

Business Planning Methodology to Support the Development of Strategic Academic Programmes

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Abstract: *Higher education institutions are often required to design and deliver a range of strategic academic programmes in order to remain competitive, support growth and ensure operations are financially sustainable. Such programmes may include the creation of new research centres and institutes as well as the installation of major new research facilities. These programmes offer significant academic benefits but can often carry commercial risk associated with the major levels of financial investment that may be needed. There is also the need to develop a compelling case to secure the necessary funding. Consequently, this paper provides details of a management framework based on a business planning methodology, which can be applied to support the development of strategic academic programmes. Adapted from the recognised MSP (Managing Successful Programmes) management process, the framework has been explored as part of a case study investigation of a medical research facility. The case study highlights a number of managerial insights across the people, process, technology and knowledge dimensions that are pertinent to the management of strategic academic programmes. The management framework can be adapted to the needs of other organisations involved in the business planning for such complex initiatives.*

Keywords: *Strategic Academic Programmes, Business Planning, Medical Imaging Facility*

Introduction

Universities and independent research institutions can often be large and complex organisations that need to be flexible and adaptable to continuous change (Navarro & Gallardo, 2003). Indeed universities are required to meet the needs of various stakeholders through providing academic services involving the delivery of education and in the case of research intensive universities, this also includes undertaking research. Furthermore, knowledge exchange activities result in the translation of knowledge and research outcomes into commercial benefits for partners or societal benefits for wider stakeholders (Philbin, 2015). In this context universities have increasingly been viewed as occupying a strategic role through stimulating innovation and economic growth through technology transfer and the resulting commercial exploitation of intellectual property (Hughes & Kitson, 2012).

Universities also face a number of challenges. There is increasing pressure on academic budgets, especially on the funding secured from governmental sources. There is an increasing level of

competition in terms of universities competing on multiple levels, e.g. competing for the best students and staff as well as for research funding. There is also a tendency for universities to be engaged in greater levels of performance measurement to underpin effectiveness across research, teaching and knowledge exchange activities (Ter Bogt & Scapens, 2012). But universities are also faced with the opportunities of adopting modern ICT (Information and Communications Technology) to improve the scope and quality of teaching (Selwyn, 2007). Additional educational channels are under development and offered by an increasing number of universities, e.g. through recent developments of MOOCs (Massive Open Online Courses) (Daniel, 2012). Other opportunities could, for example, be associated with responding to major funding calls and setting up multidisciplinary research centres (Philbin, 2011), or establishing new research facilities that bring together academic faculty to focus on a specific industrial requirement or societal need for research, such as healthcare, security or the environment.

In this context, universities need to be able to adapt to emerging opportunities and respond to strategic programme opportunities in an efficient and effective manner. In the case of major opportunities, there will be the need to assemble a supporting business case that underpins the opportunity. The business case will need to sit alongside the academic case for financial support and will jointly be reviewed by the funding body, which could be a government agency, industrial company, charitable foundation, philanthropic source or even the university itself. Development of a business plan for a new initiative requires appropriate commercial competencies in order to ensure a compelling and attractive case can be assembled, which can thereby attract the necessary funding. While companies are experienced in such business planning, in the Not-For-Profit (NFP) and academic sectors there has historically been less of a need for such commercial competencies and capabilities. This is changing, however, and increasingly universities and NFP research organisations are adopting management practices derived from the corporate world (Nickson, 2014). Nevertheless, in our experience we have found there can be certain challenges encountered, especially for strategic academic initiatives. These challenges are summarised in Table 1.

Table 1. Summary of challenges encountered for strategic academic initiatives pursued by universities.

Challenges for Strategic Academic Initiatives
<ul style="list-style-type: none"> • An inability to secure sponsorship or capital investment to support the initiative. • A lack of a robust business case to support the initiative. • Insufficient leadership of the opportunity, either academic or commercial. • The need for administration services to rapidly undertake financial and contracts related activities in order for a proposal deadline to be met. • Difficulties in the estimation of the true costs associated with the initiative. • Inadequate planning leading to difficulties in delivery of the initiative. • Difficulty in the effective review of commercial opportunities, which starts from the early conceptual stage and extends through to later stages in the development cycle. • Incomplete scope of work leading to the need for extensive change control that may result in cost overrun during delivery of the initiative. • Insufficient capture of risks and the required mitigation measures needed to reduce such risks.

