Cleared for take-off

Strategies in Lean IT and how they're relevant to the travel business

A White Paper by innovation forecaster
James Woudhuysen

Autumn 2014

Foreword

Taking a lean approach to shaping the future of travel

It may be a cliché and date back to Heraclitus (around 535–475 BC), but the travel business knows better than most that *the only thing that is constant is change*.

In this most dynamic of sectors, familiar challenges always persist: of increased demand for travel services, rising customer expectations, new markets, shifting business models and cycles of innovation that just get quicker each year.

This means we continually need to think how we can reduce inefficiency, and, more importantly, how we can enhance our effectiveness. And this is where lean thinking comes in. But it is important to recognise that lean thinking, and this paper specifically, do not necessarily speak for the whole organization – it is instead a perspective from Global Operations within Amadeus.

Lean is about centering all thoughts and actions on the customer. That has meant a fundamental shift in our mindset. It requires us to build a culture that understands and responds to our customers' increasingly complex and changing needs. By adopting a lean approach, we are able to detect and react to change quickly and well.

Within Global Operations, we have recognised that lean thinking involves a change in management style. Managers no longer direct people, as they did in the classical model for production – command and control. Instead, the role of each manager is to nurture proactivity and reactivity, and use the organisation's brainpower to achieve scale, quickly. This way of working excites and inspires our Global Operations team.

Yet while we are fervent advocates of lean thinking, we do not claim to have all the answers. That's why we have commissioned this paper: to shed light on what we believe is an important approach to managing global operations – the interconnected systems, processes and insights that underpin the global travel sector and enable the latest innovations to be deployed across all channels. I believe that this paper contains valuable insights for us, our partners and our customers, as all of us draw up plans for the future.

I hope that, as a concept, lean thinking will inspire you, the reader. I also hope that the specific analysis contained in this paper will help you realise new value for your organisation.

It is only by working together and sharing ideas that we will be able to shape the future of travel.

Wolfgang Krips
Executive Vice President, Global Operations, and General Manager, Amadeus Data Processing
Amadeus IT Group
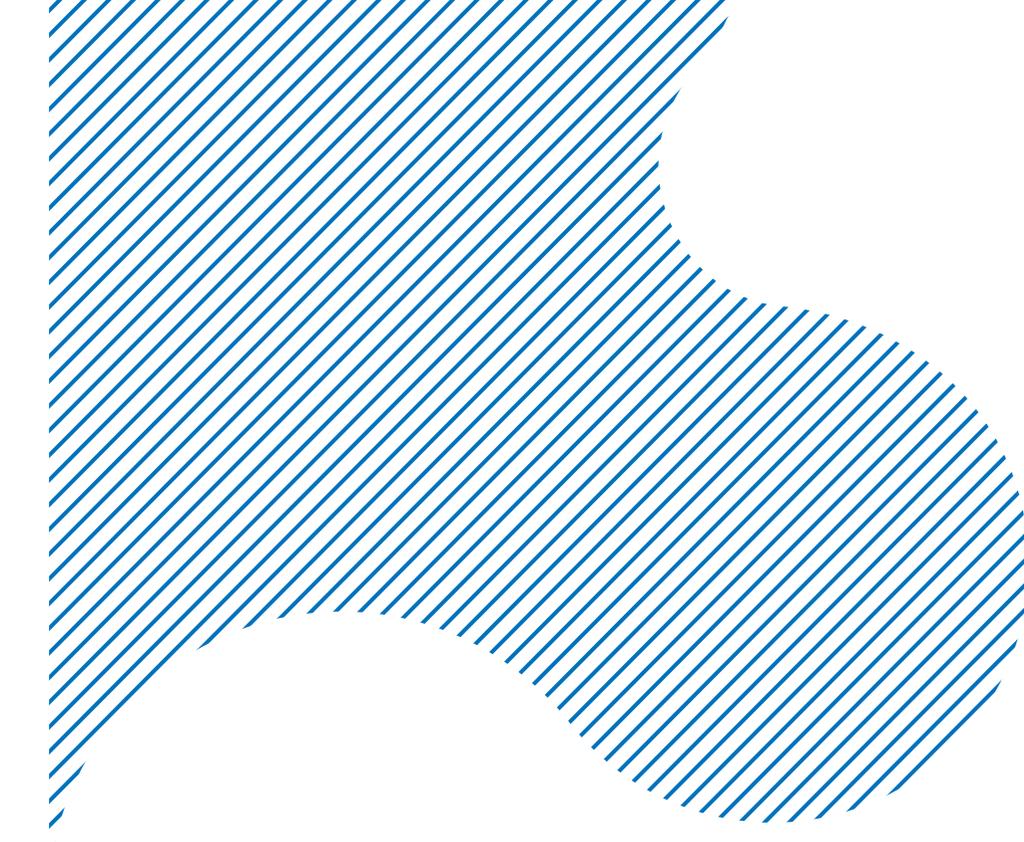
About the author

James Woudhuysen is a physics graduate, and was for many years Professor of Forecasting and Innovation at De Montfort University, UK. He helped install Britain's first computer-controlled car park when with PA Technology and Science Centre, Cambridge, in 1968. He wrote about computer magazines for the *Economist* in 1978, and, in 1979, when editing *Design magazine*, wrote a cover story on microelectronics.

James devised an instruction manual for a word processor in 1983. He consulted on and advocated e-commerce in 1988, was one of the team that developed the British telephone bank brand First Direct, and proposed Internet TV in 1993. He was manager, worldwide market intelligence, Philips Consumer Electronics, the Netherlands, 1995-7, and published *Cult IT*, a critique of the dot.com boom, in 1999. In 2004, in his book *Why is construction so backward?*, James looked at how lean thinking in the car industry could be applied to the building trade.

His clients have included Anglian Water, Fujitsu, Rolls Royce, Sage and Tata. James is also the author of *Energise! A future for energy innovation* (Beautiful Books, 2009), and *Big Potatoes: the London manifesto for innovation* (Shanghai Jiao Tong University Press, 2012). He writes for http://ChinaOutlook and for www.IDGConnect.com

Note: the views expressed here are entirely those of the author. However, he would like to thank Stephen Parry for introducing him to the world of Lean IT.

