

MET IIB Paper 2 2016

Question 1 - EGP question

Crib:

(a) **A basic answer** should cover:

Students should be able to list and explain any four from these (from UNIDO, but could draw upon other lists given in the lecture from Germany, US, et al.):

Trend	Example possible affect on manufacturing
Globalisation	Need to manage complex, distributed manufacturing operations, need to manage extended supply chains, ..
Demographic change	Availability of workers, skills of available workers, push to automation, changes in demand for products/services, ..
Sustainability	Requirements to lower CO2, reduce energy usage, waste minimisation/circular economy, changes to business models, ..
Urbanisation	Supply chain challenges, impact on retailing, changes in demand for products/services, ..
Accelerating product life-cycles	Need for tight coupling between R&D and manufacturing, rapid and efficient supply chains, ..
Threats to global stability	Supply chain vulnerability, potential of growing demand in defence sector, constrained collaboration opportunities, ..
Changing consumer habits	Sharing economy and impact on product design / usage, increased flexibility, mass customisation, ..
External industrial policy trends	Emphasis/de-emphasising the role of manufacturing in an economy will impact availability of public funding,

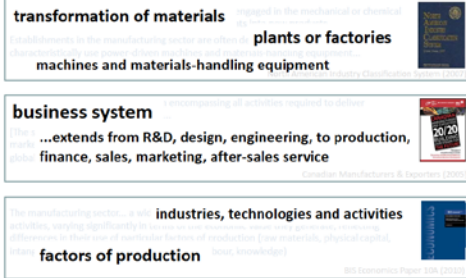
A better answer could include comment on (1) how the impact of these trends is being felt differently in different contexts. E.g., the impact of sustainability on manufacturing in China versus US, impact of demographic change in Japan versus Germany; (2) examples of companies that are responding to these megatrends. E.g. Zara and accelerating PLCs, Unilever and sustainability, et al., and (3) how different megatrends might combine to affect global manufacturing.

(b) **A basic answer** should cover:

Definitions – what is meant by ‘manufacturing’? Should provide a basic definition around which the rest of the answer is developed. Could draw upon the following:

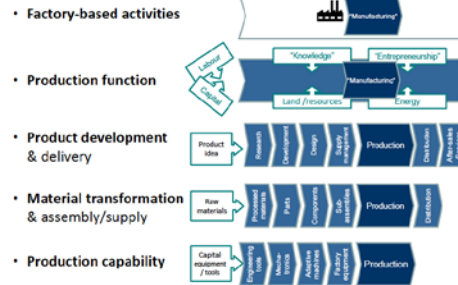
Definitions of 'Manufacturing'

People can mean very different things...



Perspectives on 'Manufacturing' / 'Production'

What we mean when we talk about 'manufacturing'...



Basic issues – should be able to explain **why** having a competitive manufacturing system is important (and could make links to answer to part (a)), and **what** a government can do to support its development, and **how** its performance can be measured.

Contexts – should draw upon material from at least two of the national approaches given in the lecture (Germany, US, Japan, UK) and/or from their own research.

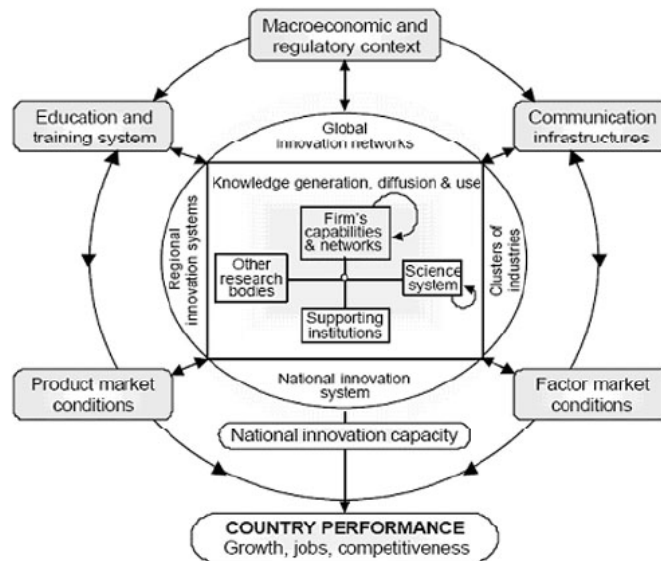
Models/frameworks – particular emphasis was given to the students on the importance of the use of models and frameworks to describe complex system issues such as those focused upon in this question. Even the basic answer should be structured around at least one of the many models and frameworks introduced.

