

MET IIB Paper 2 – Cribs

Question 1

- (a) Define *industrial policy*.

[15%]

- (b) List, explain, and give examples of activities that occur within the four phases of the *policy process*.

[25%]

- (c) You work at a government department responsible for increasing the productivity of UK manufacturing industry. You have been provided with a research report that shows how adopting digital technologies could help increase the productivity of manufacturing firms.

- (i) Describe the process you would follow to manage a *change programme* to increase the adoption of digital technologies across UK manufacturing industry.

- (ii) Discuss how you would ensure the involvement of manufacturing firms of all sizes and sectors in the design and delivery of any government activities to support the adoption of industrial digitalisation technologies.

- (iii) Explain how you would assess the success of such an industry-wide *change programme*.

[60%]

Crib for question 1

- (a)

Basic answer – “The industrial policy of a country is its official strategic effort to encourage the development and growth of part or all of manufacturing and other sectors” – EGP module slides

Good answer – might add “The government takes measures aimed at improving the competitiveness and capabilities of domestic firms and promoting structural transformation”
– EGP module slides

Excellent answer – would add examples and characteristics such as:

➤ Selectivity (general vs selective industrial policy)

A selective industrial policy (‘vertical’ or ‘sectoral’) can deliberately favour particular sectors or even firms targeted

A general industrial policy (‘horizontal’) concentrates in providing things like education, R&D and infrastructure that benefit all industries equally

➤ Diversity of industrial activities

An industrial policy can cover a range of sectors beyond manufacturing

➤ Geographical scope

Although they tend to be established at national level, industrial policies can also be developed at regional/local level

– from EGP module slides

(b)

Basic answer:

The policy process

The policy process is the path governments follow from how societal problems are defined and brought to the public agenda to the selection and delivery of policy solutions.



Good answer: should add detail on each phase:

Agenda setting: Process by which problems and alternative solutions gain or lose public and elite attention. The agenda itself = a collection of issues or problems that come to the attention of members of the public and governmental officials at a given time.

Policy formulation: could be top-down or bottom up.

Implementation: all the processes for deployment -following some form of logic model.
Should explain each step of the process: Objectives > impact.

Monitoring: Administrative function involving the regular collection of data on defined indicators to track the progress of a particular intervention. Evaluation: Systematic assessment of the impacts and cost-effectiveness of an intervention aimed to determine what can be improved.

Excellent answer:

Would draw upon the examples discussed in L3 of the EGP module. Students could draw upon the structured discussion of the examples from Business Finland, or UK's HVMC, or UK AM strategy, or Made Smarter, as discussed EGP and L&MP modules.

(c)

Basic answer:

- i. Would outline a logic model for the whole policy process **and** frame this as a change management project. The latter would draw upon L&MP models for change management (e.g. Kotter).
- ii. Would draw upon examples discussed in EGP and L&MP modules including roles of firms within each stage of the knowledge generation, diffusion, absorption stages.
- iii. Would be able to list process/impact/value for money evaluations

Good answer:

- i. Would provide details within each step of the logic model, drawing upon points raised in (b).
- ii. Would dig into the challenges of getting representation from such a broad and heterogenous community – and avoid the ‘wings, wheels and drugs’ dominance of large UK manufacturing firms – and ensure that the ever-challenging engagement with SMEs is somehow addressed (which could be via use of, e.g. industry bodies)
- iii. Reflection on the challenge of getting useful, reliable data in an appropriate timescale

Excellent answer:

- i. Might push back and suggest the specific sectors where ‘easy wins’ could be achieved should be targeted, adding more nuance. Would add in details of the role of leadership in addressing such change, e.g Jurgen Maier and Made Smarter.

- ii. Building on (i), could also have workstreams targeted at specific sectors – and roles of cross industry collaborations.
- iii. Impact of adoption of AI on productivity may be unclear, and timescales to observe change might sit beyond political/policy cycle.

Question 2

Castleton is a manufacturer of potato crisps. The firm is one of the major suppliers of crisps to supermarkets in the United Kingdom. The Chief Executive Officer (CEO) attended a conference on Artificial Intelligence (AI) embedded robotics technology. The CEO is keen to implement it in the firm to improve productivity and build a competitive advantage for Castleton. The CEO has heard at one of the conference sessions that the implementation of AI embedded robotics technology would require digital transformation.

- (a) *‘Digital transformation is most impactful when it leads to business model innovation.’* Discuss this statement.

[30%]
- (b) Describe the potential benefits of embedding AI in robotics technology for the operations of a food manufacturing company such as Castletown.

[30%]
- (c) Explain what the opportunities and challenges are for Castleton to implement AI embedded robotics technology to build competitive advantage.

[40%]

Crib for Question 2

- (a) Digital transformation and business model

A basic answer should cover the adoption of digital technologies for the purposes of improving efficiency compared to effectiveness of the business. The answer should describe how efficiency improvements on a piecemeal basis by each business function independently of others could result in reduction in productivity and performance due to the overall business becoming less coherent. In order to improve the productivity and performance of the firm, a coordinated approach would be required to change the core processes to deliver the new customer value proposition enabled by the digital technology. Such a change would require business model innovation to have an impact on the competitive position of the firm.

A better answer should cover the above plus the following. The discussion should cover the difference between strategy formulation, the business model and the operating model – the discussion should cover responsibilities for these by senior management and how such governance could lead to piecemeal adoption. The answer should then go on to discuss the evolution of the business model from ‘make and sell’ to ‘sense and respond’ (perhaps giving Philips transformation from developing and selling a plethora of products to focusing on health care technologies or other firms as examples e.g., Caterpillar, Netflix etc).

