

2009 MET Part 2, Paper 2: Answers to questions
Examiner Mr. D.R.Probert

Question 1: Answer provided by Mr Simon Pattinson

- a) Using your knowledge of New Product Development/Introduction and Product and Market Life Cycles, explain the implication of the current strategy on investment and cash flow.

Guide to answer:

Businesses are constantly seeking to grow future cash flows by maximising revenue from the sale of products and services.

Cash flow allows a company to maintain viability, invest in NPD, improve its workforce and pay stakeholders. Sustainable cash flow is key to long term investment and short term survival.

New Product Development/Introduction requires substantial up-front investment with no certainty of immediate or any return. Literature suggests that typically 80% of new ideas fail to be commercially viable. Company needs well developed NPD process drawing in good ideas and maximising the output of successful/profitable products from the given investment.

A Product Life Cycle represents the stages from Development and Introduction through Growth, Maturity, Decline and Obsolescence/Withdrawal of a single product from the Company. If we consider the cash flow it is clear that payback is usually 2/3 years – assuming the product is successful.

The Market Life Cycle takes into account different generations of product and looks at the whole market ie customers and competitors. Again it is clear that profit and positive cash flow occurs in the “middle” of the cycle.

Knowledge of NPD/NPI, PLC & MLC indicates that a strategy of developing and launching new products is a sensible strategy for the future sustainability of the company but requires a lot of investment – burns a lot of cash!

Profits and Cash Flow occurs in the middle of the curves – Growth and Maturity phases.

There is a point in the decline phase where a product is no longer profitable and there is a possibility that product withdrawal requires expenditure – running down/writing off stock, retraining, shut-down etc.

The old strategy produced a mature cash generating business but with risk of medium/long term decline as products went into decline.

The new strategy is now diverting significant cash flow into investment in NPD for the next generation of profitable products. This needs careful timing management and good communication with stakeholders.

- b) Explain how the Market Life Cycle can be linked to the BCG Matrix (market growth versus relative market share).

The Market Life Cycle is closely related to the BCG Matrix. The BCG takes the MLC for product types and looks at/compares the Portfolio of all the products in the business and their phase in the Investment/Cash generation cycle of the business.

Cash Cows: Successful mature products with good market share. Modest investment to maintain efficiency. Risk of going into decline.

Question Marks (problem child): Usually new product requiring further development. Uncertainty and Risk. Close management attention. Hopefully will develop into a Star but may decline and become a Dog

Stars: Successful products in growth phase requiring lots of investment to keep up with development and growing demand.

Dogs: products with little or no prospects that are a liability and probably need to be divested.

The business aims to have a “balanced” portfolio – reinvesting for the future, improving the current business situation and satisfying the shareholders/stakeholders. What does an ideal Portfolio look like – taking into account a possible 80% failure rate of NPI.

Understanding of timing of transitions is very important as it has a huge impact on cash-flow & profitability – but is difficult even in stable economic conditions,

- c) There is a conflict between investment and cash preservation.
“As in every downturn, who succeeds and who fails is likely to be determined not by what costs are cut, but how they are cut and above all which ones are not cut.”
(The Economist November 22nd 2008)

Explain how an understanding of marketing models and concepts can help the Marketing Director to highlight the key issues facing the business, and recommend possible courses of action in the current economic climate.

(No right or wrong answer here but lots of opportunity to show wider understanding and knowledge of the taught material and further reading and thinking.)

a) and b) above have looked at the underlying theory.

Review will need to start with an Audit of the cash flow and liquidity position of the business. Does the Existing Product/NPD Portfolio need rebalancing?

Board needs to take a view of the current recession. Scenario Planning – quick bounce or prolonged recession. Need to consider how recession is affecting other

countries and different phasing. (Customers/costs/prices/exchange rates) Need to make assumptions based upon Market Intelligence and decide course of action – but be flexible to adapt if situation changes for good or bad.

Need to take a view of customer/buyer behaviour. In recessions people become more cautious/less adventurous and typically delay capital or non-essential purchases. Therefore less replacement purchasing. Perhaps more mending/servicing/spare parts requirements.