Consequently, this paper will describe an approach developed at Imperial College London in the United Kingdom to help support the development of strategic academic initiatives at universities through use of a structured business planning methodology. The framework is introduced and an illustrative case study is described in order to provide readers with insights into the benefits of adopting a structured business planning methodology at higher education institutions. Such a framework can be deployed to support the development of strategic programme opportunities such as new research centres, major infrastructure investment as well as the creation of new academic capabilities to support research and education delivery.

The Need for Business Planning

The process of business planning needs to capture the customer need in a succinct manner and then derive a viable solution and supporting approach in order for the need to be met. Addressing this need involves the deployment of the necessary resources along with management oversight and the costs for such activities need to be ascertained. There is also a need to identify the risks associated with such a business plan and other commercial factors such as the availability of investment capital and the level of competition from other suppliers in the sector. The use of structured methodologies, such as programme management, offers the ability to provide a systematic approach to support the business planning process. Indeed ensuring there is a robust process to support planning can help improve the success of strategic initiatives. Process considerations include the features of the planning stage, human-dimensions of decision-making, managerial and technical skills available to the team—both the internal and external context for the planning as well as the initial and final outcome measures of performance (Bryson & Bromiley, 1993).

In terms of developing strategic initiatives, there needs to be alignment with the relevant organisational strategy, which could be at the corporate, business or functional level (Grünig & Kühn, 2015). This alignment is required to enable the pursuit of new strategic opportunities and to help organizations receive the necessary funding. The development and maintenance of key infrastructure and facilities can be of strategic importance to academic institutions and initiatives that are pursued in order to maintain enterprise-wide research and associated experimental facilities can benefit from the support of standardised and transparent processes (Grieb, Horon, Wong, Durkin & Kunkel, 2014).

The capabilities required for universities to initiate and deliver strategic initiatives, such as new research centres or subsidiary companies, will be associated with the processes adopted as well as the structures and resources that are available. Moreover, business planning can support the decision-making process required for developing such strategic initiatives but while adopting a structured approach to business planning offers clear benefits it should be balanced against the need to avoid becoming overly rigid or bureaucratic (Oakes, Townley, & Cooper, 1998). Indeed business planning has historically been a recognised approach to support new venture creation (Delmar & Shane, 2003), which is highly dependent on being able to articulate the commercial value to be delivered by the venture. Developing a strategic programme at a university needs to capture and articulate the academic (or technical/scientific) and the commercial case, so it is

logical to draw on best practice from the corporate environment but crucially with refinement to the university/NFP context.

Recognising the best practice and current approaches to programme management as well as business planning for strategic initiatives, we identified the Managing Successful Programmes™ (MSP) framework (Office of Government Commerce, 2007) as a suitable methodology to support the development and management of strategic initiatives at Imperial College London. This was supported by consultations with members of staff at Imperial College on the need for

Table 2. MSP programme definitions and business planning applications for universities.

Type	Programme Definition	Business Planning Applications
Vision-led programme	Focused on delivery of a strategic opportunity for the organisation and often driven top-down to meet a defined vision.	<ul style="list-style-type: none"> Development of a new multidisciplinary research centre at a university. Establishment of a joint venture company for the delivery of, for example, joint testing or analytical services with another organisation. Development of a new commercial educational initiative to provide university courses through an online platform on an international basis. Developing a business case for a research services facility in order to respond to a major industrial funding opportunity.
Emergent programme	Evolves from concurrent, uncoordinated projects where there is recognition that coordination will deliver defined benefits.	<ul style="list-style-type: none"> Developing a strategic alliance with an industrial organisation that builds on a set of existing research projects that were previously not coordinated as part of an integrated programme. Linking together several disparate management accounting systems in order to provide an integrated approach to managing research administration activities across the university. Establishing a single office to support technology transfer and intellectual property management for a university that previously had such activities carried out separately in different departments.
Compliance programme	The organisation has to undertake the programme so that compliance is achieved in the context of an external event such as new legislation.	<ul style="list-style-type: none"> Implementation of an equipment maintenance system (including additional resources and new processes) in order to respond to new safety legislation relating to the operation of technical facilities. Establishment of a research compliance office in order to respond to new legal requirements and obligations placed on the university by a major funding body such as a government healthcare agency. Resourcing of an administration team for international students in order to administer and manage compliance with a new set of immigration requirements and procedures.

an efficient process for the management of major initiatives and also through capturing views on the matter from a range of senior stakeholders at Imperial College. Consequently, we sought to implement the MSP methodology through adapting the standard process model to Imperial College's requirements for strategic academic initiatives and the process was also streamlined to be aligned with Imperial's administrative systems and thereby avoid excessive bureaucracy.