A ‘best’ answer should cover the above plus the following. The discussion should include a more critical evaluation using examples such as the following:

- (1) Lead with a central vision: L’Oréal and BeautyTech
- (2) Formulate an outside-in perspective: BBVA and venture capital fund
- (3) Develop trends bottom-up: 3M addressing digital “mega trends” and business impact
- (4) Learn by implementing customers solutions incrementally: Avis and Zipcar with fleet maintenance
- (5) Set operational improvement targets: US Navy and fleet to be air-borne ready

And also touch upon some practices to overcome the challenges such as developing a much more customer centric approach, having fluid resource allocation, having cross functional teams, working with external partners and also developing the data proficiency of employees.

(b) Artificial intelligence and embedding it in robotics technology

A basic answer should cover the definition of artificial intelligence (AI). Artificial intelligence (AI) describes a set of advanced general purpose technologies that enables machines to do highly complex tasks effectively. AI technologies aim to reproduce or surpass abilities (in computational systems) that would require ‘intelligence’ if humans were to perform them. The answer should include a discussion of robots to do repetitive and routines tasks better than humans (can work continuously and also possibly making less mistakes). Artificial intelligence embedded robotics technology would be helpful for tasks which are more variable in changing circumstances. Such AI embedded robots could in principle learn to adapt to the changing circumstances and be efficient in conducting the tasks.

A better answer should cover the above plus the following. A discussion of various application areas such as in construction or biochemicals industry where there might be more variability in activities and task and providing some examples from industry cases.

A ‘best’ answer should cover the above plus the following. A discussion of the challenges of training the AI embedded robots especially to address new and unexpected circumstances and the ability of such robots to be able to have more general type of intelligence that humans might have to respond to such events.

(c) Opportunities and challenges for Castleton Ltd to implement artificial intelligence embedded robotics technology

A basic answer should cover opportunities for Castleton Ltd to use AI embedded robotics in processes with significant variability (for example, checking for the quality of the potato crisps and/or the ingredients for the potato crisps and other similar activities in the production process or for managing the inventory and stock picking process in the warehouse). The challenge should cover a discussion of how to ensure that these AI embedded robots work with the human workers to ensure coordination of tasks.

A better answer should cover the above plus the following. A discussion of how to obtain reliable training data to train the AI embedded robots and also ensure coordination with human workers. The discussion should include case examples from related application of AI based automation in other settings and how the challenges were overcome. A discussion of how the business forecasting system could link to the AI embedded robots could further enhance the answer. In addition, the discussion should include how to get buy-in from workers and managers in the deployment of such AI embedded robots, especially given the changes in responsibilities of workers.

A 'best' answer should cover the above plus the following. Changes in the core processes as a result of AI embedded robots in one function could have knock-on effects across other functions both within the firms as well as across other firms in the industry (eg suppliers of ingredients or supermarkets selling the potato crisps). How to identify and manage these related changes in core processes both within across firms needs to be discussed. For example, using the Business Model Coherence Scorecard concept and a discussion of how the concept might be used to address the challenges.

Question 3

You have been hired as a consultant by a *technology contingent* company with about 30 employees. The company was formed around thirty years ago and manufactures a set of electronic commodity components selling them mostly to UK customers. Because it has been operating in a price competitive environment, the company is now in a precarious situation.

- (a) To escape that situation, the company's executive team wants your help to implement *roadmapping* for developing a strategy. It also wants to approach external partners to collaboratively develop innovative product features, for which it plans to secure patent protection.

Describe what is meant by each of the following concepts, and at least one benefit the company could receive from implementing each one of them:

- (i) *Roadmapping*
- (ii) *Open innovation*
- (iii) *Patent*

[30%]

- (b) The company has just formed an innovation team. This team has enthusiastically initiated an informal collaboration with a research group from the local university. That research group has relevant Artificial Intelligence (AI) expertise. The collaboration quickly resulted in an innovative, AI-enabled product feature. However, it turns out that *foreground IP* ownership allocation was not clarified in a formal contract beforehand. While your company wants ownership for the patentable AI-enabled feature, the research group wants access to the training dataset as it plans to use it for further research. When the university's technology transfer team gets involved, they suggest to jointly share ownership for all *foreground IP*. The company turns to you for your advice.

Should the company accept the joint-ownership offer? What alternative models would you suggest? Which arguments can you provide to the company so they can negotiate a more favourable *foreground IP* sharing model?

[30%]

- (c) Meanwhile the company developed their *roadmap*. As part of this, the leadership team decided to implement a *technology intelligence system* that allows it to continuously collect information about relevant new technologies.

Which *sources of information* should this particular company consider? Evaluate different *sources of information* by comparing their pros and cons so that you can provide the company with a recommendation of the top three sources it should consider.

[40%]

Crib for Question 3

- 1) Good answers are expected to provide reasonably precise descriptions of the concepts following closely along the lecture notes. Good answers tend to mention one reasonably clear but rather generic benefit for each of the three concepts.

In contrast, excellent answers provide very clear, more detailed and precise descriptions for each concept. Such answers are clearly tailored to the specific case of the company described in the introductory paragraph by relating to characteristics of the case company.

Concept	Description	Potential Benefits
Roadmapping	A strategic planning tool that outlines the steps, timelines, and resources needed to achieve technology or innovation goals. It provides a clear path from current state to desired outcomes.	<ol style="list-style-type: none">1. Clear Direction: Helps prioritize innovation efforts and align them with business goals.2. Resource Optimization: Identifies gaps and ensures efficient allocation of limited resources.3. Improved Communication: Enhances coordination among stakeholders by visualizing the innovation strategy.

