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BCIA Terminal 3: Getting IT adopted quickly

Background

Airport terminal's main revenue streams can be broadly classified into aeronautical (from airlines) and non-aeronautical (from passengers) streams. In recent years, the industry has become highly competitive with every airport terminal company looking into ways to improve its services and its terminal's capacity. The aim is to become the 'travel' hub for airlines and passengers in its region. This is also the company's vision of the state-owned Beijing Capital International Airport (BCIA) Company Limited that manages the main airport of Beijing, China. The main airport of Beijing owned by BCIA consists of three terminals namely, Terminal 1, 2 and 3. Terminal 1 was built in 1990 occupying around 90,000 m². Terminal 2 is 3.7 times larger (336,000 m²) than Terminal 1 and was completed in 1999 to take over Terminal 1 while it was closed for refurbishment. Terminal 1 reopened in 2004 at about the same time where the construction of Terminal 3 began. Constructed specially for the 2008 Olympics Games, Terminal 3 occupies a colossal space of 986,000 m². When completed in March 2008, Terminal 3 was the largest airport terminal in the world.

“Capital airport is China's first gate to the world. During the period of the Olympics, it takes on the responsibility and honor of being the first customer contact point for athletes and VIPs from all over the world ... the impression that the airport leaves on the visitors represents the hospitality and congeniality of the country ...” Mr. Hu Jintao, Chinese President (Translated from the book “The 52nd Gold Medal”)

To achieve the goal of seamless customer touch points across all facets of airport operation in Terminal 3 laid down by President Hu, IT became the imperative enabling tool.

The IT department of BCIA has been the key driving force behind the planning and management of all IT projects, day-to-day terminal operations and IT personnel (in-house and outsource staff) in the existing terminal 1 and 2. Hence, it is not surprising that the department is given the important responsibility to manage the entire Terminal 3 IT projects implementation. In this case study, we present four representative systems implementation in the Terminal 3 program (as shown in Table 1). These systems are selected for this case study because it is among one of the most

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complex systems undertaken by the BCIA IT department. It is most complex because of its large scale and of its involvement of a large number of internal and external stakeholders. For the system to be successful, the system must not only be delivered on time but also be adopted by all stakeholders readily.

Table 1: Brief Background of IT System Implementations	
System Name	Brief System Background
Airport Operation Database (AODB)	The ‘core hub’ that allows information captured within other systems in the airport to be seamlessly stored, analyzed and shared to ensure the smooth running of all aspects of its operations (a.k.a the ‘heart’ of the airport operations).
Airport Departure	System that manages the entire process of checking in and boarding the passengers and their luggage which all airlines in Terminal 3 are required to use.
Airport Security	System that handles all forms of security-related processing within Terminal 3. Security system of the airport can be classified into 5 levels of security checks (Airport-int 2009). Due to the huge number of country leaders and foreign visitors involved during the Olympic Games in 2008, the highest level of security 5 was mandated in Terminal 3.
Airport Data Centre	System that facilitates the billing for services rendered in Terminal 3 by the BCIA. From BCIA’s perspective, this system demands one of the highest priorities because it deals with the company’s revenue generating activity.

Airport Operation Database (AODB)

Right in the beginning of 1999 when the first AODB (developed by Motorola) was put into use in Terminal 2, the IT department already faced significant challenge in learning the right way to maintain and use it. Over the years, they continued to acquire valuable knowledge about AODB through the constant interaction with vendors like Motorola and through usage and experimentation during operation. As a result, the IT department developed its own set of standard operating procedures that laid the foundation for the future administration and maintenance of AODB in all its airport terminals.

“From 2000 to 2002, we came up with a maintenance standard operation procedure handbook. Till today, our maintenance strategy is dependent on this handbook.” –Deputy Manager, IT Department

In 2004, frequent hardware failures occurred that brought down the AODB in Terminal 1 and 2. The downtime highlighted the dependency of terminal operations and AODB and the need to closely monitor both. Two command centres, namely Terminal Operational Command Centre (TOCC); and System Operational Command Centre (SOCC) were established in late 2007 and all the existing AODB system and terminal operations especially in Terminal 3 were being subsumed under these two command centres.

The implementation of a new AODB system in Terminal 3 started in 2006 and was delivered in early 2008. Several key challenges were presented: (1) the new AODB was an off-the-shelf system that differed significantly from the customized AODB built for Terminal 1 and 2; and (2) the information systems in the Airport Transport Control (ATC) which AODB draws its information from were also undergoing upgrade which led to many uncertainties on how the two systems should interface. The heavy investment in IT staff training by IT department paid off. Some of the key initiatives that are still in place today are: (1) the encouragement of the leaders for the IT staff to build up their knowledge on AODB since 1999; and (2) the cultivation of a strong learning and sharing environment that facilitates the exchange of knowledge across generations of AODB administrator (currently at its fourth generation).

“... our IT department had a very strong learning culture ... In 2000, I took the lead with a few other colleagues to look into system backup and business continuity in-depth study (for the AODB) ... during that time, we didn't leverage upon outside help and we did all the research on our own ... we invented many system maintenance strategies.” –Deputy Manager, IT Department

This strong learning and sharing environment encourages desirable behaviors such as selfless sharing of valuable knowledge and proactive problem solving with ‘no-blame’ culture. The selfless sharing of knowledge is exemplified through the informal mentor-apprentice relationships in the IT department, whereby the past AODB administrator serves as mentor to the new AODB administrator.

“We have an unofficial master-apprenticeship mechanism and a backup mechanism ... if the apprentice is good at work, the master will have opportunity to do other things and can also be promoted. This serves as a big motivation for the master (to coach the apprentice).” – Chief Engineer (1st Generation AODB Administrator), IT Department

Leaders of the IT department place great trust into the hands of the highly experienced AODB administrators to drive the Terminal 3 project. In comparison, while the vendor was not expected to perform as well as the IT department staff, they were highly trusted in their ability to deliver quality IT solution largely due to the close working relationships that had been established during the AODB implementations for Terminal 1 and 2.

“Because of our in-depth knowledge of T2's (Terminal 2) business operation, we can easily make a comparison between T2 and T3 (Terminal 3) and highlight the weakness and strength of T2's system (AODB system), then we can use this knowledge to inform the vendors to improve their system by absorbing T2's strength and eliminating its weakness. In this way, our T3 design (of AODB) can be more aligned with our most ideal maintenance process which was not possible in the past (in T2 AODB).” – Business Process Lead, AODB System Project

Airport Departure System

The development work of the airport departure system of Terminal 3 started in 2006 and was completed in early 2008. To achieve wide spread IT adoption by partners of

BCIA (i.e. all the airlines), the IT department adopted a number of key strategies: (1) Inclusion of the highly experienced staff of all the airlines to ensure accurate depiction of each airline's requirement in the tender specification; (2) Assignment of several senior experts (all having over 10 years of experience, including those who were involved in the development of Terminal 1 and 2's departure systems) from the IT department to the project; and (3) Collaboration with a vendor that had more than 50 years of airport departure system implementation experience. As a result, the IT department was able to reap a number of key benefits: (1) Ability to draft out very accurate and detailed business requirements needed for the system implementation, which in turns kept any subsequent changes at bay; (2) Alignment of shared goals to serve passengers between the airlines and IT staff that encouraged selfless contribution to this common end; and (3) Development of strong trusting relationships among IT and airlines staff. However, the same level of trust appeared to be lacking between the IT department and the vendor, largely because customized development work was done overseas, the software used was proprietary and only local members, who were less experienced, of the vendor were available onsite for installation and configuration.

“If you have a chance to read the requirement submitted (for the departure system) by each airline, you will be surprised to realize how deep into the future they have predicted for the airline industry to go into development and the needs of their passengers ... Because our customers are airlines, the requirement gathered from them are all very accurate in predicting the eventual use” –Technical Lead, Departure System Project

“They (vendor) guard their technical knowledge strictly ... and because their technology is proprietary and not open-sourced ... we honestly feel that this is not a healthy development into our future relationship” – Technical Lead, Departure System Project

A series of training was conducted by the IT department to impart important information pertaining to BCIA's culture, practices, work attitudes and standards to the vendor before implementation commenced. This was to ensure that the vendor got a clear interpretation of the tender's expectation and was able to assimilate seamlessly into the BCIA's culture and working norms.

“We provide training to their (vendor) project management team to impart knowledge about our company's management philosophy, procedure and specific thing to take note of when it comes to system requirement. The objective is to ensure that they can reach up to the same standard as our internal IT staff and to align their way of thinking with ours.” – Technical Lead, Departure System Project

To mitigate the risk of low trust level of vendor, the 'Backward Planning' (interpreted as setting hard deadline for project and planning backward to set milestones) methodology was adopted to communicate expected deliverables and their deadlines. A weekly meeting was held to track the development progress with major stakeholders and vendors. On a daily basis, a more rigorous schedule of workload was drafted and the local members of the vendor were expected to follow and complete them accordingly. Some members of the IT department staff were stationed beside the

vendors to ensure conformance of the daily schedule and to ensure the quality of the task completed.

Airport Security System

The tender for the implementation of this system was awarded in October 2005 and the system went live on March 2008. The requirement to achieve maximum security at level 5 posed significant risk to the system implementation process mainly because the scale of the implementation was unprecedented then in the world in 2008. Many unknowns existed and a large number of stakeholders were involved in this project (such as custom department, airlines, ground staff etc.). To mitigate this risk, significant amount of time was spent before October 2005 visiting many vendors around the world to acquire their knowledge in the implementation of security system.

“As far as security is concerned, this system is first of its kind in China ... In April 2005 before the beginning of the tender, we did a number of visit and research on a number of airports ... we involved the design unit in T2 (Terminal 2) to consolidate our findings into the tender specification for the security system in T3 (Terminal 3).” – Project Manager, Security System Project

While the system implementation posed huge potential risk, it did not faze the members of the staff involved because: (1) they were happy to be associated with the ‘novel’ of the level 5 security system in the world; and (2) they relish in their national pride of having been proven to achieve something seemingly impossible, at all cost no less, through the collective determination of multiple stakeholders.

“The success of this project relies on our common working attitude. This doesn’t just apply to us (IT Department) but the vendor as well. One of our vendor member’s wife was giving birth during that time, he chose to stay onsite.” – Project Manager, Security System Project

The overall lack of experiences in implementing a system at this level of security raises questions about the skill set of everyone involved. This resulted in a low trust environment where tight control measures have to be put in place. To ensure proper conformance of the system requirement, a separate audit team was formed to inspect all the project deliverables. The implementation of the system can only proceed after the approval of the audit team. In addition, the IT department also mandated the staff involved to stay onsite during the entire system development period. Frequent site inspection and weekly meeting were conducted to instill the sense of urgency and to get things done right the first time. To ensure no opportunism behavior of the vendors and staff, a joint responsibility deposit was imposed on them, which mandated the timely completion of task or risk losing portion or all of the deposit. In addition, payments to the vendors were done in a ‘milestone’ fashion, i.e. they only got paid when the audit team certified that they have met all the requirements of that milestone.

“Our company adopts an outcome driven control, that is to say if you achieve your target, you will be given monetary reward, if you don’t, money is deducted... once we established the target, everyone will come up with the ‘responsibility’ deposit, you don’t hit it (target) we deduct money

from the deposit. You complete it, we give you reward.” – Project Manager, Security System Project

The leaders in the IT department have led by example. They held progress meeting on Saturday and conducted inspection at night to instill the discipline of working round the clock. In addition, the Chinese believed in encouragement slogan. Many were placed around the premises to motivate all the stakeholders to answer to the higher calling of their work. For example, one of the slogans in Chinese posted at the canteen translating to the effect of: *“If you are afraid of death, don’t become a communist. If you are afraid of hard work, don’t take up system development work of T3!”*

Data Centre System

The implementation of the data centre system started at late 2007 and was delivered within six months in March 2008. As the main purpose of this system was to provide a single authoritative source of bill calculation for all the internal stakeholders of BCIA, it must be precise and error-free. This was not easily achievable. The IT department was aware of the difficulty involved in getting buy-ins from internal stakeholders, so one of its most well-respected IT staff within the airport was assigned as the project manager. Through close coordination and many intense negotiations with all the stakeholders, the BCIA project manager was able to keep the implementation effort moving. To further accelerate the development of the system, the BCIA project manager leveraged upon his close working relationship with the local partners at the Company CX (A large multi-national company) to start work on the project before the signing of the tender document was finalized. To ensure a tight control on changes, a rigorous change management process was implemented. Despite all these preventative measures imposed to get the project completed on time, the project manager still faced a number of difficult challenges including: (1) coping with the withdrawal of CX from the tender before the actual signing of the tender document. This was a crisis especially since the local vendor of CX had already committed their resources into this project. The quick thinking project manager managed to resolve the situation by convincing the local vendor to absorb the staff deployed onsite by CX, so as to minimize disruption; (2) coping with three unforeseen change requests during the development of the system. If they were mandated to complete before the Olympics, these changes would cause the system schedule to overrun. The project manager mitigated the situation by convincing the stakeholders to defer the changes after the 2008 Olympics after some intense negotiations; and (3) coping with the request to subsume the two functionalities embedded within the Terminal Operation Database system and the Company’s ERP System into the new system. This would disrupt the established information flow and power structure within an organization derived from these two systems. Leveraging upon his respectable status and given complete authority by the management, the project manager managed to navigate an extremely delicate change process which enabled the smooth transition of the multiple stakeholders from their familiar interfaces to this new system.

“During the system development process, we have been given a lot of authority to control many decisions concerning payment and operational data which include daily operation report ... from our angle, this makes a lot of our work easier to implement” – Project Manager, Data Centre System Project

The project manager was able to overcome these challenges because of the following measures: (1) Constant and persistent communication about the accounting regulatory requirements that BCIA needs to conform to and the key advantages and improvements which the new system could provide; (2) Weekly meeting to trace the progress and report it back to the stakeholders; and (3) Verified payment to the vendor only when a milestone was completed and signed off by him. Furthermore, due to the project manager's willingness to engage the local vendor despite the withdrawal of the main potential contractor (CX), the vendor's project manager was willing to give something in return to the project manager's trust. For example, he was very proactive in reporting the status of the project and was flexible to take up ad hoc work of a smaller scale not specified within the initial terms of contract. He did these jobs at no extra cost to BCIA.

“... The core team (vendor team) comprises of team members that possess in-depth business domain knowledge and strong technical skills and experiences in this area (development of Data Centre) ... you don't need to explain things in detail to them (vendor) ... if we have another vendor, the pressure on us would be really great and we will probably have to do OT everyday” – Project Manager, Data Centre System Project

Comparatively, the internal partners (such as airlines and shop owners) were much less 'cooperative' with the IT department's project manager than the vendor. Consequently, the trust level of these partners is low.

“If you don't have professionals to control the process of this project, the project risk would be high. If you let the users (partners) control the process, you will face the challenge of frequently changing requirements ... because they (partners) represent their own interest.” – Project Manager, Data Centre System Project

The 52nd gold model in Olympics

As the games of 2008 Olympics came to an end, the athletes and VIPs head home via the massive and impressive Beijing Capital International Airport (BCIA) Terminal 3. The years of hard works of the BCIA IT department paid off. The myriads of IT systems (small and large scale) were not only rapidly adopted by all the stakeholders when they were rolled out in 2008, everyone worked closely to ensure the operational works in Terminal 3 were seamless throughout the time of the games.

To commemorate the IT department's capabilities in accomplishing a seemingly impossible mission, a book titled 'The 52nd Gold Medal' was published and distributed to all staff in BCIA. In the eyes of the Chinese government, they felt the BCIA IT department's achievements are equivalent to winning the 52nd gold medal in the Olympics Games for China. This is the greatest honor that the BCIA IT department can be given to any one organization by the Chinese government.

Looking back at this case, one can't help to wonder how does the BCIA IT department (with a manpower strength of around 150) is able to pull off this Terminal 3 program implementation? Especially given that they can only spare half of their

manpower (around 70) for this program implementation while the remaining staff worked to ensure existing operations in Terminal 1 and 2 run smoothly. What are the reasons behind their success in getting all the IT systems in Terminal 3 readily adopted by all stakeholders in such a short period of time?

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