

# ENGINEERING AND STRATEGY: RETURNING TO THE CASE OF SOUTHWEST AIRLINES, AN ANALYSIS IN PRODUCTION AND TECHNOLOGY MANAGEMENT

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## 1. INTRODUCTION

Some company cases let us see what was done to produce business model innovation that creates ruptures in the market, changing the rules of competition. One of these cases is the story of Southwest Airlines (SWA). This article tries to demonstrate that engineering operational excellence is fruitless without a compatible moving in other conceptual axes like service, finances, administration and human resources. The areas of a company are bounded into

a network that makes every part of it shake, when any component is touched. This network, immersed into the environment evolution, is a complete systemic unit, where paradigm changes must be supported with operational actions so innovation becomes a living force that changes competing profiles. This virtuous cycle between thought and action, when successful in producing adaptive and innovative competing structures, revolves the markets and generates new rules for competition.

## 2. APPROACH

One of the most successful techniques of training in management studies is the case study. Not only it approaches students to real facts, but let them introduce into different analysis techniques and research methods. Although the story of South West Airlines is a classic, still it can provide all the multiple aspects of a successful case of business model innovation that changed completely the way in which air transport companies face the challenge of competing. What today is natural to us like low fare airlines and simplified operational schemes, was in great part founded by this company.

In March 15, 1967 Air Southwest was founded by Rollin King and Herb Kelleher to serve three cities in Texas. In those days, some airlines like Braniff, Trans-Texas,

and Continental Airlines initiated legal action against Southwest and battled during 3 years to keep the new airline on the ground. Eventually Air Southwest prevailed and the Texas Supreme Court upheld their right to fly locally in December 7, 1970. When the United States Supreme Court maintained the decision, deregulation of the airline business in USA began de facto (Texas 1970). Rollin King was one of Kelleher's law buffet clients; they created Southwest Airlines business concept on a cocktail napkin in a restaurant at San Antonio Texas. The company succeeded to be different offering low fares, eliminating unnecessary services, and avoiding the "hub-and-spoke" scheduling system used by other airlines in favor of building traffic in secondary airports ( Berry 2006).

The organization created a particular corporate culture which made Southwest employees, well-known for taking themselves lightly but their jobs seriously. Southwest has an almost inexistent in-flight fatality record, as well as being recognized for several operational innovations that reduce costs. But which were the quality characteristics associated to the menu of services offered by Southwest airline? What was the difference in front of the other competing companies?

The central concept raised by King & Kelleher was very simple but an extravaganza for the typical use during the 1960s -1970s decades: flying focused on transportation. The idea when getting into a plain is not to eat, drink fine liquors, see movies or seat on leather; the clients intention is to move rapidly, safely, cheap and comfortable. With this idea in mind, the concept of "slim factory" was applied to the airline so all operations focus on what really had impact in added value perceived by clients, and then became "quality guidelines". Southwest took this direction in a breaking point in history: the beginning of globalization. Flight transportation quit to be a luxurious service for high classes and began to compete with land transportation (train, bus, car), turning into a basic service required by vast number of middle class North Americans. This change of environment combined with increased costs in gas due to OPEP embargos, required airlines changing their understanding about air transportation basics, focusing on differentiation via costs administration (Porter 1985; Porter 1996).

A second important process was the deregulation of the air market during 1978 (Morrison 2001). Large airlines like Pan Am used to depend much upon their advantages due to regulated tariffs and political social capital that provided advantages and quasi-monopoly status. Law suits and political pressure was an effective weapon to compete, but Southwest proved to be highly qualified to handle all sorts of legal crises.

A third critical area was developing a conservative financial management, which avoided extensive

loans and learned to perform effective purchase of fuel options. These practices let SWA face efficiently air traffic downs like that occurred with the 9/11 crisis. A forth critical area was human resources management and the control of union demands. The fifth fact is the administration of the company's image, producing a legend that has been reverted not only in administration studies but in stories and dramas. The story of Southwest's legal fight was recreated into a children's book, "Gum wrappers and Goggles" by Winifred Barnum in 1983. The book was adapted to a musical called "Show your Spirit", sponsored by Southwest Airlines and played in the towns serviced by the airline. This was a masterpiece of public relations and image management.

