time before Karolinska started to move in this strategic direction with the model of specialist consultants attending patients at primary care centers one day every week. Therefore, the assessment of Hospital Clínic participants on the potential impact this may have on the hospital's strategy, resources, processes and results management was considered more definite than that of Karolinska participants.

On the other hand, the results for finding 23 "Link with the university" show how Hospital Clínic's university links might not have developed to be as strong as those of Karolinska University Hospital. Hence the potential impact on the hospital is evaluated as higher by Karolinska participants, and also by this study.

Table 6. Results for dimension 1C (role of the leading hospital) ordered by relevance

	Likelihood			Impact			Relevance		
		Clínic	Karolinska		Clínic	Karolinska		Clínic	Karolinska	dif.
25. Leading hospitals will become the main setting for healthcare service innovation.	3.4	3.7	3.1	3.5	3.5	3.5	11.8	12.7	10.8	1.9
24. Leading hospitals will continue to be the main setting for healthcare research activities.	3.5	3.6	3.4	3.2	3.3	3.1	11.1	11.8	10.5	1.2
20. Leading hospitals will be required to provide both a complete range of services for the community and also highly complex services.	3.4	3.5	3.3	3.1	3.4	2.7	10.4	12.0	8.9	3.1
21. Public hospitals will be expected to integrate primary, long-term and/or social care services to become integrated care organizations.	3.0	3.4	2.5	3.5	3.6	3.3	10.2	12.2	8.3	3.9
23. Leading hospitals will strengthen teaching activities with the university.	3.2	3.3	3.2	3.1	2.9	3.3	10.1	9.6	10.6	−1.0
22. Leading hospitals will participate in decisions on the configuration of the healthcare system related to acute and non-acute services.	3.0	2.9	3.1	3.1	3.2	3.1	9.5	9.4	9.5	−0.1

The leading hospital as a center for innovation was the most relevant topic of this dimension, and participants consider that the leading hospital will be expected to participate in healthcare service innovation such as the development of new services and implementation of new healthcare technologies.

In terms of the expected role of the hospital in the healthcare system, there is a great difference in the approach to integrated care, an approach that seems not to exist in the health system agenda in Stockholm (a likelihood of only 2.6) though, if it happens, it may have a strong impact on hospital activities.

Also the dual hospital orientation, providing both highly complex and territorial services to a catchment area, is stronger in Hospital Clínic, as Hospital Clínic has taken important steps in recent years but Karolinska is now strengthening links with other healthcare providers in the area to prepare for the new Karolinska hospital. However, on this point, the main difference is with regard to the expected impact it may have on the hospital, where participants considered that it would require some modifications of hospital processes and/or resources but would not require significant changes to hospital services.

On the other hand, Karolinska has strong university links, both with the medical institute (Karolinska Institutet) and also with the Royal Institute of Technology, which create a capacity for innovation in the medical and biomedical, engineering and other technology domains.

5.2.6. Results for Dimension 2 – The Strategy of the Leading Hospital

In the next 15 years, the mission and strategy of leading hospitals will have to adapt to contextual forces such as new healthcare system expectations about the role of the leading hospital being to foster and promote innovation not only within the hospital boundaries but also in the healthcare system. Contextual forces may impact the hospital mission and vision, and the strategic and leadership concepts will show a new value proposition where the services, partnerships and organizational design are aligned to deliver the new strategies.

This dimension covers some initiatives that leading hospitals are implementing and/or will undertake in the next years, such as focusing on the services that provide the most value, becoming smaller and more flexible organizations, and creating partnerships at local, regional and international levels.

Figure 24. Results for dimension 2 – strategy of the leading hospital
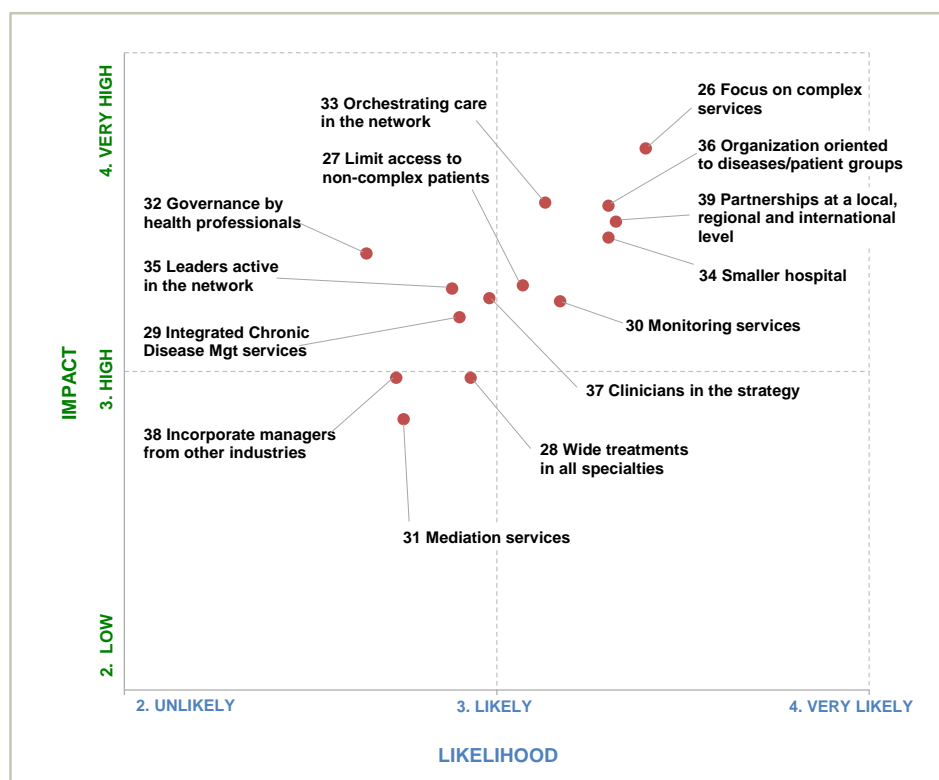
Source: Prepared by the authors.

The strategic initiatives on services include a focus on complex interventions, segmentation for specific diseases and groups of patients, and care orchestration services in the health system network.

In terms of achieving a new value proposition, the leading hospital strategy initiatives include becoming a smaller hospital in terms of structure (with fewer beds and patients on-site) but not professionals, and partnerships at different levels to provide the best value.

Interestingly, participants are not convinced that the health system will let healthcare professionals lead and govern these strategic initiatives (finding 32 in the top left corner), though the impact of this would be considerable.

In the bottom left area, participants do not consider that the hospital should also include mediation services for patients in the territory, as it was pointed out in individual interviews, and neither did they consider that incorporating managers from other industries will have a strong impact on the hospital, though participants agreed that it was necessary but would not contribute to the essential hospital strategies.

Table 7. Results for dimension 2 – strategy and leadership in the leading hospital

	Likelihood			Impact			Relevance			
		Clínic	Karolinska		Clínic	Karolinska		Clínic	Karolinska	dif.
26. Leading hospitals will focus on highly complex services and will shift some routine care services to other healthcare providers.	3.4	3.5	3.3	3.7	3.5	3.9	12.6	12.3	12.9	–0.6
36. Leading hospitals will be organized into disease process units with increased orientation to patient groups with common conditions.	3.3	3.2	3.4	3.5	3.5	3.5	11.6	11.3	11.9	–0.6
39. The leading hospital will create and foster different partnerships at a local, regional and international level with different roles.	3.3	3.3	3.3	3.5	3.5	3.4	11.5	11.8	11.2	0.6
34. The hospital will become smaller with less physical resources and fewer patients on-site.	3.3	3.4	3.2	3.4	3.3	3.5	11.3	11.3	11.2	0.1
33. Leading hospitals will participate in networks of healthcare provision in the community, orchestrating care coordination of health services.	3.1	3.3	3.0	3.5	3.5	3.6	11.1	11.3	10.8	0.5
30. Leading hospitals will provide monitoring services directly to patients with chronic diseases integrated with treatment services.	3.2	2.7	3.6	3.2	2.9	3.5	10.2	8.0	12.6	–4.6
27. Leading hospitals will be focusing on highly complex patients, limiting access to hospital services to less complex patients even in the A&E department.	3.1	2.9	3.2	3.3	3.1	3.4	10.0	9.2	10.9	–1.7
37. Leading hospitals will enable clinicians and other healthcare professionals to participate in strategy definition and hospital management.	3.0	3.1	2.9	3.2	3.5	3.0	9.6	10.6	8.7	1.9
35. Hospital leaders will have an active role in the network of healthcare provision.	2.9	3.4	2.4	3.3	3.4	3.1	9.4	11.5	7.4	4.1
29. Leading hospitals will provide integrated chronic disease management services.	2.9	2.8	3.0	3.2	2.9	3.4	9.2	8.2	10.2	–2.0
32. Leading hospitals' governance will be driven by professionals and not by politicians.	2.7	2.6	2.7	3.4	3.5	3.2	8.9	9.2	8.6	0.5
28. Leading hospitals will provide a wide range of treatments and services in all specialties as long as they have economies of scale.	2.9	3.3	2.6	3.0	3.1	2.9	8.8	10.0	7.5	2.5
38. The leading hospital senior management will incorporate managers from other industries with little or no healthcare background.	2.7	2.5	3.0	3.0	2.7	3.3	8.2	6.6	9.9	–3.3
31. Leading hospitals will provide mediation services for healthcare treatments in the community.	2.8	2.8	2.7	2.9	2.8	2.9	7.8	7.8	7.8	0.0

There are some differences between the Hospital Clínic and Karolinska approaches to services, with Karolinska's participants considering that remote monitoring services will be provided by the hospital. On the other hand, the new Karolinska hospital means shifting away some routine services to other providers, so participants consider that hospitals will not provide such a wide range of treatments and services in all specialties, even if they have economies of scale for the hospital.

On the other hand, for Hospital Clínic participants, one of the most relevant initiatives is the active role of clinical leaders in the network of healthcare provision – that is, in the territory – and not only acting as leaders in the hospital but also as points of reference for other health professionals. This initiative might prove appropriate and critical when linked with the orientation of hospital services to diseases and patient groups (finding 36) and an organization on disease processes that may initiate and/or follow outside the hospital boundaries.

The incorporation of managers from other industries is considered as having a high impact on the hospital, regarded positively in most interviews. The experience in Karolinska is rated more highly than in Hospital Clínic, hence the possible explanation of a different estimation of its impact on the hospital.

5.2.7. Results for Dimension 3 – Resources and Capabilities of the Leading Hospital

This dimension includes hospital initiatives and change drivers for the management of key resources and developing hospital capabilities.

As a result of contextual forces and strategy directions, the hospital will need to adapt current facilities, current professional roles and current technologies to respond efficiently to new healthcare services' needs, such as remote services. New professional roles will be defined to facilitate process-oriented and multidisciplinary teams, and to assimilate changes in medical specialties' boundaries. Information systems will be enhanced to integrate data from monitoring sensors and medical devices, to facilitate remote consultation, and to support clinical decisions based on real-time data.

Hospitals' physical facilities will be reduced and more equipment will become moveable to get closer to the patients, instead of having patients moving around different hospital buildings.

Figure 25. Results for dimension 3 – management of resources and capabilities of the leading hospital
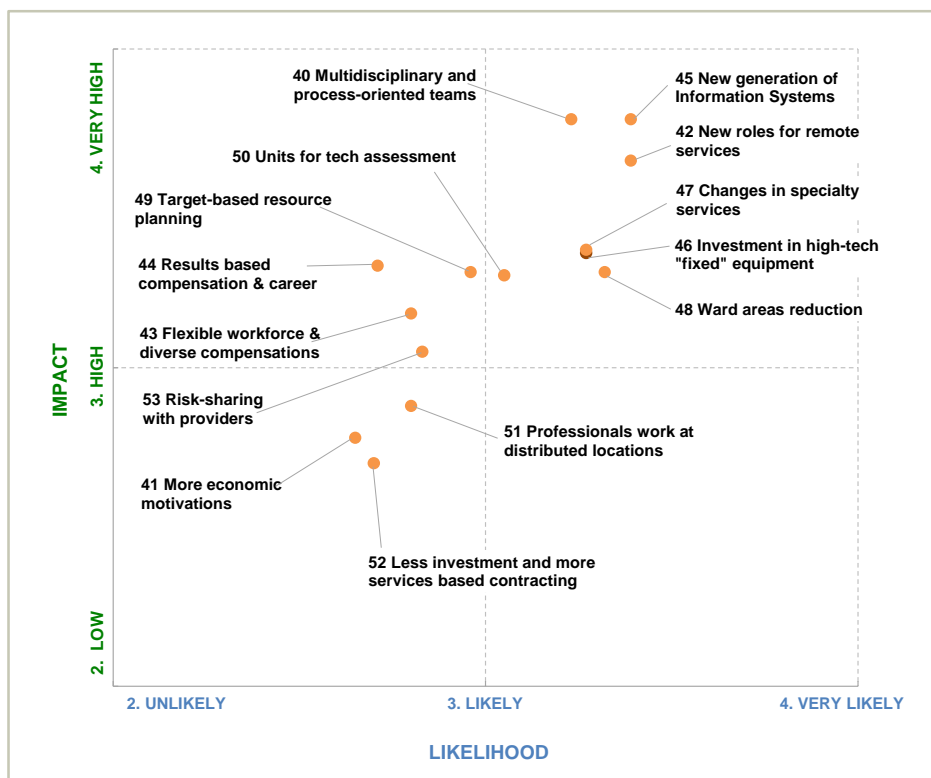
Source: Prepared by the authors.

The graph shows great potential for information systems and a great impact on professional teams to accommodate a new service orientation for a leading hospital – that is, to adapt to a multidisciplinary and process-based emphasis and create new roles for managing patients' health remotely.

The leading hospital's managers do not think that the leading hospital will be contracting critical services in new models, so will continue to invest in technologies and equipment, as considered by a manager, because the equipment manufacturing industry is not making any decisive steps into risk-sharing in services that includes an initial financial investment.

Table 8. Results for dimension 3 – resource and capability initiatives in the leading hospital

	Likelihood			Impact			Relevance			
		Clínic	Karolinska		Clínic	Karolinska		Clínic	Karolinska	dif.
45. Leading hospitals will rely on a new generation of information systems including clinical decision support, telemedicine and mobile health.	3.4	3.3	3.5	3.8	3.7	3.8	12.8	12.4	13.2	–0.7
42. New platforms for healthcare service delivery (home care, remote management) will define new professional roles.	3.4	3.3	3.5	3.7	3.4	3.9	12.4	11.3	13.5	–2.2
40. Professionals will work in multidisciplinary and process-oriented teams, blurring the existing discipline boundaries.	3.2	3.3	3.2	3.8	3.6	3.9	12.2	12.0	12.4	–0.5
46. Leading hospitals will focus their investment on healthcare equipment and technologies for services that cannot be easily located in other healthcare levels.	3.3	-	3.3	3.4	-	3.4	11.0	-	11.0	* 11
47. New healthcare technologies will allow existing specialties to provide services that are currently out of their service offering.	3.3	3.3	3.2	3.4	3.3	3.4	11.0	11.1	10.9	0.2
48. Hospital will reduce their ward areas.	3.3	3.5	3.1	3.3	3.4	3.2	10.9	12.0	9.9	2.1
50. Leading hospitals will deploy health technology assessment (HTA) units to evaluate development of new healthcare services.	3.1	3.0	3.1	3.3	3.1	3.4	10.0	9.4	10.7	–1.3
49. Hospitals' resource planning will be based on planned patient outcomes in their catchment area and not on existing capacity.	3.0	2.9	3.0	3.3	3.2	3.4	9.8	9.4	10.2	–0.8
44. The professionals will be compensated with new schemes based on results and job vacancies will be assigned on merit and not seniority.	2.7	2.9	2.5	3.3	3.5	3.2	9.0	9.9	8.1	1.8
43. Hospitals' workforces will contain a mix of contracting schemes with fewer permanent and more flexible personnel.	2.8	2.9	2.7	3.2	3.3	3.0	8.9	9.6	8.2	1.4
53. Hospitals will develop risk-sharing models with providers.	2.8	3.1	2.6	3.1	3.0	3.1	8.6	9.2	8.1	1.1
51. Hospitals will use more distributed facilities to get closer geographically to patients.	2.8	2.8	2.8	2.9	2.9	2.9	8.1	8.0	8.1	–0.1
41. Professionals will be more motivated by short-term, monetary, and reputation recognition than by organizational and societal motivations.	2.6	2.9	2.4	2.8	2.9	2.6	7.4	8.6	6.2	2.4
52. Hospitals will decrease investments in equipment and facilities and will have more rented or service-based resources.	2.7	2.6	2.8	2.7	2.6	2.8	7.3	6.8	7.8	–1.1

[11] Note: The results for finding 46 in Hospital Clínic were discarded, as there were some errors in capturing results from participants who mistook it for the previous finding. Results from Karolinska are therefore considered alone.