Policy options – should show awareness that support for the development of effective manufacturing systems rests on an understanding of the interplay between technology, manufacturing and innovation issues. Should make at least passing reference to ecosystems / national innovations systems. Should be able to describe elements of such systems and how government can influence the development of each element.

National Innovation Systems: Actors & Connections

Fostering linkages provides national competitive advantage

More effective & efficient development, diffusion, & deployment of new ideas



Source: OECD, 1999. *Managing National Systems of Innovation*

Examples – numerous examples of firm and country issues/approaches were provided in the module, and the basic answer should be able to describe a minimum of two of these to a reasonable level of detail. Students could link back to issues raised in part (a) to provide some context for their examples.

A better answer could include reflection on:

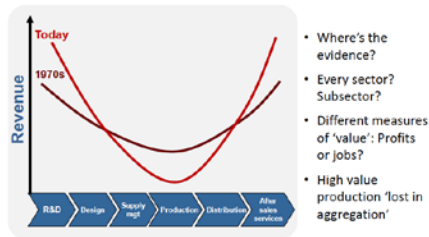
(1) how different nations conceptualise manufacturing differently, and hence are responding differently to the challenge.



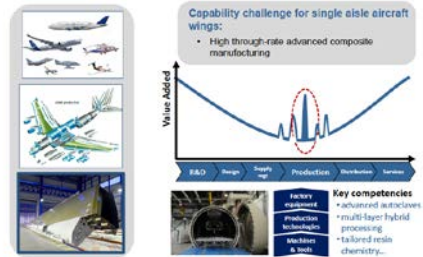
(2) Reflection on the higher level issues of trade-offs in policy implementation especially in times of constrained public spending, and challenges of balancing regional, national and international issues.

(3) Reflection on the danger of simplistic models (e.g. 'Smile Curve') when considering ways to develop national manufacturing capabilities.

Value Capture from Manufacturing The 'Smile Curve'... It's a cartoon!

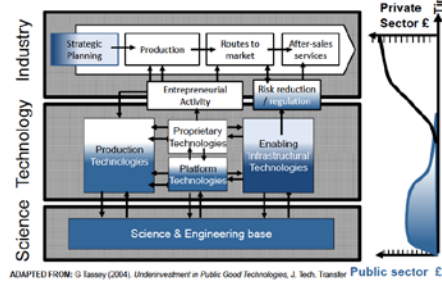


CSTI Project Future Technologies for High Value Production



(4) Evidence of deeper understanding of the issues of technologies (e.g. development of 'public good' technologies) and the challenges of sector-specific approaches.

Opening up the black boxes of Science, technology, and industry systems



High Tech or Low Tech Aerospace/Automotive or Low Tech Plastic Products

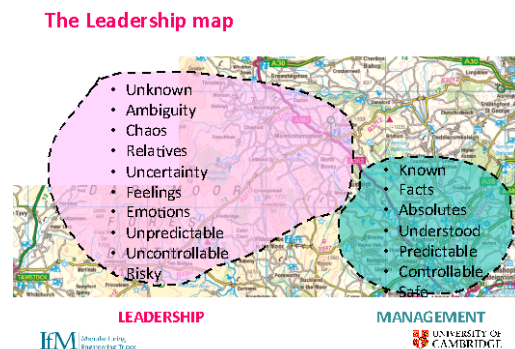


MET IIB Paper 2 2016

Question 2 - Managing People question

Crib:

(a) **A basic answer** should cover the issues discussed in the module in relation to the slide below and related case studies (and discussed by Wright and McManus), i.e. Leadership is about setting the direction, providing motivation, often in conditions of uncertainty and change, etc; management is about dealing with issues once boundaries have been set, ensuring that goals are met, etc.



A better answer might draw upon issues highlighted in the GE case study that the students completed for their module assessment (e.g. Jeff Immelt's leadership approach illustrated by defining and communicating his '5 Themes' in response to major crises that then provided the frameworks within which managers could operate). Stronger answers might also touch upon (1) the different challenges of recruitment, motivation, retention, promotion etc for leaders versus managers (2) how some leadership / management issues are generic whereas others vary by context.