All these particularities about the ways and structures of SWA, were complemented with operational and product innovations that reinvented the service concept about air transportation logistics.

- ◀ The fleet operates one single kind of equipment: Boeing 737. This facilitates various operations like stock of spares, mechanical and operational training, and enhances knowledge about the equipment. The results in term of quality are mainly two:
  - . Minimum turn-time for the aircraft (15 minutes in average which was the shortest by far in the industry) reducing to a minimum possible delay of flights.
  - . Brilliant security record (only three major incidents occurred through all the history of the company with just 2 casualties).
- ◀ Reduced costs in operation without reducing the quality of service. Elimination of meals and extras to the air transport (i.e. movies, radio channels, liquors and the like) as well as seat reservation and class differences for service. Those extras did not affect flight security, basic comfort, or punctuality but definitively added a load to expenses and

delay risk. Enhanced ticketing using self service and reusable cards reduced costs without harming queue time and in fact, it reduced it. The inclusion of the first-to-come-first-to-serve system to get the plane seats, produced a discipline effect in clients who got accustomed to arrive early to their flights, reinforcing fast passenger boarding process. This practice added to interlining (exchange of passengers between flights to the same destiny) and use of secondary non-saturated airports, produced minimum embarking times.

- ◀ Elimination of the hub-and-spoke routing system, reducing bottlenecks in the network and better suited routes, enhancing the rotation of passengers, seat occupation and net production.
- ◀ Fancy relaxed atmosphere in the flights, produced by amicable campaigns like “All you need is LUV” (American Stock Exchange ticker symbol from the airline), changing the Texas Love Field into an icon. Or “nuts about Southwest”, as nuts and soft drinks was all what they served during long fights (Southwest-Airlines 2007).

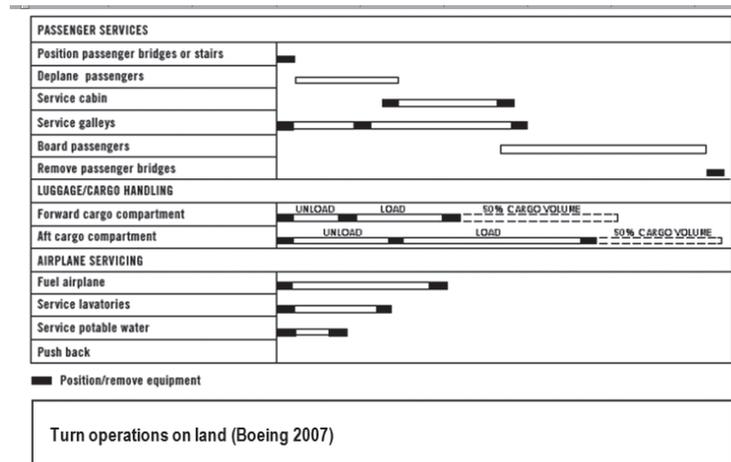
At the same time, this particular human resource administration and image had produced problems to SWA. In June 1981, the airline was found guilty of sex discrimination and stewardesses won the right in their new contract not to wear hot pants in the job (The Gale Group 2007). But difficulties were successfully managed; although SWA had a 12.5% to 25.1% more extensive labor time/flight, it offered a productivity compensation and stability that made it being named best company to work for in America by Fortune Magazine (Flouris and Walker 2005) The company focused on a good level of comfort and a remarkable friendly atmosphere, high security, low fares and efficient operation, while competitors were stuck into operational high costs derived from service components that did not offer added value (i.e. seat reservation, class differences, in-flight meals, paper tickets), keeping an impersonal, complex and expensive relation to clients.