- Will new product take-up be slower?
- Extension of mature products – revamp of old models – differentiation for product life extension?

Need to consider supply chain risk – suppliers may go out of business with very little notice. Could be very vulnerable if supply chains are long complex and lean.

Need to take above into consideration and review NPD portfolio. Re-evaluate business case for each new product.

Consider lowering Risk Profile using Ansoff Matrix. Consider slowing down (possibly cancelling) some of the riskier NPD programmes. But need to weigh this against missing market opportunity – competitor response. Likely to concentrate on existing product development/market development rather than full blown product/market diversification. Good students are likely to link this back to earlier Scenario Planning and Assumptions

Consider extending life of some of the existing mature products, introduce differentiation.

More flexibility in the Supply Chains (not too lean)

Regular reviews to keep abreast of the developing situation.

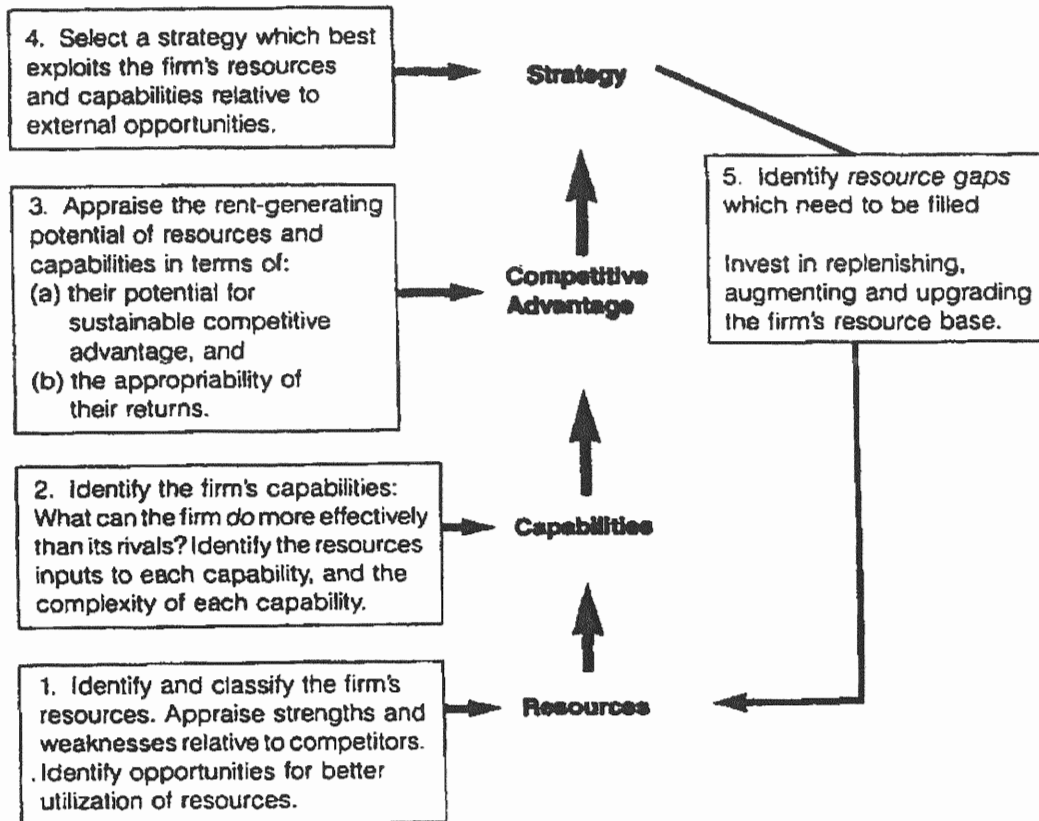
Question 2: Answer provided by Dr Ken Platts

Guide to answer:

Describe and discuss the resource-based approach to strategy formulation.

It is expected that students will use a framework like that of Grant, see fig.1.

