

Lessons from

Introduction	6
Theme 1:Whole lifecycle asset management	8
Theme 2:Getting the best possible start	11
Theme 3:Gov.eic6 6ble start	

Foreword

Based on the insights gained from our regular reviews of the project since its inception we can say with confidence that the United Nations would benefit strongly by learning the lessons in a few key areas. For example, it is vital that major projects make a successful start as experience shows it is difficult and costly to recover. The effort to get projects right at the outset is rarely wasted. Best practice is to hold any major project to a very high level of scrutiny and independent expert assurance before any decision is taken to start or to initiate each major phase during the project lifecycle. This requires from the outset effective governance and decision-making, with accountabilities and authority aligned and clearly assigned, risk and contingency transparently and explicitly at the heart of the delivery strategy, and a collaborative and integrated project team and supply chain. These are central themes in this paper.

The lessons highlighted would, if taken on board, improve the chances of success on future projects by shrinking risk and promoting learning and standard-setting, and would enable the United Nations to move towards being an organisation with a modern asset management approach and project delivery capability.

We hope the paper is of value to management, to those charged with governance, and to the representatives of member states with responsibility for oversight of the funding provided to such projects.

Amyas Morse

Comptroller and Auditor General of the
United Kingdom Of Great Britain and Northern Ireland
Chairman, United Nations Board of Auditors

Introduction

The renovation of the United Nations campus in New York (the Capital Master Plan or CMP) is a large and complex building refurbishment programme. The number of stakeholders, the organisation's decision processes, the iconic architecture that needed preserving, the security requirements, the need to keep the organisation running during the refurbishment and work around live operations, and the scale of the assets were all factors that influenced the way the CMP was managed.

The campus itself comprises five main buildings. Three of the buildings are operationally and physically interdependent: a three-level basement physically connecting the General Assembly, Conference Centre and Secretariat buildings, providing common utilities as well as an integrated campus-wide approach to security, cooling, heating and ventilation. The fourth and fifth buildings, the Library and Southern Annex, are more self-contained, although abutting the Secretariat building. Over time the condition of the estate had deteriorated beyond the point of reasonable repair, requiring a total overhaul rather than floor-by-floor refits. The General Assembly knew in 2000 that a complete refurbishment was needed and, after some significant false starts, approved the CMP project in its current form in 2007. The Secretary General broke the ground in 2008.

The Board, at the request of the General Assembly, provided annual reports on the CMP from 2002, reporting on differing aspects of the project during its lifecycle. From 2008 onwards the reports focused predominately on the lead up to, and the delivery of, the construction

This paper considers the way the United Nations has delivered the CMP and highlights lessons for consideration in planning future major programmes. It is not intended that this paper should provide a judgement on whether the CMP is a success or a failure. Nor is it intended as a toolkit of how to manage capital projects. Rather, it describes what happened during the CMP, and how the United Nations coped with those issues, and it highlights potential learning opportunities, setting this out across eight themes:

- z Theme 1– Whole lifecycle asset management
- z Theme 2– Getting the best possible start
- z Theme 3– Governance, controls and assurance
- z Theme 4– Roles within a programme lifecycle
- z Theme 5– Commercial and procurement strategies
- z Theme 6– Risk and contingency management
- z Theme 7– Cost, time and outcome forecasting
- z Theme 8– Portfolio management and organisational capability.

Theme 1: Whole lifecycle asset management

In contrast to most organisations that own large real estate portfolios, the UN did not follow a recognised whole-life asset management approach to maintaining the New York campus once it had been constructed.

Instead, it adopted a mainly reactive (run until failure) policy from the 1960s, when the campus first became operational. The UN rarely adequately invested in the fabric of the building, or in its plant and machinery other than to carry out essential maintenance and repairs. The UN did not, and still has not established, an asset management strategy for the campus incorporating a planned ongoing maintenance regime. Arguably, the need for the UN having to run such a disruptive, intense capital refurbishment plan stems from not having a well-thought-through approach to asset management. The “patch and mend” reactive maintenance policy was not sufficient to keep pace with the adverse effects of the weather, and with the wear and tear caused by occupiers. There is also a limit on the number of times plant and machinery can be repaired before it wears out and before old practices become superseded (for example, safety standards).