(b)

(i) a specialist technology consultancy firm with 10 employees, founded by two friends, with ownership shared amongst all employees, that is facing a sudden increase in demand for its services;

A basic answer should cover:

Leadership: needs to consider issues of how to deal with the current surge in demand in a manner that does not disrupt the core of the business. Leadership needs to consider whether it wishes the firm to grow and deal with all that this will entail. With

shareholding spread across all current employees, it is likely that this decision will need to be based on consensus. This is therefore a change management project that might only be temporary, or which could signal a permanent change in the company's strategy.

Management: assuming that the decision of the leadership is to embrace growth, then management will need to focus on ensuring systems are robust to cope with increased activity, recruitment of new staff is done in a manner that allows new demand to be met, but also considers how to deal with a potential drop-off in demand in the future that doesn't disrupt their current employee-engaged culture.

A better answer could include reflection on issues discussed during the module in relation to managing within engineering consultancies (Angelis, Bullivant) high performance teams (Angelis), talent management in start-up firms (Christou) and change management (OE Cam).

(ii) a multinational corporation with 100,000 employees that is seeking to dramatically reduce its carbon footprint while increasing shareholder value;

A basic answer should cover:

Leadership: this is a massive change management project that is likely to affect every aspect of the business. Students should show awareness of the challenges of change management at this scale (using models from e.g. Satir, Kübler-Ross, and Kotter to illustrate the typical phases of such change, and issues that are likely to arise). The GE case also provides an example the students could use to illustrate a leadership approach that worked for one MNC seeking to implement widescale transformation.

Management: basic answers should be able to describe

A better answer could include reflection on issues discussed during the module in relation to managing within MNCs highlighted by Guttridge (GE – dealing with current compliance issues when trying to implement new processes), Knook (Microsoft, Vodafone – dealing with national differences when implementing change in an MNC), high performance teams (Angelis), collaborations (Carroll – as this change is likely to affect suppliers, partners, customers, ..), as well as the change management models noted above. Material from the module on Industrial Sustainability could also be very relevant here.

(iii) a software start-up with 3 employees (all co-founders) that is trying to raise investment to expand its team in order to develop and ship its first product.

A basic answer should cover:

Leadership: the question does not make clear what the roles of the three co-founders are, so note should be made on whether there is actually a single leader, or whether leadership is shared, or even if roles have yet been defined. This is something that the team will need to resolve if they are going to have any chance to raising investment. This process is also likely to raise any differences in the future of the company that might have been glossed over to date.

Management: given that this is a very small team, recruiting new people is likely to be a critical but very challenging issue. Cultural fit with the three co-founders will be key. They might wish to de-risk things by (i) using contract staff to maintain flexibility as they grow or (ii) forming a partnership with another organisation to share risk and access wider pool of skills. However, each of these options also brings about challenges of motivating contract staff and dealing with complexities of partnerships (trust, contracts, etc).

A better answer could include reflection on issues discussed during the module in specifically in relation to talent management in start-up firms (Christou – especially lessons from Stanford Project on Emerging Companies), dealing with recruitment (and recruitment mistakes) in start-ups (Grant), high performance teams (Angelis), change management (using models from Satir, Kübler-Ross, and Kotter), and partnerships (OE Cam).

[90%]

MET IIB paper 2, Question 3 - TIM module

Academic year 2015/2016

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Dr F Tietze

Model answer

Question a)

- Identification: Patent data can be extracted from different databases in order to identify actors that develop new technologies with possible relevance to a company. For instance, a company may operate a technology scouting process as part of their foresight activities to pick up early signals from universities, start-ups, etc. on emerging technologies, which could potentially disrupt the company's business.
- Selection: Information contained in patent data can be used to evaluate internal or external technologies or technology portfolios to support strategic decisions making. For instance, firms can derive patent data from different databases and calculate multi-dimensional indicators (e.g. patent quality) that can be used as proxies for deciding among different strategic options.
- Acquisition: Patent data can be used to identify and evaluate potential acquisition targets. For instance, patent landscapes may be used to visualize patent portfolios of companies that have been identified as acquisition options.
- Exploitation: Having selected technologies to be exploited externally, patent data can be helpful to find non-competing companies in other markets and countries in which the own company does not operate and has limited knowledge about. For instance, patent forward citation networks can be used to identify potential licensees.
- Protection: Patents can be filed in different countries, respectively jurisdictions in order to protect outcomes of R&D investments (technical inventions) and prevent copying by competitors and thereby build or maintain a competitive advantage through innovativeness.