Dimensions of service expectations had been studied by Van Pham (Pham 2006) and found that over 5 areas, reliability (the airline's ability to perform the promised dependably and accurately), assurance (knowledge and courtesy of airline's employees and their ability to convey trust and confidence), tangibles (appearance of the airlines' ground facilities, aircraft, personnel and communication materials), empathy (caring individualized attention the airline provides its customers) and responsiveness (willingness to help customers and provide prompt service), US passengers prefer reliability and responsiveness (Pham 2006). It is no coincidence that being well qualified in all these dimensions, SWA grew remarkable in the eyes of US air passengers.

### **Did SWA phenomena had something to do with managerial developments of the time like SMED or the like?**

Such techniques were not applicable strictly to services, as they were born into the industrial manufacturing environment, but conceptually their spirit is present into this story. SMED is the acronym for “Single Minute Exchange of Die”, a philosophy that states that any change in machinery or process initialization should not last more than 10 minutes. Shigeo Shingo and Taiichi Ohno were the producers of this concept which is used into the Kaizen philosophy, the fight against waste. Southwest applied this industrial concept to its product to reduce unproductive time. The initial SWA fleet was composed by 4 aircrafts; in 1972 they have to sell one due to economical problems and kept operating “as if” still they remain with four. In this moment the “ten minute turn” was born: unload the airplane after its arrival at the gate and prepare it for departure again in less than 15 minutes.

The basics of this routine includes practices dictated by the airports' authorities and transport regulations so the operation answers to several critical elements of the business:



Source. By the author.

- ◀ Basic demands from the air transport authorities like security, comfort, health and migration control.
- ◀ Reliability and cost efficiency of the operation.
- ◀ Service quality standards.

The most significant elements into turning time included passenger enplaning and deplaning, cargo loading and unloading, airplane fueling, cabin cleaning, and galley servicing as seen in the bar graph (Boeing 2007). Here again it is noticeable that reducing this operation time was critical and it was necessary to attack several fronts under the SMED philosophy:

- Standardization of equipments, reducing diversity of tools, procedures and spares; this enhances the learning curve of the team in charge.
- Mastering tools and operations through strong training, and standardization of procedures.
- Team leadership and employee compromise. SWA was successful in building a legendary and particular organizational culture.

During 1972 crisis the company preferred to sell the 4th aircraft of the fleet than lay out employees; the same happened during the crisis period occurred after the 9/11 attack. This management style had produced high commitment from the employees. Incentive structure was efficient; i.e. pilots were paid per trip and number of hours in the air, so their interest is to minimize time in land. Flight attendants were called to collaborate in

maintaining the aircraft tidy between flights, saving time for cleaning service (Editorial 2005). How corporate culture helped Southwest Airlines became a bestseller, based on “An evaluation of the corporate culture of Southwest Airlines: measuring business excellence” by Gene Smith (2004). Strategic Direction. S. Direction. 21: 16-18. Delay control has been set not on individual basis but on team basis, to avoid conflict and increase learning. In the end the turnaround process is a team process. There was no punitive atmosphere regarding performance and the relation to the headquarters was direct; supervisory span is small (1 to 9) stated as an internal client relation. Workers selection pursued teamwork attitude (Gittel 2000). SWA carried the spirit of SMED to its highest level.

### How to ensure that standardization was compatible with the development of clients' requirements?

In fact, standardization was constructed on the base of what the clients perceive as quality, not the stereotypes that companies built around it. During the decades of 1970 and 1980, SWA refused to accept the traditional compromises that airlines' traditional clients and competitors had taken for granted, developing new ways and practices so added value trapped into this old fashioned ideas can be unlocked, to serve the new clients of air transport (Sirkin and Stalk(Jr) 1995).

