

Experiences and Pitfalls Establishing a Smart Data Lab and Transferring Prototypes into Production

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ABSTRACT

In March 2015, Fraport AG in Frankfurt carried out an experimental Smart Data Lab (SDL). For the first time, experts from a variety of departments worked together in a laboratory situation. They defined four concrete problems to be solved with analytics, using a huge collection of data from different sources within the company.

The effective communication of problems and results helped promote the acceptance of the lab's data based recommendations. Analytics and the use of huge amounts of real-time data which were integrated into the IT systems for the first time, allowed for the correction of some established decision rules. Most of all, not only the four problems were solved and the business processes behind were improved, but also several new data-based business ideas with cross-departmental impact were generated.

Results from the Smart Data Lab were widely noticed and accepted by Fraport's executive board, which in turn has decided to make SDL a permanent institution. Transforming results into real-live application is still a key-challenge in terms of user acceptance, cultural mind-set, mission critical runtime environment and process adoption.

INTRODUCTION

Airports around the world are confronted with the challenge to transform themselves from infrastructure managers to service providers in order to compete successfully in the global market. To a great extent, this transformation is driven by digitalization. While so far technology was mostly used to support business processes and thereby enable airports to realize their business models effectively, digital transformation means that new business models are developed around the technology itself. From a European perspective, the major airports in Europe, Middle East and North Africa are affected by that challenge immediately since they are the key hubs for transferring intercontinental passengers around the globe. In general, for most enterprises digital transformation means a big change in an organizational and cultural way which directly affects all employees and the nature of their thinking and collaboration. The main objective of this effort is to establish new products and services which help airports to set themselves apart from competitors and gain market shares.

Fraport has given itself a new corporate mission statement: "Gute Reise! We take care." This mission statement reflects the transformation process in particular and switches the strategic focus from the "Airport Manager's" perspective to the customers' perspective. In the past, an airport's strategic focus was about providing and maintaining runways, buildings and processes for handling aircraft operations of freight and passenger flights – the so-called product-centric perspective. Today passengers and visitors are highly moving into the attention of an airport's business interest. Running a successful airport business from a customer-centric perspective therefore requires much more than just providing a smooth handling of aircraft operations. As well, if not even more, it requires providing a positive and stress-free experience for all people around the airport. This involves for

example attention on entertainment, information services, process optimization, simplification of travelling, shopping experience and assistance.

As most of us certainly know, travelling by plane involves both positive and unpleasant situations. While planning the new trip is often connected with pleasant anticipation, the mood often turns into more or less tension – at the latest when the journey finally starts. This tension sometimes results in heavy stress if queuing at check-in is backed up, if security screening takes very long or if problems with luggage occur. A pleasant journey seems hardly imaginable at that point and the desire to go shopping or to use other services just evaporates. Those situations need to be avoided to guarantee a most comfortable trip and to persuade passengers to use Frankfurt Airport again in the future.

SMART DATA LAB

Fraport has recently started a new and innovative initiative for investigating new ideas for applying Big Data and predictive analytics to business problems (commercial as well as operational): the Smart Data Lab. In this environment, interdisciplinary teams of data analysts, mathematicians, business process experts, and IT specialists successfully work on clearly delimited business challenges with high relevance in a predefined time frame of several weeks. The most promising results achieved during a Smart Data Lab period will be turned into regular implementation projects in order to thoroughly prepare a sustainable utilization of the findings in daily operations or business.

The following elements were identified as key success factors for the Smart Data Lab:

- it is a mandatory prerequisite to provide the interdisciplinary working groups with unlimited access to all data the company possesses,
- the teams need to be composed adequately,
- the lab has to constitute a protected environment that accepts initial failure as progress towards the best possible solution, and
- a powerful analytic toolset is needed as well as agile working methods.

With regard to the first success factor “unlimited access to all data”, Fraport has established two comprehensive centralized BI data repositories (the Business Intelligence Architecture Framework BIAF for operational data and SAP Business Warehouse for administrative/commercial data), which have been collecting relevant business data for many years and keep them available for detailed analysis through various channels and tools. Based on its integrated business model, Fraport owns data from various areas of the airport business’ value added chain, including flight data, ground handling data, passenger flow data, retail data etc. It is essential that the Smart Data Lab team has access to all data across business units, as this allows for the identification and investigation of interrelations between different data sets and the related business processes.