Good students will label the five ISAEP processes and provide rather general examples. Excellent students will be more specific in their examples. For instance, they may provide concrete company cases or explain in more detail how the data can be used in each example.

Question b) (i)

- Good students will conclude that Tesla is committed to an open innovation strategy aiming to build relations with other companies through freely licensing their technology.
- Good answers will also show that students have understood the distinction between the decision to file patents (or not) and respectively the decision to enforce patents. Importantly, the statement given above refers to the latter. Tesla has committed itself not to enforce patents against others. However, the statement does not say that Tesla will not apply for any more patents in the future. Nor does the statement say that Tesla will drop its existing patents. Hence, one may conclude that patents still remain important for Tesla.

- Excellent students will then discuss the phrase “good faith”. Students will conclude that this phrase appears to be vague, hence indicates that Tesla may still want to maintain control over its technology and its diffusion as well as to decide whether to sue a company or not.
- Excellent students will also discuss that in addition to patents the company may well possess other IP rights (e.g. trademarks, designs) that can be enforced instead of patents to sue firms that copy Tesla’s vehicle design.

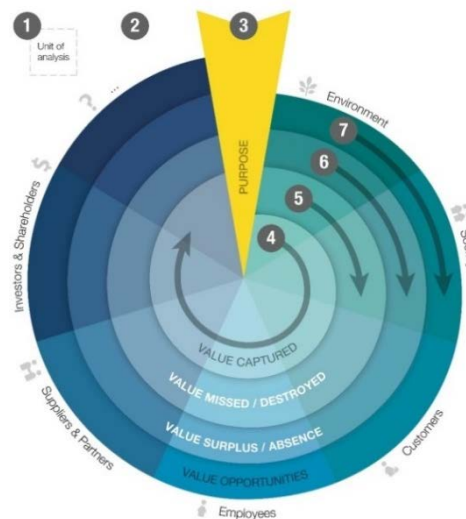
Question b) (ii)

- A good answer should show that the student has understood that Tesla’s strategy change is not altruistic, but serves a strategic business motive. Making patents freely available at least creates positive publicity. It might be seen as a “noble” move to make patents available to others and benefit society with a transition to a sustainable future.
- Good students will also show they have understood that what Tesla has done is called a “patent pledge”. They may well relate it to other examples (e.g. IBM as discussed in class, Google).
- Good students will further discuss the development of Tesla in the context of the development of the electric vehicle industry. A good answer will find that Tesla has grown during the last decade from a start-up to a reasonably sized company. It has established itself as a known player in the industry, while the industry has not developed as much as expected.
- Tesla has developed battery and charging technologies that compete with other technologies. Linked to the IBM case discussed in the lecture, good students will conclude that in order to ensure future growth through the next stage of corporate development it seems quite likely that Tesla wants to establish its technology as an industry standard (dominant design). Thereby, Tesla could accelerate the diffusion of its own technology. The benefits of fostering a standard platform for electric car technology may well outweigh short term revenue gains from paid licensing agreements. In other words, Tesla will benefit more from a growing electric vehicle market than from hoarding a lion’s share of a small market (positive feedback effects). Excellent students will further underpin this generic argument with an example. For instance, if other OEM’s install Tesla-compatible charging stations, and use the same battery technology in their cars, that would mean greater market demand for Tesla’s technology, create new Tesla technology compatible knowledge and learning effects with positive spillover effects to Tesla.
- Excellent students may further use analogous examples to illustrate how this effect has worked in other industries in the past. For instance, the classical VHS case demonstrates that a licensing model can lead to the creation of an industry standard even though the technology’s performance is inferior to a competing technology (e.g. Video 2000). Through a licensing model JVC, the company that owned the VHS technology, was able to grow the market substantially and benefit from the growth through substantial monetary returns.
- Excellent students may also distinguish between the motives to freely license Tesla’s vehicle related technologies (i.e. batteries) and the charging infrastructure technology (i.e. positive network effects).
- Excellent answers will also mention that the statement does not say anything on how Tesla will manage the free use of its technology. Other firms may be able to just use the technology or may have to approach Tesla and even sign a contract to get a free license. The latter option would enable Tesla to maintain control over who uses the technology.
- Excellent students may then conclude that Tesla might design such free-license contracts in a way that it benefits the company. There are at least two design options which students could

mention: First, Tesla may implement a grant back clause for accessing subsequently technological improvements developed by the licensee that builds on Tesla technology. Second, Tesla may want to use a “we won’t sue you if you don’t sue us” clause in these contracts, thereby gaining freedom to operate if Tesla eventually infringes patents of their licensees. A well-known example is Microsoft, who used a NAP clause (non-assertion of patents) in their licensing contracts. The NAP clause required PC and device makers, and other OEMs who licensed Windows, to agree not to sue Microsoft or each other for patent infringement.