**Figure 1. A Resource-Based Approach to Strategy Analysis:
A Practical Framework**



The essence of this is that the acquisition, coordination and control of resources enables a company to develop core capabilities, also called competences, which are things it *does* better than its competitors. This leads to competitive advantage, enabling it to generate profit by matching these capabilities to external opportunities. The resource based approach to strategy follows this model by identifying valuable resources and resource gaps, and taking actions to acquire, enhance, utilise and protect valuable resources. It then develops ways to coordinate these resources to produce core capabilities which it then exploits.

Define what is meant by a company's competences and describe how you would assess them and hence identify core competences.

A competence (capability) is a business activity, it is something a company 'does', it is expressed using a verb. For example,- developing a new product, delivering on time, producing high quality components.

Companies engage in lots of activities and hence, by definition, have many competences. However, not all of these lead to competitive advantage. Many are necessary aspects of running a business, eg paying bills, completing statutory returns, maintaining buildings. If these things are not done, they adversely impact the business, but even if done exceptionally well they offer little basis for competition. (Observe the analogy with Order Qualifying Criteria covered in the Market view of strategy.)

Unique competences may offer the opportunity for advantage. If the customer values, or can be encouraged to value, the competence, and if it can be protected then it can become core.

A Core competence is a competence that confers a distinctiveness which is highly or uniquely valued by customers. This will be a key source of competitive advantage, providing that it cannot be easily copied or substituted.

Core competences can form the basis for ongoing competition, hence we need to be able to evaluate competences to identify those that are core.

Competences, and their underlying resources, can be assessed against several criteria. The two main criteria are value and sustainability.

Value - a competence is valuable if it makes a significant impact on the business, and if it is something not possessed by competitors.

Sustainability - a competence is sustainable if it is not easily copied by a competitor, or cannot easily be substituted.

A high score against both criteria indicates a core competence

Value can be assessed by looking at impact, and rareness

Impact - The contribution of a competence to the success of the business. This can be viewed in terms of impact on bottom-line or market share, delivery of order winning criteria, centrality to the business model etc.

Rareness - An indicator as to how uncommon the competence is amongst competitors. The importance of a competence increases if others are not able to perform equivalent activities.

Typical questions to assess value include:

What is the impact of this competence on:

the organisation's costs and revenues?

the organisation's ability to exploit opportunities or defuse threats?

the potential growth of the organisation?

What level of performance does it offer compared to competitors?

How many competitors also have this competence?

Sustainability can be assessed by how difficult it is to imitate and whether there are alternatives.

Difficulty to Imitate - The competence cannot be easily imitated, or is expensive to imitate. Competences scoring highly in this category are likely to be built upon a wide range of resources and could rely on a significant amount of tacit knowledge within a company.

Lack of Alternative Competences - The competence cannot easily be replaced by a different competence which offers equivalent or greater value to customers.

Typical questions to assess sustainability include:

How easily can a competitor recognise this competence?

How long would it take a competitor to imitate it?

How much would it cost a competitor to imitate it?

Without investment how quickly will its value decline?

Could this competence be substituted, if so, how long would it take, and at what cost?

Reference

Grant RM (1991) "The Resource-based Theory of Competitive Advantage: Implications for strategy formulation" California Management Review, Spring 1991 p114-135.

The students were given copies of this paper during the module.

Question 3: Answer provided by Dr Elizabeth Garnsey

“Alliances with other organizations can help to offset the tendency to organizational inertia and promote innovations in established companies.”

Discuss this statement, supporting your answer with examples.

Guide to answer:

This question is eliciting themes from two bodies of literature (1) innovation management and (2) alliances and partnerships. The open nature of the question is intended to make it possible to give marks to students who structure their answer effectively, showing the connections between the two sets of themes and to reduce marks for disorganized exposition.

The question can be answered by combining material on organisational inertia with material on partnerships and alliances, together with the associated articles/chapters provided in the Module Readings. It could also be informed by literature on the management of change from MET 1 third year Organisational Behaviour lectures.