Sirking affirms that SWA at that moment, just like Walmart or Bank One, was a case of focus on what to do (routines, attitude, knowledge learning) and not what to have (assets, capital). These capabilities were the product of changes along the different functional areas of the company:

- Operational, rupture with the hub & spoke route system in favor of point-to-point, standardize aircrafts, turnaround enhanced process.
- Financial, low debt, gas options; “The debt-equity was by far the lowest in the industry, which enabled Southwest to manage the difficult period after September 11 without laying off any staff” (Editorial 2005).
- Service, self-service paperless seat purchase, enhanced Internet-ATM facilities (it was the first airline to enable customer making reservations and purchase tickets via web using, an Object Data Base Management System ODBMS called “Object store”; the airline sells 50% of the tickets directly avoiding agency over costs. This has been a critical tool to avoid empty seats and react fast to shortcuts in demand. Abolition of seat class, no frills but nuts and soda (Editorial 1997).
- Commercial, branding with strong nontraditional campaigns.
- Human Resources, high compromise, productivity and training, protection employees in times of crisis, familiar and positive environment, permanent training.
- The following table can summarize the basics of SWA actions to build a differential competitive position.

**Table 1. Alternative System for Achieving Coordination and Control, comparison.**

American Airlines	Southwest Airlines	
Control Mechanisms	Functional Accountability	Cross-functional Accountability
	Large supervisory span of control	Small supervisory span of control
Human Resource		
Practices	Selection for functional skills	Selection for cross-functional teamwork
	Minimal cross-functional conflict resolution	Proactive cross-functional conflict resolution

Source. Gittell (2000).

On the operational and service area, the importance of standardization was critical as it is the base of the competitive difference of the company. It breaks the assumption that having a wide variation of services directly produces increase in perceived value, while the real effect is increased cost of operation due to stock loss of profit, increase of hidden dead times and indirect costs due to complexity of logistics. All of them with negative impact to the client in the form of delays or mistakes.

### Could this specialization on one single aircraft operation produce collateral damage to SWA competitiveness?

The basic risk of this strategy was to built high dependence on one single supplier: Boeing. The airline has leased 737-200 and owned 737-300, 737-500 and 737-700 (Boeing 2007). This marriage with a single line of aircrafts and supplier lead to some technical and commercial risks:

- Faulty design, manufacturing fails or unreliable materials. Three examples for the Boeing 737: The

USA National Transportation Safety Board found in 1995 that Flight Data Recorder from B737 did “not provide needed information about airplane motion” producing increased risk in landing (Hall, 1995); an evaluation on aged 737 by Sandia National Laboratories in 2006 questioned the use of sealant replacing resin based bond adhesive, as it makes impossible to visually determining the integrity

of the rods in some areas of the hull (DiMambro, Werner et al. 2006) B737 problems with the fuel wiring and rudder produced an investigation at the Select Committee on Environment, Transport and Regional Affairs from the UK (Parliament 007).

- Dominant position of the supplier (Porter 1985) as a technical – knowledge – spares – supplies monopoly was produced.

**Table 2. Southwest Airlines fleet (Boeing 2007)**

Aircraft	Total	Passengers (Economy)	Routes	Notes
Boeing 737-300	194	137	Short-medium haul	Launch customer
Boeing 737-500	25	122	Short haul	Launch customer
Boeing 737-700	262 (111 orders)	137	Short-long haul	Launch customer All but 2 are fitted with blended winglets. The winglet saves wasted energy in the wing tip vortex producing less fuel consumption.

Source. By the author.

- Changes on basic requirements about transport regulations, mainly regarding noise reduction and alternative fuel that were not fulfilled by the supplier. Although seems that Low Fare Airlines in Europe had been greeted regarding to their impact in fuel saving and efficient use of resources, for the European Low Fares Airline Association it is clear that one of the future challenges will be the mandatory use of alternative fuels (Association, 2007)

But placing in the balance these perils, SWA thought that risks could be balanced by benefits:

- ◀ B737 is a widely known and used craft; “in the United States, on the commercial side by 1987, the 737 was the most-ordered plane in commercial history”. (Boeing 2007). This talks about the reliability and flexibility of the machine.
- ◀ There is no trace of confrontation between SWA and Boeing and seem they had a close relation, being this airline one of the biggest purchasers of

737 in the world; this surely helped to balance the supplier’s power.

- ◀ Regarding the possibility of discontinuing the 737 family, Boeing produced more that 5 upgraded models giving long life to the line but keeping the pace of air authorities’ requirements as well as technology enhancements.

