The Collider 2021

Sectorial Challenges

The Collider

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Healthcare

The health sector faces major challenges in relation to improving R&D+i for new solutions, optimising the health system and exploring new distribution channels. Furthermore, using technology, changes are being sought throughout the chain: improving diagnostics, managing treatments and solutions, monitoring and supporting patients.

Principal challenges for the healthcare sector

Psychological and emotional support for the patient throughout the cycle of the illness

The importance of offering effective solutions both for treating the pathology of the patient and for keeping the patient informed has been demonstrated. However, more and more importance is being placed on supporting the patient psychologically and emotionally. Science is finding more and more evidence regarding the relationship between optimism and health. A positive attitude does not only prevent illness, it also helps with recovery and healing. Positivity becomes the invisible medicine which every patient needs to obtain.

Improving the diagnosis of diseases and the appearance of complications in patients

The effectiveness of health treatments and services is closely linked to what stage of the pathology the patient is at. Thus, one of the key challenges is to improve the diagnosis of patients in the early phases of the pathology or to detect, as early as possible, the potential appearance of complications in patients who have already been diagnosed.

Patient access to their health data and communication with healthcare agents

Health is a universal good for the benefit of everyone and, regrettably, there are many health systems which do not allow patients to access their medical records. The problem is not one of technology, but rather that there are numerous barriers (data security, accessibility, integration, platforms, etc.) preventing patients from gaining access to their medical records, containing the most important information and in an aggregated form. Accessing their records does not only allow them to find out how their health is progressing and the health outcomes of their treatments, it also allows them to share them with and show them to all the health professionals they interact with.

Furthermore, numerous studies have shown that patients who are well informed and engaged with their pathology (empowered patients) use health resources in a more intelligent manner and make better decisions. We must, therefore, inform and train patients with regard to their pathology, from how it progresses to the process to be followed and the treatments available.

Tools for the continuous monitoring of the patient's condition and the health outcomes of the actions taken

It is important to have the patient as an ally in the battle for their health and one of the ways in which we can get them engaged is by showing them the health outcomes they are achieving and the good work they are doing with the decisions they are taking. But it is not only the patient who needs to know about their condition; all health professionals and healthcare providers must be aware of the true data which show the patient's progress.

One of the areas which are going to see the most development is the continuous monitoring of the patient. The development of technology allowing us to capture information from the patient, or to be in contact with them, is going to open up an infinite range of benefits, as we will be able to make decisions which are better adapted to the real circumstances of the patient.

Expand health services ('beyond the pill') that complement the drug and respond to the real needs of patients, in addition to optimizing treatments.

There is a need to optimise services so that they provide the best outcomes and performance. One way of achieving that is to expand the characteristics of the service in order to be able to meet the patient's needs. There are many pharmaceutical companies which have committed themselves to 'beyond the pill' strategies. That is, offering healthcare technologies to accompany a treatment, in order to improve its functionalities and be able to manage the patient's needs in a comprehensive manner.

Those companies, which include pharmaceutical companies, medical device manufacturers, private insurers and diagnostic test manufacturers, face a great challenge in order to optimise their healthcare services and they are working in various fields.

Prevention strategies to reduce the incidence and prevalence of some pathologies

Up to now, all of the challenges we have looked at relate to better management of the pathologies suffered by patients, but, without doubt, one of the discussions now starting to be had is about whether we can change from a treatment model to a prevention model. Can we put in place programmes which prevent the potential appearance of future diseases?

Improvement in the information management that the health professionals of the patient have to improve decision making

The health system is characterised by the large amount of data it has at its disposal and has to manage. One of the key challenges is the rational use of that data and improving management, in order to improve decision-making. The health system is characterised by the large amount of data it has at its disposal and has to manage. One of the key challenges is the rational use of that data and improving management, in order to improve decision-making. However, there is more and more data available to us: telemedicine, sensors, apps, medical records and human genome sequencing.

Appearance of new digital sales channels and new distribution models (e.g. Amazon)

In relation to available market solutions, there is a great deal of debate about how to purchase them and how to get them to patients. In other markets, sales and distribution channels are being completely transformed. The sale and distribution of healthcare solutions is not an exception. What is it possible to work on?