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Executive summary

Passengers and travel companies expect travel IT to improve. They expect system stability online; they expect user interfaces to get better at anticipating the demand for particular kinds of travel, sensing it, and responding quickly with solutions. In their different ways, they expect new apps. And they want all this cheap.

In today's travel IT, both system complexity and costs are hard to control. By contrast, Lean IT means cutting out 'fat' and all wasteful activities – that is, all those activities that do not create value for the customer. It means doing things right (efficiency) and, even more, doing the right things by the customer and every element in the supply chain (effectiveness).

Lean operations orientate, sense and respond to the customer, and what he or she really wants to do. Everything is organised as a low-waste, on-demand flow of value to the customer. So lean applies really well to the travel business. Now that passengers meet with gazillions of journey options, simplifying IT processes is an imperative, so a strong focus on effectiveness is required to dramatically simplify IT processes. The trick is to find new, more coherent ways of developing and deploying IT innovations that can compress both time and trickiness – for both the passenger and the travel company.

Lean IT will allow travel firms to offer more varied, but more intelligible functionality to customers, in ways that better satisfy their purposes. It lowers the costs of IT purchase and ownership, while more rapidly bringing innovations to market. It means basing drives for effectiveness on objective data; understanding the root conditions of problems; giving decision-making power to the workers who actually execute IT processes, and proactively interpreting customer data so as to improve customer value. Finally, targets and management objectives in lean reflect the customer's purpose, not the organization's prejudices.

In travel, it is vital to optimise the online user experience (UX), extend an ever-expanding variety of offer to customers, yet also minimise costly variations in offer. Moreover a whole range of travel suppliers typically have to collaborate, if only temporarily, around the customer UX. Here the front-line staff members of networked suppliers need, together, to capture and interpret data from customers, in the cause of assembling new, often surprising sources of customer value, and bringing to market new, often unexpected services. Front-line staff members also need to work together to take a helicopter view of every dimension of the whole customer journey, and then take a microscope to particular 'disconnects' in the customer experience. That way, a wide variety of modular IT solutions can be assembled in a lean and standardised manner. This is a good example of the above-mentioned drive for effectiveness, based on objective data.

In Global Operations, Amadeus uses a number of different strategies in Lean IT. Clients have benefited from these strategies. However, the world economy now faces both continued growth in the demand for travel, and a struggle, in travel services and IT, to keep up with that demand. Transport security and the security of transport data have also become more complicated.

Lean can bring wins not just in the online world, but also in the real world of moving passengers around. Here is a short checklist of quick wins that can assist travel companies in going over to lean working:

1. Draw up complete maps of typical customer journeys, from home to destination and back again
2. Understand how your service creates value to the customer on his journey and what are the relevant dimensions/ metrics related to that
3. Map your key processes along those metrics and identify snags/problems

With lean, travel companies can look forward to rapid rates of new service and app development. They will be able to make more money from cleverly spotted market niches. And, better than they are at present, they will be adept at personalising their offers to the needs of customers as individuals.
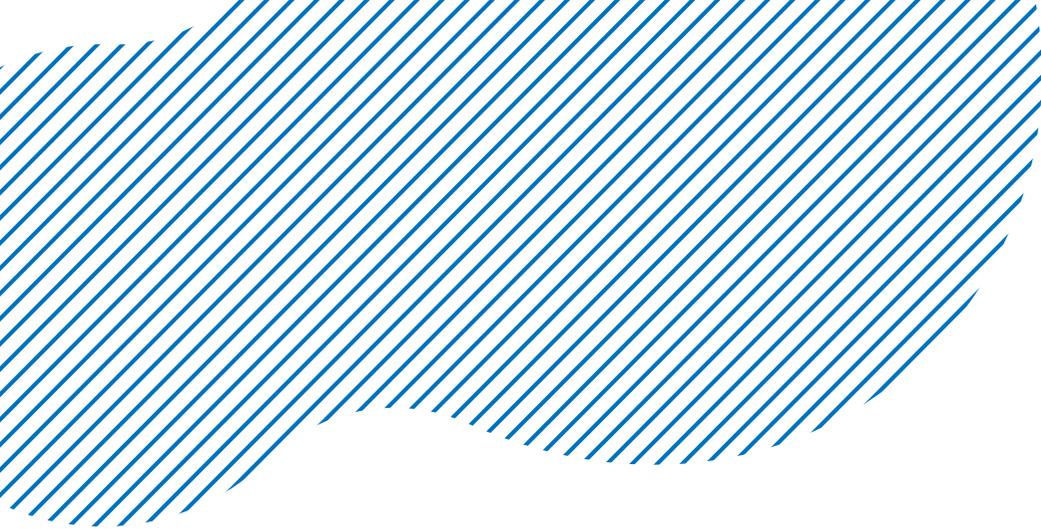
Travel needs Lean IT – for more system stability and agility, and for lower cost

When leisure and business travellers search for travel options, they meet more variety than ever before. So they search out what they want in very different and often very new ways. In the old days, the 'look to book' ratio for customers was about 10:1. Now that ratio can run as high as 200. In a world where more than a few economies exhibit deflationary trends, customers now scour the whole earth online, in pursuit of new, cheaper modes of travel.

When customers book a seat, they know that an offer – particularly one around a popular event – can vanish in seconds. They won't scroll down: they are 'disloyal', for many flip to another provider in seconds. Customers also expect every travel option to be integrated on to a hand-held device.

What passengers demand of travel IT systems is still growing. Yet not just passengers, but also all kinds of travel companies broadly expect travel IT to improve.

First: travel buyers and providers expect system *stability online*. Nobody is happy with a dialogue box saying 'Sorry, our systems have encountered a problem', or 'Sorry, our systems are closed for routine maintenance'. It doesn't matter how many people come on the system at any moment in time, and it doesn't matter what geographical distances the telecommunications and computer processing has to operate over: systems are not supposed to 'go down' any more.

