Question 1

a)

In order not to inflict the company with technological/digital debt I would propose that the new solution is thoroughly implemented in the whole supply chain. A quick fix solution would improve the situation on the short term, but down the road but it will accumulate interest in the form of increasing investment needs to keep up with the market needs, thus making it harder to efficiently implement technological advancements. I will therefore propose a longer term strategy that will take time to implement, but will in the end be more effective and efficient.

Firstly we have, from the assignment, identified the goals of this digital transformation; faster delivery and real-time package tracking. These goals seem to be intertwined, better control and traceability of packages gives more data and information on which to improve delivery times. The first step should then be tracking. As explained with technological debt it is my opinion that when improving tracking for customers we should also transform the way the company traces and monitors all parts of the supply chain. A complete transformation will give realtime data to customers on where their packages are(even within the logistics centers) but should also give the company more detailed data on the flow of stock in their supply chain, which they in turn can use to analyze processes, identify bottle necks and model new solutions that ultimately will reduce delivery time.

Only after implementing the new tracking capabilities and retrieving important information on all parts of their logistic operations, and analyzing this information, should the company decide on “faster delivery” measures. The new implementations for faster delivery should be built upon the data that is collected by the increased monitoring and concreate measures cannot be stated at this time. The broader outline for improved delivery time can be outlined:

They need to reduce downtime for packages.

- Connectivity between the different parts and actors should be increased and logistics should be adjusted real time based on actual situation, not only planed situations.

New means of delivery.

- Using emerging technology to transport and deliver packages and as pickup points.
- Last mile delivery solutions in cities that does not use big clumpy delivery cars exposed to congestion and parking regulations.

b)

For the tracking part I propose that RFID chips and readers could be used to wirelessly identify individual packages, automatically, in all parts of the supply chain. When scanned the information should be broadcast to the cloud and linked to customers UPS app. When installing RFID sensors UPS should also install sensors for them to internally monitor package flow, this data as well as RFID data should be broadcast to a modern logistic MRP or warehouse management system, SaaS based in the cloud, in order to have full insight on

package flow and a better starting point for further digitalization processes. Delivery cars should be GPS monitored and broadcast their location to the cloud with 5G. Delivery cars and warehouses/logistic centers/airport hubs should communicate thru this modern SaaS logistic service that allows for realtime data flow. The company should also invest in AI algorithms that can calculate optimal pickup and delivery schedules and routs based on the realtime data and historic/archived data from the company as well as external metadata such as traffic.

As for last mile delivery UPS should be a forerunner in development and testing of autonomous delivery vehicles, these can be smaller cars that are more space efficient(no need for driver) and drone deliveries that are not affected by traffic and congestion. Automatic pickup spots should also be technology used to minimize delivery time, in stead of home delivery in citys(where people live close) it would be faster to have pickup automated boxes where all the packeges for that neigbourhood is delivered and customers can go pick up them self. A combination of these solutions would be best.

c)

As Chief Information Officer my role would be to have strategic lead on the technological operations and innovations in UPS. It involves laying the plan for disrupting or defending the company from digital disrupters and, and laying financial and innovation plans for future developments. Another important part of this role is the organizational culture of the company. My role would be to successfully shift the companies culture so that existing employyes are following the technological advances of the company and securing digital talent trhu headhunting/recruiting but also thru retooling existing staff. It is essential hat old and new staff learn from eachother and cooperate.

d)

To bridge the mentioned skill gap the business would employ two strategies. Recruitment and retooling. New digital talent in to the business and education of some of the existing staff. It is important to integrate existing staff into the new direction and devote the proper attention to a holistic cultural shift in the organization. Consultant could be used but I would not recommend it as it is expensive and would make you dependent on them instead of beeing self reliant. Teach a man to fish type of thing.

e)

11. Sustainable cities and communities – avoiding congestions and air pollution by using alternative delivery methods to car.

Decent work and economic growth – Keeping existing employees and retooling them.

Question 2

a)

In order to digitally run collaborative lab experiments from remote locations for students we I define some features that are needed.

Accessible:

- It must not be expensive as students are on a budget.
- It must be online

Collaborative:

- It must have live communication.
- It must have shared view of lab virtual lab equipment and information.

Real experience:

- It must be interactive
- Virtual objects must behave as they do in real world.