Open Innovation	A collaborative approach to innovation where companies actively engage external partners (e.g., customers, suppliers, universities) to co-create value.	<ol style="list-style-type: none"> 1. Access to External Expertise: Leverages diverse perspectives and specialized skills to accelerate innovation. 2. Cost Reduction: Shares development costs and risks with partners, which is crucial for resource-constrained SMEs. 3. Market Opportunities: Opens doors to new markets and customers through partnerships and collaborations.
Patent	A legal protection mechanism that grants the inventor exclusive rights to use, sell, or license an invention for a specific period, preventing others from exploiting it.	<ol style="list-style-type: none"> 1. Competitive Advantage: Secures a unique position in the market by protecting innovative products or processes. 2. Revenue Generation: Enables monetization through licensing or selling patent rights. 3. Increased Valuation: Enhances credibility and attractiveness to investors by demonstrating innovative capability.

2) Student answers should clearly show that they can relate this question to the TIM module's lecture on protection and exploitation.

Both good and excellent answers should recognize that the joint ownership model suggested by the technology transfer office is not a model that is typically preferred by recognizing the substantial disadvantages of that model as discussed during the lectures. Good, as well as excellent answers should recognize that the preferred way forward is to share Foreground IP ownership by splitting it up and providing each party access to the complementary IP through granting usage rights.

Both good and excellent answers also reveal that the student is aware that there are four general models, respectively approaches for sharing Foreground IP that can result from collaborative/open innovation projects.

- 1) Owned by the party that developed it (following inventorship)
- 2) Owned by the party that paid for the development
- 3) Jointly owned by the parties involved in the development
- 4) Owned by the party that 'needs' the IP for (and beyond) the collaboration

In contrast to good answers, excellent answers are expected to provide a more systematic evaluation of the models, provide clearer and more detailed arguments, preferably use examples to support their arguments.

Model	Advantages (examples)	Disadvantages (examples)
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Ownership Following Inventorship	Aligns with patent law principles. Encourages innovation contributions by inventors. Provides clarity in ownership based on contribution.	May lead to disputes over inventorship. Ignores financial or other non-inventive contributions. Complex to enforce in large teams.
Owner is Who Paid for Development	Recognizes financial contributions. Simple allocation tied to clear funding records. Incentivizes investment in the project.	Disregards intellectual or creative contributions. May discourage non-financial participants. Can lead to unfair ownership dynamics.
Joint Ownership	Simple initial allocation when contributions are shared. Equal rights to exploit IP. Encourages cooperation among partners.	May lead to conflicts over commercialization strategies. Requires negotiation for licensing or further exploitation. Dilutes individual rights.
Ownership Based on Use Areas	Aligns IP ownership with practical applications. Encourages specialization. Reduces overlap and potential conflicts in certain use cases. Combines ownership rights allocation with usage clarifications, such as being done via licensing contracts.	Requires detailed agreements on use areas. May lead to ambiguity or disputes over application scope. Complex to implement and enforce.

3) Good answers clearly reveal that the student relates this question to the TIM module's lecture on technology intelligence, respectively the following diagram.

Besides recalling different information sources, the question challenges students to devise a process for systematically evaluating the sources' suitability for the situation of the described case company. Evaluating all sources in detail would hardly be possible within the given time. Hence, good and excellent answers are expected to produce a systematic evaluation using a two step process, i.e. by first excluding a number of the information sources which are basically impossible for a small company, such as hiring consultants, launching research centres in foreign innovation clusters and then by evaluating a small set of information sources in more details. While good answers are expected to provide reasonably detailed pros and cons, excellent answers will be more precise, typically using examples to illustrate specific pros/cons.

Sources of information: what are their pros and cons?

We need to triangulate sources to cover all the ground!

People (Tacit)	Company experts Librarians Technologists Sales/marketing Business developers	Other companies Universities Research centres Government Consultants Forecast study groups
	Internal virtual social networks	External virtual social networks
Explicit (Documents)	Company archives (databases, files, reports, notes, presentations) Libraries Personal archives	Databases (patents, journals...) Public archives Private archives* Libraries Websites
	Internal	External

* Espionage – not intelligence

Excellent answers would also be expected to adopt some form of scoring process, by which the device certain criteria for the suitability of certain information sources for small, resource-poor SMEs so they can then ranks them for proposing a specific set of sources. Excellent answers are also expected to consider in their recommendation that different sources serve different purposed, so that the selected ones together should cover the mix.

The following table provides an overview of selected examples for pros, respectively cons of the different information sources.

Information Source	Pros (examples)	Cons (examples)
Internal People (Tacit)		
Company Experts	In-depth, company-specific knowledge; easily accessible.	Limited perspectives; may lack awareness of external trends.
Librarians	Skilled at organizing and finding internal information.	Limited to what is within the company; less focus on external developments.
Technologists	Strong technical expertise; directly involved in innovation.	May focus narrowly on technical aspects; less market insight.
Sales/Marketing	Close to customer feedback and market trends.	Potentially biased towards customer-facing aspects; may lack technical insights.
Business Developers	Knowledge of business opportunities and strategic partnerships.	May overlook technical risks or limitations.
External People (Tacit)		
Other Companies	Competitive insights; potential for benchmarking.	Risk of biased or misleading information; limited access to detailed data.
Universities	Cutting-edge research; access to experts.	Research may not align with business needs; time-consuming collaboration.
Research Centers	High-level, specialized knowledge in specific fields.	Costly to engage; information may be complex and technical.
Government	Policy updates and regulatory compliance information.	Bureaucratic delays; often generalized information.
Consultants	Expert advice tailored to company needs.	Expensive; dependent on the quality of the consultant.
Forecast Study Groups	Long-term trend analysis and strategic insights.	May lack precision for immediate or tactical decisions.