Second: *passengers now expect user interfaces, over time, to get cleverer in anticipating their demands for particular kinds of travel, sensing them, and responding quickly with solutions.* Meanwhile travel companies want to deliver on all this, and still have more reach and more sinuousness from IT. Indeed, travel companies now demand a continuous stream of new applications designed to attract and retain customers.

Last, people expect travel IT to work at a lower cost than before. Inflated booking charges, hotel charges for Wifi, exorbitant bills for getting server farms fully operational – these remain Things That Still Need To Be Fixed.

Altogether, neither the system complexity nor the cost of travel IT is easy to control. That's why the travel sector needs a new, lean approach to its use of IT. Lean IT means cutting out *'fat' and all wasteful activities*. It means doing things right, otherwise known as cost-conscious *efficiency*. But Lean IT also means something else besides: *doing the right things by the customer and every element in the supply chain, otherwise known as effectiveness.*

It is an irony that, several years after aircraft manufacturers moved to build seats capable of accommodating passengers deemed obese, [1] **the travel sector as a whole now risks running IT systems that are too large and cumbersome. That is why Amadeus has published this White Paper – to draw attention to another, sleeker, cheaper, yet highly muscular way of organising IT.**

The travel industry urgently needs to adopt lean principles if it is to keep up with the volume and sophistication of tomorrow's passengers.

[1] See for example Mary Kirby, 'Obese passengers create challenge for cabin suppliers', *Flightglobal*, 5 April 2011, on http://bit.ly/1m7tE4U
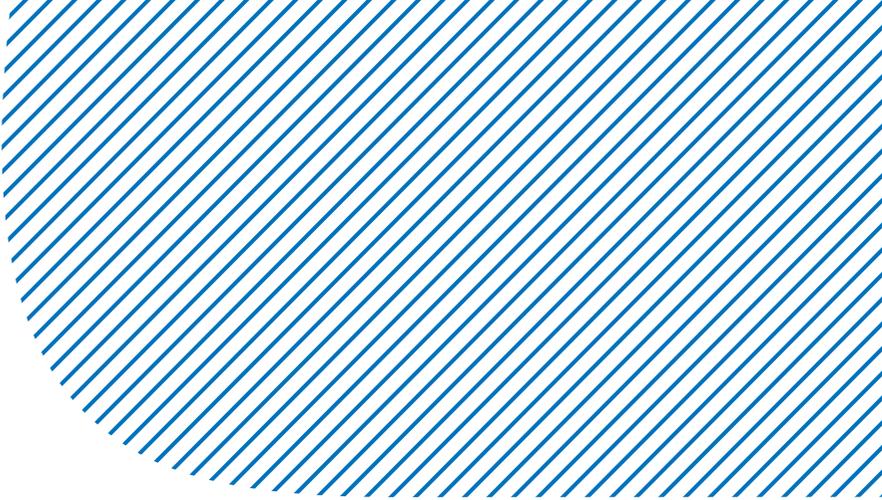
Timeliness and simplicity: the customer case for Lean IT

In lean operations, everything revolves around orientating to, sensing and responding to the customer, and what he or she really wants to do. Everything is organised as a low-waste, on-demand flow of value to the customer. So the travel business is particularly well suited to the strategies of Lean IT. Why? Well, the travel sector has always valued *timeliness in the delivery of services*. Also, right now, the number of options available to passengers is growing so fast, only Lean IT holds out the real potential of *making IT processes radically less complicated*.

Timeliness in online booking is essential. In business, 'the secretary' is almost an extinct species, as organisations look to employees to book their own travel. The growing ranks of the self-employed also have to book trips themselves. These booking tasks, business people have to do on top of their real jobs. Like consumers, they have too little time, and are too impatient with its waste. In travel IT, then, both business and leisure travellers expect *online responses to be immediate*.

For all the pressures on their time, however, *customers also find choices ever more abundant*. There are in some *ways too many options*. Customers for travel now

1. Book more multi-city, multi-country and multi-modal journeys [2]
2. Decide between multiple carriers, price opportunities, seat classes and journey flexibilities
3. Book around different departure and arrival times, different seats, hotels, car rentals and travel insurance products
4. Select special meals, and record the ages of different family members who are travelling
5. Enter passport, visa and payment details
6. Capture journey information in their electronic diaries
7. Trade in or look to earn loyalty card benefits
8. Have five or more ways of carrying tickets and boarding passes.

Assemble all these options, and it's clear that a typical passenger meets with at least 20 different forks in the road. In mathematical terms, all these forks amount to perhaps 20 combinations – 20x19x18x17 and so on, or '20 factorial' combinations. That's 2,432,902,000,000,000,000 kinds of journey, not including the purchase of different kinds of ancillary services (for example, airport transfers).

Every day, new travel options open up to people. As a result, the tyranny of choice emerges. There are more travel options, but more chances to make a mistake. Worse, mistakes are presently hard to undo, and can prove costly. Indeed, how many times does one have to start a booking all over again?

The speeds now expected in Travel IT, and the myriad of journey options now available, together demand an approach to IT that insists on simplicity in the face of complexity that easily runs out of control. The issue is not how much processing power can be mustered. It is, rather, to find new, more coherent ways of developing and deploying IT innovations that can compress both time and trickiness – for both the passenger and the travel company.

Below, we describe how travel firms could benefit from adopting lean practices in IT. Then we review the origins of lean management practice in manufacturing, and the spread of lean principles to the world of services. After that, we go into the hard-won experience Amadeus has had in Lean IT. Finally, we review what travel firms now need to do to improve efficiencies and effectiveness.