Telemedicine: Support for patients and healthcare professionals through digital devices

Cross sectorial support to vulnerable patiens via community services engagement

Other challenges for the health sector

Improving coordination between key health system actors:

- o Expediting decisions by health authorities in order to accelerate the approval of, and access by patients to, the most innovative therapies, without any kind of restriction
- o Encouraging open innovation and collaboration between healthcare companies (pharmaceutical, insurance, diagnostics and medical device companies) and other healthcare actors
- o Improving communication between healthcare companies (pharmaceutical companies, medical device companies, diagnostics companies, etc.) and health professionals and other key actors

- **Ensuring the sustainability of the health system given constantly increasing demand and the use of health resources**

- **Greater cover for new health conditions to be treated without financing**

- **Improving the reputation of and the relationship with the pharmaceutical sector**

- **Ensuring the financing of new medicines and other healthcare solutions/services**

- **Having the relevant information to improve the strategic decision-making of healthcare companies**

- **Innovating in the continuing training we offer to health professionals. They are saturated with undifferentiated training.**

- **Improve clinical trial management of new drugs / indications to reduce research lead times and increase your likelihood of success**

- **Bringing health systems closer to patients to improve the prescription-dispensing-drug administration value chain**

Industry 4.0

Industry 4.0 faces various challenges in order to continue robotising and integrating new technologies into the chain, but in balance with its profitability, pursuing sustainability with clean and recycling solutions, and also managing to use the vast quantity of data which is generated, to improve processes, scalability and personalisation.

Principal challenges for industry 4.0

Processes automation and robotization

The robotisation of production processes can make possible the concept of the 'smart factory', which is one of the pillars of industry 4.0. However, total robotisation is yet to arrive and many processes continue to be done manually. How can we speed up the change?

Using 5G in production processes

5G technology is about to be implemented as standard in many sectors. Notable among its many benefits is the ability to send a large amount of data with a latency of milliseconds and a very efficient use of energy. How can 5G transform the production processes of industry 4.0?

Technological integration of the value chain

Industry 4.0 offers enormous potential for optimisation, if the different production processes of the value chain are coordinated in an intelligent manner. However, that requires collaboration between different companies and countries and presents challenges relating to security, trust and coordination between different legal frameworks. How can we overcome these barriers to drive greater integration in the value chain?

Maintaining the efficiency of production at scale with personalised products

The demands of the end consumer require production processes to adapt to customisation, which, with current capacities, means a reduction in efficiency and a possible increase in costs. How can industry 4.0 allow such personalisation in an efficient manner?

Optimizar la extracción y uso de los datos adecuados (el dato por el dato vs dato útil)

The proliferation of 'big data' has created mechanisms for compiling data which, in some cases, are not properly analysed or interpreted. The challenge is to focus on the data which are relevant to the most important challenges. How can we determine what data and challenges are most important?

Scale up production deployment of automation and RPA solutions

Alternative sustainable solutions to the use of plastic for the transport and conservation of finished products

Valorise waste to build a circular production process

Define predictive models for production processes in the industrial field

Use and generation of self-cleaning and disinfectable materials quickly

Other challenges for industry 4.0

- **How can we make our IOT platforms profitable?**

  The creation of 'Internet of Things' platforms may generate efficiencies in the deployment and management of a fleet of connected devices. However, its development requires an investment which, in some cases, has not been recuperated, made worse by the fact that the market is saturated with platforms and also that most manufacturers create their own systems.

- **What do we do with the people that 'we will no longer need'? How do we adapt the workforce to the use of digital tools?**

  The advent of artificial intelligence is replacing qualified manual work which previously allowed the development of a middle class. One option could be to adapt the current workforce to the new scenario. If not, what alternatives could be offered? How can we minimise the potential social cost of the disruption of the labour market by new technologies?

- **What decisions do we leave to machines and which ones do we entrust to people?**

  Certain ethical and speed-related criteria can lead to a hybrid decision-making process, involving people and machines, being considered. The combination of machines and people may offer an advantage in the form of certain complementary skills; the challenge is to find out what they are.

- **How can we know whether the technology we are committing ourselves to is the one that will end up becoming established?**

  In some cases, the convergence of technologies imposes industry standards which could make industry 4.0 more efficient and bring with them greater integration of the value chain. On the other hand, the digitalisation of production processes requires a considerable investment and it is a question of knowing whether the technology opted for is the one that will end up becoming established as standard.