Learning:

- It must have difficulty
- It must be possible to do wrong

Based on these features the solution to the problem could be an online platform where students each have their own(or in groups) viritual lab equipment. The teacher also has their own equipment and students have the possibility to view both their own virtual equipment and their teachers virtual equipment. The virtual equipment should have all essential features of the real-world equivalent also the ones that enable for wrong decisions and faulty use. The platform should have a text chat and voice chat.

b)

Monitor:

- Screen monitoring
- Webcam monitoring

Analysis:

- Identify if more than one person on webcam
  - Identify if person missing from webcam.
- Identify communicative tools
  - Certain webpages or application
  - Using phone on webcam
- Identify person on webcam:
  - Facial recognition to match students picture

Realtime feedback:

- If criteria for possible suspicious action met, then notify student and exam personnel

The solution would monitor the students screen and webcam, use AI algorithms with video recognition to identify suspicious behavior on screen or on webcam, if AI identifies such behavior the student and relevant school personnel would be notified and recorded evidence could be evaluated.

c)

AI based video recognition to identify suspicious actions. It would need to be a supervised algorithm trained on labeled and tagged data(images) of the situations it would be trained to identify. Such as webpages, two people on webcam etc.

d)

One challenge of online learning is that not all students have the same access to broadband connections or sufficient hardware(computers). It can result in a digital divide between the people who have access to online learning and the people who have not. The challenge is to democratize broadband connections to ensure that no one is left behind.

e)

4. Quality education. Effective virtual labs would allow more people to get quality educations that require practical experimenting. You would be able to get proper lab experiments no mater where you are. 10.:This would also improve equality as accessibility and such courses would be increased and cost would be decreased (for people in countries without free education).
10. Reduced inequality. It would be more difficult for people with money to “buy” good exam results, for example, by hiring someone to take their online exam.

Question 3

a)

Evaluate patient's needs:

Database of journals need to be collaborative between different institutions. And Continuously updated in Realtime

Monitor key values on patients and make them available realtime on database (cloud)

Virtual doctor visits

Telemedicin

Manage resources:

Staff

Remote monitoring of patients.

Connectivity between different departments

Lean processes

Equipment

Track equipment at all times, so that it is not misplaced.

Predictive maintanace

The hospital should have a cloud based management service, where all patient information is stored across institutions and doctors and uploaded in real-time. Monitoring of patients should be accessible from remote so that staff would not need to physically enter a patients room to verify vitals. Full access to updated patient journals will help the decision making process go faster and be more accurate.

Hospital should also offer telemedicine services, such as virtual doctor visits.

A feature on their management system would be to sign off on equipment.
Equipment should have designated places and sensors monitoring if they are not in place. Personnel should use RFID tags with their credentials to quickly be able to verify and unlock equipment so that it shows who were the last to use it.

Essential equipment should have sensors connected to the management system for monitoring. The management system should archive key data on all essential equipment and use that data in combination with real time senor data as input for predictive maintenance algorithms, in order to reduce equipment downtime

The hospital should assess their procedures and evaluate them from a lean prespective and have groups that work based on an agile project structure to enhance these prosesses and find more optimal time reducing processes.

b)

IoT sensors on equipment, monitoring of equipment functions, number of uses, reporting errors, as well as who uses them.

Cloud based services such as SaaS, PaaS, or IaaS. To connect all parts of hospital activities in one place. Including Staff, patients and equipment.

Video conference feature where patients can consult doctor online

c)

Advantages of implementing this solution with the management system to the cloud is that it would be much cheaper to implement, it would allow for cross institution patient journal keeping across different hospitals and doctors' offices and the hospital would not need full on site infrastructure and digital competence.

The downsides is security surrounding the very sensitive information that is patient journals, being stored in the cloud susceptible for hacker attacks or data breaches. Sensitive data being stored in remote locations. And possible downtimes to the host of the cloud or periods with slow computing times. Or even the hosting company going bankrupt.