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[2] James Woudhuysen, Back on track: supporting the development of a 21st century rail network, Amadeus, Spring 2012, on http://bit.ly/1oOxQC3
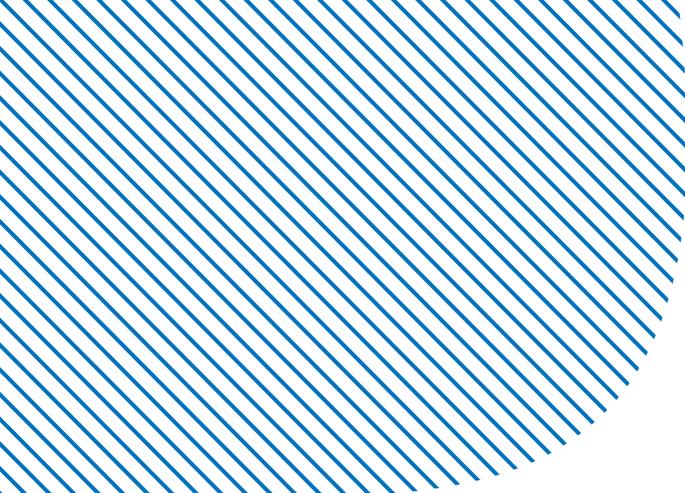
Clever, low-cost innovations, brought to market fast: how travel firms can benefit from Lean IT

At bottom, Lean IT means that the travel sector can *offer faster functionality to customers, in ways that better satisfy their purposes*[3]. That can mean the speedy addition of functions such as mobile boarding passes, 'senior citizen' room rates in hotels, or quiet coaches in rail travel.

At the same time as achieving this variety, travel firms adopting lean can *cut out waste in IT, and lower the costs of IT purchase and ownership.*

Lean can do more, too. Today, airlines seek *stability of operations*, while new entrants frequently want a *fast penetration of the market.* With airlines, the simplification embodied in Lean IT promise *high system stability and better capacity management.* There is greater service continuity, and there are fewer outages. With new players in the travel market, by contrast, lean techniques make possible the installation and operation of hundreds of servers, in line with urgent client demands.

How then does Lean IT help a travel company **rapidly bring innovations to market?** How can a travel company quickly introduce new apps, or mobilise hardware and software, or adopt a more localised approach to demand management in hardware and software? The answer lies in how the travel company manages its IT. To follow the principles of Lean IT, a travel company must

1. Make effective improvements, basing all decisions on objective data
2. Spend time on truly understanding the root conditions of problems
3. Give power to the workers who actually execute IT processes, so that they can optimise them without having to consult the hierarchy
4. Proactively interpret customer data so as to improve customer value
5. Make targets and management objectives reflect the customer's purpose, not the organisation's prejudices.

Fully applied, these principles lead to a style of governance and management of IT very different from those traditionally found in the mainframe-based IT shops that typified the Cold War era.

To understand lean strategies in IT today, however, travel professionals need to know about the origins of lean management practice in manufacturing, and the spread of lean principles to the world of services. To these issues we shortly turn. First, though, we give a glimpse of how travel might change over the next 10 years as the strategies of lean are applied.

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[3] Customer purpose forms much of narrative in Susan Barlow, Stephen Parry and Mike Faulkner, *Sense and respond: the journey to customer purpose*, Palgrave Macmillan, 2005. This White Paper owes a debt to that book.

HOW THE LEAN APPROACH BEATS THE CLASSICAL ONE: THE EXAMPLE OF AIRPORTS

In travel as elsewhere, measures of performance should be calibrated in terms of the difference made to the customer. The good news is that, since 2011, airport operators have for their part begun to focus more closely than in the past on that passenger difference. Here is a recent consensus among airport operators about the Key Performance Indicators (KPIs) that are worth striving for:[4]

Typical airport operator KPIs, 2011	Typical airport operator targets, 2011
1. Wait times at check-in, security and at the gate	15 minutes, maximum
2. On-time performance	80-85 per cent
3. Average turnaround time	Five per cent less
4. Baggage delivery time	It will vary
5. Misconnected bags	One in a thousand
6. Dwell time	It will vary
7. Retail revenue/square metre	}
8. Footfall traffic/square metre	} Between three and six per cent more
9. Average retail transaction size	}

The KPIs popular among airport operators at least register the wait times at different points in the chain of events that leads to boarding a plane. They also aim for a reasonable percentage of on-time departures. However, there is more work to do: KPIs 3 through to 9 have little to do with direct passenger needs. Below, we present an alternative, more customer-orientated list of options, to give a flavour of what the lean approach might entail:

KPIs, 2015	Possible targets, 2015-25
1. Wait at check-in, security, gate, stand and on aisle	Eight minutes each, maximum
2. Punctuality, by taxiing time and moment of take-off	90 per cent
3. Punctuality, by taxiing time and exit from the aircraft	90 per cent
4. Wait at Passports, time to baggage hall, wait for reclaim	Eight minutes, maximum
5. Return of a misconnected bag	To the hotel room in six hours
6. Time to get through Customs	Eight minutes, maximum
7. Time to get to train/taxi/bus	Eight minutes each, maximum
8. Level of disorientation, crowding and noise	etc

Even here the KPIs and targets chosen are not as orientated to customer purpose as they might be. For example, a wait or a walk in an airport is not just a matter of the time taken, but also the exertion involved in dragging bags around. How can airport operators try to improve that aspect of the passenger experience, especially for older people? And how can, say, wearable IT, complete with apps that follow each passenger's posture, play a part in lightening that experience, too?

These are issues, around lean, that Amadeus takes seriously. And there is one guiding rule: *the metrics that govern Lean IT in travel should not be based on the grey, variables of computer science, but on the real world of getting about.*

Car manufacturing and IT-based services: the origins of lean

The logic of Lean IT differs from that of lean manufacturing. Yet the revolution that took place in vehicle assembly some 30 years ago is still relevant for lean strategies in IT today.

In the 1980s, the rise of the Japanese car industry, its exports, and its direct investments in North America and Europe, transformed manufacturing. Toyota led the way. Influenced, post 1945, by the quality circles pioneered by W Edwards Deming, and the techniques of statistical quality control introduced by John Juran, the company had for years refined its regime of product and process improvement.

In the 1980s Toyota rejected Henry Ford's famously contemptuous attitude to customer choice, [5] and parted company also from the divisionalisation of the corporation famously introduced by Alfred Sloan at GM. [6] Toyota also dispensed with batch production, as well as the waiting times and idle capacity that went with that. Instead, it successfully geared its production to the ups and downs of day-to-day market demand.

Toyota engaged in a continuous drive to improve processes. In assembling components, it eliminated inefficiency, waste, bottlenecks, and as much inventory as possible. It rid finished products of defects. Last, Toyota and other Japanese car firms attacked corporate silos and the atomised competences that went with them. They formed multidisciplinary teams of engineers and production workers that worked across silos and fused together varied skills – not only on the assembly line, but also in new product development.