MSP is a management standard that has been developed over the last several years by the United Kingdom's Office of Government Commerce (OGC). This management approach is not derived from theoretical study but has been established through building on the knowledge and experience of practitioners and the approach therefore represents best management practice. The management standard relates a programme to the implementation of a set of related projects to deliver outcomes and benefits associated with the organisation's strategic objectives. Moreover, a programme is focused on aligning corporate strategy with a delivery mechanism for change in the context of existing business operations, where according to the MSP framework a programme can either be vision-led, emergent or compliance. Table 2 provides the definitions for the three main types of programmes together with a series of illustrative business planning applications for universities according to the three types.

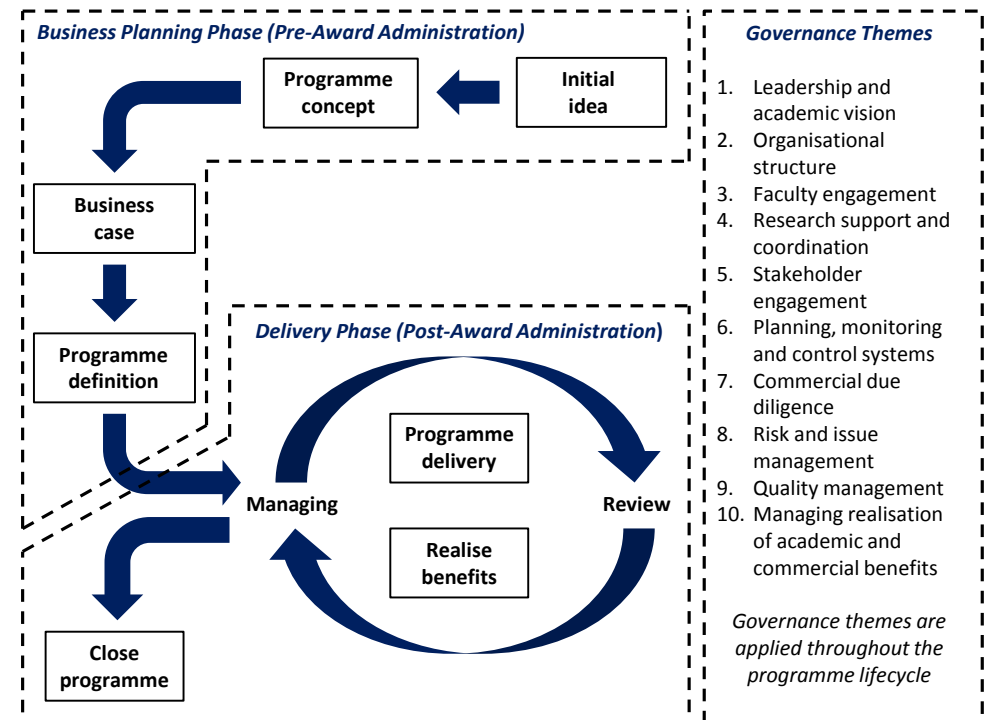


Figure 1. Overall view of the management framework to support business planning and delivery for strategic academic programmes (adapted from the MSP methodology).

Table 2 highlights that there are a range of business planning applications in higher education institutions that can be related to the programme management approach offered by MSP. Adoption of a recognised and structured methodology, such as MSP, offers a university a number of benefits. These include the efficient use of administration resources to support research programmes, effective planning according to recognised best practice for management initiatives, potential to be economical and offering value for money through avoiding duplication of management effort as well as capturing key data and information to support the ethical administration of research programmes.

Business Planning Methodology for Strategic Academic Programmes

The management framework to support business planning for strategic academic programmes has been developed through applying the MSP methodology to the academic context and is provided in Figure 1. The framework includes the business planning phase (pre-award administration) and the delivery phase (post-award administration), which together comprise the different stages of the programme lifecycle. The management framework also includes associated governance themes. The ten governance themes describe the different elements required to support the overall process, such as leadership and academic vision, organisational structure, faculty engagement as well as research support and coordination. These governance themes provide the supporting mechanisms to ensure programmes deliver the required outcomes and remain within corporate visibility and control.