A strategy towards providing remote health services was very significant in the Karolinska results. Accordingly, the results in Karolinska show the relevance of new professional roles required for delivering new healthcare services at home and remotely (finding 42), while this initiative in Hospital Clínic is a bit less significant.

Another difference between Karolinska and Hospital Clínic is in the change of motivation of healthcare professionals by 2030. This finding might be considered both as an internal (resource management) or external (contextual) force to consider, the former related to development and retention, and the latter related to the selection and hiring of professionals. Though the contextual finding 15 on shortage of professionals (related to the professional workforce market) was not very relevant for Hospital Clínic it becomes pertinent when considering the career of leading hospital professionals. Some participants pointed out that this finding would have a negative impact and would need careful planning to avoid it and its potential consequences of burnout and defection.

On the other hand, Karolinska's participants consider that the challenge for professional workforce management, in the next years, will be greater for hiring than for retaining health professionals.

5.2.8. Results for Dimension 4 – Process Management

The process dimension presented topics such as quality improvement, key process management, integrated care processes, clinical learning processes and other support and administrative process management.

Performance improvement in leading hospitals will rely on strong operational excellence for managing and optimizing for prevention, diagnosis, treatment, follow-up and coordination of care. This dimension finding enabled structuring, sharing and discussion of the impact on hospital performance and the probability of the hospital succeeding with different initiatives for process management. Some of these findings are specific process improvement initiatives and others are more generic approaches for process management.

In the next years, leading hospitals shall advance towards mature operational excellence, including not only internal processes but also cross-organizational processes, and playing a central role in a knowledge-driven redesign of healthcare processes.

Hospital process redesign will start within the hospital, but will extend beyond hospital activities, with analysis of the whole value chain using techniques implemented in other industries such as lean, to reduce waste and increase value to patients and payers. Leading hospitals will share results and best practices, generating benchmarks for other healthcare providers and creating a culture of continuous improvement and clinical learning as an asset of the organization. In Karolinska in particular, there is a lot of experience of the implementation of TQM, Six Sigma, SPC and lean, with more than 120 improvement projects.

Hospitals will develop process awareness and improvement models to capture the value of healthcare activities, connecting activities to clinical and financial outcomes, and these models will be disseminated amongst health professionals for continuous process improvement.

Figure 26. Results for dimension 4 – process management
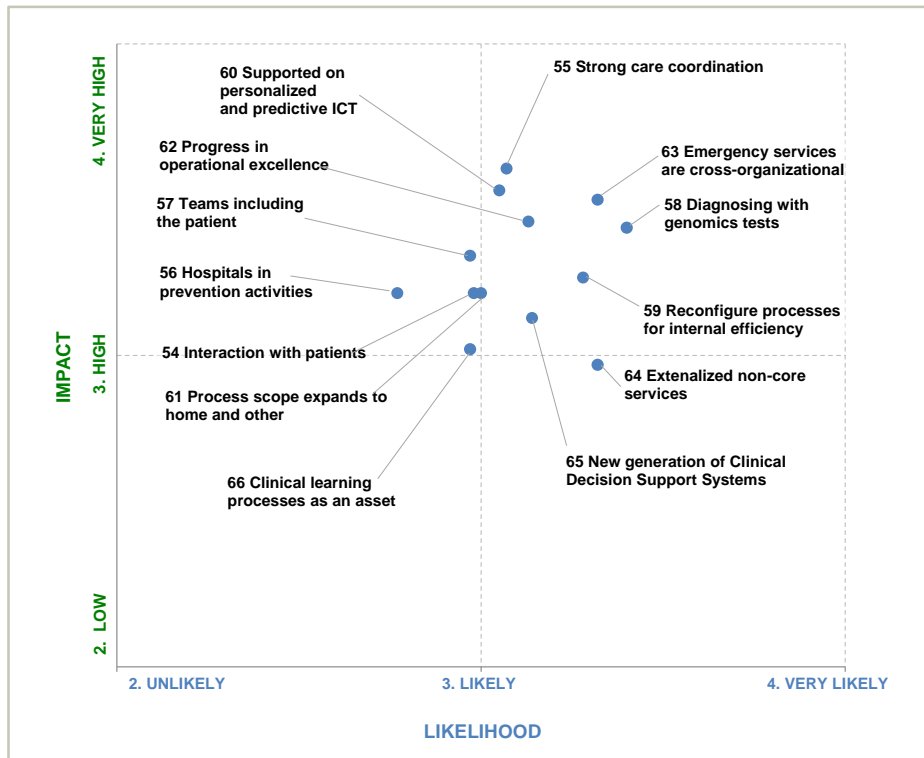
Source: Prepared by the authors.

The results show how process initiatives are considered to have an important impact on the hospital, especially with care coordination and cross-organizational services (such as emergency services in the territory), and also with application of new health technologies such as genomics to diagnosis and personalized treatment.

The externalization of non-core services is considered as very likely to happen, and the hospitals are expected to succeed with this initiative, but with a comparatively limited impact on the organizational process improvement.

Genomics will be applied in diagnosis and that may have a strong impact on hospital processes, such as personalizing treatments and adjusting guidelines and procedures to different patient phenotypes.

Participants from Karolinska consider that the e-patient as a team member will become a reality by 2030, and participatory medicine will require adjustments in the current processes to include collaborative team relationships, and patients will have transparent access and active participation in more healthcare process decisions.

In order to achieve this new model, a new generation of clinical decision support systems will be required to support decision-making and implement personalized processes. New ICT will support clinical decisions as well as new personalization and predictive services.

Table 9. Results for dimension 4 – process management in the leading hospital

	Likelihood			Impact			Relevance			
		Clínic	Karolinska		Clínic	Karolinska		Clínic	Karolinska	dif.
58. Leading hospital diagnostic services will integrate information from genomics tests.	3.4	3.5	3.3	3.4	3.6	3.2	11.6	12.5	10.7	1.7
63. Hospital emergency units will be integrated with external units from other healthcare providers as a cross-organizational service.	3.3	3.3	3.3	3.5	3.4	3.6	11.6	11.3	11.9	–0.5
55. Leading hospitals will have strong process integration (care coordination) with other health and social care levels.	3.1	3.3	2.8	3.6	3.6	3.6	11.0	12.0	10.1	1.9
60. Hospital processes will be based on new information technologies for personalized and predictive services.	3.1	3.0	3.1	3.5	3.5	3.6	10.8	10.4	11.2	–0.8
62. Leading hospitals will make a significant advance in operational excellence.	3.1	3.3	3.0	3.4	3.5	3.4	10.8	11.3	10.2	1.1
59. Leading hospitals will reconfigure their processes and structure to foster internal operational efficiencies.	3.3	3.4	3.2	3.3	3.4	3.1	10.7	11.4	9.9	1.5
57. Clinical processes will be organized around teams with patients as a team member.	3.0	2.7	3.2	3.3	2.9	3.7	9.8	8.0	11.8	–3.8
64. Hospitals will externalize non-core and support services.	3.3	3.1	3.5	3.0	2.7	3.2	9.9	8.6	11.2	–2.6
65. Health process management will be based on a new generation of clinical decision support systems.	3.1	3.1	3.2	3.1	3.3	2.9	9.8	10.2	9.3	1.0
61. Hospital processes will expand to cover home and other care settings.	3.0	3.0	3.0	3.2	3.0	3.4	9.6	9.0	10.2	–1.2
54. The hospital will increase interaction with patients, creating a continuous relationship.	3.0	3.1	2.8	3.2	3.2	3.2	9.5	10.1	9.0	1.1
66. Leading hospitals will formalize clinical learning processes as valuable assets of the organization.	3.0	2.9	3.0	3.0	2.9	3.1	8.9	8.6	9.3	–0.7
56. Healthcare will be more proactive, and leading hospitals will participate in anticipation activities (prediction, prevention).	2.8	3.0	2.5	3.2	3.4	3.0	8.9	10.2	7.6	2.6

5.2.9. Results for Dimension 5 – Results Management

The previously presented initiatives are basically oriented towards achieving better results at the hospital. Hence, the last dimension is centered on understanding the fundamental initiatives to measure and improve the results of the leading hospital organization.

This results dimension covers topics such as health outcomes, personnel results, societal results and other key results such as financial results that sustain the evolution of the leading hospital.

The leading hospitals will use new indicators based on outcomes rather than activity, and will help the health system to replace current process indicators (such as length of stay, use of resources and number of cases treated) with new indicators based on process outcomes.

The pressure on transparency and clinical safety from governments, insurers and consumers will lead to a systematic evaluation and publication of hospital outcomes that provide evidence to facilitate choice of healthcare providers to patients and administrators.

Under this pressure, leading hospitals will have to strive to maintain research and education results as a priority goal to survive and maintain their position as leading organizations in healthcare provision.

Leading hospitals do not envision globalization opening up great possibilities for expanding their services to new customers or at least they do not believe this new segment of customers will have a significant impact on hospital results.

Figure 27. Results for dimension 5 – results management in the leading hospital
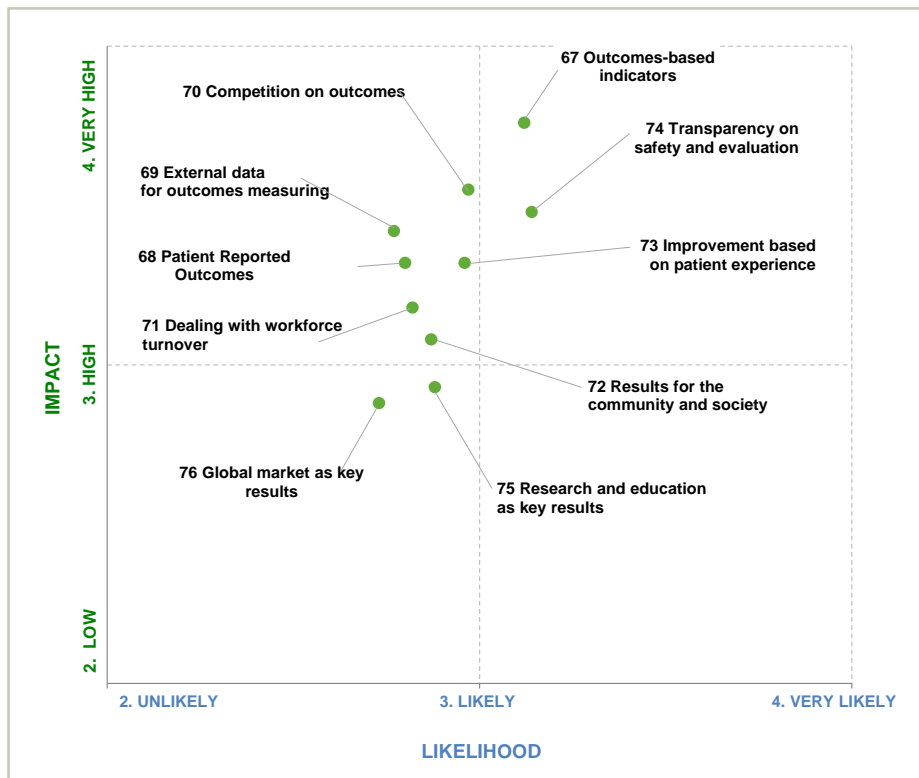
Source: Prepared by the authors.

Hospitals will need access to external (non-hospital) data to measure health outcomes (finding 69). However, the likelihood of achieving this initiative is regarded as low in both hospitals.

Table 10. Results for dimension 5 – results management in the leading hospital

	Likelihood			Impact			Relevance			
		Clínic	Karolinska		Clínic	Karolinska		Clínic	Karolinska	dif.
67. Leading hospitals will use new indicators based on outcomes rather than activity.	3.1	3.1	3.1	3.8	3.9	3.6	11.7	12.3	11.2	1.2
74. Leading hospitals will drive transparency on safety and evaluation of outcomes.	3.1	3.1	3.2	3.5	3.5	3.5	10.9	10.6	11.2	–0.6
70. Leading hospitals will compete on outcomes, delivering the best possible health outcomes at a given cost.	3.0	2.7	3.2	3.6	3.6	3.5	10.5	9.8	11.2	–1.4
73. Patient experience will be evaluated and used systematically to improve hospital services.	3.0	2.7	3.2	3.3	3.1	3.5	9.8	8.5	11.2	–2.7
69. Hospitals will access data outside the hospital to measure results on patients.	2.8	2.7	2.8	3.4	3.5	3.3	9.5	9.7	9.2	0.4
68. Leading hospitals will use indicators based on patient-reported outcome measures.	2.8	2.6	3.0	3.3	3.3	3.3	9.3	8.7	9.9	–1.2
71. Hospitals will have to deal with an increasing personnel turnover with new compensation schemes and other motivational initiatives.	2.8	2.7	2.9	3.2	3.3	3.1	9.0	8.9	9.0	–0.1
72. Hospitals will continue making an important contribution to the economy of the community and will expect society to be involved with the hospital development plans.	2.9	2.9	2.8	3.1	3.1	3.1	8.8	9.0	8.7	0.3
75. Hospitals will further develop research and education activities that will become more significant sources of income.	2.9	2.9	2.9	2.9	3.1	2.8	8.5	8.8	8.1	0.7
76. Leading hospitals will develop international service offerings to become less dependent on local health system contractors.	2.7	2.9	2.6	2.9	3.1	2.7	7.9	8.8	7.0	1.8

The findings have similar relevance values in both hospitals, with the main difference in the patient experience (finding 73). In Karolinska the evaluation of patient experience and its use for systematic improvement of the hospital services is integrated into a value-based operating model to collect, and represent in a clear picture, all cost and health outcome data, which are currently distributed across the different departments that treat the patients.

Competition on outcomes, so hospitals can deliver the best possible outcomes at a given cost, will require standardization of health outcomes. Currently, only specific interventions have standardized outcomes, but in the next years it will be expected that many highly complex and even chronic disease management processes will have comparable outcomes and benchmarks.

5.3. Conclusions From Workshops at Both Hospitals

The workshops with study participants enabled debate on the identified preliminary findings, in order to refine them and also to contribute with new insights in the study discussion.

Differentiating Likelihood From Desirability, and Impact From Benefits

In both workshops, participants agreed that rankings for the likelihood of each preliminary finding happening should not be confused with the hopes or desires of hospital participants.

For example, participants considered that it was not likely that in 15 years patients would become more proactive and willing to participate in more health prevention activities (finding 06, ranked in the low area – see Table 4.

Results for dimension 1A ordered by relevance from greatest to lowest). However, they also considered that it would be highly beneficial and desirable for all (the health system, citizens, and professionals) if this contextual driver achieved a higher realization in the next years. This perception of citizens' proactivity was diverse, and mid-managers closer to the frontline (visiting patients) considered that the current trends were showing significant advance in citizens' interest in prevention activities.

In similar terms, study participants concluded that the impact on the hospital was highly ranked for some initiatives or drivers that were not beneficial from the hospital's perspective and also, from their perspective, for the health system. As an example, the shortage of available professionals (finding 15) was ranked highly in the Karolinska results, which clearly was not the intention of the participants, but if that happened it would surely have a high impact (non-positive) on the hospital for contracting. Inversely, participation by the hospital in the health system configuration (finding 22) was ranked with a medium impact, but this impact was estimated by participants as very positive, both for the hospital and for the health system.