The students could discuss causes of incumbent inertia in established companies

- ‘Not invented here’ syndrome
- Culture of caution
- Incentives to managers that make them risk averse
- Lack of exposure to new technologies and markets
- Divisional silos --- etc
- Lack of conditions to support creativity among employees

In the second part of the question, the potential benefits of partnering include the inflow of new ideas and practices, exposure to different ways of doing things, to new technologies and markets. Examples could be cited from effective open innovation alliances and consortia, where partners work together on innovations. However alliances do not guarantee innovative success. In the list above, alliances would not change organisational culture except as regards the specific partnership project that overcame these obstacles to innovation. A more root and branch change is required to foster innovation in established companies, with ancillary help from partnering. Answers should provide examples from reading, workshops or direct experience.

The two bodies of material should be brought together systematically. For example, a simple way of doing this would be to use categories explaining organisational inertia in order to show how alliances can overcome each of these tendencies, or to list benefits of partnerships and show how each of these can offset inertia.

Marking criteria

A first class answer would be able to bring the relevant literatures together in a coherent way and provide an answer that is thoughtful and rich in content.

This could be done by presenting detailed material from both sets of workshops and readings to illustrate and elucidate common themes (see above) and providing a framework to bring them together. The answer would show thought and individuality, citing personal experience for example.

An upper second answer would cover the main content but would fail to include some of the key points and would be less thoughtful and original than a first class answer.

Weaker answers would fail to identify integrating themes or be unable to provide an account of obstacles to innovation or benefits of partnership. A third class answer would fail to make effective use of any of the relevant material presented in the module and present generalities or waste marks on irrelevant evidence.

Question 4: Answer provided by Dr Elizabeth Garnsey

“Automation and the relocation of industry to lower wage economies have taken the human resource issues that were once associated with lean production off the manager’s agenda in advanced industrialized countries.”

- (a) What human resource issues have been raised in connection with lean production?
- (b) Discuss the quoted assertion that recent developments have made these issues irrelevant. Explain your reasoning and supply detailed evidence in support of, or against, the statement.

Guide to answer:

This question assesses the ability of candidates to review human resource dimensions of lean production and to structure an overview of a complex set of issues. There are various ways of addressing the question.

Answers could point out that HR issues associated with LP include the charge of management by stress (Trade Union objections to reorganisation of work on LP lines). It has also been claimed that attempts to introduce LP in the UK have given rise to high labour turnover and absenteeism. In discussing these objections it could be pointed out that they were not based on systematic evidence of the kind presented by Conti and Angelis. This showed that well conceived and implemented, LP should not be management by stress and should result in labour retention and lower absenteeism by motivating and rewarding the labour force for higher productivity. The Karasek Theorell model of stress is relevant and could be discussed (demand/control/support).

The reasons why the labour force must be engaged if LP is to succeed should be explained. There is the need to address such Human Resource dimensions of LP as:

- Engage commitment of workforce
- Teamwork; supervisor as leader;
- Multi-tasking
- Salary, not incentive payment.
- Continuity of employment

As regards the statement that automation has rendered LP out of date in advanced industrialised economies, this disregards the remaining labour force engaged on tasks

that cannot be automated, and offshore sites for which managers from corporate HQs in advanced industrialised economies have a responsibility.

The best answers would go on to show that lean production may no longer be an issue today in western manufacturing but for reasons other than automation – ie because economic and social conditions in advanced countries are unsuitable for lean production.

The decomposition of tasks as advocated by Taylor and embodied in Scientific Management allows for higher levels of productivity but this requires specific product market and labour market conditions. It must be possible to achieve economies of scale and standardization of output. It must be possible to pay lower salaries for decomposed tasks – opposed by unions in some countries, eg Sweden. Students could show why in the absence of high volume, or of standard products/services (in a low volume, differentiated, custom built product) and unless labour markets provide workers at lower salaries for decomposed tasks, work organization based on the Taylorist decomposition of tasks will not reduce costs or raise productivity. Administrative costs are very high and must be recouped by high volume sales at lower wages. In the absence of the required product and labour market conditions, small scale, flexible production as in Silicon Valley or North Italy may be more appropriate.

However, neither automation nor off-shoring has removed the issues raised by lean production from managers' agenda in western countries, on the contrary these methods have diffused as they have been extended into the service sector. The students could draw on case study evidence provided in the course readings, revealing the extension of Taylorist methods into office work (on insurance claims and other routinized service tasks) and food processing.

