Mastering Digital Disruption with DevOps
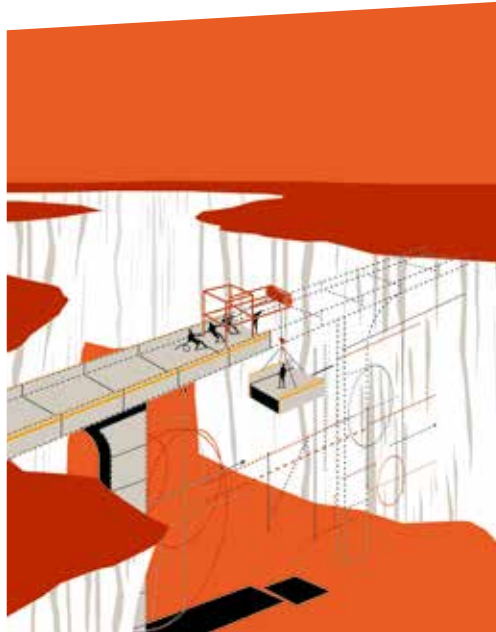## Design to Disrupt

Report 4 of 4

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SOGETILABS

CONTENTS

1 INTRODUCTION

'If the rate of change on the outside exceeds the rate of change on the inside, the end is near.'

Jack Welch

Imagine knowing upfront that your new digital product or service is going to be a guaranteed success, simply because customers were involved from the very moment the idea was born. That a multidisciplinary team is ready to help those customers solve any problems when things go wrong, and any additional wishes are fulfilled in no time. And that this team is just as engaged and motivated as the staff of a startup. And because your 'own startup' is responsible for the development and functionality of the services, blaming each other when things go wrong will be a thing of the past.

Let's take this a step further. Imagine spending fewer hours on 'management hassle', because the people doing the work organize their own collaboration. This is possible if the teams are self-organizing and any surplus management levels have been removed. How would you use that extra time? Why not — for example — develop the discovery skills of your organization; there is so much to explore in the areas of Cloud, APIs, micro services, and the Internet of Things. You could do a better job pleasing your customers, but you simply don't have the time. You would actually like to develop your own platform and join the new ecosystems. The startups figured it out a long time ago; they are so much faster and extremely wary of bureaucracy. In fact, they have committed people who are fully engaged with the customer. Their success is based on this kind of management innovation.

Imagine just ignoring the existing management dogmas, wouldn't that shed another light on your strife with the disruptive market players? We present this perspective on digital disruption in this final *Design to Disrupt* report: a different way of managing (management innovation), implemented with the help of the discipline employed by all startups: DevOps. This is how you compete with startups, no matter how old or slow your organization may be today. While building your own digital organization, you also develop an *antifragile* organization that gains strength as the disruptions increase.

There are no easy fixes. We explore alternatives, obviously, but management innovation should be on everybody's agenda. And we discuss how ING Bank and Spotify apply DevOps.

This is the first challenge: how do you remain successful in today's age of business disruption? We do need to presuppose a number of things. The proposed management innovation, as well as Lean Startup and DevOps to operationalize it, is based on your digital transformative vision. The danger of this method, whether it is Lean Startup/DevOps or any other method or holistic approach, is that it may easily swing in the direction of an ideology. Purpose and means are mixed up. 'A fool with a tool' probably sounds familiar: good ideas in the hands of mediocre people. This issue is not to be underestimated.

2 SUCCESS IN THE AGE OF DISRUPTION

The overabundance of digital startups is a sign of the times, or rather: of this age. If you wish to exclude those startups from your market, you require a proper response to that age. What should organizations do to be successful in digitally disruptive times? Organizations like yours, presumably, which were not born in the Web 2.0 age and do not bear names like Spotify or Dropbox. Whether you can truly exclude them is questionable. In any case, you can learn from them and form new combines.

From 'dotcom' to 'Uberfication'

The years of digital eruption are behind us; we now find ourselves in the age of business disruption. In the three preceding reports about digital disruption we took stock. The enthusiasm caused by the newcomers is great, but arouses resistance on the part of the establishment at the same time. Platform organizations, the so-called bilateral players, are emerging all over the market and in fact every market has one or more Airbnb-like organizations. And the blockchain heightens the effect. This platform, which in its turn enables other disruptive platforms[1], demonstrates that not only are we faced with ever-advancing platform innovations, but also a continuous stream of digital changes.