In terms of a lifecycle perspective of strategic academic programmes, ideas for new programmes are initially created (initial idea stage), whereupon they are conceptually developed by the

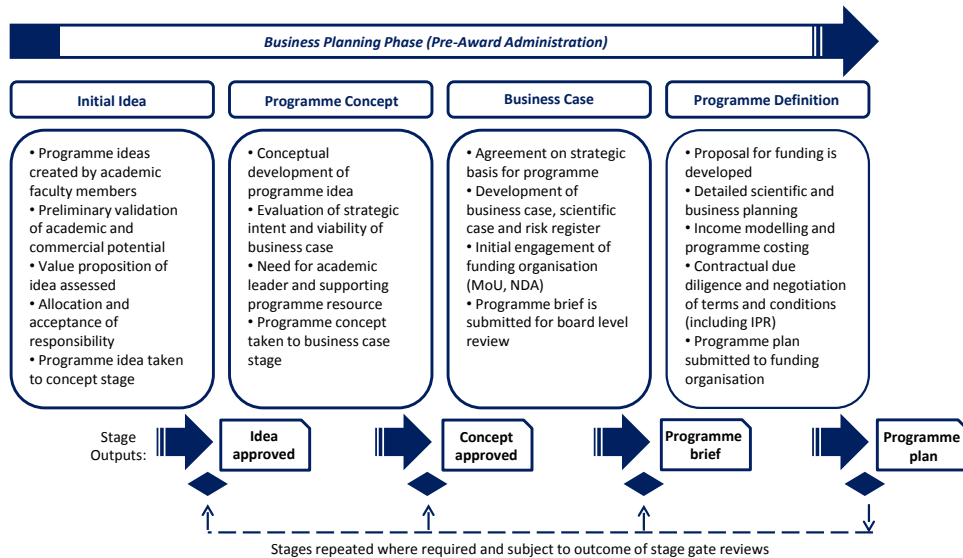


Figure 2. Summary of business planning phase and supporting stages for strategic academic programmes (adapted from the MSP methodology).

relevant team (programme concept stage). This leads to establishment of the business case for the programme (business case stage), followed by programme development where the programme proposal and business case are refined in more detail (programme definition stage). These four stages represent the wider business planning process as part of the planning phase (pre-award administration) and are summarised in Figure 2.

The business planning phase (pre-award administration) includes the primary outputs for each stage as well as the corresponding stage gate reviews. The process recognises that there may be a need for a previous stage to be repeated subject to the outcome of the relevant stage gate review, e.g. where the funding body's requirements have changed, or the stage output may be viewed as

Table 3. Key activities according to the main stages of programme management framework (business planning and delivery phases).

Stage	Key Activities
Initial idea (pre-award)	<ul style="list-style-type: none"> This is the preliminary stage where new ideas are driven by university strategy or academic need and created by senior or academic faculty members across the university. Ideas are validated to ascertain academic and commercial potential. There will be allocation and acceptance of responsibility for the validated idea to a designated programme leader. In order for a programme idea to be considered further then it is subject to an initial stage gate review.
Programme concept (pre-award)	<ul style="list-style-type: none"> At the programme concept stage there will have already been an initial programme idea that has been communicated to internal stakeholders. The programme could potentially pass very quickly from programme concept to business case if there is a clear requirement to carry out the programme together with strong backing from the university's leadership. Alternatively, there may be a need for more detailed work in the concept stage in order to qualify the programme opportunity. At this stage there should be agreement by key stakeholders on the need for the programme and the required trajectory to realise the programme benefits.
Business case (pre-award)	<ul style="list-style-type: none"> This stage turns the concept into a tangible business proposition. A major part of the business case stage involves generating the material to prepare for approval of the programme brief, which is a crucial document that provides background to the programme and defines the expected academic benefits, costs, timescales and risks. The programme brief should clarify what is to be achieved, thereby allowing a management decision to be made on whether the programme is desirable and appropriate as well as a commitment to be made to move to the next stage in the process (programme definition). The programme brief should set out the business case for the programme along with the available business structures, which could, for example, be the incorporation of a subsidiary company, or establishment of a strategic alliance with another organisation (university, company or government agency). There will need to be commercial due diligence on the available business structures and this may require the support of legal advisors as appropriate. As the programme definition stage progresses there will need to be engagement with the eventual funding organisation. To support the interface with external funders, there may be a need for a supporting Memorandum of Understanding (MoU) (or Heads of Agreement/Term Sheet, as appropriate) that sets out the principles for working together as well as the pathway for programme definition. The MoU may be accompanied by a Non-Disclosure Agreement (NDA) allowing all parties concerned to easily share confidential information. These pre-contract documents can also help bind the funding organisation to the emerging programme and they may also help clarify the objectives for developing the programme.