Here, and wherever operatives are needed in conditions of *partial* automation, stressful dimensions of LP should be addressed. The answer should explain why work under LP may be stressful and how stress can be mitigated without loss of the productivity benefits of LP as shown by the evolution of LP in Japan and especially at Toyota. Conti and Angelis have shown that this has been achieved without abandoning key features of LP, viz uninterrupted work flow, JIT, Kanban, TQM (minimising rework) and Continuous Improvement (Kaizen). According to research by Conti and Angelis, stress under LP can be reduced by:

1. reducing resources *in response to rather than in anticipation* of productivity increases
2. introducing technical changes such as total preventative maintenance,
3. worker participation in improving tools and task organization
4. provision of employment security.

Where low wage labour is plentiful it is unlikely that such measures will be introduced without use of labour conventions tied to trade agreements.

Marking Criteria

Students would not have to make all the arguments set out above but to produce a coherent answer showing they had reflected on the issues of whether automation removes the need for LP.

A first class answer would be able to bring the relevant literatures together in a coherent way and provide an answer that is thoughtful and rich in content.

An upper second would show some grasp of what the two sets of issues have in common but would lack coherence and miss some of the key empirical points.

Weaker answers would simply reproduce material from slides and reading without understanding the HR dynamics of LP or when they are likely to arise.

Third class or lower answer would be unfamiliar with the materials covered in class and would produce generalities without detailed evidence or coherent arguments.

Question 5: Answer provided by Dr Tim Minshall

- (a) Compare and contrast the key features of India's manufacturing and service sectors.
- (b) "India's economy could be larger than all but the US and China in 30 years." (GoldmanSachs (2003). *Dreaming with BRICs: The path to 2050*). Discuss the challenges facing the growth of the Indian economy with specific reference to:
- (i) Infrastructure
 - (ii) Education
 - (iii) Innovation

Guide to answer:

(a)

Manufacturing sector:

Sector made up of a combination of large, well established local firms (e.g. Godrej) (some of whom have developed globally (e.g. TATA)), MNCs and local SMEs. India sees itself as having 'missed-out' on high-tech and high volume manufacturing and so development of manufacturing now seen as key strand of government policy. Manufacturing is expected to grow between 12-14% over the next few years with a two track strategy involving a 'high-tech production & services' economy and in parallel a jobs-creation driven 'mass production' agenda that includes an emphasis on food processing and distribution.

Service sector:

Business services (information technology, information technology enabled services, business process outsourcing) are among the fastest growing sectors in India contributing to one third of the total output of services. The growth in the IT sector is attributed to increased specialisation, availability of a large pool of low cost, but highly skilled, educated and fluent English-speaking workers (a legacy of British Colonialism) on the supply side and on the demand side, increased demand from foreign consumers interested in India's service exports or those looking to outsource their operations. India's IT industry, despite contributing significantly to its balance of payments, accounted for only about 1% of the total GDP or 1/50th of the total services. Excellent infrastructure in the service sector and the lowest communication cost has helped India to be a dominant player in these sectors.

(Students will have had access to

www.ifm.eng.cam.ac.uk/cim/briefings/cim_briefing_india.pdf and similar to be able to address this part)

(b)

Infrastructure: poor roads, clogged cities, run-down airports are a major hidden cost, eroding India's labour cost advantage. Investment in roads and airports is now being provided by new schemes such as Public Private Partnerships (PPPs) but these are still politically controversial.

Education: though IITs provide great training for small percentage of engineers, these may be focused on the development of engineers able to implement standard solutions but not to be innovative. IITs are only one (high profile) strata of education system –

attention is needed throughout the education system to ensure that appropriate skills for innovation and entrepreneurship are developed throughout society.

The number of IITs is set to increase from 8 to 15. A similar expansion is envisaged for the Indian Institutes of Management IIMs. India plans to turn 12 of its universities into world-class institutions by 2020. But does increasing the number of universities support economic growth?