The new streamlined arrangements of the Japanese carmakers gave rise to the phrase 'lean'. [7] The idea was to dramatically cut costs, shorten the time it took to bring new products to market, and raise profits. The effect in practice was to cause consternation among Western carmakers – until they adopted lean techniques themselves.

As the 1980s progressed, so a series of industries outside the automotive sector tried to go lean. Factories moved away from the top-down, 'like it or lump it' offering of different designs to the customer, or what could be termed a 'make and sell' model. Instead, they focused on creating, in every sub-process, artefacts that customers would really value. Later, in 1996, this focus on what customers wanted was codified in a bestselling book *Lean thinking*. That book popularised the terms 'lean' and 'customer pull'. Notably, too, it suggested how the travel sector could cut delays and queues for passengers. [8]

In developed economies, the rise of services and the spread of IT soon led to two extensions of the lean doctrine. First, it was noted that teams in services have direct contact with customers – unlike teams based in factories. Second, it became clear that while a car is specified and built with a fixed bill of materials, life is much more fluid in services and IT. The service provided, along with the IT behind it, can take on many guises.

In travel services, then, leanness begins with front-line, customer-facing human beings – their brains and their morale. What counts is the ability of staff always to add to customer value – by (1) accurately sensing what the customer's true purpose is, and (2) anticipating and responding to that purpose in a rapid and supple manner.

Lean IT, a human creation, is no technical matter. It is about inverting organisational hierarchies – recreating middle and senior management as a support for the cross-functional operational teams that are at the sharp end of customer pressure. It is front-line employees who make the critical choices that determine whether the customer experience is unimpeded or exasperating. Lean services and Lean IT mean what Wolfgang Krips, Amadeus executive vice president of Global Operations, describes as 'putting the power to make decisions where the work is, and where it can be improved'.

[5] Henry Ford's statement 'You can have any colour you like, as long as it's black', is widely known. Less widely known is the fact that Ford adopted black paint for his Model T car because it took less time to dry than other colours – important, in rapid, assembly-line production. Also forgotten is that Ford added to his assembly-line T a network of car dealers whom he helped offer low-interest credit to their customers. See David Hounshell, *From the American system to mass production, 1800-1832,* Harvard, The Belknap Press, 1984.

[6] Alfred Sloan, *My years with General Motors*, Penguin, 1963.

[7] A useful historical account of leanness is contained in the opening section of John Bicheno and Matthias Holweg, *The lean toolbox 4th Edition: the essential guide to lean transformation,* fourth edition, 2008, pp x-xiii, 1-17, on www.amazon.co.uk/dp/0954124456/ref=rdr_ext_tmb

[8] James Womack and Daniel Roos, *Lean thinking: banish waste and create wealth in your corporation,* Simon & Schuster, 1996, on http://www.amazon.co.uk/dp/0743231643/ref=rdr_ext_tmb. Womack and Jones's 'five principles' of lean are usefully recorded on http://www.cardiff.ac.uk/lean/about/index.html
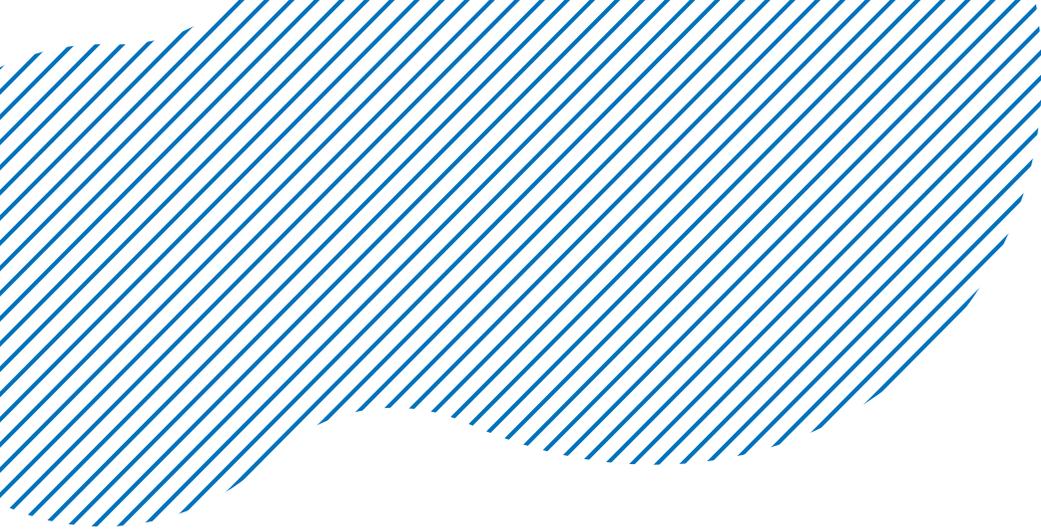
The rise of Lean IT: the examples of service management and incident management

Lean IT is a new field. Search for it in Google Scholar: just 5000 entries. Use Google nGram, and you get zero.

Take, though, IT Service Management (ITSM), which is but one of the many aspects of IT practice in which the strategies of lean have made progress. Interest in ITSM began to rise after the dot.com boom and 11 September 2001. The level of interest then accelerated in and after 2004: [9]