The second key success factor is related to the best possible composition of the interdisciplinary teams. Besides experts in data analytics, the team needs to comprise representatives with detailed knowledge of the business processes related to the operational problem under investigation, such as business analysts and process experts. Moreover, the ICT department provides technical and methodical assistance – especially concerning the data repositories and the available tools.

Thirdly, it is important that the team is able to operate in a protected and non-constraining environment. This allows for the formulation of new hypotheses unpersuaded by typical limiting factors such as the previously established approach or political influences. Nothing is stigmatized as off-limits and the teams can use the available data to evaluate any correlation that appears constructive. Moreover, it is very important that failure is an accepted outcome of the investigation

phase. The earlier an approach fails, the better, since it is then more likely that the team is able to find a better approach towards the right answer in the remaining available time.

Finally, the working methods in the Smart Data Lab follow agile principles, e.g. by using a Kanban board to illustrate tasks and progress and by holding short daily (stand-up) meetings to facilitate team communication and to scrutinize progress. Fraport has been making repeated use of the Smart Data Lab and achieved remarkable results. Some examples are presented in the following subsections.

TRANSITION INTO PRODUCTION

The Smart Data Lab plays an important role in the procedure of problem solving steps, but it is only the first step. If a result is considered to be used in production the responsibility is handed over to the Smart Data Factory in order to create stable and reliable products running in productive environment. The Smart Data Factory has the responsibility to implement the product using standard components and procedures and to maintain and manage the life cycle of that analytical product. The most important tasks for the Smart Data Factory are the completion of model implementation, the management of the realization project and the change management initiated by the lab’s results. Also, the factory is supposed to maintain and support the product, to monitor and retrain the model, to further develop the product and, not to forget, to train and coach the users.

The integration of analytical components into a productive application requires more than classical application maintenance and support like keeping a system up and running and guaranteeing a certain performance. The use of models means to ensure high quality of model generated information and to deliver the right information at the right time to the right people. Therefore, it is necessary to monitor and recalibrate models or re-engineer them immediately if basic assumptions have changed. Most of the products are used in high critical production environments like operational control centers or security offices. The requirements regarding quality and availability are accordingly high.

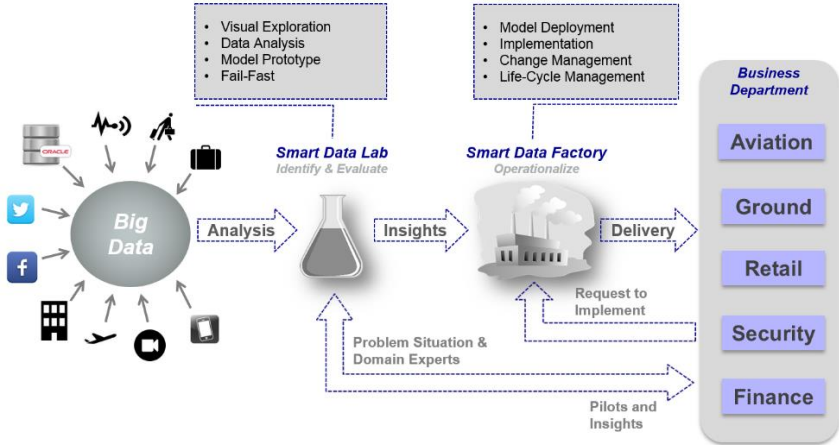


Figure 1.1: Smart Data Lab as the first step in the transformation process.

SUMMARY AND OUTLOOK

One of the key lessons learned was that problem solving with big data and analytics needs a lot more than expert knowledge in analytics and big data. The task of persuading other departments that

analytics would be inevitable to make smarter decisions and turn Frankfurt Airport into a digital-driven marketplace, turned out to be more difficult than any technological issues that came up. The incorporation of interdisciplinary practical expertise into nearly every single phase of the analytics process was crucial, in order to correctly interpret the results and to identify pitfalls which would have led to severely misleading conclusions.

The change process so far has only started. New business models discussed are cooperative Smart Data Labs with partners like Lufthansa, Deutsche Bahn etc. in order to create novel, integrative passenger services. Fraport also thinks of partner data models or even open data strategies, involving as many stakeholders as possible, not only as data providers, but also as users of the data and as developers of new applications. Finally, analytics-as-a-service driven by customer needs might lead to the development of smart applications. We observe a huge cultural transformation of the whole organization, turning Fraport into a digital marketplace both regarding the inner core of the company and its interactions with other parties.

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