

Innovation and risk at heathrow terminal five construction essay



**ASSIGN
BUSTER**

This study of the Heathrow Terminal 5 (T5) examines how innovation, risk and uncertainty were managed within a distinct megaproject depicting joint uncertainties encountered during the life-span of the T5's project. The paper intends to provide an understanding of how organizations react to risk and uncertainty by merging and matching routines and innovation. It demonstrates how approach to risk and uncertainty are formed by the contractual framework in hefty multi-party projects. The paper attends to a gap in the literature of risk and uncertainty is management to deliver innovation in large-scale 'megaprojects'. Megaprojects are infamous for high chance of failure that typically induces organizational strategies for risk avoidance. Yet tactics for managing risk and uncertainty are crucial to the practices and innovation that prevail over the challenges of effectively delivering large-scale, complex projects.

The likelihood of a fifth terminal at Heathrow appeared as early as 1982, when there was question of whether to extend Stansted or extend Heathrow (backed by BA). BAA officially publicized its proposal for T5 in May 1992, presenting a formal planning application on 17 February 1993. A public inquiry into the proposals commenced on 16 May 1995 and lasted nearly four years. In conclusion, more than eight years after the initial preparation application, on 20 November 2001 the British government took the decision to fund planning permission for the construction of a fifth passenger terminal at Heathrow.

Heathrow Terminal 5 was planned as the base for all British Airways domestic and international flights. It was designed for handling 30 million passengers annually; its design is compatible with the biggest airliner in the

<https://assignbuster.com/innovation-and-risk-at-heathrow-terminal-five-construction-essay-essay-samples/>

world presently, the airbus A380. T5 is spread over 260 hectors, which house large four storey terminal building and a satellite building. Both the facilities are connected via an underground mover transit system. Other airport infrastructure includes a 4, 000 space multi storey car park, a big hotel and an 87 meter tall air traffic control tower. T5 is linked by road to the neighboring M25, an underground railway station with branches of the Heathrow Express and the London Underground's Piccadilly Line provides fast transportation to and from central London (Doherty, 2008)

PROJECT LIFE CYCLE

The series of decisions shaping British Airports Authority's (BAA) approach to innovation and risk management on T5 will be discussed in brief and viewed against the T5 project's life cycle.

Define

Planning

Design and Organize

Construction and Control

Closing and Integration into airport operations

PROJECT SCOPE (DEFINE STAGE)

Heathrow Terminal 5 project is a representation of a megaproject, incorporating enormous investments in buildings, systems, technology and human processes. The project was a mammoth project in many aspects, from the time-span of the project to the actual magnitude of construction

<https://assignbuster.com/innovation-and-risk-at-heathrow-terminal-five-construction-essay-essay-samples/>

and the complex combination of services that were to be commissioned during the life-span of the project. The increasing need for more flights and the present airports reaching their capacity of efficient operations was the main reason behind the initiation of this project. As naturally understood by the nature of the project the project charter was the British government through British Airports Authority's (BAA), BAA was the driving force behind the execution of this mega project and they worked through many suppliers and contractors. Dividing the project's work into many sub-projects (NAO, 2005).

General Project Info (Source: Doherty, 2008)

Cost

£ 4.3 Billion

Start of Construction

Summer of 2002

Estimated Customer Handling Annually

30 Million

PLANNING PHASE

The project received the go ahead for construction in 2001 after a long lasting planning which began in 1986. The planning was delayed due to a historically long enquiry lasting from 1995 to 1999; the enquiry resulted in about 700 restrictions on the project including the rerouting of two rivers to

meet the stringent environmental requirements. 30th March 2008 was set as the project opening date in 2001 and a budget of £4. 3 billion was established in 2003.

In the planning phase, BAA primed, developed and cultured the approach that would be utilized in the delivering of the project. Due to the high importance and the involvement of many risk factors, it was determined that the project director should take up a position on the company's main Board. So the delivering of regular project progress reports from planning through design and construction to commissioning and the acquiring of the resources and high level support needed in overcoming any problems hindering its progression can be easily handled.

Planned Terminal Dimensions (Source: Doherty, 2008)

Terminal 5 A

396m (long) X 176m (wide) X 40m (high)

Terminal 5 B

442m (long) X 52m (wide) X 19. 5m (high)

Size of Terminal 5 Site

260 Ha

Cark Parking Space

3800 Spaces

DESIGN PHASE

The major design activity started in 1989, with the design of the main building. A large integrated project team was formed comprising of architects and designers to work with BAA. The work on the design drawing went on during the project's construction phase, to address issues like the adaptation of the airport facilities to the new A 380 airliner.