The ascent of IT Service Management: how much the phrase has appeared in Google books, 1990-2008
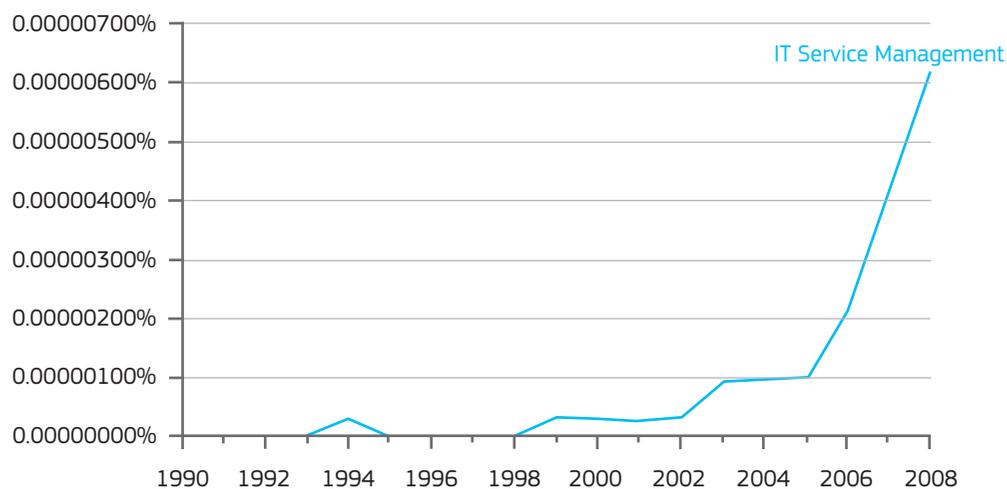
Source: Google books Ngram Viewer

Lean IT involves analysis of 'root conditions' rather than that of a 'root cause', because the lean approach removes the conditions that allow a failure to occur. It is different from simply applying a point fix, which may only remove one element of an error, rather than everything that led to it.

The short ascent of IT service management, and its evolution toward Lean IT, should not disguise an important truth. *Lean means strategy, because it is a long-term campaign, not a quick-fix tactic*. It is about slow, mindful planning, as a means of ending jams and the panics that follow jams. Lean is not just about execution, nor is it just about correcting errors; it is about *analysing the root conditions of errors*, anticipating them, and cutting the mean time needed to recover from them.

Among other tasks, ITSM means managing incidents encountered by front-line operations. The old approach to incident management was to try to optimise the cost per incident. The new, lean strategy here is very different.

If the customer reports an incident, he or she has already lost value. So with lean, *all incident management processes need to be activities to restore customer value*. Such activities don't create new customer value, and so are, strictly speaking, 'waste'. Yet if the focus is kept not just on customer redress around the individual incident, but also on *avoiding repetitions of the incident*, the durable value added to customers in general will far exceed that made up to the single disappointed customer in a single episode.

That is why, with lean, one spends time and a fair amount of money rooting out the causes of each and every incident – provided only that an even greater amount of money becomes available through reductions in the volume of incidents.

Stephane Giuliani, director of IT Service Management and data center operations at Amadeus on **LEAN AS THINKING AHEAD**

'Before starting an IT project, we now check first, over a period of up to 3.7 days, that resources are available for a project. Without a full specification of the project – how much storage is required, for example – delays can occur.'

'We now try to anticipate issues before they happen. We use lots of sources of data to anticipate incidents. Predictive maintenance, maintenance without interruptions in future – we find that it is newly skilled people in these areas who can automate and standardise changes to great effect.'

[9] http://bit.ly/1BFL0JF

More variety, less variation, and fewer disconnects in the customer's experience

In a 1985 paper on the drivers behind innovation, Peter Drucker famously highlighted the need to overcome incongruities 'within the logic or rhythm of a process', and between an industry's 'assumptions and its realities' [10] .So the differing logics of manufacturing and of services and IT are important. Let's consider them for a moment.

Unlike manufacturing, the services and IT sectors offer great scope for improvisation. There is always another way of doing things available. Yet precisely because of this scope for improvising, variations in service process and service 'product' tend to multiply quickly, and make life not just fluid, but complex.

We have said that leanness focuses on giving customers value. In travel, one key facet of that is *optimising the online user experience (UX)* so that it makes easy the pursuit of customer purpose. However, another facet is the ability to *extend an ever-expanding variety of offers* to customers, in a way that still allows you to automate your way round and so *minimise costly variations in offer.* In this respect, lean offers not economies of scale, but economies of scope.

With travel in particular, there is a further development to remember. To make a harmonious journey, door-to-door, with companions, through a series of bureaucratic procedures, to reach a destination and then find a way home: these things ensure that *a whole range of travel services suppliers must collaborate, if only temporarily, around the customer UX.* Moreover, today's IT and, in potential at least, today's cloud computing can facilitate that whole process. IT and the cloud can assist *travel company collaboration and, in turn, bring UX integration.*

Stephen Parry, author of *Sense and respond: the journey to customer purpose*, a visiting fellow of the Lean Enterprise Academy and senior partner at Lloyd Parry Consulting on **LEAN INSIDE A FIRM, AND BETWEEN FIRMS**

'Lean IT provides a new way of looking at the way work operates cross-functionally inside a firm. It helps firms move away from the disparate, "vertical" measurements made in separated silos toward a single common set of "horizontal" measurements that unify all the departments involved in the value chain.

'Measurements such as "total elapsed time" and "capability to deliver value" are good examples. Sometimes, too, one needs the ability to measure the benefit of what might be a first-time fix – although the organisation can also look more creatively at the question and ask whether the customer really needs that kind of fix; he or she may really be after something else entirely.

'Strong leadership will see IT staff through a short period of handling work both ways – in silos, and in the more lateral processes of lean. After that, lean can take over.

'In travel, cross-functional working is essential not just as an intra-company affair, but also at an inter-company level. Many different service providers need to change how they do business with each other, and the customer, in order profitably to reorganise and smooth the stream of customer value. Here, the task of leadership is still more demanding – but it is precisely because of this that a strong style is once more required.'

How can that difficult work of assembling and integrating the services fielded by different travel companies best be done? Here *lean's orientation outside the company, toward customers*, deserves extending to whole *networks of suppliers*. And the important thing here is *how the front-line staff members of networked suppliers capture and interpret data from customers, in the cause of assembling new, often surprising sources of customer value, and bringing to market new, often unexpected services.*

The big thing is for front-line staff to *look carefully at every dimension of the whole customer journey,* and in particular to *probe 'disconnects' in the customer experience.* Then, *provided that employees among different travel companies choose to divulge the relevant information about the journey and its discontinuities,* a wide variety of modular solutions can be assembled in a lean and standardised manner.

If we think about airline travel, Peter Drucker's old point about freighters being too tied up in ports applies very much to the disconnect that occurs when an airline's aircraft arrives at an airport stand to disembark old passengers and embark new ones. From a customer point of view, the delay involved in trying to stretch one's legs and get out of the aircraft is quite excruciating.