Innovation: Much of India's competitive advantage is still based on labour price arbitrage and domestic market circumstances make the emergence a game-changing corporation, equivalent to Microsoft or Intel, unlikely. Many of the innovations that collectively have the power to improve the daily lives of millions of Indians are closer to social than technological innovations, or they may be characterised as the broad implementation of mid-tech solutions. As such, they may not drive the growth of the Indian economy in the same way that ITC innovations did in the US. Also, as above, education system may not support innovation and entrepreneurship.

The translation of ideas from the science base require there first to be a stronger science base and a more sophisticated network of links between academia and industry.

(Students will have had access to data resources captured by the 'Funding Technology - India' research project and similar to be able to address this part)

Question 6: Answer provided by Mr David Probert

Technological development has underpinned the market growth of mobile telecommunications over the last 25 years, in areas such as batteries, displays, microprocessors and memory.

(a) Explain what is meant by the technology 'S' curve and how this concept might be used to help manage the application technological developments such as those listed above. Illustrate your answer by applying the 'S' curve concept to two areas of technological progress relevant to mobile phones.

(b) Discuss how the practice of technology roadmapping might be applied to planning product succession in a mobile phone manufacturing business. Illustrate your answer with a sketch of a hypothetical technology roadmap for this case, identifying and explaining the key features of the roadmap.

(c) Explain how the application of the 'S' curve concept could support the roadmapping process, identifying any risks and limitations of this combined approach.

Guide to answer:

(a)

The technology 'S' curve shows the progress of some aspect of the technology's performance (vertical axis) against time (horizontal axis). This typically shows an 'S' shape as in Figure 1, although in reality progress is a series of small steps. The time axis is in fact a proxy for investment or effort, but since these can be difficult to measure over long periods and/or with many firms involved, time is an acceptable alternative.

Performance

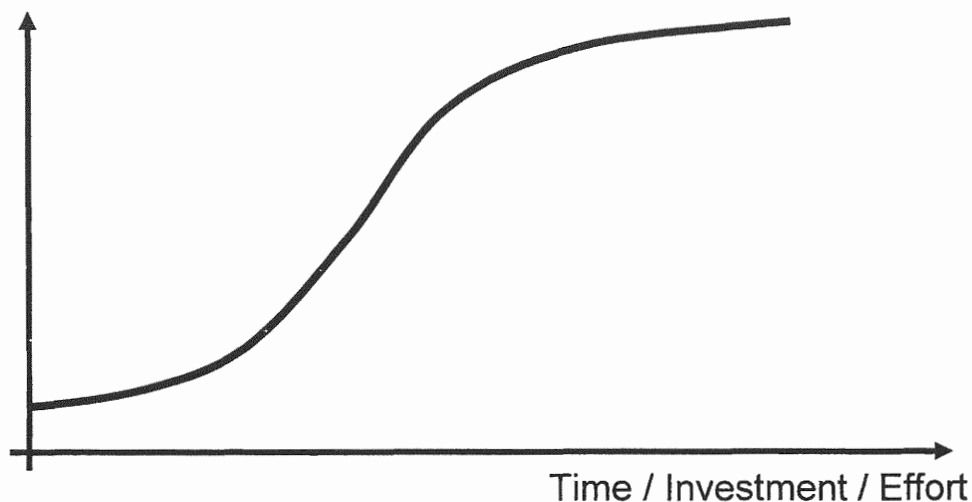


Figure 1: Example 'S' curve

The shape arises from the relatively slow pace of technological development in the early stage of a technology's life, when it is first discovered and before much investment has been given to it. The steep rise in performance during the mid life stage results from significant effort being applied to develop the technology, and later in the life cycle performance development slows down as the technology matures and there is little scope left to improve it. The choice of performance dimension is very important; technologies may have many different performance measures and the appropriate measure must be selected for the application under consideration. In some cases composite performance measures may be appropriate, for example for the price of energy from a battery in \$/wh or for DRAM memory \$/bit.

The concept may help to manage the application of technological development, by showing what stage of development a technology is at, and when progress is beginning to slow down. At this point alternative new technologies are likely to substitute for the current technology, and a company should investigate these alternatives if it wishes to remain competitive. In practice, a graph may be of a technological area, with several individual 'S' curves drawn for competing technologies, showing the point at which a new technology takes over from an older one.