Over the years the fabric of the campus deteriorated and fell out of line with legislative standards, normal industry practice and its users’ needs. The ensuing \$2.4 billion refurbishment programme was not only very costly but significantly disruptive for staff required to work in temporary rented accommodation for several years in buildings dispersed around New York.

The UN did not set aside a sinking fund to cover the costs of maintenance and upgrades. The budget for facilities management activities was one element among many in the Department of Management’s budget. As such, it was inevitably at risk over the lifetime of the building from the effects of cost reduction exercises; these were mostly carried out on a ‘top down’ basis and the budgets were rarely enough to prevent a net degradation in the building from year to year.

Learning opportunities

The main corporate learning opportunities are:

- z** to have a physical asset management strategy that preserves the condition of the asset at a level that keeps it in a fit-for-purpose condition;
- z** to record comprehensively all drawings, operational manuals and maintenance and repairs records, thus providing certainty of the asset condition for future maintenance or refurbishment projects;
- z** to understand the relative importance of usage systems and functions;
- z** to fund the maintenance regime at an appropriate level, driven by the asset management plan;

- z one way of organising the maintenance funding is to create a ring-fenced sinking fund. The UN may find this approach more suitable in the future as a way of protecting its assets from the effects of uninformed cost-cutting; and

Aside from deciding on how and when to invest in a maintenance regime, an asset owner often has opportunities to commission further capital investments. Scanning the supplier market, an asset owner can often find investment options that would reduce whole-life running costs, or simply replace outmoded plant that requires specialist labour or bespoke spare parts that have long lead times.

Theme 2: Getting the best possible start

The CMP had a hesitant start, originating in the late 1990s when the need for the refurbishment programme gradually became apparent. A series of relatively broad-brush cost estimates and outline plans were met with resistance, challenge and delays; the project suffered both from a lack of sponsorship and low momentum in these early years and from the resignation of the original project director.

The CMP eventually got the go-ahead in 2007, after a change of pace that came with the newly appointed project director. What became known as the 'Accelerated Strategy' (intending to save two years off the previous strategy and take advantage of available space in the Manhattan office rental market to facilitate temporary swing space for staff) was accepted as the approved time schedule. Despite the change of pace, the CMP even then did not get off to a good start, for several reasons.

- 1 The business case did not articulate any benefits that were particularly compelling or measurable. The case was presented primarily as a 'fix and replace' argument, although some energy savings were identified from introducing new technology. The main prize, one of moving to a desk-sharing layout, which would have greatly increased occupancy densities and saved significant rental costs around New York and created opportunities for new and potentially more productive ways of working, was not recognised as an opportunity in the business case and was not even part of the remit.
- 2 The Administration did not establish an external independent peer review assurance process. An architectural advisory panel helped provide a sounding board to the CMP mainly on the heritage, artwork and aesthetic or iconic building features which was useful. But there was no source of constructive independent challenge regarding the project management arrangements, progress, costs, risks and issues. The lack of external constructive challenge was a weakness exacerbated by the absence of a corporate-wide portfolio and programme management approach – it was not even possible to organise peer review support from similar projects because the central capability did not exist.
- 3 The governance arrangements were weak as described in Theme 3 below. As such, early warning signs about cost over-runs and schedule delays were not picked up and acted upon effectively by the Administration.
- 4 There were weaknesses in the risk assessment approaches and cost forecasting techniques (see Themes 6 and 7 below). The approach to risk management and cost forecasting for the CMP relied, too heavily in the Board's view, on the expert judgements of the highly experienced project team, combined with a formulaic approach to

Further, the forecast costs were incomplete. The 'Associated Costs', as they became known, covering the costs of a collection of activities necessary to support the project, had not been identified. Nor were they directly under the management or budgetary control of the CMP project team. For example, additional security guards were necessary to maintain an effective security perimeter during construction; the budgetary responsibility for this resource, however, lay with the Department of Safety and Security.