- **How can the whole process of digitalising an industry be financed?**

- **How can we automate 100% of an industrial laundry?**

Energy

The energy sector faces economic and environmental challenges. The appearance of new production technologies is accompanied by a certain degree of liberalisation of the sector, allowing the creation of new consumption models. New possibilities present themselves for empowering people and all of that will be accompanied by new business, production, distribution and marketing models.

Principal challenges for the energy sector

Electrifying the heat (residential and industrial processes)

Waste from everyday life and certain production processes contains energy which could be made use of, but which is currently wasted due a lack of certain incentives, logistical capacity, etc. How can we ensure that 100% of waste is made use of?

Optimising the processes for producing biofuels

Biofuel processes are not currently an ideal alternative to the energy model due to the major impact they continue to have on the environment and on food prices. How can we optimise the process in order to minimise that impact?

Achieving a 100% renewable energy system

The current energy system entails the consumption of limited resources and generates externalities which are harmful to the environment. How can we accelerate the change to a 100% renewable model?

Reconciling the digitalisation of strategic processes with data protection and cybersecurity

The digitalisation of production processes creates vulnerabilities to cyberattacks, which put the viability of business models and the security of the company and the country at risk. Opening production processes to new protocols also exposes them to new threats. How can we mitigate that risk?

Maximising self-consumption and local generation in an efficient manner

Own use and local energy generation (integrating the sources and uses of energy within a single area or neighbourhood) may be a solution for speeding up the reduction of greenhouse gas emissions. Positive energy districts (PEDs), energy communities, etc., are some examples of new energy models. How can this change be speeded up?

Mobilize citizens for network management and how to make city platforms between sectors (water, etc.) One of the barriers to communities for local energy generation and consumption is the mobilisation of the public itself. The public has to understand that it plays, and will play, an important role, and it must have the tools available to it to be able to influence the management of the supplies. How can we make it possible?

Balancing the uptake of new technologies with the amortisation of current energy assets (generation, distribution and transport)

The energy model leaves a legacy of energy generation, distribution and transport assets. The profitability of that infrastructure could make the change to a new energy model difficult, as there is an interest in maintaining them and recovering the investment made. How can we make use of that infrastructure in a new energy model?

Maximising the personalisation of the service/product, improving the contracting service and reducing times

Introducing new economic models based on technologies which make it possible to provide the network flexibility

Automatization of processes and remote operation

New energy technologies (hydrogen) and O&M digitalization (sensors, prognosis,...)

Digital channels for interacting with customers

Other challenges for the energy sector

- **How can we harmonise and give effect to European and global energy policy using market tools?**

  A solution to reduce emissions and incentivize the switch to renewable energy sources can be the creation of an emissions market. However, these markets are limited by the lack of global integration between different states, legal frameworks, etc. How can we make them effective?

- **How could we improve the experience of customers and/or reduce costs for services and products involving digital transactions?**

- **How can we keep up the development of new technologies in the long term: hydrogen, nuclear fusion, etc.?**

- **How can we denuclearise the energy system?**

- **Is it possible to maintain the energy supply without relying on nuclear energy?**

- **How can we make use of ICT (IoT, AI, comms., etc.) to create a more efficient, cheaper and cleaner energy system?**

- **How can we introduce a BIM model throughout the value chain of the sector?**

- **Improving and optimising the energy system of the different sites of a company.**

- **How can we improve the refrigeration of tanks of liquids?**

- **Take advantage of excess waste / garbage to generate energy**

- **Optimize biofuel generation processes**

- **Apply VR / AR to manage electrical risks, device autonomy, ergonomics, privacy, public spaces, etc.**

- **Balance the penetration of new technologies with the amortization of current energy assets (generation, distribution, transport).**

Mobility

Mobility faces challenges in relation to bringing down the cost of technologies, such as the lithium battery, and the appearance of new business models likely to have a major impact on cities, which are more and more congested on account of the rapid process of urbanisation. Also, increased public awareness requires changes to a sector which generates 20% of global CO_2 emissions.

Furthermore, in the rail mobility and multimodal logistics sector, we believe that this digital transformation is taking place along four axes: transformation of the customer experience, transformation of the operating processes, training of employees and transformation of the business model. To put it another way, digital mobility, the digitalisation of operations and on-demand logistics.