## Patient Experience and Patient-Reported Outcomes

From the current reality, where hospital transformation and process improvement initiatives might be performed without much patient involvement, we might see an unexpected advance in patient participation, as happened with patient consent, and/or specific groups of chronic patients who are very proactive and influence the healthcare system design.

In order to accomplish patient-reported outcomes, including patient experience and patients' perceived quality of service, the hospital will need to systematically involve citizens in the design of healthcare services.

> "It is not the impact of one patient on the system, but many impacts of many patients that will shape the future hospital."

Hence, the relevance of patient involvement findings was emphasized, especially at the Hospital Clínic of Barcelona workshop – see Figure 28.

Figure 28. Graph discussed at the Hospital Clínic of Barcelona workshop, showing the link between patient involvement findings
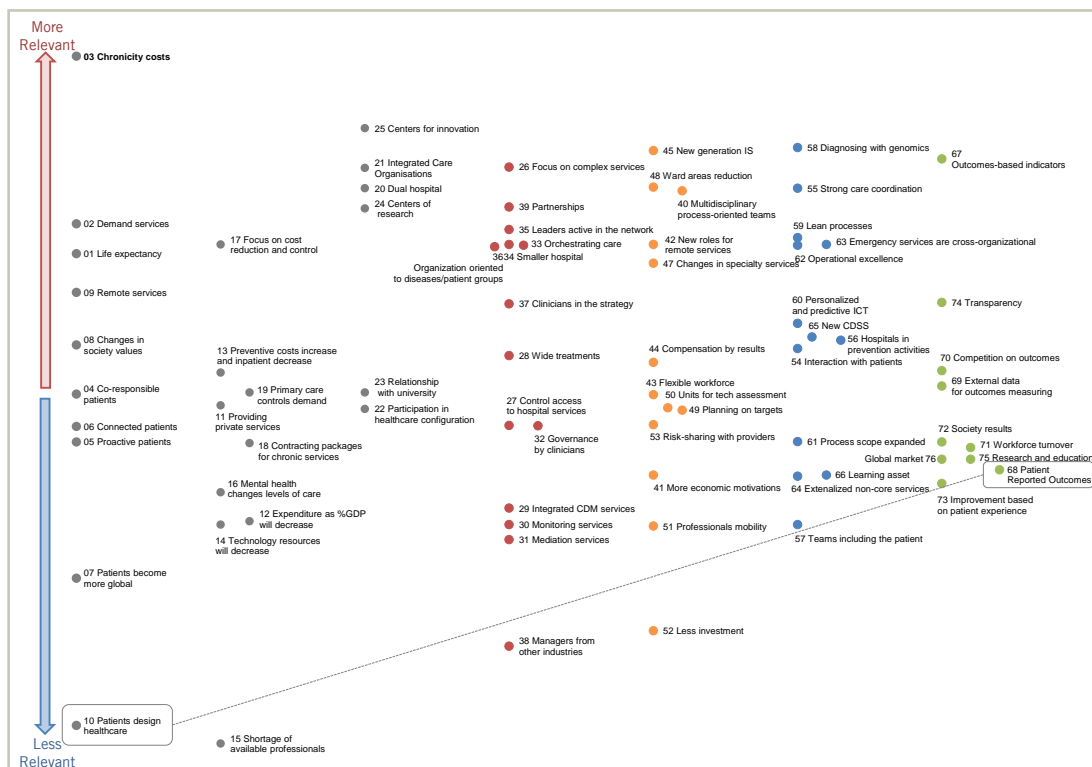
Source: Prepared by the authors.

Patient participation also might be beneficial for the hospital, if patient groups require public administration to increase or at least maintain investments in healthcare technologies.

An element of discussion in both workshops was solidarity and, in general, changes in society's values, though Karolinska participants were optimistic and confident that the trend in new generations was positive towards regaining solidarity as a strong value, compared to current mid-age generations.

The "connected patient" involves the adoption of communication technologies and changing the culture not only of organizations but also of patients themselves. Hence, there was controversy in the debate over whether this change would become a generalized reality by 2030, or would only reach a peak of patients, particularly, those mid-age citizens who are heavy users of technology, and empowered patients with chronic diseases that may be monitored remotely.

Growing Demand for Services and Primary Care Controlling Demand for Services

The growth in demand for health services was considered the most important contextual force by Karolinska participants, which means that is the driver for change that might have the highest likelihood of happening and the highest impact on the health system and on the hospital.

However, the driver of primary care controlling this growing demand for healthcare services (finding 19) was not considered so likely, but it was necessary to accomplish the hospital strategy of focusing on highly complex services (finding 26) and it highlighted the importance of the hospital's participation in the configuration of the health system (i.e., care pathways and patient referral flows) (finding 22), as is shown in the following figure discussed in the workshop.

Figure 29. Linkage of contextual forces and strategies for service demand, discussed at Karolinska's workshop
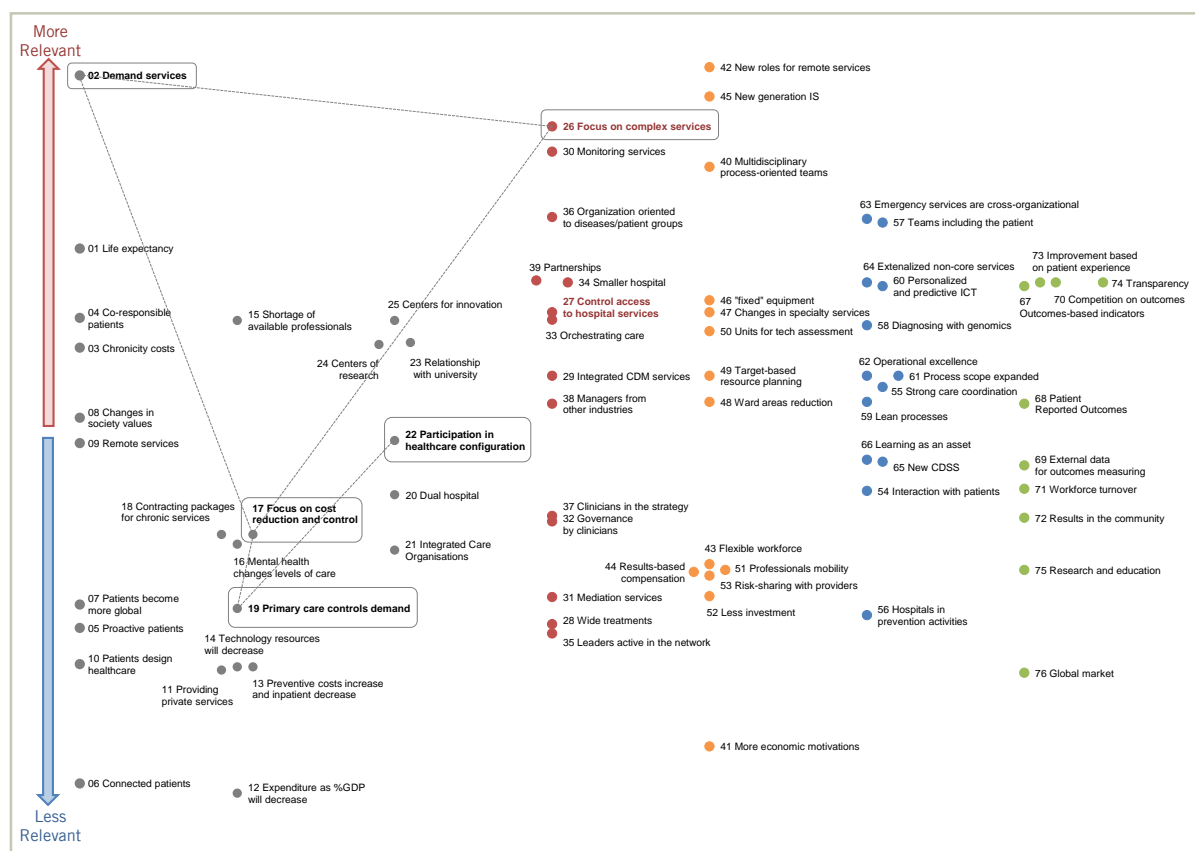
Source: Prepared by the authors.

Primary care controlling demand was not desired from the hospital's point of view (both at Hospital Clínic and Karolinska), but this idea also prompted the participants to question what primary care professionals would think of this growth in demand for services and whether they would be capable of managing chronic patients and referrals to hospitals in an efficient way.

A Network of Healthcare Provision

The leading hospital, primary care, and other healthcare service providers will collaborate in the provision of care. Considering that the majority of chronic care processes, and also many acute processes, start in primary care, the question raised is "Who are better prepared to define these processes?"

> *"Conceptually we accept that patients must participate in the design of health services, but we are more reluctant to accept and encourage the participation of physicians from other providers in the hospital governance."*

To improve service demand control, the participants considered that primary care representatives should not only participate in the redesign of the healthcare processes but also in the governance and strategy of the leading hospital.

> *"We must create networks that are knowledge-driven, where health allies participate in governance and leadership of the hospital. Society shall have a stronger role in the hospital governance, and industry promotion of research activities should find a balance in the governance too."*

Both hospitals' participants considered that mental health would be the main challenge for the growing demand of healthcare services, and that the burden of chronic disease would require new approaches, with new roles for nurses, and also limits on healthcare treatments during the last year of life.

Focusing on highly complex services means also that some current hospital services will be shifted away to local centers, to become more accessible to patients. This service shift will impact healthcare processes and structures, requiring innovation in practical care pathways to make more efficient use of resources, and allow access to the most expensive resources and tests only when they are appropriate for evidence-based clinical needs.

Leading Hospital Strategies and Priorities

One of the top strategies and contextual forces is the focus on cost control, so research priorities of the leading hospital must be aligned with cost control also, and research should be considered a source for generating (freeing) hospital resources. Therefore, the leading hospital shall prioritize all research that may free talent and resources, required for other services or purposes.

> *"Hospitals have accumulated a lot of talent and must put this talent to serve other providers in the network."*

The dual hospital model gets full support in the Hospital Clínic workshop, and is still perceived as being farther away from the model in Karolinska, where becoming a community hospital with a clear catchment area is yet not foreseen.

> *"A leading organization does not mean it should be taking in all the services and best opportunities for themselves."*

Both hospitals agree that the physical structure will adapt to focus on the most complex services, becoming smaller in terms of activity volume.

Partnerships and Integration Options

Considering what is happening in other geographical areas where healthcare starts looking like other consumer-oriented high-technology-enabled industries, it is likely that new entrants will also appear in the European

healthcare landscape, and leading hospitals will have to decide whether to compete with them or to work in cooperation.

In providing care for specific complex medical conditions, leading hospitals will have to draw patients from over a wider geographical area than they do now, in order to increase value on a larger scale. They can do this by physically expanding their facilities in other counties or countries, or virtually through agreements or alliances with other hospitals for each to build on their specializations, thus diverting patients who can be more effectively treated in the other hospitals and attracting patients who can be better dealt with on the leading hospital's own premises.

Promoting Efficient Organizations

Leading hospitals will become points of reference as "integrated practice units."[12] These clinical units, already existing in some hospitals, have the following characteristics:

- They are organized around a medical condition (or set of related conditions).

- Care is delivered by a stable group of clinicians devoting a significant portion of their time to this unit.

- The team takes responsibility for the full cycle of care for the condition, including outpatient, inpatient, rehabilitative care and support services, patient education, and follow-up.

- The unit has a single administrative structure and is co-located in dedicated facilities.

- The team measures outcomes, costs and processes for each patient, using a common platform, and there is joint accountability for outcomes and costs.

Moving New Professional Competences and Roles Forward

Managing professionals seems to be the main concern regarding resource management. Hospital managers consider that healthcare transformation in hospitals will require a leadership model that considers the involvement of nurses as full partners with physicians.

Moreover, the development of professional competencies must be accounted for by hospital managers, to create a stimulating working environment for professionals when competing on salaries might not be an option.

> *"Current salary expectations are conditioning the professionals who decide to work in public healthcare system."*

> *"It must be the responsibility of hospital managers, and not only of heads of department, to develop professional competences."*

Leading hospitals expect politicians to develop and pass new regulations that allow new ways of developing professional roles in healthcare and also for contracting the best professionals who adapt to a required position.

New roles that adapt to real needs, such as the role of anesthesiology nurse implemented in Karolinska University Hospital, are required for the hospitals' transformation. These new roles need legal support in most European countries, such as Spain, where the current definition of responsibilities and tasks of professional disciplines are limiting the optimal development and contracting of professionals.

> *"Societies and professional universities are trying to protect a system that needs change not conservation, but it is somehow against the traditional culture of healthcare that praised the value of protection and safety."*

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[12] We are using here the terminology of Porter (2013). These units are also referred to as institutes, clinical management units, and clinical directorates, in different hospitals.

Process Management and Quality Improvement

Incorporating new health technologies such as genomics for diagnosis and personalized care will require the healthcare processes to be configured to enable quick adaptation and fast learning, so that knowledge can be quickly shared amongst the different disciplines involved in the process and changes in processes and protocols may be quickly implemented.

> *"Technology is changing at a faster pace than the hospital can assimilate."*

There is an intense debate about whether ICT will deliver as promised in the next 15 years, with the perception among managers that information technologies are eventually adopted later than expected, such as telemedicine and remote monitoring systems, and some things need to change both in hospitals and also in technology service providers to facilitate and embrace services for creating a digital health hospital.

> *"In the next 15 years, IT might be adopted at a personal level, but to generalize adoption at the organizational level will become more difficult. IT is still seen as a company tool and some barriers for process improvement are cultural."*

The challenge for new ICT solutions – such as remote monitoring, data analytics, and collaboration tools – will be to maintain the quality of information and the efficiency of new information technologies and solutions when implemented at a global scale in the hospital – i.e., extending pilots to the organizational level.

Results Management and Value Creation

Leading hospitals would like to engage in new reimbursement scenarios, but they must consider the existing barriers, such as fragmented information systems and clinical information systems traditionally structured to register administrative information and not the clinical process. As a consequence, in highly complex acute processes, healthcare professionals are not equipped with the necessary tools and are not used to measuring and evaluating outcomes systematically.

> *"The current and forthcoming changes to models of reimbursement by the healthcare payer will need a lot of help in methodology and culture change from hospitals, so hospitals and health systems must be realistic and not generate false expectations."*

> *"In the next 15 years many things can change, and while the healthcare insurer is focused on other priorities – such as reimbursement and cost control – the leading hospitals must maintain excellent results, in order to keep current incomes but also prepare to deal with disruptive changes in the care delivery model."*

Hospital managers are convinced of transparency, but tend to focus on pragmatic actions that make it difficult to take decisive steps towards an open and transparent sharing of hospital results in health outcomes and efficiency.

> *"If hospitals compete on patient-reported outcomes, that would be a game changer for the hospitals in the network and, if hospitals need to become really patient-centered, then patient-reported outcomes should be interiorized as a method to rethink all processes and strategies of the hospital."*

6. Final Conclusions and Recommendations

6.1. Conclusions

This study contains 14 key messages that encapsulate the most relevant ideas on a new role for leading public hospitals in Europe and a list of 15 recommendations to hospital managers and professionals, and to healthcare system authorities and policy makers.

Definitions of "role" in the Merriam-Webster dictionary[13] include (1a[1]) "a character assigned or assumed"; (1a[2]) "a socially expected behavior pattern usually determined by an individual's status in a particular society"; and (2) "a function or part performed especially in a particular operation or process."

The role of hospitals has been a recurring idea among participants throughout this study and can be understood as an evolution of the function of leading hospitals within healthcare systems in Europe and also within the health sector and society.

Specifically, leading hospitals are expected to initiate or evolve a new role as orchestrators in a network of healthcare, as facilitators of innovation and research, and advisers for redesigning healthcare processes. This new role responds to contextual forces and also new strategies, and approaches to management of resources, processes and results.