The Associated Costs (some \$140 million) went un-owned and unresolved throughout most of the life of the CMP project. The General Assembly instructed in 2009 that the CMP should absorb the costs within the existing budget but there was limited room to do this.

Overall, the CMP got off to a difficult start, a factor which was to influence its delivery at every stage.

Learning opportunities

- z Deploy dedicated and experienced resources to assist major projects in their early stages.
- z Make sure that the business case is robust and includes a full benefits case, a robust risk assessment and mitigation approach, a strong governance arrangement and a comprehensive cost forecast underpinning the budget.
- z Establish an integrated project assurance approach, especially in the early formative stages of a project.

Best practice considerations

The start of a project, when the biggest decisions are made, represents the most vulnerable time in its lifecycle. It is often when the least information is known about risks, when resources are still thin on the ground, when there is little funding support or momentum behind the early steps and when the organisation has a relatively limited understanding of the nature, scale and aims of the project. It is a time when initial ideas can become entrenched without proper challenge and review.

Building core project resources quickly

Before an organisation recognises and funds a project, the early thinking is carried out mainly by visionary people working alongside other 'day job' duties. This is an inherently risky approach because it risks missing out options and narrowing down too quickly on a costly or inappropriate solution. A key to success is in deploying experienced resources to support those early exploratory stages.

Governance and the CMP

In practice, the executive control of the project, and the heart of the decision-making, lay with

Independent assurance

Additionally, the UN did not have in place a policy for obtaining independent expert assurance on its projects or programmes. Other than ad-hoc external reviews, mainly to provide a second opinion on the cost forecasts, the CMP did not benefit from regular and integrated external technical, cost or project management assurance reviews. These are

- z** Establish independent assurance throughout the life of a project. Rather than relying on internal and external oversight as a source of objectivity and constructive challenge, the UN would benefit from establishing an integrated assurance approach. This was shown in Theme 2 to be particularly important in the early stages of a project. The aim is to support management and help them deliver strategically important and high-value programmes, not to add another layer of oversight. Adoption of a portfolio management approach spanning all the UN's capital programmes, and other major programmes, would enable a systemic assurance approach, with learning opportunities at key stages, for example:
 - z** project or major sub-project inception;
 - z** business case approval;
 - z** procurement decision;
 - z** handover/readiness for service; and
 - z** strategic and operational impact.

Best practice considerations

In most large, complex organisations projects, programmes and portfolios of activity are normally subject to robust stakeholder management, governance and controls, supported by a combination of internal and external assurance processes. The aim is to ensure clear accountability and responsibility for delivery and at the same time establish effective controls and limits to mitigate and manage risk without overly constraining progress.

A well-governed project typically features:

- z** a detailed Full Business Case, articulating the benefits, costs, scope and proposed approach;
- z** clearly defined project management roles and accountability;
- z** a project board – properly constituted and effective;
- z** appropriate mechanisms for change control;
- z** at y

Theme 4: Roles within a programme lifecycle

The UN invested in a relatively small project team to run the CMP project, around 20–30 people. Recognising that the UN did not have an organisation-wide cadre of resource with similar experience at its disposal to draw upon, the UN supported the core UN CMP team with external resources:

- z** An external cost consultancy company was appointed to provide risk management and cost management support. The cost consultancy was responsible for reporting actual and forecast costs – not only the core costs of each construction package, but also the costs of all change orders and of any claims made for additional payment due to disruption.
- z** A construction company was appointed to lead and manage all of the construction activities. The construction company was already familiar with the New York construction market and used its expertise, knowledge, authority and reputation to manage costs and to drive progress with the suppliers.

The responsibility for delivery of the whole CMP project rested with this small core team of people. Within the team, roles were established to suit the nature of the project, for example:

- z** engaging with the users about floor layouts and space allocations;
- z** managing the design team, particularly to ensure design coherency and timely delivery;
- z** managing construction;
- z** managing progress on each of the main buildings across the campus;

With hindsight, however, there were some challenges that the team struggled to address. For example, the effort put into the initial user consultation process was not sufficiently intense to create genuine engagement or authoritative direction when required and the early migrations into the temporary swing space proved difficult.