Principal challenges for mobility

Optimising the infrastructure for autonomous mobility

The autonomous vehicle promises to be a solution for road safety, congestion in cities, environmental impact, etc. However, there are many factors which limit its development and implementation, including the design of the cities itself. How can the design and adoption of autonomous vehicles be speeded up?

Reducing the carbon footprint of transport

According to the World Health Organisation, transport makes up more than 20% of the CO_2 emissions generated globally. How can we reduce that?

Changing the paradigm from a vehicle with an energy source (battery, fuel cell, gas, etc.) to a vehicle capable of making use of energy (e.g. solar)

The current mobility model depends on the deployment of charging points, whether for hydrocarbons or electricity. How can we make cars make use of energy sources within their reach, in order to ensure their autonomy and change the mobility model?

Ensuring that shared vehicles are properly sanitised

Shared vehicles, by definition, are used by different people and, in the case of a pandemic such as the present one, could become a means of transmission for diseases. How can we properly sanitise the vehicle between uses?

Access to information of the entire logistics chain to optimize the flow of goods and routes

Transport and logistics need greater integration of the different modes of transport available at any given time, in order to offer flexible and efficient solutions to loaders/logistics operators/end customers. That would make it possible to optimise flows of goods and reduce the impact of traffic in terms of CO_2 emissions, congestion on roads, accidents, illnesses related to environmental pollution, etc. A platform would allow open access to multimodality and in a manner which would add value (in relation to environmental and economic aspects and the competitiveness of the supply chain, etc.). At the same time, it would offer the possibility of creating new transport units which were modular, interchangeable, adapted from origin to final delivery (last mile), etc.

Know the occupation of spaces in real time

The digital twin concept combines the visualisation of an asset or the behaviour of the system in operation, along with the simulation of its performance and expected lifespan, in order to operate the system better and anticipate possible faults, with real-time and future-oriented prediction of operational aspects.

Improve traffic information in real time on low-density networks and at an affordable cost

Interoperability and safety improve and ensure the smooth and safe movement of passengers and goods in rail vehicles throughout the European Union and even beyond its borders. The aim is to ensure that all European rail transport networks are adequately secured and can detect safety incidents in an efficient manner.

Sustainable urban charging to avoid congestion

Improve air quality in public transport

Infection detection and prevention in airports

Other challenges for mobility

- Connected cars and smart cities offer numerous possibilities for additional services and new business models How can we take advantage of it in designing new financial services?

- Change the paradigm from a vehicle with an energy source (battery, fuel cell, gas,...) to a vehicle capable of harnessing energy (example: solar)

- Adapt or construct buildings for charging electric vehicles

- Harmonize security systems with digital technologies that allow crossing borders without adding extra costs or loss of time

- Provide new financial services by taking advantage of communication between different devices, vehicles and / or infrastructures

Agri-Food

Innovation in food and agriculture is a sine qua non condition to overcome the global challenge of a demand for food that will explode in the coming decades. The food industry is experiencing a wave of disruptions in how the food we eat is produced, how it is packaged, how it is delivered, or even how it is consumed.

Investments in technology will continue to increase to help deliver on the promise of healthier and more sustainable food systems for the world.

Principal challenges for agri-food

Eliminate the environmental impact of packaging in the food&beverage industry

The waste generated by our consumption habits is in the spotlight due to its impact on the environment and our health. Single-use plastics from the food industry receive special attention due to their volume, duration and visibility in our lives, and companies are beginning to notice this attention in their business, affected by the rejection by increasingly aware consumers and by laws that make it expensive or prohibit its use. Some companies are exploring new materials, packaging formats and new business models based on reuse to find an alternative, but it remains to be seen what the final solution will be.

One of the most important challenges is that it is very difficult to replicate the attributes of plastic: impact on food safety, comfort, cost, etc. Current alternatives, such as bioplastics or cardboard-based materials, do not quite eliminate waste or cover the needs for which plastic is used in the first place.

Support the HORECA sector to adapt to a new reality and attract customers again

One of the sectors most affected by the pandemic has been the restaurant sector, as it is pointed out by several governments as a catalyst for the spread of viruses and is so strongly linked to tourism. In addition, we must add the changes in consumption habits that have accelerated during 2020, such as the boom in delivery and takeaway, in addition to the impact that remote work may have and the appearance of new models such as the dark kitchen concept. Although the duration and intensity of this change in behavior remains to be seen, there is no doubt that the sector will have to be able to reinvent itself and adapt to a new reality. The effects may have repercussions in other sectors, due to the number of small and medium-sized companies that supply products and the high margin it generates for the large beverage brands that market their products in HORECA and retail.