Stage	Key Activities
Programme definition (pre-award)	<ul style="list-style-type: none"> This part of the process involves development of the detailed proposal documentation in order to secure the funding required to undertake the programme. The programme definition stage will be informed by the programme brief. There will need to be detailed planning around the scientific proposal and this will be led by the principal investigator (PI) with input from other faculty members. Where it is appropriate, multidisciplinary proposals should be developed that draw on the academic strengths from relevant academic departments in order to provide the programme's funder with the highest quality scientific offering. Programme definition will involve detailed business planning including cost and income modelling. Programme costs should be calculated according to the university's financial procedures, including costs for staff (namely academic, research and support), students (e.g. PhD) as well as laboratory and computing equipment, materials and other costs as required. Appropriate overhead calculations will also need to be carried out. Typically the programme definition stage will need to include preparation of an outline programme management plan, including a programme schedule for the main programme activities and milestones. This will extend to the programme risk register that identifies the risks in terms of impact and likelihood along with mitigation measures and risk owners. The programme's governance arrangements need to be considered. There may be a need for appropriate boards of management (such as a strategic advisory board, or operations board) as well as programme reporting arrangements and any relevant performance measurement system such as the balanced scorecard. Within programme definition there will need to be continued engagement with the potential funders of the programme as well as comprehensive due diligence of the proposed contractual framework. The terms and conditions of the contract will be reviewed for acceptance to the university's commercial requirements and in particular those relating to the allocation of intellectual property rights (IPR). In order for the programme to move ahead there will typically be submission of the proposal plan including the business case, scientific proposal and any accompanying documents to the sponsoring organisation(s).
Programme delivery (post-award)	<ul style="list-style-type: none"> Programme delivery takes place once funding has been approved and supporting contractual documentation has been signed by all the relevant parties. Delivery will involve implementation of the programme management plan through appointment of the required staff and in particular there will need to be appointment of the principal investigator of the programme. Programme benefits are realised as identified in the programme plan to be delivered incrementally over the programme's delivery period so as to avoid an apparent lack of progress in the initial stages. Programmes should preferably be structured to deliver 'quick wins', e.g. setting performance milestones for the recruitment of staff, or for the commencement of initial research or education activities. Then, over a longer timeframe other benefits should be realised, whether commercial or academic, such as establishment of new facilities, publication of research results in scientific journals, or negotiation of licensing agreements with industrial companies. During the programme delivery stage there should be periodic review by the programme delivery team (and externally where appropriate) of the programme to check on progress, evaluate benefits realised, make adjustments as well as learn and decide on appropriate action, including eventually programme closure.
Programme closure (post-award)	<ul style="list-style-type: none"> Upon completion of all programme activities, or following a strategic decision by the university (with other stakeholders involved as appropriate), formal closure of the programme will be undertaken. It is suggested that a suitable programme exit plan is developed during programme definition so that programme closure can proceed smoothly if required. In the case of subsidiary or joint venture companies, care will be needed to minimise the university's financial exposure.

not being acceptable or not of the required quality standard. Once the necessary funding has been secured, programme delivery commences and this involves delivery of the capability alongside realisation of the programme's academic benefits (programme delivery stage). Upon completion of all programme activities the programme is formally closed (close programme stage).

Table 3 provides supporting details on the key activities to be carried out for all six stages (both pre- and post-award administration), although it is recognised that business planning refers only to the pre-award administration stage. These key activities are described in order to provide practitioners with greater insight into how the business planning methodology can be adopted in their own organisation. Application to a given organisation should however take account of the local environment as well as management needs and hence the specific activities would need to be adapted as required.

Case Study Investigation

Introductory Comments

The case study investigation involved the business planning for a medical imaging facility at Imperial College London in the United Kingdom. The case study is based on the experience of the authors who were directly involved with the programme through being part of Imperial's Enterprise Division. The division is responsible for providing business development, programme management, commercial planning and support to faculty members across Imperial College and this includes the development of industry funded research projects, European Union funded consortium research projects as well as strategic academic programmes such as new research centres and institutes. The following case study is provided for illustrative purposes. The findings are reported through a process of reflective inquiry (Schön, 1983) by the authors and where appropriate, representative data and information is included to provide further context. The case study highlights the practitioner benefits of utilising the management framework to support the business planning for the development of strategic academic programmes that are pursued by a university or NFP research organisation.