Design management was a constant challenge for the CMP team. Significant percentages of the buildings across the campus were occupied by staff during the time when the initial design was being carried out. As such, the designers had to rely on assumptions supported by limited data about the true nature of the underlying structures. Only when the buildings were fully vacated could full information be derived. This inevitable delay put pressure on the design process, as did the challenge of coordinating the design across the various packages of work.

There was considerable advantage in retaining most of the responsibility for design management, but it also exposed the CMP to a high level of risk, as described in Theme 5 below. In hindsight, the CMP underestimated the challenge that would come from the design coordination process and from ensuring that the emerging design kept pace with the need for information from the construction process. Consequently, contract packages went out to competition in the construction market with designs less developed than they should have been, exposing the UN to risk from subsequent changes.

Another area where, with hindsight, matters should have proceeded differently was in the engagement with the Facilities Management Service (FMS). As already discussed, the UN

Learning opportunities

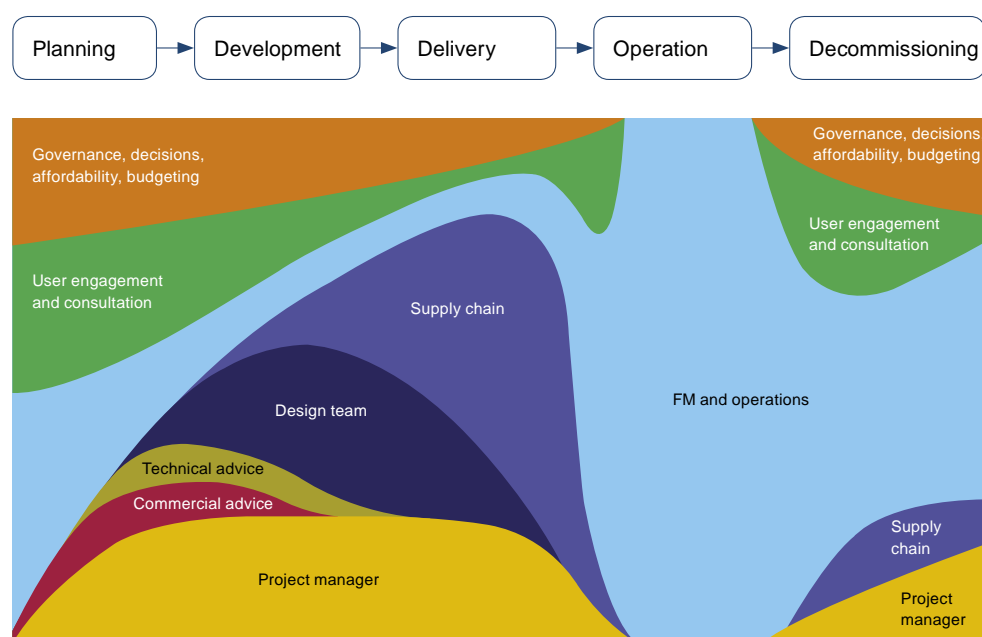
The main lesson learnt on the CMP project is in recognising how the roles of the project team inevitably have to vary as time passes on a project and that a high degree of flexibility will be required in terms of ensuring an appropriate resourcing strategy. In particular, it is important to:

- z establish an integrated and, as far as possible, co-located team;
- z create an effective user consultation process. The key to success lies in establishing an effective project board, which will include a 'senior user' with a strong consultative and communications remit;
- z manage the design teams robustly, so as to ensure effective design coordination between contract packages and timely delivery of design drawings and specifications; and
- z ensure that the Facilities Management solutions are embedded from the outset, firstly to ensure compatibility with the long-term asset management plan and secondly to ensure that the handover process is robustly supported.

Best practice considerations

The level of activity and focus of those contributing to a project varies enormously with time as projects move through the various phases from start to finish, as indicated in Figure 2.

Figure 2
Relative roles during a project's life



Source: Concerto partners

After careful consideration, the CMP team chose a solution closer to Option A in the diagram above, namely to keep control of the design and to retain responsibility for design management. Teams of designers worked under the direction of the CMP team, supported by the external cost consultancy, which also took on a design project management role as the CMP project progressed.