Nearly two decades ago, the euphoria with regard to the digital possibilities was even greater than it is today, if anything. But this so-called dotcom age proved a total fiasco. The expectations about IT returns were exaggerated, something the American power company Enron in particular had down to a fine art. The crash that followed was inevitable and was blamed on sloppy management. Restraints were imposed on the industry by the American Sarbanes-Oxley Act (2002), the COBIT methodology and the auditors. This resulted in a good deal of grumbling. However, corridor chat tells an entirely different tale nowadays: it is thanks to law and regulation that we still exist. Although it is not conceded without great reluctance, regulation is the first line of defense against disruption.

Meanwhile, this disruption is high on the agenda of every organization; the new generation of startups does not waste any time. The nickname 'unicorn' is even being used for the one billion dollar startup concept: a startup with a market value of a billion dollars. The value of Uber, an app to order a taxi, is now estimated at around 60 to 70 billion dollars. This is more than the value of General Motors, who manufacture the automobiles used for these taxi rides.

1 *We also refer to the three preceding reports of the* Design to Disrupt *series*: An executive introduction, *on the acceleration of innovation;* New digital competition, *on the success factors of the platform organizations, and* Blockchain: crypto-platform for a friction-free economy *about a platform for disruptive platforms.*

Three startup characteristics

1. The startups are *fast*. Their products and services are reaching their peak in the digital age in no time. This is sometimes termed the 'Big Bang theory' for market introductions. Startups are naturals at this game, far more so than traditional businesses. And the only chance to be successful as a startup is by designing such digital services that the customers are excited about them.

2. They are *customer obsessive*, being only too ready to fill the gap of latent and unfulfilled consumer wishes with digital platforms and smart algorithms. They are brilliant in terms of SMACT technology (Social Media, Mobile, Cloud, Things) and have different rules and methods of working that attract young talent.

3. Their staff is *engaged*. They are and feel responsible for the end result.
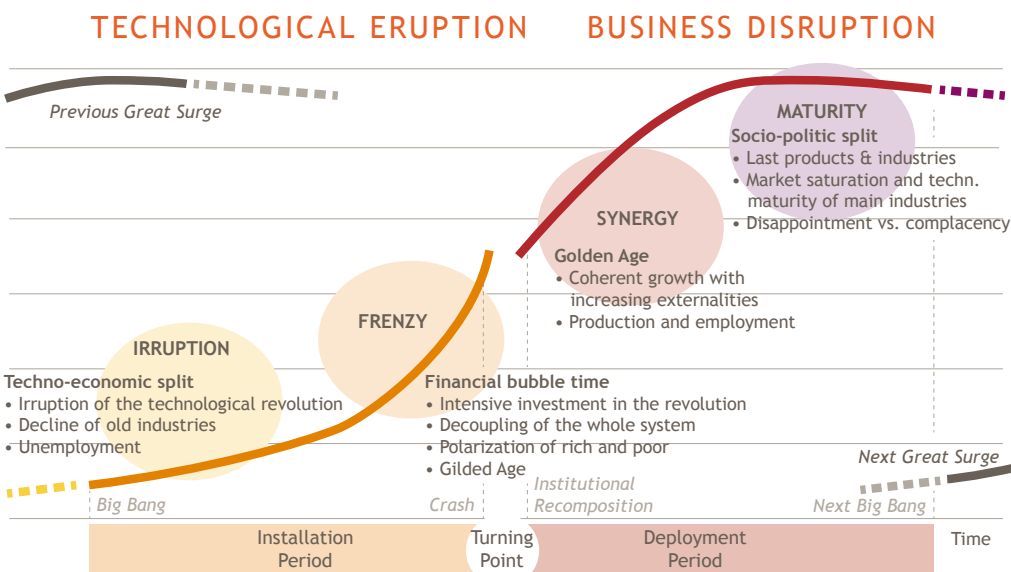
Age of business disruptions

Obviously, it is quite possible that another bubble is on its way, but the situation is rather different this time. The high expectations are not being pushed by companies such as Enron, but pulled by consumers and end users. The 2.6 billion smartphone users are urging organizations to make things easier and above all more digital. And this note is only going to become stronger. In 2020, the number of smartphone users will be as high as 6.1 billion.[2] In the words of IDC analysts: 'The digital age is behind us, the transformation age has begun'.