In the next 15 years, hospitals will have to respond to a challenging context, in which citizens' demand for healthcare services will be increasing, with chronic conditions representing a great part of healthcare costs, and life expectancy continuing to improve. In this context, leading hospitals will be expected to provide excellent complex care while reducing costs, and also to develop a new scope of services including personalized medicine treatments and genome-based diagnosis and treatments. Moreover, there will be an opportunity for leading hospitals to deliver new services for chronic and population health management as the health insurer will develop new contract schemes, such as chronic disease management services in packages that may include monitoring, treatment and management.

Leading hospitals will also be expected to build and orchestrate networks of care provision, coordinating care in this network and leading the redesign of processes and services. In this role, leading hospitals will become more open and distributed for other providers and organizations in the network, and also more connected to patients at home. Leading hospitals will have to be very aware and adapt to any changes in society's values and expectations that might arise from the public and patients' associations, which are predicted to become much more willing to participate.

Professionals from leading hospitals will prove to be excellent specialists and also credited team-workers and coordinators of care in their network of care. New professional roles will emerge at leading hospitals that will further shape this task and the relationship of leading hospitals with other providers.

Furthermore, these activities will be provided by a more complex organization but one that is smaller in terms of volumes of activity, where less complex activities will be shifted away to other providers in the network.

Finally, there will be a new role for leading hospitals to develop new models and facilitate partnerships with various stakeholders in the healthcare system at international and local levels, for health and social care provision, teaching and research. Through these partnerships, leading hospitals will monitor results, shape models and create new value for the healthcare system.

[13] www.merriam-webster.com/dictionary/role, last accessed January 2016.

KEY MESSAGE 1: A TRIPLE-CHALLENGE CONTEXT FOR HOSPITALS

Leading hospitals will strive in a challenging context with a combination of an increase in healthcare needs, a decrease in resources, and changing social values.

Leading hospitals will have to find new ways to keep providing efficient and high-quality services in a challenging context. Over the past decades, life expectancy in Europe has grown, thanks to improvements in living conditions, public health interventions and the progress of medicine.

As the public demands more and better healthcare services, growth in healthcare expenditure – as a percentage of gross domestic product – will probably continue to decline, thus creating a challenging context for hospitals and also the rest of the healthcare system's stakeholders.

The need to prioritize public resources will bring back some of the debates about society's values such as solidarity, individual responsibility, and limits on free and universal access to healthcare services.
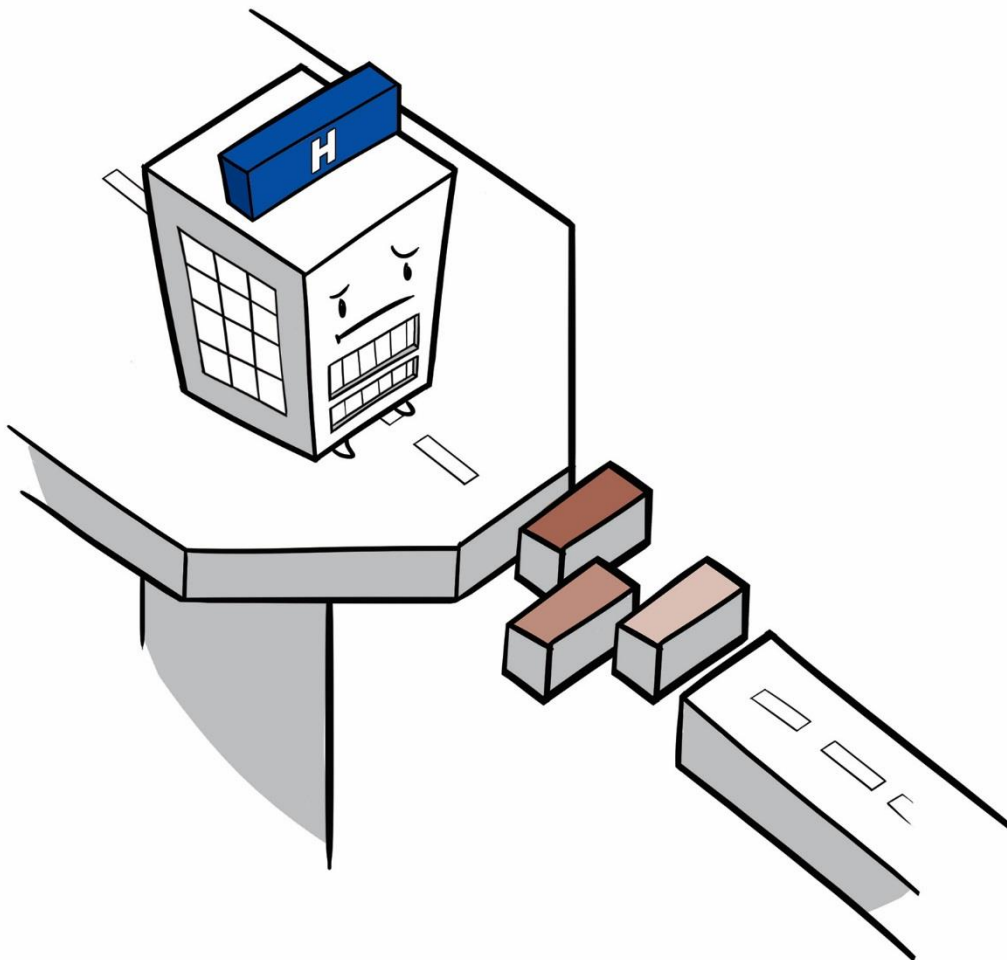
Current trends in sociodemographics may result in extreme scenarios of health services, especially for some patient groups with high needs, and public health systems are providing good outcomes but are very rigid and slow to implement changes.

In the next 15 years, there will be important changes in the health system with important social and economic implications.

## KEY MESSAGE 2: SMALLER AND MORE COMPLEX HOSPITALS

Leading hospitals will be expected to focus on high-value and highly complex services and to become highly efficient organizations, without requiring high activity volumes.

Europe's leading hospitals will be under great pressure over hospital financials, and will be required to deliver as planned and meet budgets, not only improving efficiency but also reducing investment and activity, with programs for demand control, service reconfiguration and resource reallocation.

High-value services will be complex services that require specialist knowledge or technologies or both, and that require a minimum number of cases or patients to achieve quality, safety and efficiency per unit of service provided.

Noncomplex services will be shifted from leading hospitals to other healthcare providers (district and community hospital or clinics), which should provide these routine care interventions at lower costs with a workforce mix and technologies that represent a lower average cost than at leading hospitals.

Leading hospitals will become less capacity-based and more results-oriented as organizations, implementing process improvement to reduce waste and increase value to patients and payers. They will share results and best practices, generating benchmarks for other healthcare providers
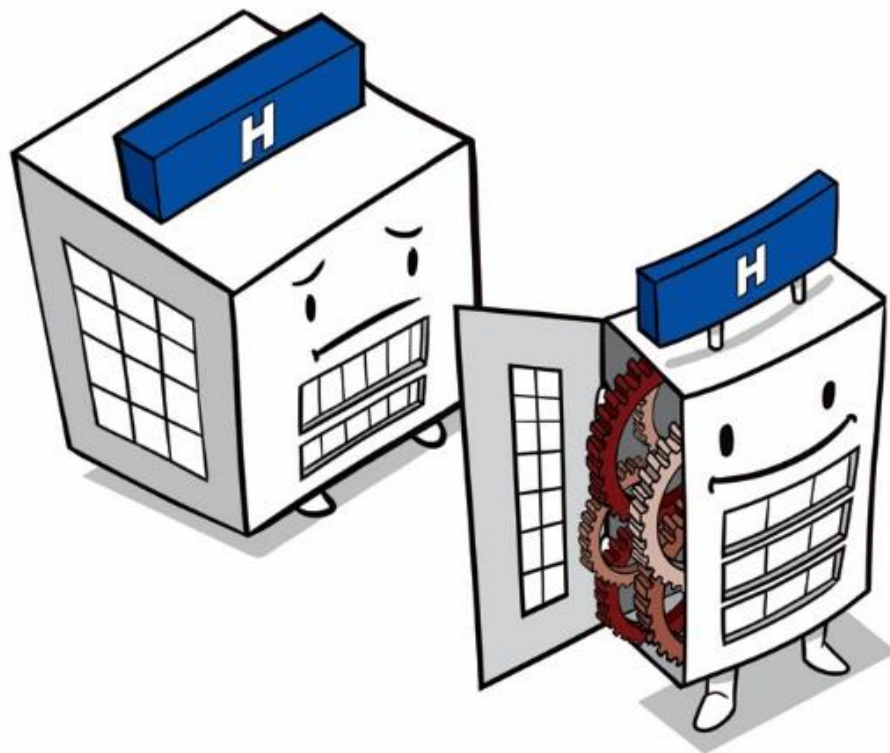
The hospital will be smaller, with less volume, and more complex. Shifting some current hospital services will mean an improvement in hospital efficiency.

The payer will be purchasing outcomes and the value provided, and that means evaluating health status and considering the whole process of care and not just the cost of some interventions.

KEY MESSAGE 3: NEW SCOPE OF SERVICES

Leading hospitals will embrace new services such as personalized medicine and genome-based diagnosis, with a broader scope of services, which may include chronic care management.

Leading hospitals will deliver new and highly complex healthcare services, such as genome-based and personalized medicine based on new health technologies that require expert skills.

Genome-based services will move hospitals forward in prevention services, and hospital professionals will support decisions on prediction tests and treatments for potential health problems and not only on confirmed diagnoses.

Leading hospitals will also embark on a broader scope of services such as population health management and chronic care management. These services will be based on a per capita and subscription model and will include a wide range of activities, from prevention, diagnosis, monitoring, intervention and remote management of patients to coordination and collaborative care planning with other healthcare providers.
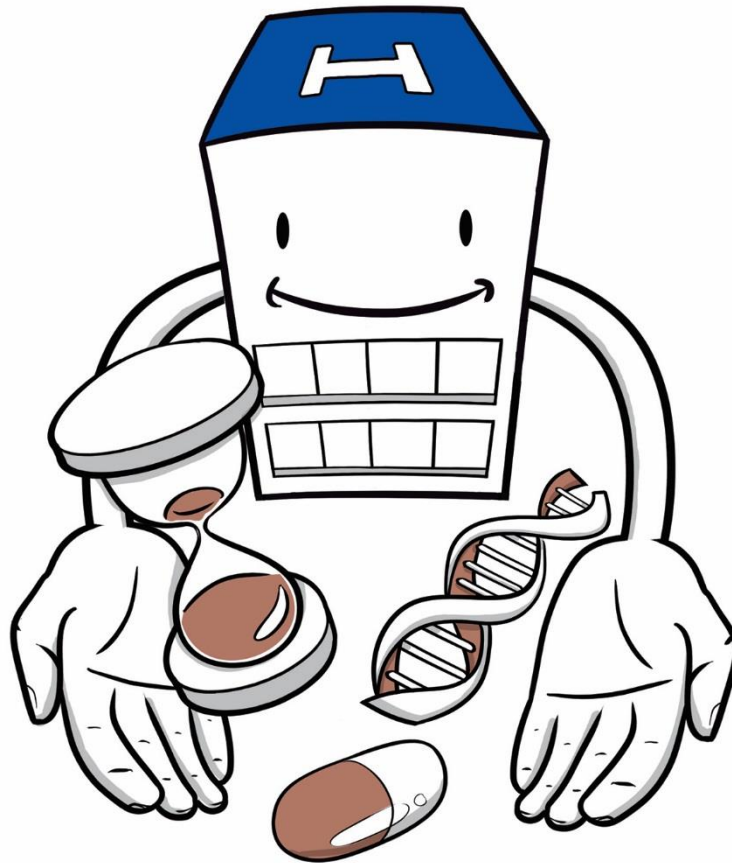
Leading hospitals have the obligation to take a step forward and help the community with chronic care management, putting the hospital's talent and knowledge at the service of the community.

New chronic care management services must be led jointly by the hospital and other providers of care.

## KEY MESSAGE 4: DUAL ORIENTATION: TERTIARY AND TERRITORIAL

Leading hospitals will provide complex services to referred patients and also manage the provision of acute services in a catchment area.

First of all, leading hospitals will continue to provide excellent diagnosis and treatment services aimed at patients referred from other centers that cannot provide the same services with an adequate level of quality or at the same cost.

Moreover, leading hospitals will provide acute services for a catchment area in the community, and also supervise or manage other services such as prevention, primary care and mental health for this population. Managing or providing care for this catchment area will imply establishing strong links with the other stakeholders in the local network such as primary care centers, social care community services and local hospitals.

This dual role allows a leading hospital to maintain the necessary volume of activity and, as a consequence, the resources and professionals required to maintain excellence in service quality and innovate in complex treatments and also in disease management.

NOTE: At first, there appeared to be some inconsistency in this message with the focus on highly complex interventions. However, although a hospital may move toward becoming the reference hospital for a catchment area, this does not necessarily imply that this hospital must perform all required activities for this population. Rather, it means that the hospital takes on responsibility for organizing and managing the provision of healthcare for a catchment area, probably focusing on highly complex interventions and supervising and managing the provision of other less complex interventions, while being fully aware of and responsible for the territory's needs for services and processes.
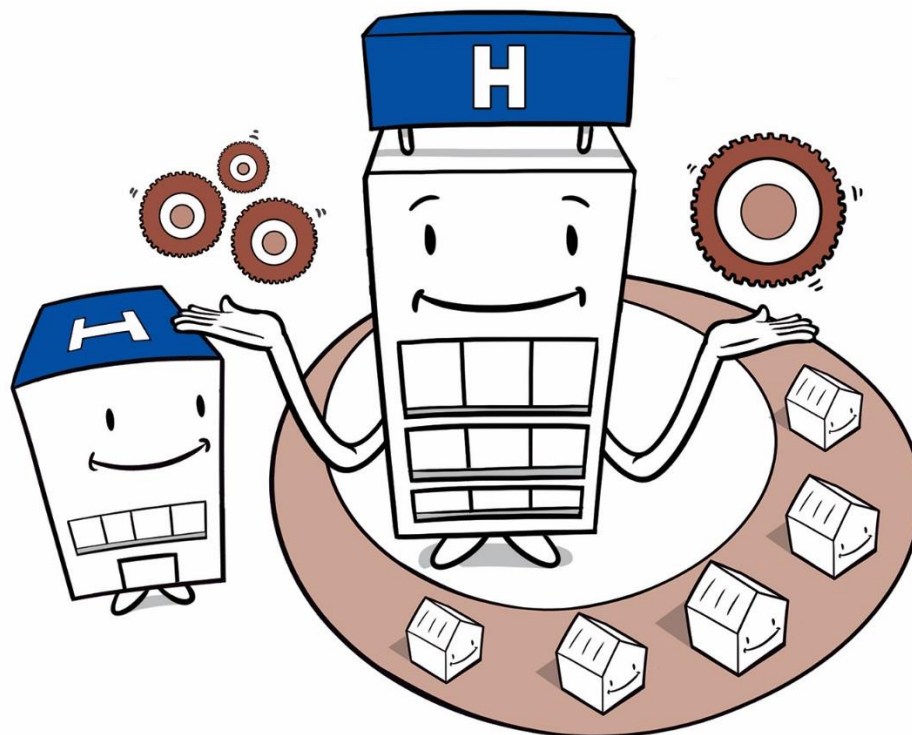
The hospital infrastructure will be smaller, with equipment and professionals oriented to provide the most complex services and, at the same time, it will perform efficiently as a community hospital.

The current hospital is very inefficient because it tries to solve different problems with one structure and organization.

## KEY MESSAGE 5: KNOWLEDGE-DRIVEN REDESIGN OF SERVICES

Leading hospitals' knowledge will play a central role in the knowledge-driven redesign and planning of healthcare services.

Public health systems will carry out a reconfiguration of services geared toward efficiency and quality, which must be evidence-based and driven by knowledge. The required knowledge for this redesign could be based at leading hospitals where professionals treat and interact with patients.

At the same time, leading hospitals will have a critical role to play in achieving the triple aim in public healthcare systems: improving the patient experience of care – including quality and satisfaction – as well as improving the health of populations and reducing the per capita cost of healthcare.