METIIB Paper 2 – Question 4 - Sustainable Management Crib

- (a) The Value Mapping Tool is a new tool for sustainable business model innovation. It has been developed to elicit failed value exchanges among multiple stakeholders in the business network and thereby uncover new value opportunities through a systematic and structured approach. The tool adopts a multi-stakeholder perspective, through which the exchange of value can be analysed and potential stakeholder conflicts identified to create positive value in the network. It provides a new perspective for practitioners to understand and create new economic, social, and environmental value from their business.



www.industrialsustainability.org/tools/value-mapping/

Key concepts embedded in the Value Mapping Tool:

- New perspective on value: value captured vs. value uncaptured. Value uncaptured is identified through the failed value exchanges in the business network which include value missed (I give, but don't get a return); value destroyed (I give but you don't want); value absence (You want but I don't give); and value surplus (I give or have too much).
 - Structured approach to thinking about value. The tool facilitates a systematic analysis of value captured, helps identify value uncaptured, and through this analysis prompts the generation of new value opportunities for a company.
 - Multiple stakeholder analysis which considers natural environment and society as stakeholders of the firm.
 - The Triple Bottom Line applied to the concept of value - i.e. sustainable value which comprises economic value, environmental value and social value - to identify new value opportunities.
- (b) A good answer would go through the step-by-step process of the Value Mapping Tool with particular focus on failed value exchanges in the business network in order to identify new value opportunities for Furnitura. Assumptions can be made based on the case studies (AB

Sugar, Elvis & Kresse, Formula E, Vitsoe, Riversimple) and future trends covered in the module as well as general knowledge and understanding of the furniture industry.

Steps 1, 2 and 3 – Setting the scene

- Decide the unit of analysis - product/service, business unit, company or an industry.
- Add or modify any missing stakeholders
- Identify the purpose of the unit of analysis

Steps 4, 5 and 6 – Map the value

- Current value captured for each stakeholder
- Value missed / destroyed / surplus / absence for each stakeholder - stakeholder tensions may arise

Step 7 – Generate new value opportunities

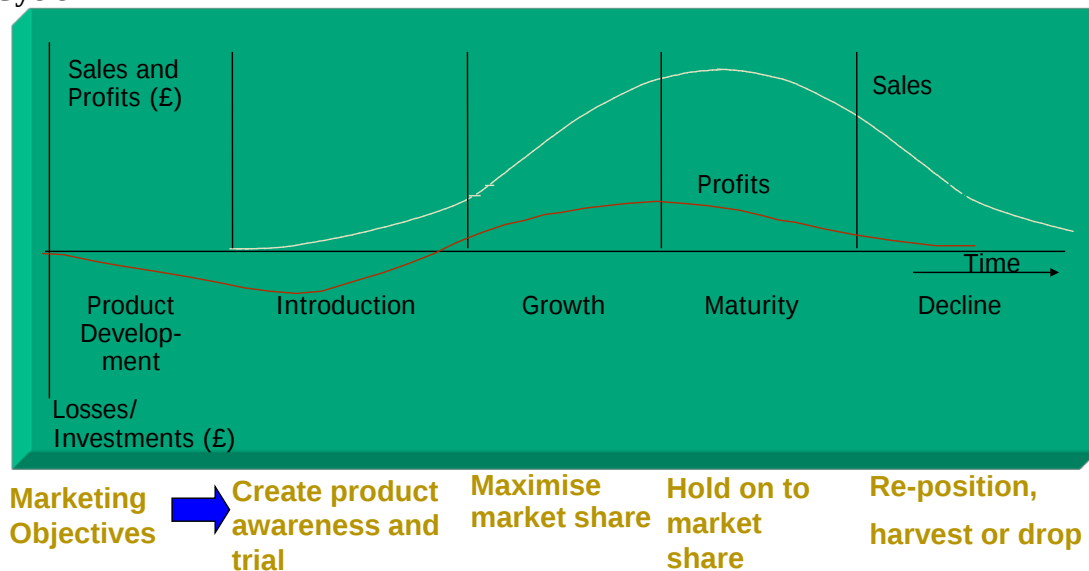
- Eliminate value destroyed and absence - reducing the value uncaptured, turning it into positive value
- Utilise value missed and surplus – reusing the value uncaptured, increasing value in the business network
- Look for value opportunities – extending the value captured, shifting to higher value added