Other area of specialization that could represent trouble to SWA in times of globalization was the focus on short flights. What would happen when the airline is forced to expand into overseas trips or continental routes? It was expected the at least 10% of the long distance traditional carriers routes (mainly American Airlines, Alaska and Continental) were to be taken by low fare airlines, mainly SWA; “Southwest began entering into a number of relatively thin, long-haul markets that it had previously avoided” (Boguslaski, Ito et al. 2004) page 349. But SWA knew well the field in which they were strong and defended it but, although the pressure of world-wide air transporters was strong.

## How did finally, low cost flight created in the USA by companies like SWA, could combine productivity, quality and flexibility?

The success of SWA calls our attention to the fact that productivity, flexibility and quality are bonded elements that depend on how conceptual approaches to a business recognizes the added value triggers into it, and translate such knowledge into viable operational facts. The relation between (1) conceptual (mission & vision), (2) customer perception (marketing & service) and (3) routines (operations) requires the perceptual ability to identify turning points in the environment, so new routines are adaptative to new rules of market competition. If such innovations are accepted, the firm evolves to master the market. Productivity and competitiveness are a matter of facts: time, space, routines, marketing and service, under a constant feedback processes. Mission & vision are concepts that may configure the organization on images about what the activity must be. SWA evolved on these three axes to generate productivity, quality and flexibility.

- **Productivity.** Shatter the hub-and-spoke concept, master turnaround process, eliminate catering and seat classes, transform ticket purchase and boarding, standardize equipments, avoid congested or expensive airports, Internet massive application (operational); low debt, gas options (financial); choosing only very dense, short and medium haul markets (marketing). All these measures had given to SWA a strong potential to produce profit although is an aggressive fare company, and let them concentrate in quality. SWA unit costs per seat remained less than all its competitors i.e. Southwest 7.82, American 9.49, Continental 9.76, United 10.18, Northwest 10.23, Delta 10.38, Alaska 10.41, U.S. Airways 11.68 (Boguslaski, Ito et al. 2004).
- **Quality:** we can divide this word into two questions: (1) what would be considered by the client as added value? Giving more would lead to waste. Here the

elimination of traditional non valued services let to a “lean production” which could offer a strong attractor: low price. Operational savings let the company create discounts that did not punch their ability to be in time, have comfortable seats, offer peanuts and soft drinks and the most important, have a remarkable attention to the client and an unbeaten security record. (2) What should the organization do to obtain such expected value? Standardization in equipment and process, innovative approximation to operations, training and compromised human resources.

- **Flexibility.** Quality and productivity mean doing the right thing at the right moment, in a particular situation in place and time, with a restricted amount of assets. The age of Pan Am and the mega carriers passed through, and traditional air lines did not noticed how changes affected their business. Low fare airlines had been flexible enough to see a different concept of air transportation that is more adapted to current times. Focusing on transportation let them be flexible in time schedules, routes and prices; a lower variable cost structure let such organizations adapt to new challenges as the basics (productivity) are solved by now. They have been flexible to adapt to the changes and restriction making of them profitable lessons; this means adopting changes in operations, finances, marketing and human recourses. During the 9/11 crisis, the multiple organizational gymnastics that SWA made to adapt let them not touch neither training expense nor human resources contracts. This ability made the airline pass over the situation with profit and increasing market (Taylor 2003)

Productivity, quality and flexibility built a system of closey related variables that turn concepts into routines perceived by customers as valuable. Low fare airlines had applied a model that adopt a viable strategic position (low cost operational model), leverage of organizational capabilities (job quality and training) and reinventing the value equation (mission & vision). That equilibrium

explains the success of SWA operational area as it has sense: pricing structure, fleet composition, route structure, choice of airports, distribution and productivity. "According to a Unisys Global Transportation report,

"the only prerequisite to economic success is to achieve a low cost base from which to built a desired service offering" Unisys, 2003, p. 9. (Flouris and Walker 2005).

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