FORESIGHT IN DESIGN PHASE

When in the design stage there are important considerations about not just designing a facility that caters to the current requirements, but also caters to the projected requirements of the future and in the case of case of such massive projects, the design foresight is not just for the near future. What will travelling through Heathrow Airport be like in the next century? Will we still have to wait in queues? Will we still be travelling as frequently as today or just use virtual travel? Over £1million a day is spent by BAA on building sections of airport and a comparable sum on retaining and developing them. The buildings will be there for decades so we want to make sure that they will answer to tomorrow's needs. The Airports of the Future will be a reaction to the characteristics of the future and these are tangled and inter-reliant:

ASPECT EXAMPLES

Environment

climate, resources, pollution, noise

Technology

communications, users interfaces, intelligent buildings, materials

Future Society

global politics, (de)regulation, security, tax, welfare, culture

Future Business

globalization, supply chains, retail, money, employment patterns

Future Passengers

demographics, lifestyles, expectations

Future Aviation

alliances, aircraft developments, market segmentation, congestion

During this phase, Norman Haste, T5's first Project Director, stressed that many large projects fail due to the lack of investment in the design: "this is when you achieve your biggest wins. You're never going to achieve them during the construction phase." To permit digital harmonization of design as well as the integration and testing of components during the construction phase, single model environment (SME) was developed. The SME was a real-time CAD system which enabled a virtual environment and allowed the visualization of the designed elements and entities. This greatly assisted in the decisions to move forward in construction. (Yin, 2004)

CONSTRUCTION PHASE

The activities were divided into two phases of construction. The infrastructure and buildings were constructed from July 2001 to March 2008

and from January 2006 to March 2008 the integration of systems and the retail fit-out was carried out.

RECRUITMENT AND TASK DIVISION

The project manager divided the construction phase into the following four activities:

Buildings

Rails

Tunnels

Infrastructure & Systems

300 highly trained and experienced group of skilled workers were put under a small team of senior managers of BAA. The responsibility of 16 major projects and 147 sub-projects was shared by these teams. The value of these projects ranged from £1m. These groups were responsible for 16 major projects and 147 sub projects, with the smallest valued at £1m ranging to £300m. (Wolstenholme, 2008)

CLOSING PHASE

INTEGRATION INTO AIRPORT OPERATIONS

Over three years were spent in preparation of the systems, people and processes before the opening. The last six months were spent in testing and trials, simulating 72 real operational situation testing involving about 2500 test subjects.

In spite of being completely aware of the potential risks that could arise at opening and the extensive simulation testing prior to the opening the BAA & BA team was unable to prevent the major complexities arising at the commencement service. The initial five days of service saw misplacement of 20, 000 bags and cancellation 501 flights, sustaining \$31m in costs. The first full schedule of operations was achieved after 12 days of opening.

MANAGING RISK AND UNCERTAINTY

Formal contracts are formed to manage risk and uncertainty in a project the basis of these contracts take shape from past experiences and assessments. BA realized this during planning that the scale and complexity of the T5 project demanded a new approach as many uncertainties could not be predestined. BAA recognized that a standard commercial agreement would not be suitable. To recognize, isolate and deal with risks BAA had to develop a contractual approach which cultivated a routine-driven culture and attitude whilst leaving space for flexibility when dealing with random or unplanned events. (Done, 2008)

It was concluded that a desired outcome can only be achieved by rewriting the rule book; they created a new type of agreement which was based on two fundamental principles:

The client bears the risk

The client works collaboratively with contractors in integrated project teams.

RISK BEARING

The agreements of the T5 projects were a form of cost-plus incentive contracts, in which the incurred costs on the contractors are reimbursed by the client; additionally the contractor is rewarded for exceptional performance with a cut from the profit margin. The risks are shared between the contractor and the client in other forms of cost-incentive contracts but in T5 contracts BAA assumed full liability for the risk. (Done, 2008)

INTEGRATED PROJECT TEAMS

Incorporated project teams were created at the beginning of the planning inquiry to build the general plan of the facility. T5's construction was considered as a string of consumer products delivered by teams. The intention was a creation a "virtually integrated" supply chain composed of incorporated project teams under the lead of BAA staff, consultants, contractors or other organizations. The agreements did not state the work to be carried out by first tier suppliers; instead it was an obligation from suppliers to provide competence when and where it was required on the project. This method allowed BAA access to competent individuals with the competencies and experience to carry out the detailed tasks, irrespective of the needs of their head organization.

The formation of virtual teams eliminated the chances of the risks from being transferred to a sole supplier and didn't allow a single supplier to be held responsible for any letdown in achieving project's objectives. The teams were anticipated to work in cooperation with each other towards accomplishing project objectives by solving problems and acting on any

experience gained, instead of pointing fingers at others for any failure in the pursuit of commercial advantage.