~~There are off course several different types of cloud based services. Four different types are:~~

~~a) Iaas Infrastructure-as-a-Service, where the infrastructure is the service(Servers, network, storage etc) and the OS middleware applications etc are self managed~~
~~b) PaaS Platform as a service, where the infrastructure and platform including OS is the service you manage data and applications~~
~~c) SaaS Software as a service, the full package, applications data software Os infrastructure are provided as a service by a host.~~

There are several ways to implement cloud services, here are four common models:

1. Public cloud – cloud infrastructure is owned and maintained by cloud provider users pay rent to use it(meterage based cost)
2. Private cloud – Cloud exlusive only for one company. Cloud infrastructure and maintenance is done by the company it self or third party or both.
   Hosted on site. Offers greater control over cloud resources, data security and compliance.

3. Community cloud – Resembles a private cloud, and is pretty much a private cloud for several users(companies). Users that have similar needs can go together on a collaborative(community) private cloud. It is more cost effective, but users must share bandwith and storage space.
4. Hybrid cloud – Integrated model of public and private some parts (sensitive information) are hosted on site. While hybrid solution also gives acsess to public cloud services as SaaS PaaS IaaS for additional realtime storage or extra computing capacity as needed.

d)

As they do not have the skills or resources to finance develop and run such projects I would recommend that they use a suitable (SaaS) software as a service solution with all features(infrastructure, platform and software) included, in order to deliver services on the right time.

e)

3: good health and well-being, thru an accessible and efficient healthcare service.

Question 4)

a)

Defensive strategy: Protecting businesses from competetors and disrupters.

A defensive strategy seeks to “keep up”, and can be exemplified by legacy internal combustion engine (ICE) car manufacturers adopting electric drivetrain technologies to keep up with emerging market demand. It could also be exemplified by brick and mortar shops venturing into digital online shops, as to keep their relevance in an online dominated shopping environment.

Offensive strategy: Disrupting the rest of the industry

An offensive seeks to disrupt the industry, with new uses of technology, threatening existing industry actors. It can be exemplified by Tesla who disrupted the car industry with faster, cheaper too run, continuously updated, cars running on a more environmentally conscious electric drivetrain. Challenging established car manufacturers for large marked proportions and causing them to adopt EVs, as consumers perspective on EVs changed.

b)

Covid-19 made governments impose restrictions on citizens. People were initially told to stay home, and not interact unnecessarily with others.

This meant that people where now almost exclusively accessible thru online services, as people where recommended to work from home. Companies had to adapt to the new reality quickly.

This resulted in video conference serviced being adopted on a huge scale, the service providers had major increase in customers and competitiveness increased resulting in better solutions. But mainly people were forced into a cultural shift where we had to adapt to virtual meetings as the new normal. One would have difficulties picturing the oldest generation of office workers adopting video conferences, this fast, or at all without the Covid-19 crisis making it a necessity

Organizational culture was restructured from physical office hours to virtual precence in weeks months instead of years.

The restrictions also meant that going to the doctor was more complicated than before and this made private doctor offices expand and adopt virtual doctor technologies.

As Covid-19 restrictions eased and people could socialize in small groups at bars/restaurants, new technologies like Ordr were adopted that made ordering food and drinks from the table possible. This became widespread and is now completely common, it was extremely unusual before covid-19.

c)

Technological debt describes the cost of limited/simple technological solutions, that will require rework in the future. If you choose a halfway measure that fulfills your needs to day, but not down the line, you will have to rework it at some time. The longer you wait the more the cost will be to rework it into a proper technological solution, that is competitive, and we can say that the technological debt will accumulate interest over time.

Technical debt insinuates that it may be more cost effective to do a proper, full fledged, adoptadtion/restructure the first time around not splitting the industrial digitization process into several small steps.

d)

Some of the leading indicators of failure in an industrial digital transformation(IDT) are;
Lack of IDT strategy,
too little focus on cultural shift,
Self-absorbed focus, not updated on industry trends, customer needs/perspective
Lack of top – down support
Execution misaligned with initial plan.

e)

Lights-out manufacturing is a state of manufacturing where everything is fully automized and the only need for human interaction is maintenance and repairs.

One of the key industrial digital transformation drivers towards Lights-out manufacturing is standardization of industry standards. Industries are starting to see it beneficial for all actors to move towards lights-out manufacturing, (as was the case for semiconductors), and too achieve this they have to agree on industry standards that makes it possible to invest and develop specified facilities with lights-out manufacturing capabilities for products specced to these standards. These investments would be too risky without the industry standards.