Internal Documents (Explicit)		
Company Archives	Easy access to historical data and project records.	May contain outdated or irrelevant information.
Libraries	Organized, accessible information repositories.	Limited to company-held knowledge; may not include external developments.
Personal Archives	Unique, experiential knowledge from individuals.	May not be well-documented or accessible to the entire organization.
External Documents (Explicit)		
Databases (Patents, Journals)	High-quality, detailed technical and scientific information.	Expensive subscriptions; time-intensive analysis required.
Public Archives	Wide variety of accessible information.	May lack specificity; could be outdated.
Private Archives*	Potentially highly valuable and specific information.	Risk of espionage; ethical and legal concerns.
Libraries	Reliable, publicly available resources.	May lack real-time updates or cutting-edge developments.
Websites	Up-to-date, widely available information.	Risk of misinformation; need for careful validation.
Social Networks		
Internal Virtual Networks	Facilitate collaboration and knowledge sharing within the company.	Limited to internal knowledge; requires active participation.
External Virtual Networks	Access to broader perspectives and industry-wide trends.	Risk of biased or unverified information; security concerns.

Question 4

Deliveraway, a logistics firm specialising in fulfilling customer orders from various businesses, is committed to becoming a customer experience-centric organization. The company seeks to manage and measure customer interactions to enhance its understanding of customer pain points and improve both customer experience and service quality. By leveraging Customer Experience (CX) data and Artificial Intelligence (AI), Deliveraway aims to gain deeper insights into customer frictions, encompassing attitudinal, emotional, and behavioural aspects. This data-driven approach is designed to refine customer interactions, increase satisfaction, and build long-term loyalty.

- (a) Identify and explain the different types of CX data that Deliveraway can use, providing specific examples.

[40%]

- (b) Discuss how Deliveraway can apply AI and analyse CX data to identify both attitudinal and behavioural issues among customers.

[30%]

- (c) Propose strategies for turning CX insights into actionable improvements to enhance customer satisfaction and loyalty.

[30%]

Crib for Question 4

Basic answer model

Rationale—The student should highlight the key dimensions of the customer experience management framework and adapt them to the logistics context.

An illustrative answer:

1. Types of Customer Experience (CX) Data Deliveraway Can Use:

Deliveraway can utilize various types of **customer experience (CX) data** to gain a comprehensive understanding of customer interactions. These include:

- **Structured CX Data:** Quantifiable data, such as:
 - Transaction details (e.g., delivery times, number of items delivered).
 - Geographical data (e.g., delivery locations).
 - Customer satisfaction scores (e.g., CSAT, NPS).
- **Unstructured CX Data:** Non-quantifiable data that provides deeper insights, such as:
 - Textual feedback from customer surveys, customer service emails, or chat logs.
 - Audio recordings from customer support calls.
 - Images or videos shared by customers about damaged goods or packaging.
- **Solicited Feedback:** Actively collected data, such as:
 - Surveys should be sent to customers after delivery, asking about their experience.
 - Focus groups or interviews to understand pain points.
- **Unsolicited Feedback:** Voluntarily provided customer data, such as:
 - Social media comments about delivery experiences.
 - Direct communication from customers regarding issues or suggestions.

By categorising CX data into these groups, Deliveraway can analyse it holistically to address customer pain points effectively and find solutions.

2. Application of AI to Analyse CX Data and Identify Issues among customers:

Deliveraway can apply **Artificial Intelligence (AI)** and analytics techniques to uncover attitudinal and behavioural issues in the following ways:

1. **Attitudinal Insights:**

- Use **Natural Language Processing (NLP)** to analyse customer feedback from emails, surveys, and social media for sentiment, emotion and root cause analyses. For example, identifying frustration or dissatisfaction with late deliveries.
- Leverage **speech emotion analysis** on support call recordings to identify customer issues and detect instances where customers express negativity, disappointment, or varying levels of satisfaction with the service.
- Monitor **online reviews** to detect dissatisfaction/satisfaction trends without direct customer input.

2. **Behavioural Insights:**

- Apply **predictive analytics** to transaction data (e.g., frequent late deliveries) to forecast customer complaints/churn.
- Analyse **website behaviour** using tools like Google Analytics to identify delivery schedules and preferred slots.
- Use **machine learning models** to detect patterns in customer actions, like recurring complaints about delivery times, indicating an operational bottleneck and identifying areas of excellence.

3. **Strategies for Turning CX Insights into Actionable Improvements:**

By combining attitudinal insights (customer perceptions) with behavioural data (customer actions), Deliveraway can identify and address critical customer friction points and personalise services to the customer. Deliveraway can implement the following strategies:

• **Operational Actions:**

- **Real-time Monitoring:** Use IoT-enabled tracking for deliveries to provide accurate, real-time updates to customers and reduce delivery uncertainty.
- **Process Adaptation:** Employ AI to predict peak delivery times and optimise resource allocation to reduce delays.
- **Customer Support Enhancement:** Use a chatbot integrated with intent and sentiment analysis to provide immediate support and escalate complex issues to customer service using human agents.

• **Strategic Actions:**

- **Customer Journey Redesign:** Develop a seamless experience across digital and physical touchpoints. For instance, integrating delivery tracking with customer notifications and support chat within one platform.
- **Data-Driven Personalization:** Offer tailored delivery options (e.g., preferred time slots) based on customer preferences analysed through historical behavioural data.
- **Proactive Engagement:** Predict and address potential issues before customers raise complaints, such as notifying them by email or text messages in advance about potential delays.