In order to improve the quality and efficiency of the health system, both for private and public services, leading hospitals will be expected to participate in healthcare service innovation such as the development of new services and implementation of new healthcare technologies.

Hospital physicians and managers will consider the whole healthcare provision network as their area of influence and will develop an active role for knowledge development, care management and improvement, not only within the hospital but also for other providers in the network.
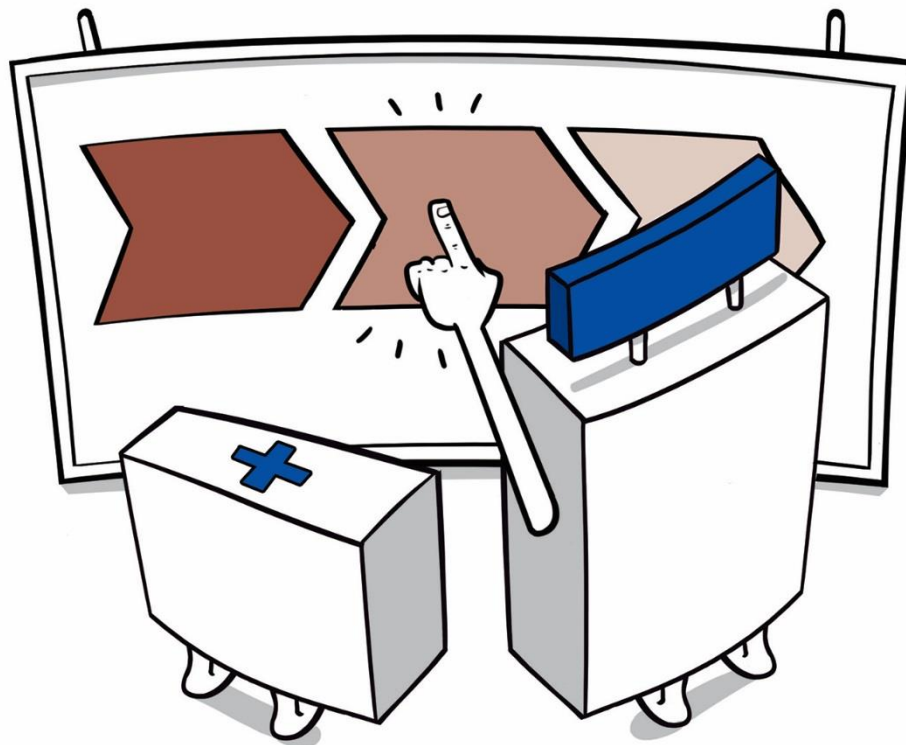
There is an opportunity to redesign healthcare using clinical knowledge accumulated at hospitals.

The hospital might have a new role to design, plan and manage healthcare services.

Process redesign starts within the hospital, but is not limited to the hospital walls. We must analyze what hospital activities and knowledge contribute to healthcare processes as a whole.

KEY MESSAGE 6: OPEN AND DISTRIBUTED ORGANIZATIONS

Leading hospitals will not be defined by the physical structures and will be organized so they deliver services at different locations.

Leading hospitals will adjust to become smaller in terms of physical resources, due to fewer inpatient processes, smaller equipment and fewer patients on-site.

Leading hospitals will reduce their physical resources on the main site, such as ward areas, and will use distributed facilities to get closer geographically to patients, with processes covering not only on-site activities but also home care and providing services at facilities shared with other levels of care.

The size of wards, rehabilitation areas and A&E departments will be adapted to new flows of patients, and resources will be more flexible (suitable for different uses) rather than for a fixed purpose or specialty.

In combination, the leading hospital will deliver care at different locations with virtual and flexible, multidisciplinary and process-oriented teams.
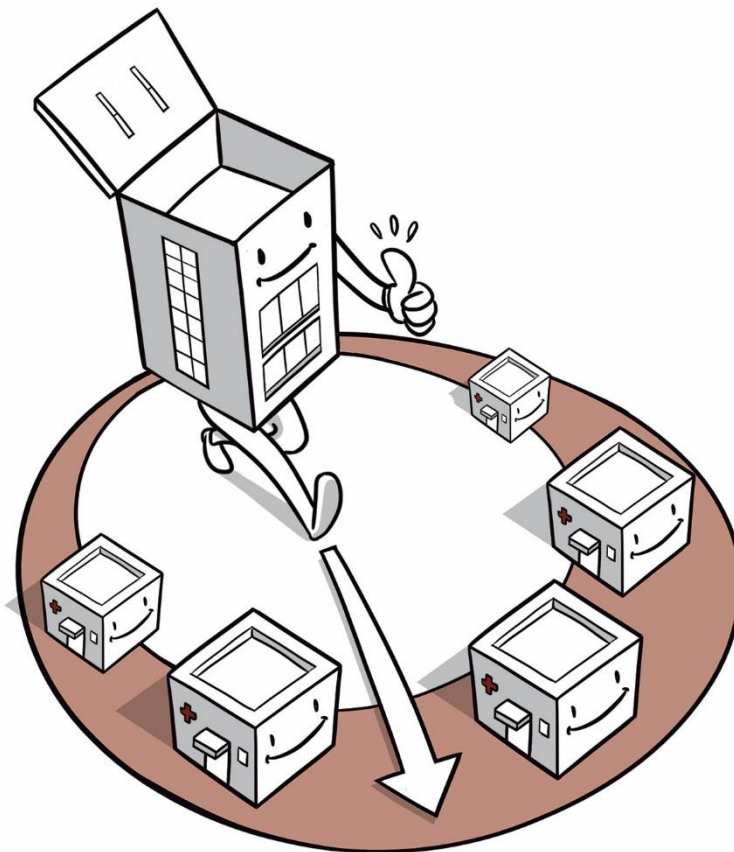
Hospital units with a focus on specific pathologies will break the current boundaries of medical departments.

Some hospital equipment will be moved to local centers, with easier access to patients, and professionals will work at different hospital locations.

KEY MESSAGE 7: INNOVATION CENTERS OF TECHNOLOGY AND SERVICES

Leading hospitals will be reference centers for process and technology innovation and healthcare service design.

In order to improve the quality and efficiency of the health system, leading hospitals will be expected to participate in the detection, adoption and dissemination of healthcare service innovations in specialist services, playing an orchestrating role in innovation in the catchment area.

Healthcare process innovation should include clinical processes and patient flow processes inside the hospital and also in the care continuum (including coordination with other stakeholders), based on the application of lean methods to improve the value and efficiency of healthcare services.

The hospital-based health technology assessment (HTA) units will have a growing role within leading hospitals to improve decisions on service development and healthcare technology innovation and management.

Leading hospitals' innovative contributions to the health system should be evaluated and compensated accordingly, as they represent an important line of income on leading hospitals' balance sheets.

Leading hospitals will play an important role in the healthcare system as reference points for the improvement and transparency of public health service safety, by providing benchmarks for and evidence to other healthcare providers, the administration and society.

Leading hospitals will build links at European level for innovation but at the same time create and foster an environment for innovation at local and regional levels.

Nowadays, innovation in practical care is driven by hospital strategy and goals, whereas technology innovation is driven by knowledge and research, but we will see a combination of these innovation processes in the near future.

The final goal of hospital innovation is to create a good environment for innovation, so the hospital will seek to find solutions to support the other providers in the system and approach them with a nonprescriptive message.

KEY MESSAGE 8: RESEARCH AND EDUCATION AS KEY RESULTS

Leading hospitals will continue to be the main centers for research and for the education of new professionals, which means generating knowledge and capabilities.

Leading hospitals will develop networks with other healthcare providers in order to create research networks at a local, regional, national and international level. Leading hospitals should develop partnerships, knowledge and activity that serve as the basis for clinical and translational research activities.

Research will be linked to cost control initiatives, where research can be understood as a source for generating resources, with an understanding that most research will be clinical (translational) research and not basic research and will be linked to innovation activities.

Leading hospitals will be interconnected with other healthcare providers and other industry companies at different levels and with different roles, combining competition and collaboration.
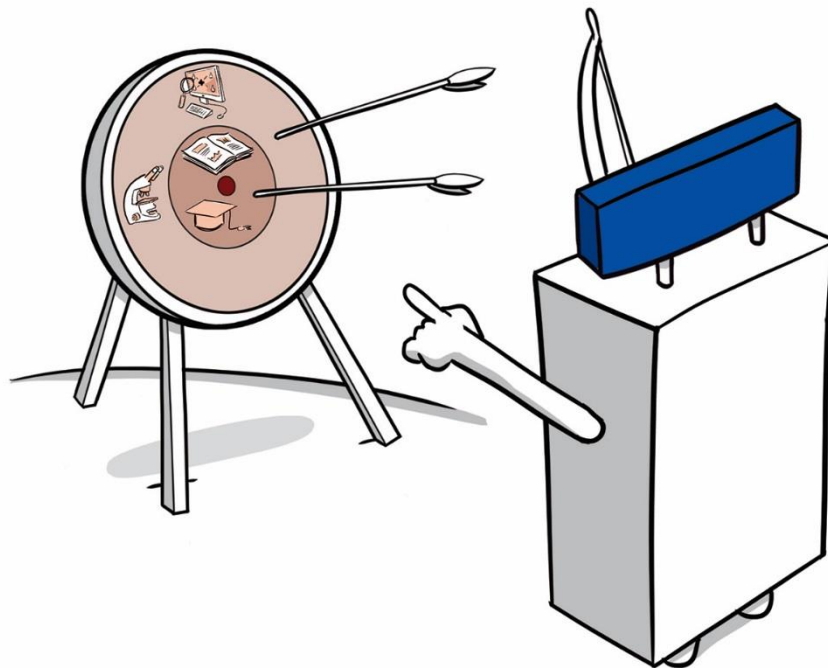
The hospital must be open so the flow of patients in the system can be seen and not only within the hospital walls.

Clinical research and process innovation can (and should) be done by all hospitals... However, translational research should be concentrated in a few leading hospitals.

KEY MESSAGE 9: RISK-SHARING MODELS
## INVOLVING ALL STAKEHOLDERS

Leading hospitals will develop new risk-sharing models with insurers, industry and/or other providers.

The coming years will see the progressive introduction of new methods of payment for treatment – such as payment by results – that will require hospitals to reconsider their revenue models and structures.

Two other drivers for hospitals to explore and adopt new revenue models are the decline of healthcare expenditure on hospital curative services and new opportunities for services that only public or private high-tech hospitals can provide.

The decrease in healthcare expenditure on curative services is related to the relative increase in expenditure on preventive services. Hospital services will be reduced as a percentage of total expenditure, so there will be a need for efficiency gains in hospital services (curative services) to reduce costs, and new revenues from other services will be required.

The framework of the relationship with hospital providers will change and introduce risk-sharing models – for example, in the provision of pharmaceutical products.
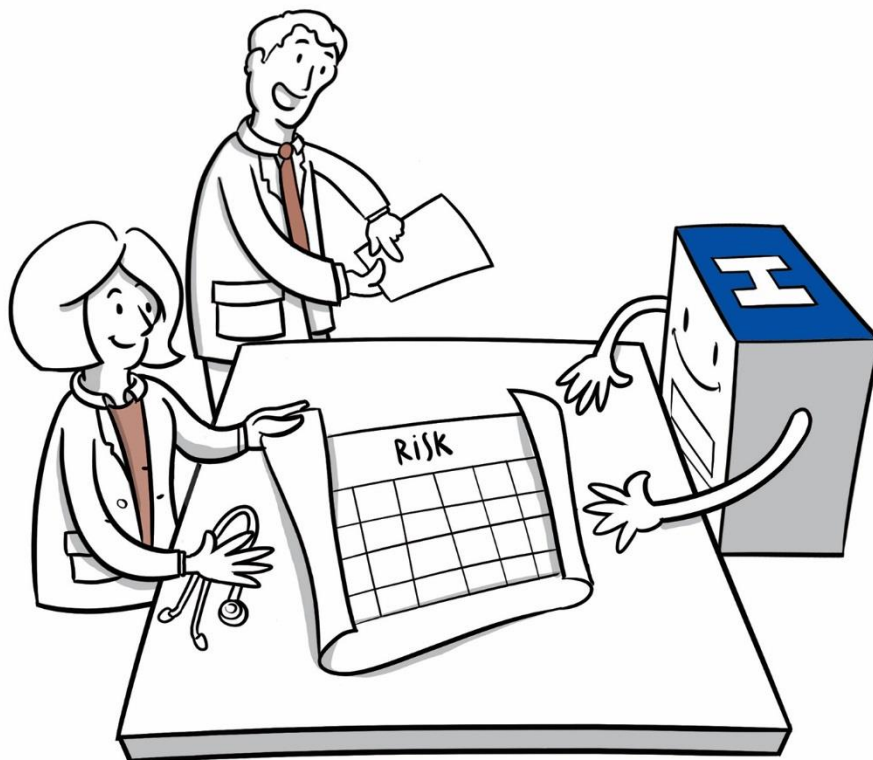
The framework of the relationship with hospital providers will change and introduce risk-sharing models.

Somehow, there is already a kind of risk sharing in the development of new technologies in the hospital – companies bring money and other assets and the professionals put in their time and reputation.

KEY MESSAGE 10: PROFESSIONALS IN HOSPITAL GOVERNANCE

Hospital professionals will actively participate in the strategy and leadership of the organization.

Hospitals' leading professionals will develop an active role in care management and improvement, not only within the hospital but also in the network of provision. As leading hospitals become an open organization, these leaders will drive the collaboration between the hospital-based healthcare professionals and the community-based healthcare professionals.

Healthcare professionals will be incorporated into the leading hospitals' management and considered as individual entrepreneurs managing their firms under a general umbrella, participating in all committees, in order to align and create synergies between hospital goals and professionals' goals.

Clinicians and other healthcare professionals will participate in strategy design and implementation, with management responsibilities in different units, and their opinions will be very influential on the governance boards.

Decisions on management positions, such as the head of department, and hospital organization will not depend on politicians' decisions but will carefully include the views of all stakeholders in the community, and especially those of healthcare professionals.

Hospital professionals will advance in nontechnical competencies, such as team management, conflict management, patient communication and other soft skills and management skill
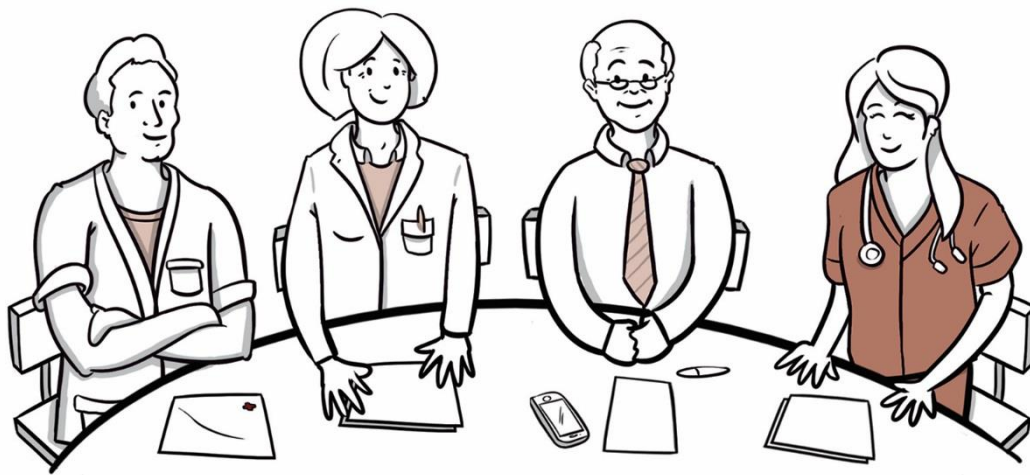
Hospitals currently have a massive challenge. For real change to occur, the authorities – especially politicians – should let leading physicians play an active role in the redesign of the health system.

In the following years, for positive changes in hospital governance, it is necessary to have clarification of the roles and responsibilities of all healthcare institutions around the hospital.

KEY MESSAGE 11: INTEGRATED CARE AND PROCESS-ORIENTED TEAMS

Leading hospitals will be organized into process-oriented teams and seek to create integrated care models (either virtually or by merging companies).