Eliminate environmental impact of industrial food waste or find uses to neutralize its effects

The food industry is responsible for a quarter of greenhouse gases, occupies 50% of the habitable land and accounts for 70% of annual water use. In addition, the use of pesticides and fertilizers accounts for more than three-quarters of eutrophication, the excessive enrichment of nutrients in an aquatic body that causes imbalance in ecosystems and affects many other areas.

How to reduce the environmental impact of the food production industry (greenhouse effects, water usage, pesticides, impact on the equilibrium of ecosystems, etc.)

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How can we improve our health through food

For the first time in history, more people die from overconsumption than from lack of food. Although we are living longer than ever in history, obesity and poor eating habits cause a large part of chronic diseases that also consume an important part of the budgets of health systems and have an impact on the economy of individuals and of the countries.

Advances in genomics and other fields allow us to better understand the impact of the food we eat on our health.

How can we improve efficiency of productive processes using new technologies to bring down cost and increase productivity

"The computer age can be seen everywhere except in productivity statistics," said US economist Robert Solow. The year was 1987, but today it could be stated even more emphatically with technologies such as the internet of things, drone technology, artificial intelligence, etc. Despite the explosion of new technologies, growth in productivity - the level of production per amount of resources employed - is stagnant below the rate that some experts point out as necessary to affordably meet the demand of 10 billion euros. inhabitants in 2050, and the 2030 sustainable development goals call for doubling this agricultural productivity in the poorest countries.

How to empower consumers to be better informed on the health, environmental and economic impact of what they eat, given the abundance of incomplete, misleading and false information

Consumers are more aware of the economic, social, human and environmental impact of their consumption decisions, and they demand clearer and more transparent information in order to make their own decisions. However, this information is sometimes scarce, hampered by the opacity of global supply chains and the complexity of assessing the effects.

How to shorten the supply chain from farm to table, increasing income for producers and reducing costs for consumers

A very small part of what a consumer pays for food goes into the producer's pocket. This is due to the complexity of the logistics and distribution chain, in which there are also some market failures such as the appearance of oligopolies and oligopsonies. This phenomenon reduces the purchasing power of both parties, since it increases the final price and decreases the profits at the beginning of the chain.

How to create alternatives to animal products that are better for health and the environment and do not compromise on the consumer's eating experience

Meat production has a detrimental impact on many levels, from the life of the animals that are raised for consumption, to the effects on the environment, through the implication it has in the creation and spread of super bacteria and viruses.

There are initiatives to create alternatives of non-animal origin or from material created in the laboratory. The challenge is to ensure that this product meets the requirements from the consumer's point of view, both organoleptic, experiential or even nutritional.

How to create resilience in crops and food production to face ecological disaster

El cambio climático pone en riesgo la seguridad alimentaria y económica a escala global, especialmente en los países en vías de desarrollo. Inundaciones, fenómenos meteorológicos y plagas, como la plaga de langostas sufrida por los países del cuerno de África, son sólo algunas de las consecuencias que amenazan a una parte muy importante de la población.

Si bien uno de los enfoques es la lucha contra el desastre ecológico, los productores no pueden esperar de brazos cruzados que el problema se resuelva, y deben buscar formas de mejorar la resiliencia de sus cultivos y producción.

Other challenges for agri-food

During the workshop, a large number of challenges were listed that have either been grouped into the list of 10 main challenges, or were considered secondary but equally of interest. A non-exhaustive list is provided below.

- **How can we avoid chemical thickeners**

- **How to get the texture of meat in vegetable substitutes**

- **How to trace products throughout the value chain**

- **How to improve the nutritional properties of food while maintaining palatability**

- **How to personalize the diet to the individual**

- **How to reduce the water footprint of food**

- **How to take advantage or value of crop waste**

- **How we can know information about crops in real time**

- **How we can improve job safety in the industry**

- **How to protect the health of diners in a restaurant or bar**

- **How to help small and medium-sized businesses to be more competitive**

- **How we can improve the quality and perception of frozen food**

- **How we can better preserve the properties of food**

- **How we can optimize the profitability of the bar and restaurant business**

- **How to make contactless payments and have tools for social distancing**

- **How to protect our employees in areas of health and safety**

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