Good answer model

Rationale– The student should integrate the key dimensions of the customer loyalty and customer experience management framework and adapt them to the logistics context.

An illustrative answer:

By systematically measuring and analysing customer behaviour using AI and CX data, Deliveraway can transition to a more customer-centric model. To achieve its goal, Deliveraway must adopt a comprehensive approach that integrates a loyalty framework focused on attitudinal, emotional, and behavioral dimensions. This framework enables the firm to manage CX data, identify customer pain points through AI, and implement actionable strategies that enhance satisfaction and loyalty.

1. Types of Customer Experience (CX) Data Deliveraway Can Use:

To collect and utilise customer experience data effectively, Deliveraway can focus on three key types of measurements:

1. **Attitudinal loyalty data:** Deliveraway can implement customer satisfaction surveys (CSAT) after deliveries, asking customers to rate their experience with aspects such as delivery timeliness, condition of goods, and communication. Additionally, Net Promoter Score (NPS) surveys can be used to assess the likelihood of customers recommending Deliveraway's services to others.
2. **Emotional loyalty data:** Collecting customer feedback from email communications, customer service, chat interactions, and online reviews can reveal emotional cues such as frustration with delays or satisfaction with timely service.

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| 3. Behavioural | Measurement | Data: |
| | Collect behavioural data which can provide insights into customer actions and patterns. For example, Deliveraway can track delivery completion rates, customer interactions with digital touchpoints like order tracking portals, and the frequency of customer complaints. | |

2. Application of AI to Analyse CX Data and Identify Issues among customers:

Deliveraway can experiment with the use of AI to analyse the CX data to:

1. **Build superior performance, desirability, and advocacy:** Ensure reliability and service excellence through analysing IoT data to monitor delivery times, identify issues like delays with real-time updates and track on-time delivery metrics, allowing rapid intervention.
2. **Creating delight and connection:** By leveraging NLP and LLM techniques, Deliveraway can analyse customer feedback from email communications, chat interactions, and online reviews to categorise feedback into positive or negative sentiments, enabling the identification of emotional drivers behind customer experiences. Tracking these cues can help understand how customers perceive the logistics process and whether it meets their customer service expectations.
3. **Encouraging Repetition and Retention:** By analysing order patterns, complaints, and interactions with tracking systems, Deliveraway can detect behavioural indicators of dissatisfaction, such as a decline in repeat orders or increased engagement with complaint resolution channels. Examining repeat order trends and customer engagement over time enables Deliveraway to identify service gaps and areas for improvement, such as optimising delivery routes or enhancing package tracking systems.

3. Strategies for Turning CX Insights into Actionable Improvements:

Deliveraway can integrate collected CX data into a centralised system for analysis, enabling actionable insights to enhance customer experience. Based on these insights, Deliveraway can implement targeted improvements:

- **Operational Enhancements:**
 - **Immediate Improvements:** Address frequent delivery delays by optimising schedules or allocating additional resources to high-demand routes.
 - **Personalised Solutions:** Offer discounts, apologies, or loyalty points to customers affected by delays, demonstrating empathy and a commitment to service excellence.
 - **Proactive Engagement:** Utilise AI-driven tools to notify customers of potential delays in advance and provide alternative delivery options. Automated chatbots can assist with real-time tracking and issue resolution.
- **Strategic Experiments**
 - **Introduce Subscription Models:**
 - ♣ Introduce loyalty-based tiers (e.g., free expedited shipping for premium users).
 - ♣ Launch a "Deliveraway Prime" service for high-frequency customers.
 - **Offer Personalised Engagement:**
 - Tailor promotions based on customer behaviour.
 - Offer weekend delivery discounts to customers who prefer weekend orders.
 - **Retention Campaigns:**
 - Use churn prediction models to re-engage at-risk customers.
 - Provide limited-time discounts to customers showing reduced activity.
 - **Customer Delight Initiatives**
 - Send personalised thank-you notes or loyalty rewards.
 - Offer a free expedited delivery voucher for customers with 5+ successful orders.
 - **Proactive Customer Support:**
 - Developing AI chatbots to automate customer support, in which AI proactively answers customer enquiries, such as providing quality information on the packages, offering reschedules or refunds before a complaint arises, detecting frustration, and offering immediate resolutions.

Excellent answer model

Rationale– The student should analyse customer profiles, propose tailored solutions for each customer segment, and align these strategies with the core dimensions of the customer loyalty and customer experience management framework. Additionally, they should demonstrate how AI can be utilised to analyse CX data, extract actionable insights, and effectively adapt these insights to the logistics context.

An illustrative answer:

Deliveraway can revolutionise its customer experience (CX) by integrating diverse CX data, leveraging advanced AI and large language models (LLMs), and developing robust conversational analytics capabilities.

1. Types of Customer Experience (CX) Data Deliveraway Can Use:

Deliveraway can have a comprehensive CX approach to ensure every customer touchpoint data is captured—whether surveys, reviews, emails, call centres, social media, chatbots, voice assistants, or operational processes—and delivers value. Also, Deliveraway must prioritise being customer-centric by offering real-time order tracking, guided complaint resolution, and proactive notifications for delays or alternative delivery options to maintain high satisfaction. This includes during peak seasons like Christmas. To do so, we need first to analyse the different customer profiles Deliveraway is serving:

- ***Customer Profile 1: The Sender (Jessica)***

For example, a small business owner frequently ships packages through Deliveraway. Their priorities include easy scheduling pickups, accurate tracking updates, and timely deliveries. They value efficient complaint resolution and expect personalised communication for their business needs.