This was highly advantageous, given that the design had to evolve and adapt at regular intervals as new information emerged about the condition of the asset. The approach carried significant responsibilities, however, as the CMP team had to ensure that the designs were properly coordinated between the packages, producing an integrated solution that joined up properly. It meant that the CMP team was responsible for ensuring that information was released on time, thus avoiding claims for delay or disruption. In reality, however, the CMP struggled to keep pace with the demands of the construction process and on several occasions packages were procured based on incomplete design information. This in turn created risks and meant that numerous (over 3,000 to date) change orders were required to clarify design details or to coordinate design information at package interfaces.

In selecting a GMP contract packaging approach led by a main contractor and in choosing to take full responsibility for the design, the CMP project positioned itself at the 'maximum control with maximum responsibility' end of the scale. Given the circumstances, with the high degree of change anticipated on the project, the two choices still make good sense in hindsight. It was, however, a contract strategy that left the UN exposed to the vast majority of risks arising on the project, from late design completion, inaccurate design and coordination between the package contractors. Where the CMP faced difficulties was in the execution of those strategies – with design management being a particular challenge. The design management process failed to keep pace with the construction schedule, and for that the CMP did carry the risk and in due course felt the consequences in terms of schedule delays and cost over-runs.

It will never be known whether setting a different contract strategy at the outset would have

Learning opportunities

There are substantial learning opportunities associated with the way the CMP team selected and then organised the contract strategy on the delivery of this major refurbishment contract.

- z The choice of a 'packaged' contract strategy enabled work to progress when substantial parts of the scope were unclear or could not be determined at the time. This choice created a significant time advantage by allowing work to start in some areas before the full scope became known but it inevitably created risk for the UN as the total cost of the whole campus-wide refurbishment will not be known until the last contract package has been agreed. It also meant that the CMP team was responsible for the risks of poor coordination between packages.
- z The contract strategy created a necessity for design management of the highest order. If the UN wishes to follow a similar contract strategy in the future, ie one based on multiple GMP contracts whose scope only crystallises as time passes, then the project team's design management capability must be excellent.

Best practice considerations

Selection of a commercial policy and strategy is one of the most important decisions an asset owner can make. This covers an organisation's funding arrangements for the project and its appetite to risk, to risk mitigation and incentivisation, and broadly how to go about keeping the project under control in order to deliver its stated benefits.

After that comes the procurement policy and strategy (how to shape the market and go about buying the required contract services). Within this overall process, a vital decision for the asset owner to make is the responsibility for management of the design.

It is important to consider each of these decisions explicitly, document them and obtain sign-off from the project board. The key decisions include:

The commercial policy and commercial strategy including:

- z funding;
- z whole lifecycle cost management approach;
- z risk management, mitigation and incentivisation; and
- z lump sum v target cost v reimbursable commercial regimes.

Best practice considerations

Modern best practice is for programmes and projects to be driven by their risk management processes, with the risk register and associated mitigating actions frequently updated and a clear link maintained between the contents of the risk register and the expected costs should those risks arise. Those expected costs, usually termed the contingency costs, comprise subcategories that often include:

- z a cost allowance for the effects of inflation (which can be a material factor on a long-running project), separately justified and reported based on robust data;
- z an allowance for the costs of foreseeable risks; and
- z an allowance for the risks of unforeseeable risks.

The contingency cost allowance must be fundamentally linked to managing risk, with no assumption that it will all be used, an understanding that any unused contingency

The project team then calculates the likely impact of those combined risks based on the individual probability of their occurrence. The calculation method adopted can vary from simple tabular summation of the weighted probabilities through to sophisticated riskmodelling techniques using dedicated software. Pragmatic asset owners, supported by experienced project directors, often adopt the first approach rather than the second.

Having computed the net probable cost impact of all the known risks and having made an assessment of the cost of future as yet unknown risks, for example by benchmarking or by trend analysis, the project team will then reforecast the contingency cost allowance and use this information to update the project total forecast.

Theme 7: Cost, time and outcome forecasting

The Board of Auditors reviewed as part of its annual audit the CMP's approach to forecasting the total costs of the project, finding combinations of good practice and significant flaws.