- (c) A good answer would consider the new value opportunities identified in the previous analysis and translate them into elements or characteristics of a new more sustainable business model for Furnitura. Understanding of sustainable value, i.e. economic, environmental and social benefits of the new business model in the context of the furniture industry should be presented. Emphasis on better management of the end of life of the furniture products should be sought. Examples of such sustainable business models could be service-based business models e.g. rental or leasing of furniture esp. in the B2B segment; repair and upgrades through the use phase of the furniture; remanufacturing of furniture at the end of its life. Extending the life of the product through design and material innovation should be sought to achieve longevity of the product alongside longevity of the business. Ideas around circular economy principles, e.g. closed-loop material flows, recycling, reuse, repair, remanufacturing, at the core of the business model would be commended.

Answer

- (a) (i) Product management is the organisational structure and activities within the business that manage the development, marketing and sale of a product or set of products throughout the product life cycle. It encompasses the broad set of activities required to get the product to market and support it thereafter. The product life cycle curve (explained in lectures) illustrates this, and better students might be expected to sketch this to support their answer.

Sales and Profit together with the Marketing Objectives over the Product Life Cycle



- (a) (ii) The marketing function addresses the broader context of the products and services to be offered, and product management will focus on particular aspects of the product or product range being managed within the marketing strategy of the firm. In particular aspects of the marketing mix which relate to the product(s) in question will be determined, and provide the main links:
- Price - initial price, cost of ownership
 - Product - attributes, specification
 - Place - location of sales, distribution
 - Promotion - advertising and other market communication
- (b) The differences in the role of a Product Manager in various sectors arise from the differing target market segments, customer types (eg B2B, B2C...), product life cycles and many other factors that apply to particular sectors. During the Strategy and Marketing module in particular (and during the MET course in general), students have been exposed to specific examples of the product

management function in the sectors to be considered. Good answers will adopt a systematic framework for comparison between sectors, highlighting the specific factors, and the associated attributes, affecting the roles. Such a framework could include the following factors:

- The importance (and meaning) of the brand in the market
- The timescales of product life cycle
- The elements of the marketing mix (including relevant promotional methods)
- The significance (or otherwise) of R&D and technology in differentiating the product

Weaker answers will give a comparatively unstructured review of the activities of the Product Manager in the example sectors.

Excellent answers will make use of a systematic framework and provide richer detail in the comparisons, and emphasise the differences (contrast).

- (c) This part of the question will allow the better students to demonstrate their ability to extend product management and product life cycle thinking into considering the impact of servitisation. This is touched on the Strategy and Marketing module, and they can also draw on other MET2B module content. Weak answers will provide an unstructured account of service and support aspects of the extended product life cycle, with minimal reference to the significance of the focus being on complex engineered products. Good answers will review the aspects of product management and the life cycle that need to be reconsidered if the service business is to be successful. From initial market assessment, through design (to enable cost effective support), and manufacture, consideration of the customer's use requirements assumes a much greater significance than for rapidly consumed products, or even complex engineered products not developed to address the service business opportunity. Excellent answers will provide a richer range of examples, and explore the range of support solutions that could be offered, highlighting the importance of engaging the customer in the co-design of the solutions. They may redraw the life cycle curve indicating where the different servitisation approaches will impact the curve.

Overall the content that answers could draw on is as follow:

An explanation of the meaning of servitisation.

Servitisation is the process by which product providers add accompanying services to their product proposition. The growth of servitisation within manufacturing industry has provided opportunities to extend/modify the product life cycle, and hence revenue (and profit) generation. This applies particularly to complex engineered products, where the life of the product in use can be much extended. The aero-engine is a much quoted example.