In the case of the technology areas given, any of the following performance measures might be tracked (as well as others):

Batteries: weight, size, storage capacity, life (talk-time, stand-by...)

Displays: resolution, brightness, colour rendition, size, power consumption

Microprocessors: speed, power consumption, physical size

Memory: capacity, physical size, operating voltage

Students might also suggest other areas of technological development relevant to mobile phones, and should be able to sketch notional 'S' curves for the two they choose. The graph should show which particular performance measure is being used, and any step changes in performance as new technologies are introduced into the area.

'S' curves tend to apply at the aggregate industry level, ie the smoothness is due to many organisations' activities. For a single company such a curve will often be more jagged.

Descriptions of the technology as emerging, pacing, key or base, may also be applied to the lifecycle and marked on the 'S' curve, and connections made to the industry life cycle, particularly with early stage technologies in the era of ferment.

(b)

Technology roadmaps, when applied to planning product succession, show the introduction of new products over time, based on the application of new technologies. The products may be individual, or they may be families. The roadmap may also show market and business drivers relevant to the business. Figure 2 shows a generic technology roadmap as applied to product planning.

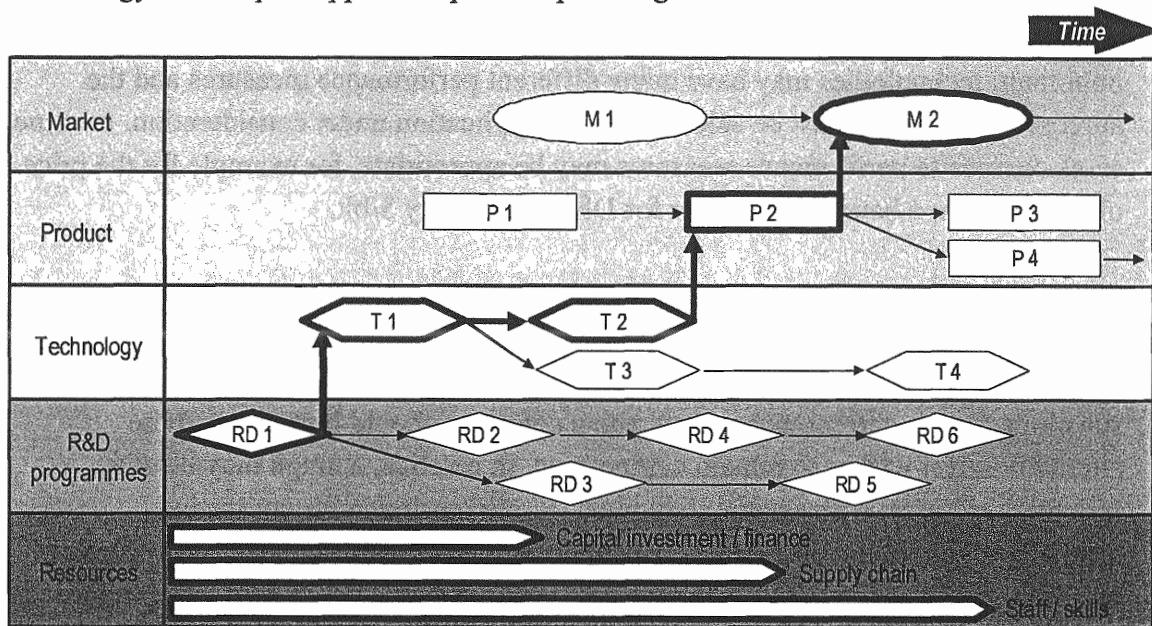


Figure 2: Generic technology roadmap

Important aspects of the roadmap are the dependencies it shows in terms of when new products need to be available to meet market conditions, and when new technologies have to be available to support new products. Other resource requirements (such as for R&D projects to develop a new technology) may also be shown, and critical decision points can be identified. The roadmapping process is usually a group activity that builds consensus and commitment to plans, and is thus a useful support to new product planning and introduction.