- ***Customer Profile 2: The Receiver (Michael)***

A busy professional often receives packages at home. They prioritise clear notifications about delivery times, hassle-free options to reschedule deliveries, and the safe arrival of goods. Frustration arises when tracking updates are unclear, or packages are delayed.

These customer profiles guide Deliveraway's strategies to address both ends of the logistics experience.

To improve the experiences of both customer segments, Deliveraway can focus on three critical types of CX measurement data:

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| 1. Attitudinal | Measurement | data: |
| Deliveraway can use CSAT surveys to capture sender and receiver feedback on delivery timeliness, package condition, and communication clarity. Additionally, NPS surveys can assess how likely customers are to recommend Deliveraway based on their experiences. For <i>Jessica</i> , this might involve feedback on pickup scheduling, while <i>Michael</i> could focus on delivery reliability. | | |
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| 2. Emotional | Measurement | data: |
| By analysing feedback from emails, call centre, chat interactions, and social media, Deliveraway can identify emotional cues such as <i>Jessica's</i> frustration with delayed pickups or <i>Michael's</i> satisfaction with timely deliveries. | | |
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| 3. Behavioural | Measurement | Data: |
| Behavioural data offers insights into customer actions. For <i>Jessica</i> , this could include tracking her package volume, repeat shipments, and interaction frequency with customer support. For <i>Michael</i> , data on delivery completion rates and rescheduling requests can highlight service gaps. Analysing these behaviours helps Deliveraway identify trends and refine its services, such as optimising pickup and delivery schedules. | | |

2.Application of AI to Analyse CX Data and Identify Issues among customers:

- 1. Emotional Drivers:** Deliveraway can leverage Large Language Models (LLMs) for real-time feedback analysis, processing customer sentiments like *Jessica's* frustration with delivery

delays or Michael's appreciation for proactive updates to prioritise service improvements across different segments.

- o **AI-powered root cause analysis** can identify systemic issues, such as frequent delays in specific regions, enabling better resource allocation.
 - o **Applying value creation dimensions**, Deliveraway can assess service design and the customer journey through key touchpoints—evaluating friction points like scheduling pickups or rescheduling deliveries, optimising resources such as driver punctuality and chatbot clarity, and understanding contextual factors like peak season demand.
 - o **AI-driven sentiment analysis** can categorise feedback into positive and negative experiences, revealing key triggers behind complaints or compliments.
 - o **Capturing customer suggestions** provides actionable insights—for example, Jessica's recurring frustration with pickup delays may highlight the need for improved scheduling, while Michael's satisfaction with proactive notifications underscores the importance of clear communication. By integrating these insights, Deliveraway can enhance efficiency, customer satisfaction, and overall service quality.
2. Leveraging the **Recency, Frequency, and Monetary (RFM)** model to generate behavioural insights involves analysing patterns in customer interactions, such as purchase frequency, recent activity, and monetary value for behavior data. For example, for Jessica, this means tracking her shipping frequency and the monetary value of her transactions during holiday seasons while monitoring feedback on delayed pickups or missed delivery windows. RFM model can be used as follows:
- o **Recency**: Identify how recently Jessica shipped a package to assess her engagement.
 - o **Frequency**: Measure how often she uses the service to determine her loyalty.
 - o **Monetary**: Calculate her total spend to understand her value to the business.
3. **Building Ensemble ML Modelling for Customer Loyalty Prediction**: By combining attitudinal, emotional, and behavioural data, Deliveraway can develop a robust prediction model. For example, Deliveraway can integrate Jessica's different CX metrics into predictive models to assess her risk of churn, flagging periods of inactivity or reduced spending as potential disengagement indicators. Also, the ensemble model integrates these metrics/features to classify customers similar to Jessica into loyalty segments (e.g., Gold, Silver, or Bronze).

3. Strategies for Turning CX Insights into Actionable Improvements:

Deliveraway can leverage these insights to devise strategies for immediate improvements and provide personalized strategic solutions, such as:

- **Operational Actions:**
 - o **Implementing 360CX Solution**: A dashboard with real-time analytics to track customer feedback, service performance, and behavioural patterns.
 - o **Pickup & Scheduling Adjustment Solution**: This helps Deliveraway optimise its services and address delivery frustration. For example, addressing Jessica's frustration with pickup delays signals a need for improved scheduling systems. Also, it will help to ensure personalised strategies for engagement.
 - o **Enhanced Communication & Promotions**: This helps to communicate better with customers and accurately. For example, Michael's delight with proactive delivery updates reinforces the importance of clear and timely communication. Also, identifying a customer like Jessica as a high-value "Gold" customer can prompt proactive measures, such as discounts or expedited shipping for promotions.

- **Strategic Actions: Developing and Experimenting Solutions in Customer Service**
 1. **AI-Powered Chatbots:** Chatbots can assist senders and receivers in real-time:
 - o For *Jessica*: Provide instant support for scheduling pickups or addressing billing queries.
 - o For *Michael*: Offer real-time tracking updates and assistance with delivery rescheduling.
 2. **Voice Assistants for Personalised Support:** Voice assistants can enhance the customer experience:
 - o For *Jessica*: Offer hands-free solutions for scheduling pickups while multitasking.
 - o For *Michael*: Provide proactive notifications about delivery times and alternative options during delays.
 3. **Conversation Analytics for Friction Reduction:** Analysing chatbot and voice assistant transcripts can identify common concerns:
 - o For *Jessica*: Highlight frequent issues with scheduling and optimise the process.
 - o For *Michael*: Pinpoint frustrations with delayed updates and refine notification systems.