The design of the hospital organization will consider the whole network of provision, structuring disease or process-oriented teams, the scope of which extends beyond the hospital facilities. The hospital's role will be not only coordinating but orchestrating services. In order to do that, hospital professionals will share clinical knowledge with other levels of care and providers in the network.

Hospital physicians and managers will consider the whole healthcare provision network as their area of influence and will develop an active role for care management and improvement, not only within the hospital but also for other providers in the network.

In order to manage this healthcare network efficiently, leading hospitals will push forward integrated care models to create either a single integrated care organization (merging entities) or a virtual integrated care organization (a multiple-entity organization with a joint governance body).
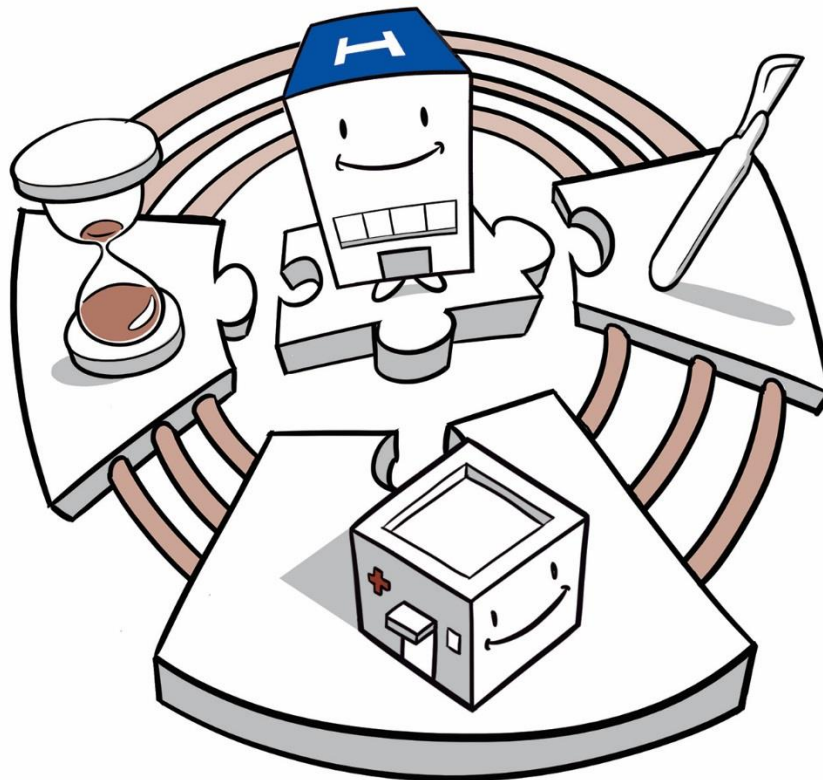
Process units represent progress in adapting the structure to the patients' real needs, yet they do not fully represent the complexity of clinical care.

Process units may evolve into structures oriented to population tracks, like a geriatric acute care unit.

KEY MESSAGE 12: CONNECTED HOSPITALS

Improvement of the patient experience will lead to connected hospitals where case managers will reach out to coordinate care for patients at home.

In the next 15 years, patients will spend less time at the hospital and on healthcare premises. Improving the patient experience will demand the introduction of new modes of interaction between patients and hospital professionals.

Information technologies will be used to predict needs, personalize healthcare processes and treatments and follow up and connect with patients wherever they are, using virtual consultation, not only one-to-one but also between a team and patient. Hospital professionals will also become mediators of relevant and personalized information to patients.

As remote health management services become widespread, citizens will use mobile apps, sensors and medical devices to monitor and improve their health and well-being. There will be a wide range of such devices and apps, covering different age and socioeconomic groups in the population almost equally, though there will be different levels of adoption depending on each patient's willingness to communicate remotely and receive directions, support and monitoring.

These changes will lead to patients taking a more active role in the design of hospital services and participating in activities to redesign care processes so patients' needs and views are considered.
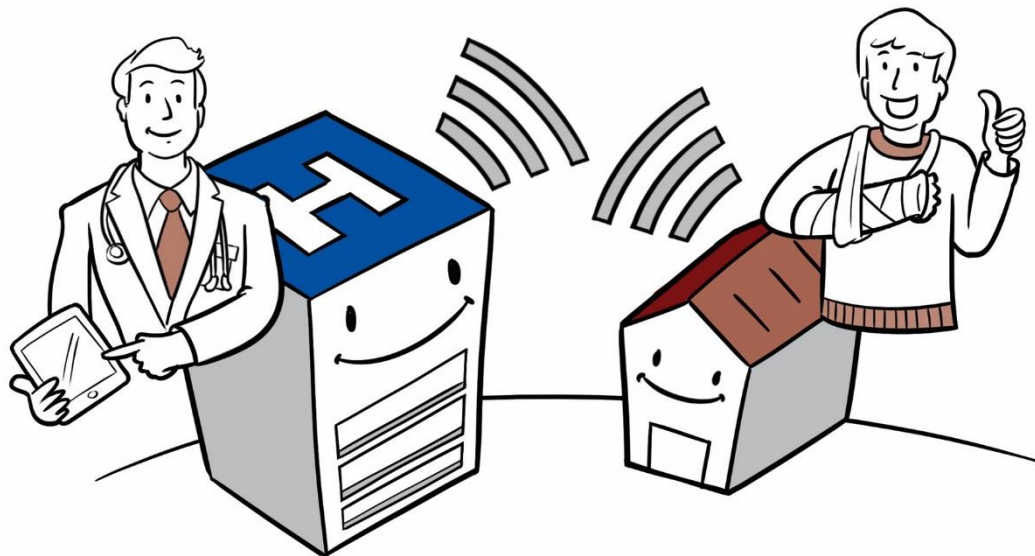
Some groups of chronic patients are very proactive and will influence the health system in some respects.

Patient communities will have an impact on the health system so the perceived quality is taken into account.

KEY MESSAGE 13: NEW PROFESSIONAL ROLES

Leading hospitals will need health coaches, genetic counsellors, disease-specific case managers, information management experts and "med-engineers."

Leading hospitals will need new professional roles, for disease-specific case management, healthcare service personalization, team coordination, and follow-up for patients that will also act as the first levels of contact for patients in specific disease groups.

Professionals will work in multidisciplinary and process-oriented teams, blurring the existing discipline boundaries between physicians, nurses and other healthcare professionals.

Health coaches will focus on patient tracks in a proactive manner, and will be either hospital or primary care-based but with strong links to hospitals' knowledge and professionals.

Disease-specific case managers will help patients access the knowledge experts when needed and will contact and follow up patients every day.

Genetic counsellors will team up in all hospital areas to help personalize care, acting as the interface for genomics advances, promoting the fast and safe introduction of genomics into patient care and helping to address the challenges associated with genetic information and technology.

The med-engineer will be a new role combining engineering and medical education to facilitate initiatives for process improvement and service excellence.

The info-enabler will be the expert on the analysis and evaluation of information, who teams up with healthcare professionals to obtain outcomes, costs, value and benefits for new processes and technologies frequently.
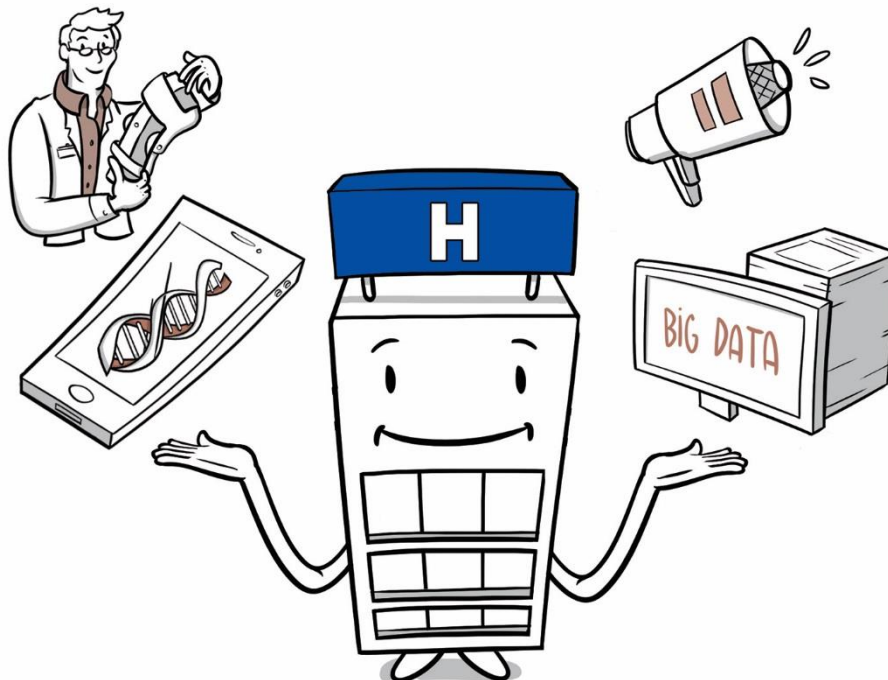
The case manager will become the central figure who connects the patient with the rest of the healthcare team and the health system.

In high-technology hospitals… someone will help establish a bridge between technology and the hospitals' professionals.

KEY MESSAGE 14: PATIENT-CENTERED INNOVATION

Leading hospitals will systematically redesign the service experience with innovation to become really patient-centered.

Hospital services will need to evolve along with clinical knowledge and also with patients' expectations, systematically evaluating and improving patients' experience and quality of services.

Leading hospitals' innovation will promote the establishment of collaborations with other healthcare providers and industry to discover, ideate and prototype new services and new ways of providing services to patients.

Patients' involvement in the redesign of healthcare services will be promoted and their perceptions of health services will be consistently evaluated for quality improvement.

Innovation activities will not be limited to a small group of practitioners but will extend to most healthcare professionals, and skills and competencies in innovation will be included in the curriculum of different professional career plans.

Perceived quality of healthcare services will be systematically evaluated and considered for innovation.

Communities of patients will have an impact on the redesign of specific healthcare services (and processes).

6.2. Final Recommendations

The following recommendations, drawn from the work performed during this project, published materials, expert interviews, questionnaires, workshops, etc., are oriented towards hospital leaders and health system policy makers to help them drive the transformational change required in the coming new era of healthcare.

These recommendations are also grounded in the ideas and current practices that leading hospitals consider are needed to transform the way care is delivered to patients and the population, building on existing strengths and the healthcare context, opportunities and risks. They should not be taken as absolute truths, since the context that different institutions face can make them consider their application in a different light.

These recommendations are intended mainly as discussion points that hospital leaders and health policy makers need to consider when drafting the future plans for their institutions.

Recommendation 1: Leading hospitals should take an active role in helping public administration and society deal with the healthcare economics challenge, bringing vision and knowledge to the debate on the configuration of the future healthcare system. In playing this active role, they could establish (or defend) their key position in the healthcare value chain. Independently of the ongoing discussion to further develop primary healthcare where it is not available, and the need for the primary care physician to be the usual entry point in the system, hospitals should maintain their prominent role in many other facets, such as clinical knowledge development and archiving, overall health chain system design, etc.

Recommendation 2: Leading hospital managers and health system policy makers should seek to protect "synergic" hospital services, which could otherwise be shifted away to other providers. However, if kept within the control of the leading hospital these services will be more effective in generating knowledge or capabilities that can be shared and transferred to other services.

Recommendation 3: Leading hospital managers should foster trusting relationships with other providers at different levels – local, regional, national and international – to build efficient healthcare value-creation networks, involving alternative sites of care or new roles for caregivers, creating new care processes, and enabling technologies.

Recommendation 4: Hospital professionals should play an active role in leading service redesign and the implementation of new services. In doing so they may need to develop new soft skills. Leading hospitals will incorporate new professionals coming from other disciplines (med-engineers, service designers, anthropologists, etc.) and will have to work together with the hospital's professionals (physicians, nurses, technicians, etc.) in the innovation and development of new services.

Recommendation 5: Healthcare payers and hospital managers should create controlled scenarios for testing new contracting models and new healthcare services. Leading hospitals may – in a proactive role – contribute to these scenarios with the hospital's knowledge, facilities and systems to pilot innovative contracting agreements with health authorities and other payers in the system. Participating in these controlled scenarios would help hospitals to prepare for dramatic changes in the revenue models of public hospitals that may alter the traditional operational model.

Recommendation 6: Healthcare policy makers should consider including hospital clinical leaders when designing disease management strategies and plans, and consider including hospital managers when planning healthcare services in order to assign suitable catchment areas to hospitals.

Recommendation 7: Hospitals should develop programs and capabilities for health technology innovation and performance improvement at deeper levels in the hospital and also in the network of provision. They will need to continuously search for operational excellence, ensuring the efficient and effective use of the available resources, eliminating all types of waste (including duplicated activities, process waiting periods, defective processes, over and underprocessing of patients, hospital-generated infections, lack of continuity of care in the transfer of patients between services or providers, etc.). Leading hospitals should aim to achieve a swift even flow of patients, and learn how to better match the existing capacity with demand, controlling as much as possible the variability in the processes and redirecting the flow of patients in a dynamic way to the facilities where suitable resources may be available.

Recommendation 8: Leading hospital managers should prepare different environments and partnership models that will help establish closer collaboration among different stakeholders in research and education. The leading hospital should take the main role in developing educational programs for the clinical education of physicians inside the hospital and in other care provider settings, as well as in supporting new channels for educating patients and community care personnel.

Recommendation 9: Hospitals should strengthen links with primary care, mental and social care providers, to build efficient care networks, and work with healthcare authorities to create integrated care organizations. As is the case in other industries, one of the players in the value chain will take a coordinating role in the design and operation of integrated care networks. The leading hospital is well positioned to take on this role.

Recommendation 10: Hospital managers should create new capabilities and ICT services for healthcare professionals in order to improve connectivity with other players in the extended integrated healthcare network and with patients. The portfolio of services available for the professionals may include e health enabling services for virtual consultation, collaboration tools with other healthcare professionals, remote monitoring systems, as well as new health information analysis solutions.

Recommendation 11: Healthcare authorities should develop programs for patient experience improvement, including patient involvement through patient advisory councils for the redesign of healthcare services. Further, the idea of patient experience satisfaction should be extended to cover the institutions' other stakeholders, such as patients' families, and clinical and non-clinical staff, ensuring that their experience in dealing with the institution is also considered and improvement opportunities continuously studied.

Recommendation 12: Health system policy makers should consider and evaluate the possibility of allowing public hospitals to offer private services, for instance, those not covered by the national health system where the hospital has the knowledge and technologies to deliver these services. In doing so they must ensure that the proper rules of competition with private providers are in place and that the extra revenues are used to improve research and the care provided to public patients.

Recommendation 13: Leading hospitals should ensure professional development plans for clinicians that include not only clinical skills but also leadership, management and communication competencies, which will help achieve the greater impact that the system requires. The prospects for care redesign and performance improvement in health systems depend on clinician leadership in units, wards, clinics, and practices. These clinical microsystems are composed of and controlled by clinicians whose primary work is patient care but who also need other management and leadership skills.

Recommendation 14: Policy makers should design new hospital governance models that allow decisions to be made closer to the level where problems arise, with more actions at the technical level, and only a few at the political level. The hospital governance model should allow healthcare authorities and politicians to ensure that citizens' interests are considered in hospital decision making. Also the nature of healthcare systems implies that some changes may require years to be implemented and to achieve the expected results, so hospital managers should be allowed to execute adequate plans in the medium and, especially, long term.

Recommendation 15: Leading hospitals, being very active in care delivery, teaching, and research, should develop systems to keep up to date with the development of clinical knowledge in the different specialties, and ensure that new knowledge is rapidly spread throughout the health system they belong to (in connection with primary care, ambulatory services, social care, etc.). Leading hospitals will also provide training to develop the skills necessary to apply the new medical technologies in an environment that guarantees patient safety, and they will also design internal systems to ensure that the knowledge and evidence generated during the hospital activities are collected, analyzed and, when they prove valuable, incorporated into the medical body of knowledge and made available to other experts.