Lean IT is all about paying a great amount of attention to scheduling movements so as to fix that kind of delay. In air travel, for example, it relies on the collaboration between airlines, airports and also air traffic control.

As we have hinted in our discussion of airport operator KPIs, each aircraft's 'on stand' time window needs to be shortened. That way, airlines would be able to devote their energies more to differentiating themselves through luxury levels of hospitality and service in-flight – arguably, the business they are in, or would be in, were it not for disruptions to the passenger experience.

Lean IT is about the *scheduling of queues of IT jobs.* So it rather lends itself to *handling queues at transport terminals.* In August 2013, long-haul passengers arriving at JFK airport at 4-5 pm would typically wait two hours just to get through Customs. [11] Yet by July 2014 automated passport kiosks had cut the through-the-day average waits at JFK Terminal 4 from 34 minutes down to 17. [12] After that, the world's transport terminals began to invite people to allow *Bluetooth and Wifi sensors to track and so streamline passenger movements, from deplaning and getting off a train though to exit from Customs.* Once that kind of permission was widely given, Lean IT was deployed to make use of the massive amounts of dynamic information unleashed in airports.

Another example of the relevance of Lean IT to disconnects encountered by customers is what happens after a flight cancellation. Even today, when a flight is cancelled, passengers are usually left in the dark about rescheduling, if and how to use other airlines or other transport modes, and about where their baggage is. Collaboration across a network of travel services is conspicuous by its absence.

Part of Lean IT in travel is learning, very simply, how to avoid giving passengers nasty and indelible experiences around cancellations.

[10] Peter Drucker, 'The discipline of innovation', *Harvard Business Review,* May-June 1985, on
http://ogsp.typepad.com/focus_or_die_ogsp/files/drucker_1985_the_discipline_of_innovation.pdf

[11] Delayed – JFK Airport has longest summer customs wait times', *Global Gateway Alliance*, September 2013
http://bit.ly/1o4mdFg

[12] NEW STUDY: GGA Customs Data Shows Automated Passport Kiosks Continue to Reduce Wait Times at NY-NJ Airports', *Global Gateway Alliance*, July 2014
http://bit.ly/1zjgT9D

How Amadeus uses lean in Global Operations

At Amadeus, leanness is chiefly applied in the company's Global Operations team. In a single data centre, Amadeus Global Operations handles perhaps 10,000 changes in infrastructure and configuration a month. That requires a lot of brains.

For some years after its formation in 1987, Amadeus followed what one might call the *McDonalds model* as it exists in fast food today: cook up products (IT systems and software) in line with market forecasts, limit the variety of offerings, and expect a lot of waste – because it's held vital to make stuff 'just in case'.

Since those days, Amadeus has moved away from the McDonalds approach and closer to the *Subway model*. It now works with customers to *co-create, from standardised components, a great variety of offerings – offerings made to order, and not to forecast.*

This drive to get a flow of value going to the customer has changed processes at Amadeus. In the old regime, the prevalence of *in-trays full of IT project data* at Amadeus meant that projects could fall to the bottom of those trays. At the very least, Amadeus Operations staff also had to spend time prioritising each project and dealing with rush orders. And when problem projects emerged, they were often placed in another in-tray named Pending. It became impossible to know when a project would be ready.

Things have moved on. Instead of in-trays, the Amadeus team spends time right at the outset of every project checking that all resources, from one end of the process to the other, are available and allocated. If they're not, the project doesn't start until they are in place; and if the resources requested are incompletely specified - for example, if just 'storage' is requested, but not the amount - work doesn't start until a full specification is ready. This means that the project is no longer held up further down the line by a missing resource or an incomplete specification that needs double-checking.

In the past, Amadeus sometimes made the mistake of believing that the person who documented particular processes actually had full charge of them. Yet in reality that person wasn't in charge at all. Nowadays at Amadeus, the team in charge clearly looks after each project from start to finish – takes 'end-to-end' responsibility. The documenter still documents projects – for example, the KPIs around it. Yet the documenter no longer has responsibility for the process. The team, not top management, decides where to start and which resources to bring in. And each team now has no in-trays: it always does just one piece of work at a time.

This way of organising is very different from the old, halting and slow routine of different internal departments handing a project on among themselves, through the discrete stages of Plan, Build and Handover.

One can't totally prevent incidents, but one can prevent their recurrence. As Stephane Giuliani mentions, Amadeus likes to foresee incidents. It is also able rapidly to regain its balance when incidents disrupt operations. It manages incidents, finds their root conditions, and writes these causes up, the better to eliminate them.

In part because of this more meticulous approach, the Global Operations centre is now much better at handling servers than it used to be. Servers used to be ordered quarterly, and it took about 12 different competences to get a single working server. The process covered approval, provisioning (plugging into racks), readiness for different operating systems, implementation of apps on the system (complete with named users and files sizes), app production readiness, and, in software, opening firewalls, making changes to data, updates, release management, and the configuration of telecommunications switches.

By going lean, Amadeus has now changed the way it treats servers. It orders servers continually, in line with demand. The process of provisioning a server and bringing it through all the stages till it is fully operational – this has been enormously simplified and shortened. A configuration management database now models the behaviour of all servers. This meant Amadeus was well-placed to help one travel search engine keep the hectic 2013 Christmas season under control, ordering 400 servers and operating all of them just a few weeks later.

Wolfgang Krips, executive vice president of Global Operations at Amadeus on
LEAN AS COLLABORATION AROUND THE HIGH GROUND

'Our demand to employees, to speed up the process of getting a server working, sent shockwaves through our Operations organisation – not least, because people hadn't realised how long it can take in practice. The shockwaves forced them to **collaborate.** *Even if people saw the need to collaborate, they needed to be developed to make collaboration happen. We did that work of "up-skilling". And with clearer goals, commitment increased.*

'You need a continuous, low-latency reflux of communication between front-line staff and those with the more helicopter view.'