What the CMP did well was to break the total scope of the job into smaller packages, procuring each one separately and reporting the costs accordingly. Each contract package procurement exercise was preceded by an independent cost forecast from the cost consultant, together with a higher-level cost estimate from the construction manager. The contractor's bids, when they were opened as part of the bidding process, were compared against these independent numbers. Anomalies were queried and clarifications issued. At the end of that process the CMP team, informed by the construction manager and by the cost consultant, had a good understanding of the tendered cost structures. This informed the forecast total cost for each GMP contract package. That part of the cost forecasting process matched good practice and was robust.

The weakness with the cost forecasting process was that, as described in Theme 6, the UN has a formulaic approach to forecasting the costs of risks, applying a 20% contingency cost allowance before a contract is awarded and a 10% allowance after award. Such a cost forecasting approach was flawed in that it was not based on the true estimated costs of the risks. The Board commented regularly on this forecasting weakness but the CMP team did not adopt a more comprehensive cost forecasting technique.

As a consequence of that approach, the total cost forecast would tend to remain relatively stable for long periods, with the 10% contingency sum being utilised as a source of funding for numerous change orders associated with design development and design coordination. Cost stability prevailed until a major risk materialised, at which point the cost forecast would be re-examined and a new figure reported to the General assembly. In this way, the CMP's cost forecasts inevitably understated the true position and the life of the CMP project was punctuated by apparently unpredictable cost shocks.

A more informed approach to forecasting risks and to relating the costs of those risks to the total cost forecast would have given earlier warning to stakeholders about the true cost position and would have provided earlier opportunities to make trade-offs between the scope, time and cost objectives.

Learning opportunities

The formulaic approach to contingency management did not serve the UN well on the CMP project. The learning point is that contingency should be estimated from the ground up, based on an appreciation of risks and their probable cost impacts plus an allowance for unknown risks or costs derived from trend analysis or benchmarking.

The monthly cost forecasts should be genuine estimates of the total final cost of the project, based on all known information about the procured contracts, about future procurements, about change orders that have been agreed, about those that are known about but not yet agreed, and lastly about the forecast cost allowance for risks.

Best practice considerations

Most asset owners follow a common path when forecasting a project's costs. Typically, the anticipated final cost is arrived at by working from left to right across the table shown in [Figure 5](#).

The anticipated final cost (shown in column F) is the sum of the costs of:

- A The contracts awarded to date.
- B The contracts expected to be awarded in the future.
- C The change orders instructed and agreed to date.
- D The changes orders instructed to date, awaiting confirmation of the scope or cost records.
- E A contingency cost forecast for future risks.

A and C represent costs that are certain – they are agreed and are part of the contract payment mechanism.

B and D represent costs that are less certain – typically, some information is available but the cost forecast will involve assumptions as well.

E is the least certain cost. It is usually derived from a risk analysis as described in Theme 6, supported by a cost estimate for remaining unknown risks, which can be derived by benchmarking, by trend analysis of the changes to date or by judgement.

Figure 5 contains an illustrative example – showing how the budget of \$100 is forecast to be exceeded by \$5 due to the forecast costs of future risks.

This philosophy, and approach to forecasting the final costs is commonly accepted practice across most projects, although the presentation and format may vary from one asset owner to another.