Product firms might offer services for various reasons. On the one hand, there is the provision of services in mature industries, where the product becomes a commodity and hence the provision of services provides a means of differentiation and source of diversified revenue stream. On the other hand, the provision of services such as leasing is necessary to persuade customers to

buy products that are new to the market based on unknown technologies. Therefore, in this case the service comes first and, hence, substitutes product sales.

Studies have classified different types of service related to products, namely smoothing, adapting and substituting services. Smoothing services include services that help smooth product sales without altering the underlying product functionality. This includes financing and warranty services. Adapting services are services that expand the functionality of the product or assist customers in using the product in new ways. This could include customization of the product or bundling of the product with other products to provide a bundled proposition. Substituting services are services that replace the purchase of the product for the customer. This includes services such as “pay-per-use”, where the customer substitutes buying the product with paying for the service based on usage.

Servitisation can be seen as a continuum from basic product-oriented services towards more customized, process-oriented services and ultimately to the provision of solutions. In such a continuum of servitisation, the customer and supplier interface increases from being merely transaction focused to more of a relationship orientation, with deep co-engagement from design and development to end-use.

MET IIB Paper 2 - Question 6

Managing People and Strategy and Marketing question

Crib:

*A **basic answer** should first demonstrate understanding of the key elements of this question, i.e. large FMCG firm (likely to have wide product range, sophisticated sales and marketing capabilities, substantial manufacturing and logistics operations – devoted to current product range), disruptive product launch (new product may perform less well against currently understood consumer requirements but offer new value proposition; may require new production/marketing capabilities), new capabilities required (firm has substantial capabilities but seems to lack certain resources required for this new product – manufacturing and marketing), organisational asymmetry with potential partners (media agency and specialist contract manufacturer – both very different from FMCG firm).*

There are many strategic and operational issues that could be discussed but the questions asks specifically for people management issues. Students could bring in all sorts of issues from across the range of MET IIB modules – Strategy and Marketing is an obvious one but there are possible links to themes covered in TIM, ISOS and Sustainable Manufacturing.

People management issues could include:

- 1. New product launch: there are all the challenges associated with launching a new product, as covered in Strategy and Marketing (and in TIM) that should be covered here (4Ps, segmentation, understanding/anticipating consumer behaviour, etc) with the added complexity that this seems to be in the 'high risk' corner of the new to company/new to market matrix. Hence, should make reference to the ways in which company is attempting to reduce risk (partnerships) but this in itself may add additional risk (partnership management)*
- 2. Basic partnership management: there are all the issues associated with working in partnerships. Material covered in the lectures from OE Cam highlighted some of the numerous issues likely to be faced (developing trust / use of contracts) but this situation also raises a whole series of other amplifying effects: three very different organisations (each with their own specific*

cultures, organisations, operations and strategies), different locations (global core business, media agency in London, contract manufacturer in Eastern Europe), trying to do new thing in a new way.

- 3. Change management: This situation requires change within the organisation as it seeks to not only make a new thing in a new way with an external collaborator (whose capabilities need to be internalised), but also for this new thing to be marketed in a new way (learning from another external collaborator). How will these new capabilities be integrated within the existing operations of the business?*
- 4. Team/organisational issues: it is likely that a 'special' team will be put together for a project such as this. How do you select the members of that team? How should that new team be positioned within the parent company? What do you do with that team once the launch is over?*

*A **stronger answer** might explore issues of long-term impact on capabilities of the core firm: if the product launch is a success, will the core firm capture the learning from this? Although not detailed in the question, answers could explore issues of whether capabilities required for making and marketing this new product could transform other elements of the core business. If so, how would these be transferred? Students could explore the change management challenges of dealing with such longer term transformations within the core firm:*

How will the new manufacturing and marketing activities interface with the existing manufacturing and marketing activities?

Will the use of an external specialist contract manufacturer cause problems with all the existing supplier/logistic operations of the core firm? What about QA related issues?

How to manage the conflict of interest that could arise if the three firms have different performance management and compensation criteria?

How would the information asymmetry be managed if the management information system across the three firms provides different levels of granularity of information for decision-making?

How would the coordination take place between R&D, manufacturing and marketing if the products needs to be further enhanced after the launch based on customer feedback?

What if the launch is a partial success? If the product launch is not successful (depending how measured), how will the lessons from this be captured and transferred elsewhere in the business?

Will those who were involved in this project face problems when returning to other roles in the business?