WAKES OF INNOVATION AT THE FIELD LEVEL

by Olivier Berthod

Context

At 10:29 PM on Sunday 31 May 2009, flight AF 447, an Airbus A330-200 operated by Air France, took off in Rio de Janeiro with Paris as its destination. Around 2:00 AM, the pilots entered a cloud layer. The temperature increased, thus augmenting the risk of ice formation around the plane. At 2:10 AM the Pitot tubes, which measure speed, most likely obstructed by ice crystals, reported flawed information, which lead the aircraft to disconnect the autopilor. This missing speed information lasted 29 seconds until the probes on the left side recovered, and 54 seconds until total recovery. And yet: during the four minutes that followed, the pilots failed to gain control over the aircraft.

Failure

With the speed indicator missing, the airplane's information system computed a loss in altitude. The pilot in charge pulled on the airplane's control to make it gain altitude. The airplane stalled losing its "flight envelope". From this position, the only way out is to push on the controls and let the plane drop; a maneuver for which the pilots had trained – even though superficially. Instead, the pilots, encapsulated in their cockpit (in night conditions, pilots must rely entirely on the indicators of the cockpit), kept on pulling on the joystick of the aircraft, reaching a point at which the plane's system stopped computing. The crew kept on struggling with the situation until collision with the ocean; it was 2:14 in the morning. The BEA, the French agency investigating the case, concluded: "[it] supposes additional work on operational feedback that would enable improvements, where required, in crew training, the ergonomics of information supplied to them and the design of procedures".

Innovation

The crash of flight AF447 triggered a wake of innovations at the field level. These innovations, too numerous to list, went in two main directions: technical improvements of the machine-user interface (e.g. development of new tubes preventing ice formation, new cockpit designs for better feedback processes and interactions, better transmission of basic parameters to the ground for continuous monitoring), and improvements in training (e.g. new simulators including critical situations and their recovery, better procedures to make decision among pilots and copilots, new criteria for certification and evaluation). Many public agencies and firms involved in the industry participated in the discussions surrounding

Domain
Public ☒
Private ☒

Non-profit ☐
Commercial ☒

Business: Aviation

Start up (0-1yr) ☐
Growth (1-5 yrs) ☐
Mature (5yrs +) ☒

Micro (Staff <10) ☐
SME (10 – 250 Staff) ☐
Large (250+) ☒

Regional ☐
National ☒
Multinational ☒
Methods
Longitudinal ☒
Cross-sectional ☐

Access ☐
Exemplar ☒
Random ☐
Innovation
Top Down ☒
Bottom-up ☐

Product ☐
Process ☒
Organizational ☐

Radical ☒
Incremental ☐

the aftermath of the crash thus contributing to diffuse the innovative wake across the field of aviation.

Transformation

The initial investigations were headed by the French authorities for civil aviation (BEA). This included locating and recovering the remains of the aircraft, recovering the flight data and investigating the data. Two goals in mind: to understand what happened and to propose recommendations for the field of civil aviation. What started as a one-organization endeavor quickly became the center of tremendous attention. Airbus jumped into the discussion, as did AirFrance, and numerous other organizational stakeholders (e.g. pilots unions, victims' relatives associations and other public agencies around the world). At first, work remained mostly in the BEA's hands. Quickly, with the first results of the investigations, the wake propagated and numerous efforts for change began taking place among numerous other firms and organizations. The challenge remained: how to lead the wake?

Role of Leadership

The investigative reports took on the role of a trigger by diffusing recommendations and addressing first critics. But with respect to leading the wake of innovation and learning out of the dramatic event, working groups were instrumental. A first example: the human factor working group. The objective was to investigate cockpit ergonomics and improve the pilot-machine interactions. This group featured 3 experts from the BEA, 2 pilots, 1 psychologist, and from time to time experts from AirFrance and Airbus. A bigger example is the flight data recovery working group, which included over 120 members. Their goal: improve our capacity to locate and recover flight data. Many private companies from diverse fields (aviation, satellite technologies) took part in the discussions, together with regulatory agencies and other international organizations. Last but not least: the Aeroplane Upset Recovery Training Aid Working Group was instrumental in developing new guidelines for training, discussed by members of most major airlines, safety agencies, Airbus, Boeing and Bombardier, pilot associations, and other actors. Working at the field level, it became necessary to replace the field with a smaller representation in the form of working groups. Nonetheless: the larger the group grew; the more controversies arose…

Data

This case study relies on an in-depth qualitative investigation based on the investigation reports and semi-structured interviews with professionals involved in the industry.

Failure
Caused externally ☒
Caused internally ☐

Step1 Invent ☒
Step2 Select ☒
Step3 Implement ☒
Step4 Capture ☐
Transformation
Internal to Organisation ☒
External to Organisation ☐
Delivered by Organisation ☒
Delivered by Others ☐
Role of Leadership
Strategic Recovery ☐
Employee-led Recovery ☒

New Leader Engaged to lead transformation ☐
Existing Leader-led transformation ☒

Recovery Strategy Published ☒
Recovery Led by Operational Activity ☒

Strategy Announced ☐
Recovery Evolved ☒

Learning outcomes

- Central leadership at the network level needs to be bypassed by distributing leadership in smaller units.
- Dilemma at the network level: The more participants, the better… and the harder to manage