Recurring phases of each great surge in the core countries

Degree of diffusion of the technological revolution

TECHNOLOGICAL ERUPTION   BUSINESS DISRUPTION

Previous Great Surge

MATURITY
Socio-politic split
• Last products & industries
• Market saturation and techn. maturity of main industries
• Disappointment vs. complacency

SYNERGY
Golden Age
• Coherent growth with increasing externalities
• Production and employment

FRENZY

IRRUPTION
Techno-economic split
• Irruption of the technological revolution
• Decline of old industries
• Unemployment

Financial bubble time
• Intensive investment in the revolution
• Decoupling of the whole system
• Polarization of rich and poor
• Gilded Age

Institutional Recomposition

Next Great Surge

Big Bang   *Crash*   *Next Big Bang*

| Installation Period | Turning Point | Deployment Period | Time |

Source: Perez, *Technological Revolutions and Financial Capital* (2002)

2   http://techcrunch.com/2015/06/02/6-1b-smartphone-users-globally-by-2020-overtaking-basic-fixed-phone-subscriptions/#.hyszfer:RPIH

Carlota Perez is the champion of the neo-Schumpeterian school of thought, who examines the great shifts in society that are brought about by technology[3]. She portrays a period that lies behind us: the ICT installation stage (see the figure on page 5). It took about 30 years to build this ICT infrastructure. After the outburst and excitement caused by this technology, a crisis (the dotcom crisis of 2000, and the stock exchange crisis of 2008) and a turning point follow. Next is the deployment stage, in which the technology is adopted. This is a transition from technology push to consumer pull, from disconnected to connected customers, from unrealistic expectations on the part of shareholders to high expectations of customers, from delivery skills to discovery skills, from slow adoption curves to Big Bang market introductions, from old to new business models and from having no clear idea of how to set about the technology to 'everybody gets it': this is the age of the *digital enterprise*. The digital enterprise makes the most of these digital opportunities at any given place in the organization, is equal to rapid changes, is data-driven, which enables it to operate smartly, is fully engaged with the customer and thinks and operates in ecosystems.

The digital enterprise

All digital:	Every product or service is digitally enriched.
Experience:	Creates a world-class customer experience.
Antifragile:	Is equal to market disruptions. End-to-end secure by design. Translates rapidly changing customer wishes into new services in no time.
Data sensitive:	Feedback loops of assets and customers *(empathic pulses)* feed the actions. Facts over guesswork.
Ecosystemic:	All internal systems are data-driven and unlocked with APIs. Built on value networks instead of value chains.
Delightful:	As-a-service delivery has removed all handovers in the processes.

3   See also Design to Disrupt: An executive introduction.

Mastering digital disruption

In our previous disruption reports we sketched the prospect of the 'Valley of Death'. Traditional organizations will end up in this track of deadly peril if they fail to come up with a timely solution to disruption. Across the valley, however, glows 'The New Normal', the new set of rules for success that those organizations should adopt. The digital enterprise is the ambition that is totally in line with this.

The transformation process for organizations towards such a digital enterprise is outlined in detail in *Leading Digital*.[4] The process runs from the 'Grand Vision' via involving the entire organization, to the new forms of governance and eventually the full 'embedding' of the digital technology in the entire organization ('all digital'). The sine qua non for success with DevOps and Lean Startup is taking that first step: developing a vision. Involving the staff, the new governance and the merger of IT and the business are all part of the course that you steer when you are going to tackle management innovation.

It is a remarkable fact that ideas from three different angles are converging with the aim to keep disruption under control: marketers, IT departments and management experts. The marketers call it the Lean Startup and will sign up en masse for startup conferences. The IT departments are talking about DevOps and organize their own meetings on the subject. The experts in the field of management speak of management innovation and usually have a bit of a distance from marketing or IT. All three of them have the same thing in mind: stop wasting people's time, bring the human component into focus and accelerate innovation. Names are irrelevant in this context (other fashionable terms will probably pop up in the near future) — what matters is the direction that is now becoming clearly apparent.

4   G. Westerman, D. Bonnet & A. McAfee, Leading Digital: Turning Technology into Business Transformation, *Harvard Business Review Press, 2014.*

focusing on rapid IT service delivery through the adoption of agile, lean practices in the context of a system-oriented approach. DevOps emphasizes people (and culture), and seeks to improve collaboration between business, operations and development teams'.[8]

Management innovation

'(...) the invention and implementation of a management practice, process, structure, or technique that is new to the state of the art (...)'.[5] This is how management guru Gary Hamel defines the term 'management innovation'. He represents a larger group of management experts[6] claiming that market disruptions can only be counterbalanced if the organizational DNA changes as well.

Lean Startup

'(...) a new discipline of entrepreneurial management'.[7] This method offers lessons in the working practice of startups, which have been translated into management principles for traditional organizations. The term 'Lean Startup' was coined by Eric Ries, who gained experience with various startups.

DevOps

Culture, Automation, Lean, Measuring and Sharing: the CALMS acronym that characterizes DevOps is derived from these five concepts. DevOps is a combination of the words 'Dev(elopment)' and 'Op(eration)s'. Gartner defines the term as follows: '(...) a change in IT culture,

Antifragile

We present management innovation, Lean Startup and DevOps as three manifestations of the same phenomenon: a different way of working that is in line with modern practices. There are, however, minor differences. DevOps is the most holistic and more likely to take cultural aspects and the existing operation (Ops) into consideration. Lean Startup tends to focus more on a method for product development (Dev). But both of them explicitly work on management innovation: they put up a vigorous fight against bureaucracy, make teams and staff responsible and urge the customer to take his turn at the wheel when it comes to digital innovations. This is how speed, staff engagement, and customer obsession come within reach of any organization. The umbrella term 'antifragile' for these three phenomena, is most likely to stick. In *Antifragile: Things That Gain from Disorder*, Nassim Taleb, author of *The Black Swan*, outlines which organizational form is best equipped for this time of disruption and uncertainty.

Good ideas about how to learn from the digital disruptors do not appear out of nowhere. DevOps, Lean Startup and management innovation are rich sources that you can draw on.[9] For the startups that you are fighting, it is all mere child's play — this is the way they work. For organizations that are about to start up a digital transformation, however, the implications still need to be established. You won't know whether you have acted fast enough until the dust of the wave of disruption has settled.

'Some things benefit from shocks; they thrive and grow when exposed to volatility, randomness, disorder and stressors, and love adventure, risk and uncertainty. Yet, in spite of the ubiquity of the phenomenon, there is no word for the exact opposite of fragile. Let us call it antifragile.'
　　　　　　　　　　　　　　　　　　　　　　　Nassim Nicholas Taleb, *Antifragile*

5   J. Birkinshaw, G. Hamel & M. Mol, 'Management Innovation', Academy of Management Review *2008, Vol. 33, No 4, pp. 825/45, http://faculty.london.edu/jbirkinshaw/assets/documents/5034421969.pdf*
6   *Such as Hal Gregersen, executive director of the MIT Leadership Center, and Nassim Taleb, author of* Antifragile.
7   *E. Ries,* The Lean Startup, *Crown Business, 2011.*
8   *Gartner, http://www.gartner.com/it-glossary/devops/*
9   *Read e.g., 'Learning from Web Companies to Drive Innovation: Embracing DevOps, Scale and Open Source Software', http://i.dell.com/sites/doccontent/business/solutions/whitepapers/en/Documents/web-company-innovation.pdf*

success

time

Antifragile system
Resilient system
Robust system
Fragile system

Antifragile: *fragile* organizations tend to avoid disruption because they fear the chaos that disruption may cause. *Robust* organizations are strong but can even so be caught off guard and fail. *Resilient* organizations can absorb blows without having to change, and *antifragile* organizations will become stronger and more creative thanks to the disruptions they are faced with.[10]

THE ANTIFRAGILE ORGANIZATION

MANAGEMENT INNOVATION	LEAN STARTUP	DEVOPS
Multiply funding for new initiatives	Implement experimentation systems	Continuous iterative innovation
Learn from the fringe	Experiment is a product	Embrace a culture of 'Fail Fast'
Community over hierarchy	Instill entrepreneurship	Make DevOps teams responsible
Employees first	Customer first	Empower employees to put customers first
Ensure transparency in decision making	Validated learning	Short feedback loops & measure end-to-end
Kill bureaucracy	Minimum Viable Bureaucracy (MVB)/lean	System thinking, crossing silos
Think competencies and platforms	Think digital innovation	Innovate digitally and use cloud platforms
Honor Web-inspired value	Honor end customer value	Honor end customer value
Reinvent management	Self-management	Self-management
Speed	Pivot	Flow

3 MANAGEMENT INNOVATION: NO EASY FIXES

Many people have reasonable doubts about whether the conventional organizations are capable of dealing with the startups, but according to Internet guru Kevin Kelly 'you are not too late.' Radical digital innovations need not be reserved for newcomers only, according to Kelly. After all, we are only at the beginning of the Internet age and the real transformation is yet to begin. Eric Ries, the founder of Lean Startup, also claims that existing companies can be just as successful with digital innovations as startups. And even the über guru of disruption, Clayton Christensen, is optimistic about your opportunities. In his article 'Surviving Disruption'[11] in *Harvard Business Review* of 2012, he explains that there is a way out, also for existing businesses.[12] But it is true that in the last two decades much has changed. A number of *great firms* has joined the club: Facebook, Google, Twitter, Amazon, Netflix, Airbnb and Alibaba — to mention only a few.

'Management innovation is going to be the most enduring source of competitive advantage. There will be lots of rewards for firms in the vanguard.'

Gary Hamel

But to make up for lost ground, a couple of easy fixes are not enough. Management guru Gary Hamel's plea shows us the shortest way to what he calls management innovation.