In the case of a mobile phone manufacturer, one would expect to see product generations planned for the next three to five years given the rapid developments in technology and market that apply in this industry. Longer term speculative product ideas might also be shown, going out five to ten years. Figure 3 shows a hypothetical technology roadmap for such a manufacturer.

Key features are the succession of product generations, linked to technology developments and R&D projects. Possible (but not yet committed) products can also be shown, indicating when commitment would be needed to meet dates for market entry. The timing and dependencies are critical to planning, as are any additional resource requirements.

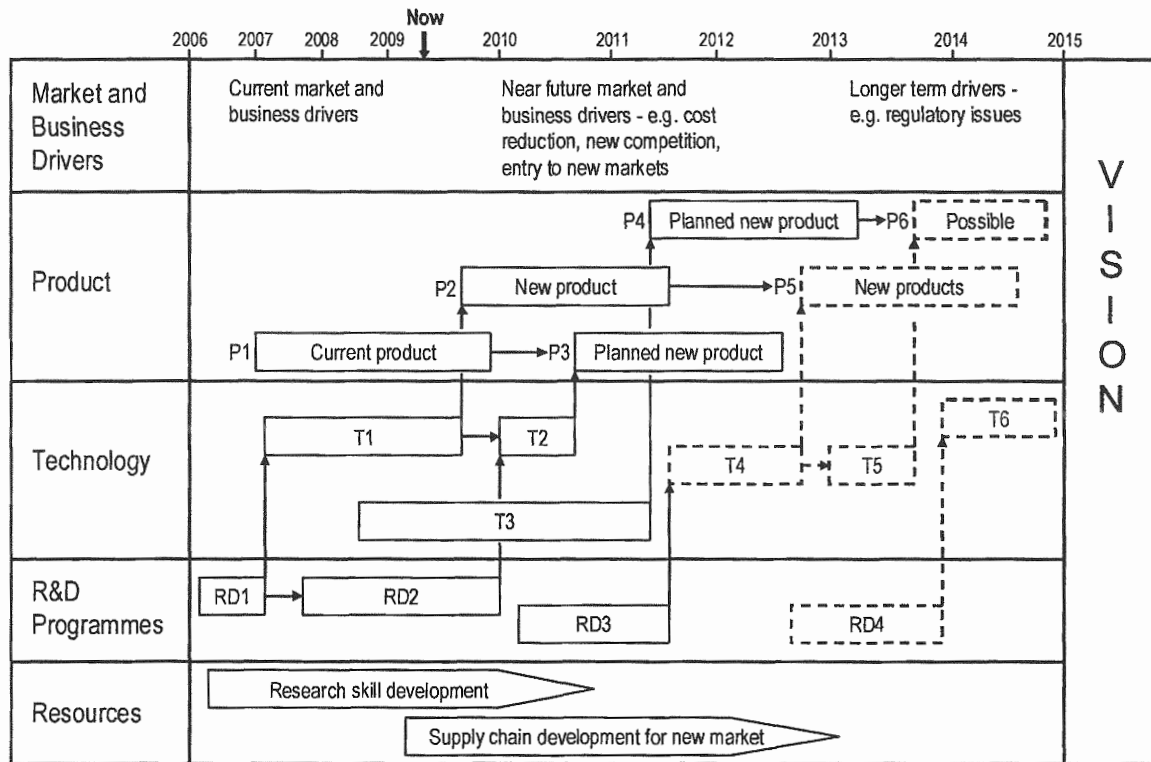


Figure 3: Hypothetical technology roadmap for mobile phone manufacturer

(c)

The areas of technology critical to the mobile phone technology roadmap should be tracked by 'S' curve analysis, in order to help predict when new technologies will replace older ones, or simply as a forecast of technical performance. The lines of technological development shown on the roadmap, should be supported in this way. Risks and limitations arise from the possibility of choosing inappropriate performance measures for a technology, and thus missing a new relevant technology that competes on different measures. This implies that some effort should be given to scanning for technologies outside the current areas of expertise, for example in this case fuel cells as a power source alternative to batteries.

Another possible risk for new entrants/substitutes is that they often underestimate the continuing progress of the incumbent technology.