Amadeus organises relations with its clients around written documents – documents familiarly known as *Service Level Agreements, or SLAs.* These outline the terms and the performance targets set for Amadeus, which Global Operations focuses on fulfilling. However, the measures in an SLA do not necessarily focus entirely on customer value.

The result? As Wolfgang Krips puts it, 'All the reports showed green, but sometimes clients still saw red!' Amadeus has now begun pilot-testing service-based reporting on certain key transactions, to measure performance in terms of customer value.

Now Global Operations at Amadeus is more interested in *aligning Amadeus' business objectives with those of its travel company clients.* **Because of lean, discussions with clients are different, and commercial arrangements are different. The focus is not on legalese, but on** *increasing each client's market share, revenues and profitability.* **That has also contributed to something of a transformation in the management of human resources at Amadeus within Global Operations.**

Ana-Paula Ribeiro, director of data store services at Amadeus on
LEAN TRANSFORMING HUMAN RESOURCES

Silos still exist at Amadeus, as in any company, but communication is better, gatekeepers prevent bad data coming in, and goals are clearer.

'Because they now do their own performance management reviews, silo managers are more mindful of the impact of their work on others, and of the whole process of getting IT projects out of the door. We have stopped having a separate cadre of project inspectors. The team that does the project is in the business of experimentation, not compliance – and it rates itself.

'We find that staff work best when they have the time and the income to allow them to think. A robot can't think. People, by contrast, really want to achieve something, including recognition, whether it's for pragmatic acts or strategy conceptions. The people view behind lean is to put the power to make decisions in those who can really improve the work.'

What travel firms should now do with Lean IT

When we look at the world economy today, it is clear that we face continued growth in the demand for travel. However, that growth remains unmatched by growth, in both travel services and in travel IT, of capacity and reliability. There are more delays, and more mishaps. Seats are easily overbooked. And in travel IT, the world's IT infrastructure still falls prey to overload and the corruption of databases and mirror servers.

Though legacy systems are still a problem in the travel sector, mainframes are now buttressed with several thousand servers each. An even better future lies in cloud computing, where in general software resources can be located not only on-site, but also worldwide.

The cloud means better backup and faster disaster recovery. The cloud will also encourage Amadeus and other IT firms to apply lean in a single and coherent manner with all their travel company clients. That should bring still more rapid and varied application development.

In matters of transport and cyber security, lean has much to offer. In airports, for instance, the staffing of security operations is still not planned in line with the numbers of passengers that are expected to disembark from incoming aircraft. The queuing of outbound passengers through body and baggage checks is still done more on a batch-and-queue basis than in a continuous, lean manner. Even without IT, and certainly with it, consistently and adventurously applying lean principles of flow design and scheduling could do much to lower levels of harassment around transport security.

With threats to cyber-security, as for all their other kinds of work in future, travel companies need to start now at the job of sensing developments while they are still subterranean, and of responding to developments before they have fully matured. Importantly, lean can here bring wins not just in the online world, but also in the real world of moving passengers around. The customer journey, after all, is a physical business. Here is a concluding short checklist of quick wins that can assist travel companies in going over to lean working:

1. Draw up complete maps of typical customer journeys (see below), from home to destination and back again
2. Understand how your service creates value to the customer on his journey and what are the relevant dimensions / metrics related to that
3. Map your key processes along those metrics and identify snags / problems

MAPPING THE CUSTOMER JOURNEY FROM END TO END

To organise travel for a customer means to understand every aspect of the customer's journey. How does he or she select a destination, research routes, make some kind of a miniature plan, select travel options? From front door back to front door, what services and data will be needed at each point?

According to Stephen Parry, to map the customer journey is to (1) take a helicopter view of the whole process, looking for unexplored disconnects, and (2) take a microscope to each disconnect. The purpose of mapping is to help travel providers looking for opportunities to extend their control, influence or partnership with others, as long as the result is better and more value is created for customers.

Parry says that many organisations already have the data to do this. However, nearly as many have years ago abdicated responsibility for customer value to other organisations, agencies and institutions – or, worse still, to their competitors.

In this framework, understanding what customers truly want makes marketplaces much bigger and more fruitful. Based on the latest and best maps of the customer journey, Lean IT can only enhance competitive advantage.

It is important to make a start. As we have observed, gains through leanness are not won overnight. In particular, it is vital to win staff over to the new ways of working. Yet once this is done, travel companies can look forward to rapid rates of new service and app development. They will be able to make more money from cleverly spotted market niches. And, better than they are at present, they will be adept at personalising their offers to the needs of customers as individuals.

Travel has many obstacles to surmount if it is truly to reflect the online immediacy of the 21st century. There remains a world still to win. That, however, is a compelling reason why travel companies should start gaining expertise and experience in lean sooner, rather than later.
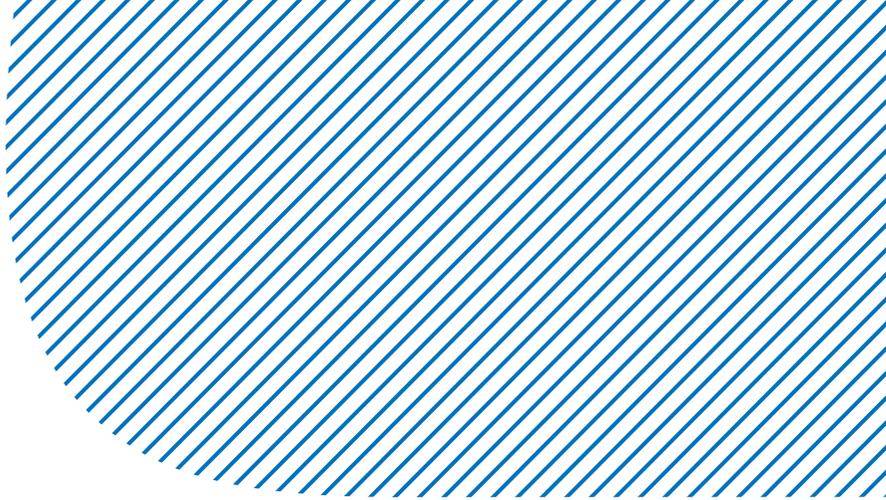
Appendix: background reading on Lean IT

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