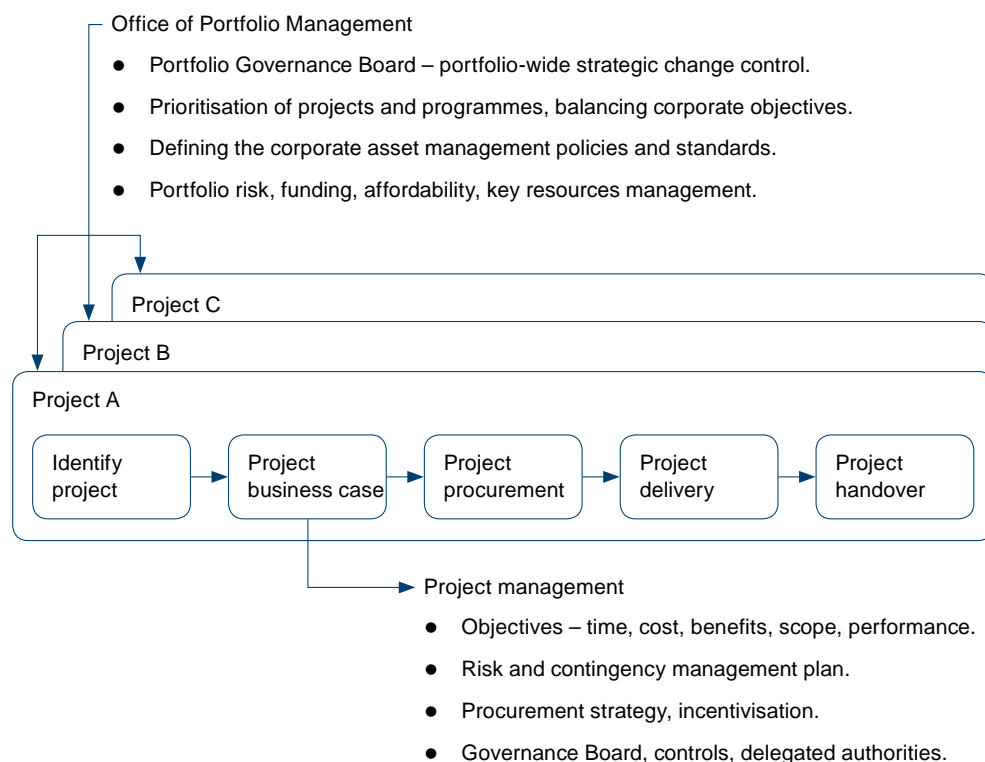
Theme 8: Portfolio management and organisational capability

When the CMP was conceived the UN, despite having an extensive real estate portfolio, did not have a portfolio-wide management approach to planning or managing its global asset base. The practice at that time, in the late 90s, was for projects to emerge individually, to have their business cases assessed as one-offs and, after approval, to make progress on their own. This is an important point: working in isolation meant that the CMP could not benefit from or be supported by an already-established capability group or centre of excellence. There were also few existing standards and policies to draw from. Nor was there a cadre of project and programme managers potentially available for deployment onto the CMP project. The CMP was therefore delivered very much as a discrete project, not part of a coherent planned global portfolio of activity, and it was not supported by organisation-wide estates management processes or resources, or any framework for the delivery of major projects.

The UN's response to this capability and capacity shortfall was to search the construction management market for suitably skilled and experienced people, recruiting them to lead the CMP on fixed-term contracts, supported where possible by internal administrative staff already employed by the UN. This approach had the advantage of enabling the UN to pick the best people for the senior roles from the market. It carried a major disadvantage, however, because the recruitment lead time was typically 12 months. The CMP lost momentum in its early stages when there was a change of project director and after that it was not easy to adjust upwards or downwards its resource profile when the workload and required capability demands changed. There was a risk of poor continuity throughout the project; there was no 'Plan B' that would have coped with senior staff losses and there was inadequate corporate strength in depth.

Another disadvantage arising from the one-off approach taken by the UN was that there were no corporate occupancy standards in place for the quality of the fit-out, occupancy densities, standard office and floor layouts/specifications and so on. The CMP had to solve all of these challenges from scratch. The CMP in fact made a lot of progress, considering those circumstances, in standardising the physical solutions (there are now far fewer office variants for senior staff and limited desk size choices for other staff) but, working without corporate guidance or structures, the CMP never managed to bring the UN anywhere close

Figure 6
Adopting a portfolio planning approach



Source: Board of Auditors

Best practice considerations

Many organisations with large real estate portfolios establish a capability to coordinate and manage project, programme and portfolio activities across the entire estate. This enables the organisation to develop a cadre of talent that can deploy from one project to another, to adopt a consistent approach when delivering projects and programmes and, crucially, to define and maintain estate-wide standards for quality, brand identity, occupancy densities, maintenance investment and capital programme delivery. Typically, a portfolio asset management director will be responsible for:

