Creating airports of tomorrow in a changing aviation landscape

In today's complex business environment, many projects at airports run off course. The traditional design-driven approach is failing in the increasingly complicated stakeholder field and business environment and consequently several airport companies are now successfully shifting to a new approach on airport development. Decisive elements of this new approach include focusing on actual needs, preparing for changes, developing airports as holistic systems, creating a 'top-down' strategic fit of projects, engaging stakeholders, and aligning expertise. These success factors underpin the principles of a project management approach called 'Systems Engineering'. Colleagues *Rogier Doffegnies*, *Alex Jansen* and *Gé Smit* from 2ndSense AirportCreators delve deeper into this new approach.

EVER wondered why projects at airports run off course time and again? We have researched airport development projects of various kinds and scales and discovered that in many cases it is the fundamental issues that result in budget overruns, delays, quality issues, and lack of stakeholder acceptance. These issues include harmful and structural project routines such as jumping to solutions while neglecting intrinsic needs, overlooking the strategic fit of projects, misaligning expertise, creating a disconnection with stakeholders, and mismanaging the scope of the project and changes that occur. These routines have become increasingly problematic in our radically changing business environment, yet most airport companies continue to use old strategies of airport development. However, a small number of airports have successfully shifted their approach. These companies have built their success on the following six key principles:

1. Focusing on intrinsic needs
2. Preparing for changes
3. Developing airports as holistic systems
4. Creating a 'top-down' strategic fit for projects
5. Engaging stakeholders
6. Aligning expertise by means of early market involvement.

So, what can we learn from those airports?

How does the 'new normal' affect airport development?

The current state of the economy and business environment has presented us with many unprecedented challenges. Continual unpredictable changes are common traits today and many believe that the trend is irreversible: this current state of our business environment is the 'new normal' and is here to stay for the foreseeable future. In this era of the 'new normal', old strategies are useless or even harmful. Airports face numerous significant challenges such as unpredictable growth and incompatible demands of stakeholders. The companies that are most successful at managing these challenges are those that recognise and adjust to this 'new normal'. Those that passively continue with their old strategies are endangering their business. As Ian Davis[1] defined: '*The business landscape has changed fundamentally; tomorrow's environment will be different, but no less rich in possibilities for those who are prepared.*' Airport companies need to find new strategies and tactics to develop and operate their airports within the 'new normal'.

> *"Airport projects unfortunately may fly off course more often than other types of infrastructure construction because they are more complicated and involve more uncertainty"*
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> **Anthony Morgan** – PWC

Rethinking airport development

A small number of airports have already successfully shifted their approach to adapt to this business environment, showing enhanced agility to cope with the unpredictable and incompatible demands of stakeholders. There are six System Thinking principles that are essential to abide by for airports that want to adopt this new approach.

Needs-driven rather than design-driven process

At the initiation of a project, teams tend to begin by designing physical assets or infrastructural solutions for their challenges. Focusing on the solution may provide a sense of stability, but it is a false one. With this so-called 'design-driven' process, project teams tend to jump to solutions while paying little attention to the actual need or leaving the problem poorly defined. This harmful routine increases the risk of developing incomplete, unsuitable, unacceptable, and un-integratable solutions. A design-driven approach is very common and it has become the principal problem in airport development. Errors in designing airport assets remain 'invisible' as the design cannot be verified or validated. When errors are discovered during the construction phase, the costs of failure are extremely high. In contrast, a 'needs-driven' process focuses on the motive of the project, and defines requirements based on the actual needs rather than the obvious technical solutions. In this process, the project requirements are specified in iterative design works. This incremental 'define, design, and verify' process stimulates innovation, reduces failure costs, engages stakeholders and, above all, gets things right the first time.

Preparing for changes rather than preventing changes

In today's environment, airport development involves large uncertainties and an increasing likelihood of changes. A harmful practice in projects

BIOGRAPHY

ROGIER DOFFEGNIES is driven by the challenges in aviation industry and currently works for 2ndSense AirportCreators as a Senior Consultant and Managing Partner. Rogier's focus is on bridging the gap between strategy development and projects. Before AirportCreators, Rogier worked in the Master Planning and Strategy Department at Schiphol Group. He was responsible for the cooperation with Aéroports de Paris and Incheon Airport and for redeveloping the intercontinental departure areas at Schiphol.

is to hold off or even ignore change. Although this makes a project controllable from the perspective of project management, it does not create a 'fit-for-purpose' result and, as a consequence, expensive modification to assets are conducted immediately after project delivery. To successfully succeed in this business environment, one should be prepared for changes in development projects by defining one's goals, assumptions, and decisions in a structured way. In case of a change, an impact assessment can be easily achieved. '*How does this change affect our goals, stakeholders, and the results we have achieved so far?* The iterative 'define, design, and verify' process provides a robust instrument for change management.

Focus on holistic integrated systems rather than technical details

Airport projects are often large in scope and involve a wide variety of stakeholders, processes, and technologies. Project teams tend to focus on too many details at the outset, setting the bigger picture aside, making it hard to simplify the scope and eliminating choices later. Simplicity is at the core of greatness, but it takes focus, the right level of detail, and a holistic approach. No matter how large a development project is, it will only be successful once the deliverable is well integrated in its context. A modern airport is not just a building with a stretch of asphalt; it is an integrated system that closely interacts with its environment to deliver a competitive performance. This performance is achieved by the seamless integration of people, assets, and processes, which work together by means of commonly accepted procedures. Such an airport is not developed as a group of assets, but as a complete system. Outside-in thinking must be employed from the very beginning and the starting point should be exploring and defining the system-of-interest, its functions, context, interfaces, and stakeholder.

Engaging rather than misaligning stakeholders

Many think that stakeholders make airport projects more complex rather than easy. But, what if there is a way to turn stakeholder involvement into a valuable asset that supports progression, creativity, and innovation? It is important to make use of the stakeholders in order to succeed in development challenges. It is imperative to involve and incorporate stakeholders from the very beginning, even by setting a strategic outline, documenting their interests and requirements. As a project may not fulfil all their wishes, it is important to engage stakeholders in the consideration of their requirements. The key is to listen, learn, and achieve consensus, rather than convince and compromise.

Alignment of expertise rather than the silo mentality

Driven by the conventional market approach, most project teams spend considerable amounts of time in their silo dictating solutions to suppliers. The majority of project specifications that we have analysed are highly technical and solution-driven, excluding the scope of alternatives and innovation. This is where the biggest opportunity of the 'new normal' is being missed; a sub-optimised supply chain where all opportunity for innovation or market expertise is excluded in tenders. Aligning expertise can be achieved by means of early market involvement and performance, or function-based specifications.

Top-down rather than bottom-up development

Creating and maintaining a strategic fit for an airport project is essential, but it is not easy. Although many airport companies have a strategic plan, only few know how to translate it to a firm project portfolio

TABLE 1 **Comparisons between System Thinking and Traditional routines**

SYSTEM THINKING ROUTINES		TRADITIONAL ROUTINES
Needs-driven process	Vs	Design-driven process
Preparing for changes	Vs	Preventing changes
Focus on holistic systems	Vs	Focusing on isolated assets
Engaging stakeholders	Vs	Misalignment among stakeholders
Alignment of expertise	Vs	The silo mentality
Top-down approach	Vs	Bottom-up development
Incremental development	Vs	Sequential development
Thinking in functions	Vs	Thinking in assets

BIOGRAPHIES

ALEX JANSEN has worked along the principles of Systems Engineering in several roles such as Project Manager, Process Manager and Procurement Manager within large infrastructure and airport projects. Alex is currently Managing Partner at 2ndSense AirportCreators. He is capable of creating a holistic and strategic view and bringing it to an operational level. Alex worked on the A-area expansion of Amsterdam Airport Schiphol in which the method of Systems Engineering was successfully introduced.

GÉ SMIT is a Partner and Senior Consultant at 2ndSense AirportCreators. With his extensive experience in airport projects, Gé helps airport companies to succeed in their development ambitions. Gé worked for Schiphol Group in various complex and extensive development projects at several airports. His expertise has a vast range including airport planning, project development, tendering, design, and asset management by means of the Systems Engineering principles.

and a solid project top-specification. A top-down approach must be employed to seamlessly integrate projects with strategy: every requirement, solution, and trade-off must be derived from the airport strategy. To achieve this, information tooling is required – reliance on flashy sheets or tons of documents is never recommended.

Releasing the power of 'Systems Thinking': the *real* new way of developing airports

Systems Thinking routines are at the core of the project management method of Systems Engineering. As a system, the airport is a part of higher level systems (like the national transportation system and the ecological systems) but also, it is a synergetic sum of its subsystems (such as the airfield, terminal, and baggage system). Thinking in terms of systems will enable better understanding of how value at an airport is created, consumed, and used by its stakeholders and customers. By defining the strategic road map with use of Systems Engineering techniques, the needs and values of stakeholders are considered and communicated back and forth at all levels of detail. As a result, stakeholders gain much more understanding of the decisions that airport master planners have to make.

Systems Engineering supports policy-makers and decision-makers in focusing on needs rather than 'things': it provides focus on the right issues at the right time, preventing teams from quickly jumping into details – the so called 'solutions'. One may recognise that airport development is, in fact, a long and multidimensional trajectory of decision-making. Research has shown that most projects at airports run off course due to implicit decision-making in which information is lost over time. Systems Engineering is doing away with this old approach by introducing an explicit, traceable and transparent method of decision-making. With Systems Engineering, decision-makers at all levels of the organisation have all the required information readily available to make the right decision at the right time.

Setting up the strategic roadmap and the masterplan according to the Systems Engineering principles is advantageous when defining and starting up projects. Projects are more capable of contributing to the strategic roadmap, as they are derived from it. The strategic roadmap and master plan will no longer be a cloud in the sky but a firm and robust starting point for all the projects and, eventually, operational processes at the airport. The gap between high level plans and daily business will just disappear.

REFERENCE

1. (McKinsey, 2009)