Need for Medical Imaging

The medical research imaging facility includes PET-CT (Positron Emission Tomography-Computed Tomography) and MRI (Magnetic Resonance Imaging) scanning equipment and the initiative related to a requirement to upgrade the facility so that academic research could be carried out on the imaging equipment. PET-CT is a medical imaging technique that combines through a single system a PET (Positron Emission Tomography) scanner and an X-ray CT (Computed Tomography) scanner. This allows images to be taken sequentially from both scanners to build up a co-registered image. The PET imaging involves the patient receiving a small dose of a radioactive tracer, e.g. fluorodeoxyglucose or FDG protocol. The scans provide an image of how the tracer is processed by the body, where the PET-CT technique is based on the use of X-rays to generate images of the body. Conversely, MRI is an imaging technique that produces detailed anatomical images but without the need for radiotracers. An MRI scanner uses magnetic fields and radio waves to form three-dimensional images of the body. For further reference, Suetens

(2009) provides details on the fundamentals of medical imaging. Both MRI and CT scanning are increasingly used in the provision of modern healthcare services and this is illustrated in Figure 3, which highlights the growth in numbers of clinical imaging tests in England from 1995-96 to 2013-14. This data from National Health Service (NHS) England (2014) identifies that the rate of average annual growth over last 10 years for CT and MRI has been 10.1% and 12.1% respectively.

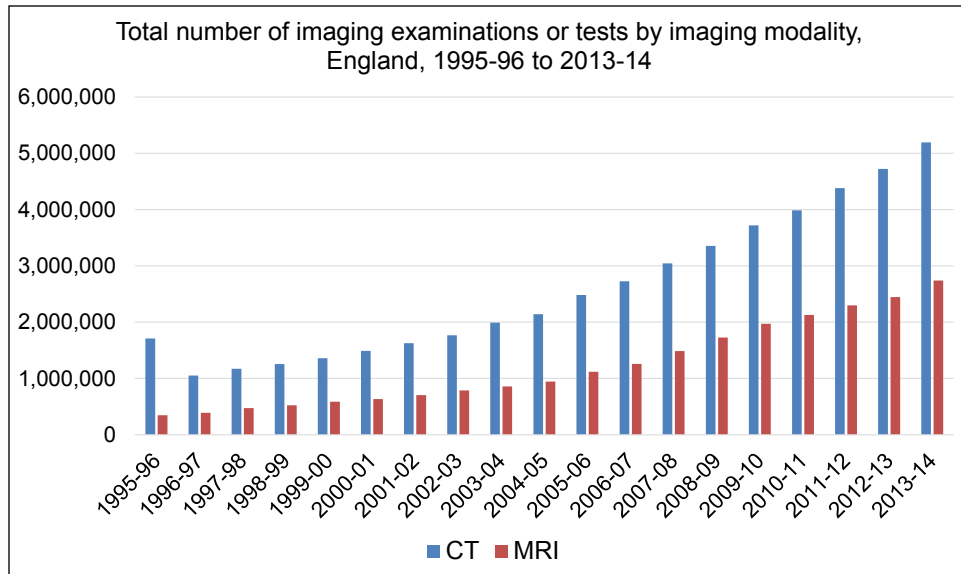


Figure 3. Growth in numbers of clinical imaging tests in England from 1995-96 to 2013-14. Source: NHS England, Annual Imaging and Radiodiagnostics Data, 1995-2014.

Development of Imaging Facility

The programme involved refurbishment of the facility so that it could be used to support the research needs of academic faculty members at the university. The initial idea was identified by senior staff at the university and this was communicated to Enterprise Division so that the business planning work could be initiated. The preliminary assessment of the programme opportunity was carried out and this highlighted the academic needs for the programme as well as the commercial potential. The programme then transferred to the programme concept stage, whereupon more detailed planning was carried out on the scope of the programme as well as the academic benefits. At this stage, a programme steering group was assembled. The steering group was a multidisciplinary team representing different functional areas, such as senior management, finance, facilities management, health and safety as well as general administration.

During the concept stage there was also allocation of a limited amount of internal funds to support an engineering feasibility study that was required in order to ascertain the overall costs

of the main refurbishment and upgrade works. At the first meeting of the steering group, there was discussion on the work packages of the programme, namely the engineering feasibility study and the business case development. The feasibility study was required to determine the total programme costs for upgrading the facility and the business case was needed in order to derive the likely revenues to be generated by the facility through providing an imaging service to members of the academic faculty. After this initial meeting of the steering group, the programme transferred to the business case stage.