BALANCING ROUTINES AND INNOVATION

The T5 case demonstrates that in projects of huge magnitude the risks and uncertainties can by no means be fully eradicated, but careful and extensive planning can reduce the chance of unfavorable outcomes or provide a mechanism or a list of actions to be taken in-case of an unexpected occurrence. However, when megaprojects run into unidentified problems or emerging events – as they eventually always do – a well-prepared or pre-planned reaction is not sufficient at all times. Sometimes fresh or distinctive solutions must be found to prevail over the barriers in progress. Therefore, managing risk and uncertainty in megaprojects entails in finding a well thought-out balance between executing routines and supporting innovation. This is expressed as a trade-off between developing the capability to exploit repetitive processes to cope with risks, whilst being able to explore and implement customized solutions when unexpected events take place.

(Shenhar, 2007)

ROUTINES

The scale, regularity and obviousness of actions performed on a project provide opportunities to develop recursive and stable project and operational processes. These routines that are planned in a illicit order, cut down into core repetitive responsibilities, based on homogeneous design modules and components and frequently repeated processes. Practices must be formulated to cope with basic risks that could obstruct the advancement of the whole project.

<https://assignbuster.com/innovation-and-risk-at-heathrow-terminal-five-construction-essay-essay-samples/>

INNOVATION

In a lot of cases, however unforeseen troubles and opportunities to perk up performance cannot be taken care of by resorting back to an existing inventory of routines. Such situations can be so unanticipated or odd that they entail new and ground-breaking ways of solving them to attain or surpass their performance objectives.

Our research identified two levels of organizational flexibility and innovative capability in response to uncertainty:

The overall project

Sub-project levels

THE OVERALL PROJECT

A main uncertainty which can prove to be threatening to the project's progress, demands a response from the project's senior management or client's organization. When the Heathrow Express project grinded to a halt to a standstill due to a collapsed tunnel a resolution was made possible as the client's project directors and managers enjoyed the liberty to put into practice and adjust the cost-reimbursable approach based on the past experience gained from the Glaxco research facility.

SUB-PROJECT LEVELS

A big project is time and again carried out as a plan divided into major projects and sub-projects. As comprised of LOR and Mott MacDonald, managers responsible for an individual project – within a larger program – need the independence and liberty to draft solutions to troubles or

occurrences that they come across. Our research recognized quite a few other cases of integrated project teams operating innovatively around issues that stalled progress specific sub-projects within the overall T5 main project, for example the use of digital modeling and construction of buildings and facilities, including air traffic control tower, airside road tunnel and main terminal roof.

FAILURES

BAGGAGE SYSTEM FAILURE

The baggage handling system installed at T5 is the largest baggage handling system in Europe installed at any single terminal. There are two systems; a main a main baggage sorter and a fast track system. An integrated team from the system was designed by an integrated team of BAA, BA and Vanderlande Industries of the Netherlands, the system handles both intra-terminal and inter-terminal luggage and has the capacity to process 70, 000 bags per day. Automatic identification, explosives screening, fast tracking for urgent bags, sorting and automatic sorting and passenger reconciliation are the processes the system performs as it handles the baggage.

On the opening the system failed and the initial five days of service saw misplacement of 20, 000 bags and cancellation 501 flights, sustaining \$31m in costs. The first full schedule of operations was achieved after 12 days of opening. On investigation it was discovered that the cause of problem was the dissimilarity of the staff with the new system, although there was a lot of time and time and money invested in the training of the staff, emphasis on

training was also huge due to the complexity of the system. Still the results were unfavorable and costs were faced due the failure (HCTC, 2008).

CONCLUSION

Big projects demonstrate low innovation and high risk, although the success of such projects depends of increasing the innovation and reducing risk factors, a clear identification of risks and uncertainties is needed to find equilibrium between the routines and the innovation. Responsiveness to react to unforeseen events is greatly reduced if the focus is more on the routines and on the other hand focusing on just innovation lead to less control oriented environment leading to chaos. Our objective has been to scrutinize the affects of the contractual framework in the Terminal 5 project, on the balance of innovation and routines. Economists and Lawyers would take up dissimilar point of views, but focus is neither on economic consequences and choices nor with legal construction and interpretation. We are more focused on analyzing the strategy of an organization during the complete life span of the project, which mitigates the risks and uses innovation to achieve project objectives.

We have established that the contractual framework is vital in finding an appropriate balance between innovation and routines. Megaprojects need routines to address risks and create a room for innovation to deal with uncertainty. Routines generate a consistency of approach such as the CIPP, T5 Project Delivery Handbook, and progressive design fixity – to address risks recognized before project execution. However, predefined and planned routines are not enough to cope with unusual events or incidents, not previously acknowledged during the planning stage. A megaproject must

<https://assignbuster.com/innovation-and-risk-at-heathrow-terminal-five-construction-essay-essay-samples/>

keep scope for deviation and innovation as a reaction to such uncertainty. In the T5 case the contract provided a framework for a deliberative process and opted for the resolution to problems with and between suppliers to address unexpected problems. Organizations and managers accountable for the whole project and sub-projects had the self-sufficiency, elasticity and space to search experiment and put into practice exclusive solutions to unanticipated problems encountered during the life-cycle of the project.