Appendix 1. HoF Study Participants

Participants from Karolinska University Hospital:

- Mr. Mikael Forss, deputy CEO

- Prof. Jörgen Larsson, director, Innovation Center

- Prof. Johan Permert, director of development and innovation

- Mrs. Anne-Charlotte Knutsson, director of communication

- Mrs. Susanne Ljungqvist, director of finance

- Dr. Annelie Ljungberg, medical adviser

- Mrs. Anna Rasmuson, Lean Strategy Change Office

- Dr. Ulf Lockowandt, chairman, Department of Thoracic Surgery

- Dr. Erland Löfberg, Department of Renal Medicine

- Mr. Johan Nordenadler, project manager, development and innovation

- Dr. Annelie Liljegren, operational project manager, New Karolinska Solna University Hospital

- Mr. Magnus Renck Holmes, strategic business development

- Dr. Carl-Johan Wallin, strategic business development

- Mrs. Emma Loven, head of the Innovation Center

- Mrs. Anna Sahlström, market & business development

and from other institutions related to Karolinska:

- Mr. Hans Winberg, executive director of the think tank Leading Health Care, Stockholm School of Economics, and Karolinska Board member

- Mr. Jon Rognes, deputy director of Leading Health Care, and Karolinska Board member

- Mr. Olle Hillborg, director of SLL Innovation, Stockholm County Council

- Prof. Hans Hebert, dean of the School of Technology and Health, Royal Institute of Technology

- Prof. Martin Ingvar, professor of clinical neuroscience, Karolinska Institutet

- Prof. Rolf Hultkrantz, Chief Division of Gastroenterology, Karolinska Institutet

- Mr Björn Varnestig, CEO of Stiftelsen Flemingsberg Science

- Prof. Pär Åhlström, Stockholm School of Economics, and Karolinska Board member

- Mrs. Catharina Barkman, director of innovation of SLL

- Mr. Henrik Gaunitz, head controller of the program Future Plan for Stockholm Health Care, SLL

- Mrs. Lena Freijd, human resources director of Karolinska University Hospital

- Dr. Harald Blegen, director of the Division of Oncology, Cardiovascular and Respiratory Diseases at Karolinska University Hospital

Participants from Hospital Clínic of Barcelona:

- Dr. Josep Maria Piqué, general manager

- Dr. Josep Brugada, medical director

- Dr. Àlvar Agustí, director of the Thorax Institute

- Dr. Antoni Castells, director of the Institute of Digestive and Metabolic Diseases

- Dr. Adelaida Zabalegui, director of nursing

- Dr. David Font, director of strategy and planning

- Dr. Joan Bigorra, director of innovation

- Mrs. Dolors Heras, director of the Finance Department

- Mr. David Vidal, chief information officer

- Dr. Eduard Gratacós, head of the Maternal-Fetal Medicine Department

- Dr. Joan Escarrabill, director of the Chronic Care Program

- Dr. Xavier Pastor, chief medical information officer

- Dr. Laura Sampietro, deputy director of innovation

- Dr. Luis Donoso, director of the Center of Diagnostic Imaging

- Dr. Josep Vidal, head of the Endocrinology and Nutrition Department

- Dr. Josep M. Nicolàs, head of the intensive care unit

- Dr. Josep M. Campistol,[14] director of the Clínic Institute of Nephrology and Urology

- Dr. Manuel Castellà, head of the cardiovascular surgery unit

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[14] Dr. Campistol became the new medical director of Hospital Clínic in July 2014.

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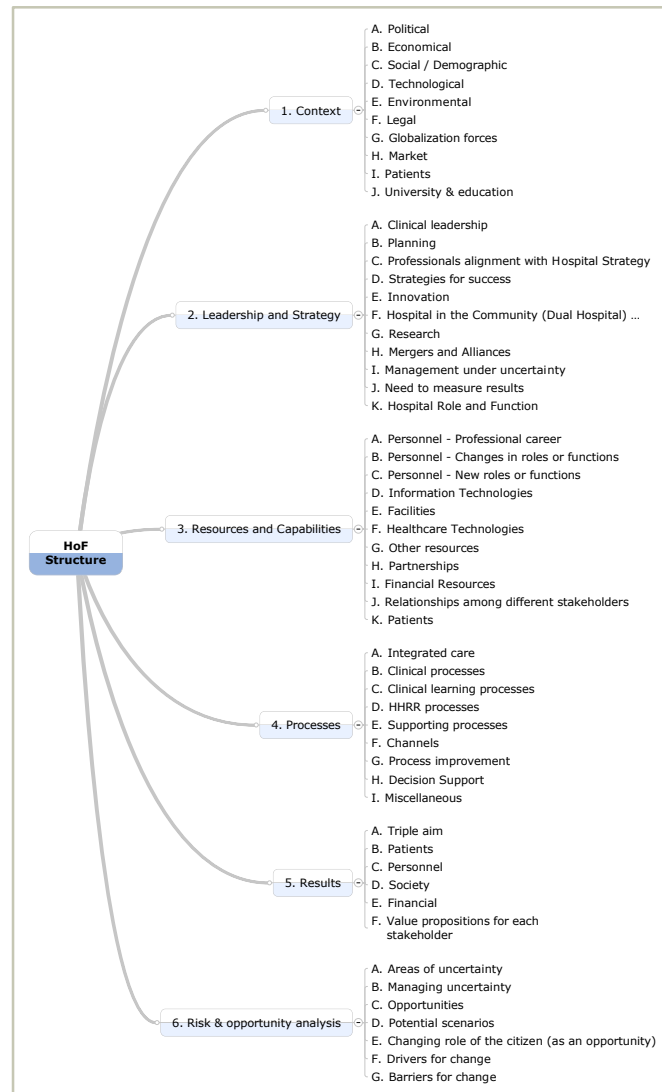
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Appendix 3. Literature Review Mindmap

After analysis of the literature review, the mindmap model for the study contained six dimensions, and 54 subdimensions that were later adapted to fit all interview comments and preliminary findings on the five dimensions of the HoF conceptual framework.

Figure 30. Basic structure of mindmap for interviews

Source: Prepared by the authors.

Figure 31. Mindmap after literature review showing the first three levels of detail

Source: Prepared by the authors.

Appendix 4. Questions for Individual Interviews

The following list is a summary of 30 questions used as a reference tool for individual interviews. This list was not shared with interviewees but was only used for reference by interviewers, and for structuring later analysis of the interview concepts.

The original list of questions was structured following the EFQM criteria, though after initial interviews this shortlist of questions proved to be more useful as a tool during interviews to orient the interview towards the different topics of the study.

1. What are the main drivers for today's hospital strategy?

2. What are the main innovations that deal with these drivers?

3. What are the main concerns of hospital leaders?

4. What are the most important inner and outer threats?

5. What might be the hidden opportunities driving forces? "If I only had known that…"

6. What are the main barriers to moving forward?

7. What should be done if the hospital was to be rebuilt from scratch?

8. What will be the main changes to hospital governance?

9. What will be the role of clinicians in the hospital leadership?

10. How will the hospital's organizational structures be transformed?

11. How will the patient-provider interaction change?

12. What services will be delivered inside/outside the hospital walls?

13. What role will the hospital play in the coordination or integration of healthcare services?

14. How will patient needs be grouped or clustered?

15. Will physicians be required to perform the same activities in the clinical processes?

16. In which cases will consultation by a hospital physician be substituted by other professionals or services?

17. How will the assignment of tasks to professional disciplines change?

18. How will the training and/or motivation of professionals change for performing the required tasks?

19. Will healthcare professionals be involved in new compensation schemes as entrepreneurs?

20. What changes in resource management do you expect?

21. What changes in the clinical processes do you expect?

22. Will new roles be likely to emerge for people or groups?

23. What will change in terms of the location of the delivery?

24. Will hospitals transform their existing physical facilities into a virtual hub for healthcare?

25. How will hospitals afford the technological advances in healthcare?

26. How will hospital IT and clinical applications be managed?

27. Which models of risk sharing do you envision with suppliers, payers, etc.?

28. Which roles will the hospital play in the community?

29. Which management practices currently being implemented in other countries do you see as being imported in the next 15 to 17 years so as to solve the sustainability problem?

30. What are the current uncertainties that will be decisive by 2030?

Appendix 5. Detailed List of Findings

The following table contains the 76 preliminary findings as presented in the online questionnaire to participants, including the finding title and a description.

1A) SOCIAL, DEMOGRAPHIC AND MARKET

O1. Life expectancy will continue to improve.

Improvements in living conditions, public health interventions and progress in medical care have led to large gains in life expectancy over the past decades.

In 2011, life expectancy at birth in Spain reached 82.4 years, with an increase of 6.6 years of life expectancy in the last three decades. At the same time, in Sweden life expectancy at birth reached 81.9 years, an increase of 6 years of life expectancy in the last three decades.

O2. Citizens' demand for healthcare services will increase.

The demand for healthcare will grow as a result of an ageing population, new lifestyle diseases, a rise in public expectations and a lack of value-consciousness among healthcare consumers.

O3. Chronic conditions will represent the greater part of healthcare costs.

WHO reports and research suggest that chronic conditions will impose an increased burden on future European healthcare systems.

Although healthcare systems will find cost-effective strategies and solutions to tackle this burden, resources will be limited and as the population grows older and the prevalence of chronic diseases increases, the healthcare systems' cost structures will be impacted significantly by chronic diseases.

O4. Citizens will be more co-responsible and participative in their healthcare.

Citizens will be co-responsible for their health issues, including from an economic point of view.

Healthcare providers will be expected to encourage citizens to become drivers of their own health and consider patients as healthcare partners.

O5. Citizens will increase participation in prevention and predictive healthcare initiatives.

Citizens of all ages will understand and will be willing to participate in well-being and other healthcare prevention activities.

Patients will participate in and make decisions on healthcare prevention and not only treatments.

O6. Health literacy will increase and patients will be more connected with healthcare professionals.

Health literacy will grow and citizens will be connect to different information sources and participate in online forums and meetings.

In general, citizens will have more positive attitudes towards technology, and the percentage of patients willing to interact with their healthcare professionals using information technology will increase. The interaction of patients with healthcare organizations will become more continuous and, in some ways, more difficult to control and with lots of information to be managed.

O7. Citizens-patients will become global, seeking quality healthcare services locally or abroad.

A larger percentage of patients will seek global healthcare services, independent of geography or language.

O8. Society's values will change, limiting free and universal access to healthcare services.

Society's values such as solidarity and equity will change, giving greater weight to individual responsibility for health.

In order to achieve healthcare system sustainability, society will consider initiatives such as the need for co-payment and limits on access to expensive treatments to patients at the end of their lives.

Citizens will have to accept greater levels of responsibility in management of their health status, including from a financial point of view.

O9. Citizens' use of remote health management services will be widespread.

In the next 15 years, the use of remote monitoring devices (heart rate monitors, movement detectors, spirometers, pulse oximeters, weight scales, etc. and mobile applications) by citizens will be widespread, covering all age and socioeconomic groups in the population almost equally.

Patients will be familiar with these devices and will demand that these remote health management services be included in the public healthcare system offering.

10. Citizens-patients will get involved in the design of the healthcare system.

Society will take on a new role for healthcare system change through associations, board representatives, etc. and participate in the decision-making processes for the prioritization of healthcare system initiatives and for strategic design of the healthcare system.

1B) HEALTHCARE SYSTEM CONTEXTUAL FACTORS

11. Public healthcare organizations will be allowed to provide a combination of public and private health services, using the same professionals and/or facilities for both services.

In the next 15 years, the private health service market might increase. Public hospitals will offer private health services within certain conditions to patients from private insurance companies. This combination will be needed to create efficiencies in hospitals that are focused on very complex and highly technical interventions and thus require a minimum volume of activity to reach efficiency and acceptable levels of safety.

12. Healthcare service expenditure will decrease as a percentage of gross domestic product.

In Spain, health spending grew, in real terms, by an average of 5.6% per year between 2000 and 2009, but it fell by 0.5% in 2010 and by 2.8% in 2011. This negative growth was driven by a large reduction in public spending on health.

In Sweden, health spending increased in real terms by almost 4% per year on average between 2000 and 2009, but this growth rate slowed down to 1.5% in 2010, before going up again by 3.7% in 2011. Several other OECD countries also experienced a marked slowdown or even a reduction in health spending in 2010 and/or in 2011, following the recession and the need for fiscal consolidation.

13. Healthcare service expenditure will increase for preventive services and decrease for hospital curative (ambulatory and inpatient) services.

According to the OECD, hospital services currently represent about 40% of the total expenditure on public healthcare services in EU countries, with 41% in Spain and 46% in Sweden in 2011. Prevention and public health services represented only 0.02% of expenditure in Spanish public hospitals in 2011.

In the next 15 years, prevention healthcare services will increase as a percentage of the healthcare system expenditure to reach at least 5% of healthcare expenditure. Hence, it is anticipated that hospital services will be reduced as a percentage of total expenditure, thus requiring efficiency gains in hospital services (curative) to reduce costs.

14. Equipment and healthcare technology resources assigned to public hospitals will decrease or at least not increase.

The public healthcare system will have fewer resources available to invest in healthcare technologies and equipment.

Hospitals in the same region will need to compete for these resources, and will have to present compelling opportunities for healthcare technology companies and for the healthcare administration.

15. There will be a shortage of physicians and nurses available for hospitals.

In 2013, OECD countries had an average of 3.2 physicians and 8.7 nurses per 1,000 population. Spain had 4.1 practicing physicians and 5.5 nurses per 1,000 population. Sweden had 3.9 practicing physicians and 11.1 nurses per 1,000 population (data from OECD 2010).

The shortage will be mainly caused by the globalization of healthcare careers and the relative decrease in salaries of physicians and nurses.

16. Mental health conditions will cause paradigm changes in the healthcare system configuration, modifying the current levels of care.

The growth in mental health conditions will represent a huge challenge for the healthcare system, with changes to the configuration of the whole healthcare system, probably involving other stakeholders in the new healthcare system's design.

17. Healthcare systems will focus on cost reduction and control.

The rising cost of care will force the healthcare system to reallocate resources in order to lower costs. The application of new therapies and technologies will be slowed or stopped significantly, with a possible impact on the current trend for outcome improvement.

18. The health insurer will contract chronic disease management services as a whole package that may include monitoring, treatment and management.

In the next 15 years, the health insurer will define and contract a specific set of health services to provide to chronic patients separate from current levels of care. This specific set of services would include the monitoring, treatment and managing of diagnosed patients separately from current levels of care.

The health insurer will define chronic disease management (CDM) tariffs, billable annually for providing comprehensive CDM to a patient with one or more chronic diseases (such as diabetes, asthma, congestive heart failure, coronary artery disease, and hypertension).

These CDM services will not be specifically linked to a level of care (primary care, secondary care, long-term care), but will include coordination and collaborative care planning with other healthcare providers as appropriate.

19. Primary care centers will have a more important role in generating demand for hospital services.

Health systems will give primary care greater power to contract hospital services and act as patient gatekeepers.

1C) HOSPITAL ROLE WITHIN THE HEALTHCARE SYSTEM

20. Leading hospitals will be required to provide both a complete range of services for the community and also highly complex services.

Leading hospitals will be required to perform a dual function: as a community (secondary-level) hospital and as a center of excellence (tertiary) hospital, therefore combining two service proposals:
• Acute services for a population catchment area of at least 250,000 citizens, which will include A&E, ambulatory, diagnoses, surgery, hospitalization, rehabilitation, day hospital and other acute services required in the community of reference of the hospital.
• Highly complex specialized services, prescribed by the health system authority, and with a larger population catchment area of reference.

21. Public hospitals will be expected to integrate primary, long-term and/or social care services to become integrated care organizations.

Integrated care providers offer a range of health services from primary care (ambulatory), acute care and long-term care, and some social services such as assisted-living houses.

The health system's insurer will favor providers that will be able to offer packages of integrated care, in order to facilitate care service contracting and to streamline processes.

In the next 15 years, more public hospitals will become integrated care providers, merging primary care, long-term care and social care organizations or creating these capabilities in their offering.

22. Leading hospitals will participate in decisions on the configuration of the healthcare system related to acute and non-acute services.