Question 5

- (a) Describe what is meant by the *circular economy*. Discuss the benefits and challenges to implementing it, and explain how it differs from the current economic model. Use two specific examples in different sectors to support your answer. [40%]
- (b) A battery energy storage startup wants to participate in and encourage the circular economy. With reference to the *Ellen MacArthur Foundation Circular Economy Systems Diagram*, suggest what strategies the company could use. [25%]
- (c) Identify the four categories of *circular economy business models* and explain the types of business models which can be found in each category. [35%]

Crib for Question 5

a) The circular economy is a systemic model of the flow of energy, materials, and products for production and consumption. It may also be considered as an approach to economic

development. It is an industrial economy that is regenerative and restorative by design. In a circular economy waste and pollution are minimized through recycling, repairing, refurbishing, and reusing products as they reach their end of life, and waste itself can be considered a resource. This model attempts to circulate products and materials within the existing ecosystem, so that fewer raw materials are needed, and used products don't end up in a landfill. It also attempts to regenerate nature, through minimizing the use of non-renewable resources, in favor of renewable ones, such as renewable energy.

Benefits include:

- reduced pressure on the environment
- enhanced security of raw materials
- increased competitiveness
- innovation & growth
- reduced obsolescence
- improved human health

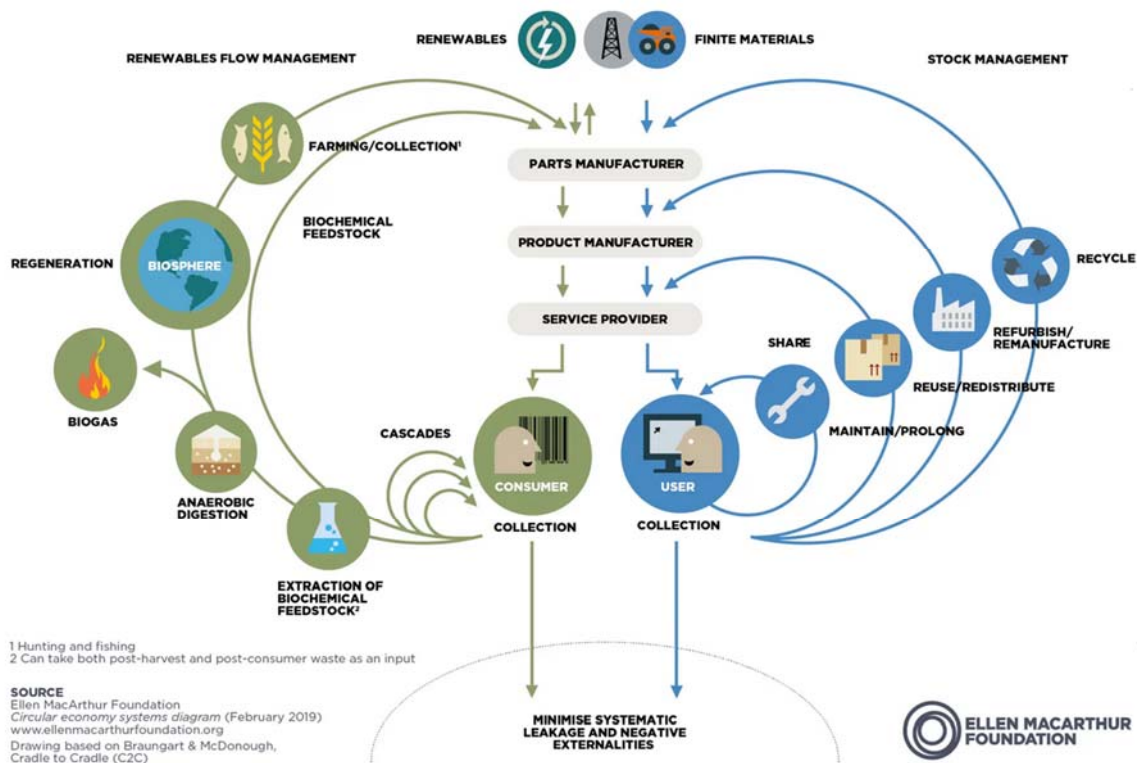
Challenges:

- cost – shifting to the circular economy could require significant investment
- changes in consumer behaviour would be required
- governance issues would need to be coordinated over huge areas and policy levels
- limited technical knowledge for how to recovery, recycle, or reuse some products

This is different from the current linear economy, or the take-make-waste model, as the current model does not seek to minimize extraction of raw materials, makes little effort to recover or reuse products, and does not prioritize nature or the environment. It is based on the idea that resources are limitless, and the earth has an infinite regenerative capacity.

b) The electric energy storage startup is already contributing to the circular economy by providing a service which allows for more efficient use of electricity. Storing electricity when it is generated, then releasing it when there is demand allows for increased renewable energy usage, and reduced need for inefficient fossil fuel-based power plants.