Knowledge Dimensions of the Case

The business case was dependent on developing an improved understanding on how the clinical scanning facility would complement other facilities operated by the university, thereby allowing an overall view to be established for the entire scanning services offered across the university. Knowledge was generated on the clinical research areas to be investigated through use of the enhanced medical scanning facility. This knowledge was obtained from a series of academic faculty consultations with leading medical research practitioners across the university's various hospital campuses. Data and information was also acquired that related to the operation of the medical scanning equipment including operating conditions, throughput levels and maintenance regimes. Plus, information relating to sponsor needs was obtained, including potential funding opportunities with research councils and charitable foundations. Table 4 provides a summary of the medical research areas that would be accessible through use of the upgraded medical imaging facility, which were identified during the consultation meetings with faculty members.

Table 4. Summary of medical research areas accessible through use of the upgraded medical imaging facility.

Medical Research Area	Description
Neuroscience	<ul style="list-style-type: none"> Investigation of the nervous system, including molecular and cellular research of nerve cells as well as imaging of brain functions. For example, use of clinical imaging to improve understanding of Parkinson's disease, dementia, movement disorders and multiple sclerosis.
Pharmacology	<ul style="list-style-type: none"> Investigation of the biological action of drugs. For example, use of clinical imaging to understand the drug action pathways in order to improve the treatment of diseases of the central nervous system (CNS).
Oncology	<ul style="list-style-type: none"> Investigation of tumours and cancer, which involves abnormal cell growth that occurs in a particular part of the body and which results in cancerous cells destroying surrounding healthy tissue and organs. For example, use of clinical imaging to monitor the response of cancerous tissue to therapeutic treatment regimes.

Programme Lifecycle Management

Once the business case had been assembled for the enhanced facility and as part of the next stage in the lifecycle, the programme definition stage was undertaken. This involved more detailed financial modelling on the expected level of revenues for the facility that was related to the medical research areas identified in the business case stage. Revenue modelling also included a number of financial scenarios, including the so called best-case scenario (high level of revenues), worst-case scenario (low level of revenues) and base-case scenario (medium level of revenues). This form of financial scenario planning allowed probability factors to be applied to the various sources of funding so that a reasonable estimate could eventually be made through the base-case scenario that took account of the relative levels of risk (and corresponding probability) for each source of funding.

For example, in the scenario where a research programme has already been awarded by a medical research charitable foundation, this was viewed as a low risk source of funding corresponding to a high probability that there would be funding made available for imaging research on the upgraded facility. Whereas, in the case where a research proposal was to be submitted to a pharmaceutical company that had yet to make a decision on programme funding, this was viewed as a high risk source of funding and a corresponding lower probability that there would be funding made available for imaging research on the upgraded facility. Programme definition allowed the full business case to be prepared for the programme, including academic and technical aspects as well as commercial and business considerations. The funding proposal was submitted to the university's management board and after careful consideration the programme's capital expenditure (CAPEX) was approved.

Programme delivery took place after the allocation of programme funds and this involved the upgrade of the facility so that the required medical research could be undertaken using the imaging equipment. This stage proceeded smoothly and included the various engineering works, such as upgrades to the M&E (mechanical and electrical) services as well as installation of additional pieces of equipment. The facilities were tested for effective operations and subsequently opened for use as a medical research imaging facility at the university. Programme closure involved the facility being handed over from the engineering team to the academic department so that medical research studies and imaging activities could commence. Finally, programme finances were reconciled with all outstanding payments met and other programme administration activities completed allowing formal closure of the facilities development programme.

Managerial Insights from Case Study

A number of managerial or practitioner-related insights can be drawn from the case study that involved implementation of the programme management framework and these are summarised in Table 5. The insights are described in terms of the people, process as well as technology and knowledge dimensions.

Table 5. Managerial insights from the case study investigation.