Demographic changes and the increasing burden of disease will require a fundamental change in health service delivery, with the core focus of delivery shifting from the hospital to the community. However, the leading hospital will continue to develop a fundamental role in healthcare service provision, and clinical knowledge will be an asset of the hospital.

Consequently, the health system authorities will involve the leading hospital managers and clinicians in the reconfiguration of hospitals, the location of services, the design of healthcare processes, and the planning of healthcare services in the community.

23. Leading hospitals will strengthen teaching activities with the university.

Teaching, research and patient care are highly interdependent, as the healthcare system needs a supply of trained staff and the knowledge generated by appropriate research. In addition, in order to effectively teach/train healthcare professionals healthcare settings (such as hospitals) are needed as training locations.

Hospitals will have a more important role in the design of the medical curriculum, and will need to provide training in non-technical competencies, such as team management, conflict management, patient communication and soft skills.

24. Leading hospitals will continue to be the main setting for healthcare research activities.

The leading hospital will have a combination of partnerships, knowledge and activity that serve as the basis for clinical and translational research activities.

The leading hospital will develop networks with other healthcare providers in order to create research networks at a local, regional, national and international level.

25. Leading hospitals will become the main setting for healthcare service innovation.

In order to improve the quality and efficiency of the health system, both for private and public services, the leading hospital will be expected to participate in healthcare service innovation such as the development of new services and the implementation of new healthcare technologies.

The leading hospital will foster the detection, adoption and dissemination of healthcare service innovations in specialized services.

DIMENSION 2: STRATEGY AND LEADERSHIP

26. Leading hospitals will focus on highly complex services and will shift some routine care services to other healthcare providers.

Leading hospitals will focus on highly complex services, which require specialist knowledge, techniques or equipment. These services require a minimum volume of activity (cases or patients) to achieve quality, safety and an appropriate cost for providing the service.

As a consequence of this focus, leading hospitals will transfer non-complex services to other providers that are more focused on routine care interventions.

27. Leading hospitals will be focusing on highly complex patients, limiting access to hospital services to less complex patients even in the A&E department.

Leading hospitals, focused on highly complex services, will have specialists and equipment that are oriented towards patients of high complexity. Therefore, access to leading hospitals will have procedures in the hospital network to prevent simple conditions representing a burden for the hospital.

28. Leading hospitals will provide a wide range of treatments and services in all specialties as long as they have economies of scale.

Leading hospitals will continue to offer a range of healthcare services in all (or most) specialties, instead of focusing on a single treatment category or medical condition.

Hospitals will seek operational efficiency with internal economies of scale and scope, reaching appropriate volumes of activity for each pathology or treatment.

29. Leading hospitals will provide integrated chronic disease management services.

Over the next years, leading hospitals will offer services for integrated chronic disease management, including:
• Planning and proactive care for well-being and prevention, including regular screening, support for self-management, lifestyle and behavior changes.
• Coordination of care that is provided by different health service providers and over time through different stages of disease.

30. Leading hospitals will provide monitoring services directly to patients with chronic diseases integrated with treatment services.

Over the next years, the hospital will offer monitoring services to groups of chronic patients, and also the required treatment services for those patients entering an acute phase of their disease.

The leading hospital will manage the required resources of the chronic patients in the covered population (or in a defined territory) and the generation of case registries and information systems that strengthen the management and monitoring of chronic patients.

31. Leading hospitals will provide mediation services for healthcare treatments in the community.

Leading hospitals will offer mediation services to hospital patients and also citizens in general, such as for those seeking healthcare or medical information from trustworthy and credible information sources.

The hospital professionals will be intermediaries, giving relevant information to citizens, referring to quality sources, and guiding patients in new collaborative ways to filter and process the information citizens may collect to manage their health conditions.

32. Leading hospitals' governance will be driven by professionals and not by politicians.

Governance of leading hospitals, belonging to the public healthcare system, will be influenced to a greater extent by hospital professionals, with less interference by politicians.

Healthcare professionals will help translate population and citizens' values and healthcare innovation initiatives and opportunities into the hospital strategy. The political arena will deal mainly with access to and coverage of the healthcare system and accountability for resource consumption.

33. Leading hospitals will participate in networks of healthcare provision in the community, orchestrating care coordination of health services.

Health services will be organized in networks of providers with more integration and coordination.

Each leading hospital will play an orchestrator role by becoming an open organization that shares their clinical and management knowledge with primary care, other hospitals in this network and with patients in their catchment area.

34. The hospital will become smaller with fewer physical resources and fewer patients on-site.

The leading hospital will need to adjust its size to a new capacity required for dealing with fewer inpatient processes. This would entail fewer physical resources (such as beds), equipment and fewer patients on-site.

The size of wards, rehabilitation areas and A&E departments will be adapted to new flows of patients, and resources will be more flexible (suitable for different uses) rather than for a fixed purpose or specialty.

35. Hospital leaders will have an active role in the network of healthcare provision.

Hospital physicians and managers will consider the whole healthcare provision network as their area of influence and will develop an active role for care management and improvement, not only within the hospital but also for other providers in the network.

As leading hospitals become open organizations, these leaders will be the driving the collaboration between the hospital-based healthcare professionals and the community-based healthcare professionals.

36. Leading hospitals will be organized into disease process units with increased orientation to patient groups with common conditions.

Hospitals will be oriented to customer needs, with horizontal units in the organizational structure that cut across diverse medical specialties and institutes.

Diverse units will be created, such as "one-stop" clinics, to drive efficiency and quality of service with a customer orientation.

37. Leading hospitals will enable clinicians and other healthcare professionals to participate in the strategy definition and hospital management.

The leading hospitals will develop mechanisms to involve leading professionals in the definition of strategy and its implementation, and in the management of the different departments and areas.

38. The leading hospital's senior management will incorporate managers from other industries with little or no healthcare background.

Senior leadership team members will be professionals from other industries with experience and skills in business development and financial management and with heavy technological expertise.

39. The leading hospital will create and foster different partnerships at a local, regional and international level with different roles.

The leading hospital will be interconnected with other healthcare providers and other industry companies at different levels and with different roles, combining competition and collaboration.

For example, the leading hospital will have a leading role in research activities at a local level and – with improved health system planning that is more accurate and adapted to patient needs and system capabilities – the current competition of hospitals at a local level will evolve into collaboration.

DIMENSION 3: RESOURCES AND CAPABILITIES

40. Professionals will work in multidisciplinary and process-oriented teams, blurring the existing discipline boundaries.

Current task separation between physicians, nurses and other healthcare professionals will change, and professionals will take on activities currently assigned to other disciplines (nurses and physicians).

41. Professionals will be more motivated by short-term, monetary, and reputation recognition than by organizational and societal motivations.

In the next 15 years, the European public healthcare workforce will see a shifting motivation of professionals toward short term, explicit and implicit motivations (e.g., monetary and career development) and less transcendent motivation (e.g., participation in the development of the institution and doing good to patients).

This shift will probably create a conflict with the desire that the doctors be aligned with the hospital values and strategy.

42. New platforms for healthcare service delivery (home care, remote management) will define new professional roles.

Leading hospitals will need to develop new roles to help close the gap between hospital services and new remote management technologies and also to implement new service offerings. These roles such as health coaches (as an evolution of case managers who help the patients access the knowledge experts when needed and contact and follow up patients every day), and professions such as geneticists or genetic counsellors will become more popular.

43. Hospitals' workforces will contain a mix of contracting schemes with fewer permanent and more flexible personnel.

Hospitals will have flexible contracting schemes, to adapt to demand, with remote working models for professionals. These contracting schemes will also facilitate a balance of personnel renewing and maintaining the organizational culture and values.

44. The professionals will be compensated with new schemes based on results and job vacancies will be assigned on merit and not length of service.

The hospital will need to develop new compensation schemes and vacant positions will be assigned and renewed based on merit not on the professional's length of service (years in the department). Relying on the personnel's vocation and providing a good environment for professionals to develop their own research initiatives will not be enough to ensure the retention of the best professionals.

The hospital will implement a human resource management model that balances a mix of visionaries, high performers and efficient workers.

45. Leading hospitals will rely on a new generation of information systems including clinical decision support, telemedicine and mobile health.

Leading hospitals will use information technology as a strategic driver for change and innovation, and to drive the implementation of new services and the coordination of the provider network.

The new generation of healthcare information systems will require less investment and will be contracted using service models.

46. Leading hospitals will focus their investment in healthcare equipment and technologies for services that cannot be easily located in other healthcare levels.

Some diagnostic and treatment equipment currently available only in hospital settings will become smaller, more mobile and more economic – such as endoscopy equipment – and thus allow other healthcare levels to acquire them.

Leading hospitals will have to focus on healthcare equipment and technologies for services, such as ICUs, that will be more difficult to shift away from hospitals.

47. New healthcare technologies will allow existing specialties to provide services that are currently out of their service offering.

For example, radiologists will provide new intervention services that were traditionally in the surgical services domain.

48. Hospitals will reduce their ward areas.

Hospitals will reduce their number of beds, and hospital income will depend more on achieved outcomes and less on capacity and utilization.

49. Hospitals' resource planning will be based on planned patient outcomes in their catchment area and not on existing capacity.

Hospitals will undergo resource planning based on planned results for patients in their catchment area, defining the objective in terms of health outcomes and then working backwards to define the resources needed and the location of these resources in the territory.

50. Leading hospitals will deploy health technology assessment (HTA) units to evaluate the development of new healthcare services.

The hospital-based HTA units will have a growing role within leading hospitals to improve decisions on service development and innovation management.

51. Hospitals will use more distributed facilities to get closer geographically to patients.

Healthcare delivery locations will be defined more by the needs of the patients than by what is convenient for the providers.

52. Hospitals will decrease investments in equipment and facilities and will have more rented or service-based resources.

Hospitals will reduce capital investments with fixed costs (owning the equipment and facilities and running them with the hospital's own personnel) and, in contrast, increase operational variable expenses (renting or paying service suppliers for services provided).

53. Hospitals will develop risk-sharing models with providers.

The framework of relationships with hospital providers will change and introduce risk-sharing models, for example, in the provision of pharmaceutical products.

DIMENSION 4: PROCESSES

54. The hospital will increase interaction with patients, creating a continuous relationship.

Healthcare professionals will interact with patients in new ways, creating "liquid" relationships, where professionals will have to be more accessible for their patients and reachable through different communication means such as e-mail, text messaging and mobile apps.

55. Leading hospitals will have strong process integration (care coordination) with other health and social care levels.

Processes will be coordinated and co-directed by different health and social care levels. Integration of hospitals and primary care centers will be process-based and knowledge-driven, based on tools that will help to put this knowledge into practice.

This care coordination will create new operating models where some medical departments currently based in the hospital will move to primary care settings, with revenue models being adapted accordingly.

56. Healthcare will be more proactive, and leading hospitals will participate in anticipation activities (prediction, prevention).

There will be predefined process algorithms to supervise/monitor the flow of patients within the system based on the concept of anticipation of patient health progress (as in prevention, prediction).

The hospital will participate in these prediction and prevention activities in collaboration with primary care and other care levels, and new measures of health outcomes of prevention and prediction activities will be needed.

57. Clinical processes will be organized around teams with patients as a team member.

Teams will include hospital healthcare professionals, specialized social networks, clinical researchers and primary care teams, and representatives of other institutions.

The team will consider the patient (e-patient) as a team member. Participatory medicine will require the creation of a collaborative relationship in the team, providing access to all the patient data available and changes to the decision-making process, and the efficient and safe utilization of communication and often collaboration tools and social networks.

58. Leading hospital diagnostic services will integrate information from genomics tests.

Diagnostic processes will be influenced by new genomics technologies and not only by current symptoms, signs and tests, which will help to predict the future medical history of the patient, and also help prevent and control external factors that might increase the chances of developing some illnesses.

59. Leading hospitals will reconfigure their processes and structures to foster internal operational efficiencies.

Leading hospitals will reconfigure their organizational structures, processes and internal services to enable internal economies of scale (volume of activity facilitates improved quality) and scope (synergies in professional skills and competencies facilitate the provision of services at lower costs).

60. Hospital processes will be based on new information technologies for personalized and predictive services.

Medicine will evolve to become P4 – personalized, predictive, preventive and participatory – using health analytics for individual risk stratification and triage to help define personalized treatment plans.

61. Hospital processes will expand to cover home and other care settings.

There will be increasing potential to provide rehabilitation care and support for long-term conditions in citizens' homes and in community-based facilities.

Hospitals will have to adapt their processes to provide, monitor and manage these processes outside the hospital facilities using new technologies, such as telemedicine.

62. Leading hospitals will make a significant advance in operational excellence.

Process management in leading hospitals will rely on lean approaches, eliminating activities that do not add value to the patient and reducing waiting times between inpatient and outpatient procedures.

63. Hospital emergency units will be integrated with external units from other healthcare providers as a cross-organizational service.

Emergency care will be cross-organizational processes with almost no organizational boundaries, requiring hospital emergency professionals to work seamlessly with other healthcare organizations in the territory.

64. Hospitals will externalize non-core and support services.

Non-core and support services will be externalized and contracted based on agreed levels of service.

65. Health process management will be based on a new generation of clinical decision support systems.

Clinical decision support systems and clinical pathways will become a reality in everyday clinical use, due to the evolution of information technologies – both software and hardware.

New clinical decision support systems will be based on artificial intelligence and natural language processing algorithms that will enable proposals to be presented to the clinician about the causes of a patient's symptoms and also recommendations for treatment.

66. Leading hospitals will formalize clinical learning processes as valuable assets of the organization.

Leading hospitals will boost the clinical learning processes, with clinical knowledge development integrated into the direct care activities.

Closing the knowledge management circle, new discoveries and developments will be disseminated and applied to direct care processes.

DIMENSION 5: RESULTS

67. Leading hospitals will use new indicators based on outcomes rather than activity.

Leading hospitals will guide the system to replace current process indicators (such as length of stay, use of resources and number of cases treated) with new indicators based on process outcomes.

68. Leading hospitals will use indicators based on patient-reported outcome measures.

Patient-reported outcome measures will be used by hospitals as a means of collecting information on the effectiveness of care delivered to patients as perceived by the patients themselves.

69. Hospitals will access data outside the hospital to measure results on patients.

The need to measure healthcare results will mean that hospitals will have to collect data from other healthcare providers and institutions.

70. Leading hospitals will compete on outcomes, delivering the best possible health outcomes at a given cost.

This scheme will involve using outcome data to improve clinical processes, linking reimbursement to specific outcomes and sharing risks with insurers in the provision of a complete set of health outcomes for a given population.

71. Hospitals will have to deal with an increasing personnel turnover with new compensation schemes and other motivational initiatives.

Hospitals will develop flexible compensation schemes for professionals that link hospital and business unit results with recompense for personnel, to leverage alignment with the hospital strategy and avoid high turnover rates among highly skilled professionals.

72. Hospitals will continue making an important contribution to the economy of the community and will expect society to be involved with the hospital development plans.

Hospitals will continue making a significant contribution to education and employment, and the links of the hospital and society will be stronger. Consequently society will be involved in the hospital development plans.

73. Patient experience will be evaluated and used systematically to improve hospital services.

The hospital will strive to improve the patient experience, in addition to providing the best and most effective medical care, in the most efficient way.

Hospitals will create units or "the office" of patient experience, to disseminate best practices from inside the hospital and outside service companies.

74. Leading hospitals will drive transparency on safety and evaluation of outcomes.

The growing evidence of preventable harm resulting from some hospital treatments will increase the pressure from governments, insurers and consumers for transparency of public health service safety.

Leading hospitals will facilitate measures and provide evidence to facilitate a choice of healthcare providers to patients and the administration.

75. Hospitals will further develop research and education activities that will become more significant sources of income.

Leading hospitals' contribution to research and education will be evaluated and correspondingly will represent an important line of income in leading hospitals' balance sheets.

76. Leading hospitals will develop international service offerings to become less dependent on local health system contractors.

Leading hospitals will market their services internationally regardless of their offer in the region to increase incomes from international patients who require highly complex procedures.

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