The startup should primarily engage with the right half of the diagram, which is the technical cycle for man-made materials. Inner loops are considered “better” for the environment, as less remanufacturing is required for them – it is best to start inside, and work outwards. There are several pathways the startup can take to best position their business for the circular economy. They can maintain/prolong their equipment as best as possible to ensure a long life – this could be done in-house or with a service contract with another company. They can also reuse product or materials by purchasing second life batteries, which may come from old electric vehicles, for example. They could also choose to resell their own batteries or energy storage system at end of life, for another group to reuse. They can refurbish existing energy storage systems which have issues so they can make use of them, possibly allowing them to purchase these at a discount. Finally, they can recycle their old equipment once it has reached its final end-of-life, allowing the material to be used in new products.



c) The four categories for circular economy business models are (1) product-oriented, which focus on extending the life of assets which are typically owned by the customer, (2) user-oriented, which focus on maximizing the use of assets, usually across multiple users, (3) results-oriented, where the asset is owned by the service provider, and the customer pays a contract for use and service of the product, 4) end-of-life, which focuses on what to do with products once they have reached the end of their usual life.

For the types of business models in each of these categories:

Product-oriented services business models.

- **Maintenance:** The provider offers maintenance services that may be performed on- or off-site, directly or remotely
- **Repair:** The repair service business model enables the extension of life of current assets and therefore delay the need to buy new assets. The reuse of assets slows down the consumption of new materials.
- **Remanufacturing/Refurbished:** The provider sells remanufactured/refurbished products or refurbishment services for the existing products. It extends the use of the product by giving it a second life. It reduces the needs for new products and minimizes the consumption of raw materials.

User-oriented services business models.

- **Leasing:** The customer pays a regular fee for individual use of the product.
- **Renting:** The customer uses the product individually for a predetermined (short/long) period. Similar to leasing, but usually a shorter period.
- **Sharing:** The product is used sequentially by different customers.

- Pooling: The product is used simultaneously or near-simultaneously by different customers.

Result-oriented services business models.

- Pay per use: This enables customers to use assets and pay for the actual use of them without the need for ownership.
- Outsourcing: The service provider manages one or more activities for the customer, but the decision regarding how to perform and control these activities remains up to the customer.
- Pay by result: This makes the customers objective the service provides objectives, functioning as a contractor.

End of life services business models.

- Recycling: The provider dismantles products and recycles them.
- Repurposing: The provider uses the end-of-life asset and generates a new or different product/service out of it.
- Disposal: The provider ethically disposes of assets.

Question 6

You are the CEO of a medium-sized manufacturing firm working in the motorsports sector. Your firm provides critical mechanical components to racing car companies. Your firm has been using Additive Manufacturing (AM) technologies for many years to make prototypes but never final parts for the customer. Now, your Head of R&D believes that AM technologies could be used for some of the final products to be used by your customers. Your Head of Manufacturing is strongly opposed to this. He believes that none of the AM technologies currently available are suitable for the production of your high-performance final parts, and that this would be *‘a total waste of time for my team, and for everyone else. We’ve got enough problems just responding to current customer demands for things we know our current machines can do’*.

(cont.

- (a) List and describe *technology management tools* your Head of R&D could use to assess the suitability of different AM technologies for final parts production, and to communicate this analysis to you and the Head of Manufacturing.

[25%]

- (b) Describe the design and implementation of a *change management programme* to overcome the resistance of your Head of Manufacturing and get AM technology into use for final part production in your business.

[40%]

- (c) You have met the founder of a small, early-stage technology firm that has developed and is selling specialist AM technologies for making final products for medical applications. That firm wants to diversify and enter new markets, including motorsport. You decide to set up a partnership to work with them to explore opportunities for the mutual exchange of AM experience and IP between medical and motorsports applications. Evaluate the potential challenges of managing such a partnership through its life cycle, and what you would do to address such challenges.

[35%]

Crib for Question 6

a)

Basic answer

The simplest tool would be TRLs, mapping the maturity of different AM technologies against different application areas.

Good answer

Would also explore the integration of tools such as TI and TRM to map stage of maturity, application area, source of technology, level of development/adaptation required.

Excellent answer

Would bring in broader issues of organisational fit (e.g. the likely skills-related issues arising from a technology moving from a lab-based environment to a production environment for critical components), and the balancing of cost and risk (e.g. how to mitigate the impact of failure of this new approach on the core business).

(b)

Basic answer

Would explain one of the basic change management approaches given in LM&P lectures (e.g. Kotter, Lewin), but also show awareness of the type of change that is being implemented (e.g. balance of developmental and transitional). Should link to at least a basic observation of leadership types and approaches in this sensitive context.

Good answer

Would discuss each of the steps of a selected process in detail, mapping out the specific activities needed to be undertaken at each stage, showing awareness of the specific context and personnel sensitivities. From a leadership perspective, expect to see reflection on different leadership types that could be deployed in this context, which might be different from the leadership style used for day-to-day activities.

Excellent answer

Would reflect on the challenges of managing change across very different cultures within R&D and production, and the impact this would have on any change – but also on the current operations. Need to show that the risk of this going wrong mustn't lead to damage to the 'day to day' – this is fundamentally about managing organisational ambidexterity – how to deal with exploration and exploitation at the same time. From a leadership perspective, the risk of messing up the core business and annoying the Head of Manufacturing is high. But there is also the risk of annoying the Head of R&D if the ideas are not explored.

(c)

Basic answer

This is a standard open innovation process. Basic answer should demonstrate that process, and be able to highlight basic organisational issues that could arise from culture, asymmetry, etc, plus also technology acquisition challenges.

Good answer

Would be able to explore the nuances of this particular collaboration, including reference to the broader strategic context (who would be 'leading' the collaboration?) and understanding of the challenges of transferring technologies between different sectors, not just organisations.

Excellent answer

Would look at not just the points above, but also how such a partnership could work to support new business opportunities for the focal firm. Might also reflect, though, on the organisational risk of how this has been set up, and risks for the current business. Could

explore options for setting up a joint venture to de-risk organisational fall-out if things go wrong.