Area of Consideration	Managerial Insights
People	<ul style="list-style-type: none"> The medical research facility was a strategic academic programme for the university that required senior level oversight and eventual approval by the university's management board. It was therefore essential that senior stakeholders, including senior academic and management staff, were involved in the programme from the outset through to completion. The programme steering group benefited from being a multidisciplinary team that represented all the key functional areas that needed to be engaged through the programme lifecycle. This meant that the key internal stakeholders were engaged in the programme from the outset, thereby helping with governance of the programme as well as compliance with the university's various protocols related to research facilities. The individual consultation meetings that were held with academic faculty members needed to be carried out in a highly structured manner in order to ensure the medical research needs for the facility were properly captured. Such meetings should ideally be conducted in an open and transparent manner to build trust. These meetings also provided the opportunity to highlight the research capabilities of the facility to be upgraded, thereby building a pipeline of potential work for the medical research facility.
Process	<ul style="list-style-type: none"> Adapting the MSP methodology to the academic setting provided a clearly defined and structured approach that was used to guide the business planning work required for the medical imaging programme. Engineering risks were identified at an early stage in the overall process through the feasibility and design study that was carried out. These risks were mitigated through appropriate measures so that the programme could be completed in the required timeframe and according to the overall academic needs for the facility. Business case development through financial scenarios based on different levels of revenue generation for the upgraded facility supported the decision-making process and thereby helped senior management to weigh up the costs and benefits for the new facility. Process-driven management approaches also help give confidence to senior management that all the required factors have been properly identified when considering substantial CAPEX decisions.
Technology and knowledge	<ul style="list-style-type: none"> Both the business planning and delivery phases should be supported by appropriate ICT (Information and Communications Technology). This may include use of the university's ERP (Enterprise Resource Planning) system as well as standard tools, such as those from the Microsoft™ suite of products, such as MS Excel, MS Access, etc.

Area of Consideration	Managerial Insights
Technology and knowledge	<ul style="list-style-type: none"> • The case study also required the use of programme-specific technologies and this included the various diagnostic and testing systems used to collect environmental data on the facilities as part of the engineering facilities work package. The technical team also employed various clinical related technologies associated with scanning equipment. Such technologies should be driven by the specific needs of the programme and will clearly be different for different types of programmes. • In order for the programme to be effective, it will need to generate the required knowledge and this data and information is needed to inform the business planning phase. In the case study this included the knowledge generated on clinical research areas (namely neuroscience, pharmacology and oncology) that would be investigated through use of the medical scanning facility. A supporting culture of sharing such information is also desirable. Access to such knowledge is therefore a crucial factor in regard to the success of business planning and eventual delivery of complex academic programmes.

Concluding Remarks

Universities and NFP research organisations face a number of challenges that include responding to increased pressure on funding and budgets as well as increasing levels of competition for funding and the recruitment of leading faculty. These challenges are, however, accompanied by various opportunities such as those presented by adopting different forms of ICT in regard to educational delivery as well as opportunities related to establishing major new research initiatives. Moreover, the ability for such organisations to be able to adapt to changing circumstances and drive forward strategic academic programmes is likely to be a major indicator of success in the future.

As distinct from smaller scale research projects, strategic academic programmes are complex initiatives that require coordinated development. This complexity can be associated with a range of factors, such as the need for complicated legal arrangements, company formation, an international dimension, multi-department involvement, or a high-level partnership leading to significant funding. For example, this could include a high-value research programme enabling creation of a new centre or institute, or alternatively there could be development of the business case to support a new joint venture (JV) company, or an overseas campus initiative. In addition to the potential higher academic and commercial benefits, these programmes often carry an enhanced level of risk, for example, involving financial risk in the delivery period, or the possibility for the university's brand to be tarnished. The management framework described in this paper was established in order to support the business planning and development of such strategic academic programmes and to help manage the significant complexity that often arises with such programmes.

The programme management framework was developed through adapting the MSP methodology to the academic setting in order to derive a structured approach that is based on best management practice. This programme lifecycle approach is based on a stage-gate process that involves the business planning phase (including the initial idea, programme concept, business case and programme definition stages) and the delivery phase (including the programme delivery and programme closure stages). This framework provides a robust approach to support the business planning required for strategic academic programmes, including the so called vision-led, emergent and compliance type programmes.

The case study investigation reported in this paper highlights the utility of the programme management framework to support the business-planning phase for an enhanced medical research facility. The imaging facility includes PET-CT and MRI imaging equipment that can be used to support various medical research areas, such as neuroscience, pharmacology and oncology. Implementation of the programme management framework will be highly dependent on the people, process as well as technology and knowledge dimensions of a given a strategic academic programme. A supporting culture that promotes sharing of knowledge across the programme is also an important factor to the success of such programmes. Although the methodology provided in this paper provides an overall route map to help practitioners design and deliver major new academic programmes, the individual activities carried are contingent on the specific organisational context and the needs for a particular programme. Nevertheless, the programme management framework can be adapted to the needs of other universities and NFP research organisations as needed.

Future work is suggested on applying the programme management framework for business planning to other strategic academic programmes, such as the creation of multidisciplinary research centres and institutes or the creation of a new spin-out company arising from the commercial exploitation of intellectual property. Such applications would further highlight the practical benefits of adopting a structured business planning approach to the development of strategic academic programmes that support the growth and financial sustainability of university and NFP research organisations.

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