Hamel considers some easy fixes in the context of competing with startups:

> **EASY FIXES**
> Entering into a legal battle against new business models, starting up an accelerator, arranging business incubators, going to Silicon Valley to be inspired, setting up an ideation platform, putting a high-performance team to work, preaching intrapreneurship, re-engineering processes, using the learning organization as an example to epitomize the idea, establishing communities of practice, etc.

They served a specific purpose, Hamel says, but are not nearly sufficient to solve today's issues. On the other hand Hamel does not deny that these are useful actions, but they just won't do. This is in line with the view of other management experts such as Hal Gregersen, executive director of the MIT Leadership Center, and Clayton Christensen, Harvard Business School professor and the person who coined the term 'disruptive innovation'. This duo refers to adapting the organizational DNA, a far more drastic operation[13] than a seemingly easy fix.

Research by Capgemini Consulting,[14] asking organizations to give their response to digital disruption, shows that four actions are particularly popular:

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11 *M. Wessel & C.M. Christensen, 'Surviving Disruption',* Harvard Business Review, *December 2012, https://hbr.org/2012/12/surviving-disruption*

12 *Mainly by applying the jobs-to-be-done-concept: a very strong focus on the jobs performed by customers. Christensen feels that this job-oriented customer focus provides the solution to disruption.*

13 *See also the book* The Innovator's DNA *by J. Dyer, H. Gregersen and C.M. Christensen (2011) as well as the article with the same title in* Harvard Business Review *(December 2009) by the same authors, https://hbr.org/2009/12/the-innovators-dna*

14 *Capgemini Consulting,* When Digital Disruption Strikes: How Can Incumbents Respond?, *February 23, 2015, www.capgemini-consulting.com/when-digital-disruption-strikes*

According to Hamel, management innovation means recognizing the problem to start with, and he too attributes the cause of the problem to a genetic defect. Something needs to be done to the DNA — incremental therapy does not do the trick anymore. Hamel's words, for example in his article 'Reinventing Management at the Mashup: Architecture & Ideology',[15] really hit home. He finds that:

1. Organizations are slow in times of crisis. This inertia often destroys them, because mechanisms for pro-active bottom-up innovation are lacking.
2. Organizations are incremental. They rarely come up with pioneering innovation, despite the abundance of resources they have at their disposal. Few CEOs pursue innovation just as consistently as operational efficiency, for example. At the end of the day they buy a young company that does have that drive, but loses the spirit after the acquisition.
3. Organizations are emotionally sterile. They are good at command-control mechanisms, but when it comes

to voluntariness, they are left empty-handed. Emotions are an organization's main assets. Imagination, initiative and passion are thoroughly incompatible with command-control structures. Recent American research shows that a mere 13 per cent of employees is truly engaged with their work.[16]

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15 *http://www.managementexchange.com/blog/reinventing-management-mashup-architecture-ideology*
16 *Gallup,* State of the Global Workplace, *http://www.gallup.com/services/178517/state-global-workplace.aspx*

Inert, incremental, and without engagement. If the wind of creative destruction rises even more strongly, Hamel says, these weaknesses will destroy those existing organizations. Hamel provides three pieces of advice to address the core incompetences of organizations effectively:

- *Tackle the hierarchy.*

A formal hierarchy overweights experience and underweights new thinking. Instead of hierarchies, network structures and ecosystems need to become the guiding principles.

- *Tackle the culture.*

In many organizations, bureaucracy is the prevailing culture. Hamel even calls it an ideology. Bureaucracy is the technology of control. Crazy ideas of weird people with exceptional results do not fit in this culture.

- *Kill bureaucracy.*

We have empowered employees, but they are not supposed to interfere with the strategy. We preach innovation but refuse to dismantle the barriers. We make organizations flatter, but the hierarchy remains intact. We are campaigning against bureaucratic rules, but have failed to oust them as yet. Now is the time to do so.

4 LEAN STARTUP: LEARNING FROM THE DISRUPTORS

So chances are that marketers seeking help in this sudden market acceleration, will end up with Eric Ries. Ries is an experienced Silicon Valley-based entrepreneur, who pioneered with 'rapid development' of new digital products from 2004 to 2008. Ries propagates a scientific approach of the innovation process, based on his bankruptcy experience in the dotcom age, and on the lessons he learned later on while working for new startups. Lean Startup applies the views of the Lean methodology and focuses on the innovation process. The introduction of such an approach should lead to entrepreneurship in all levels of the organization. That, at least, is what it promises to do (apart from the fact that it is a fervent wish on the part of directors of big companies).
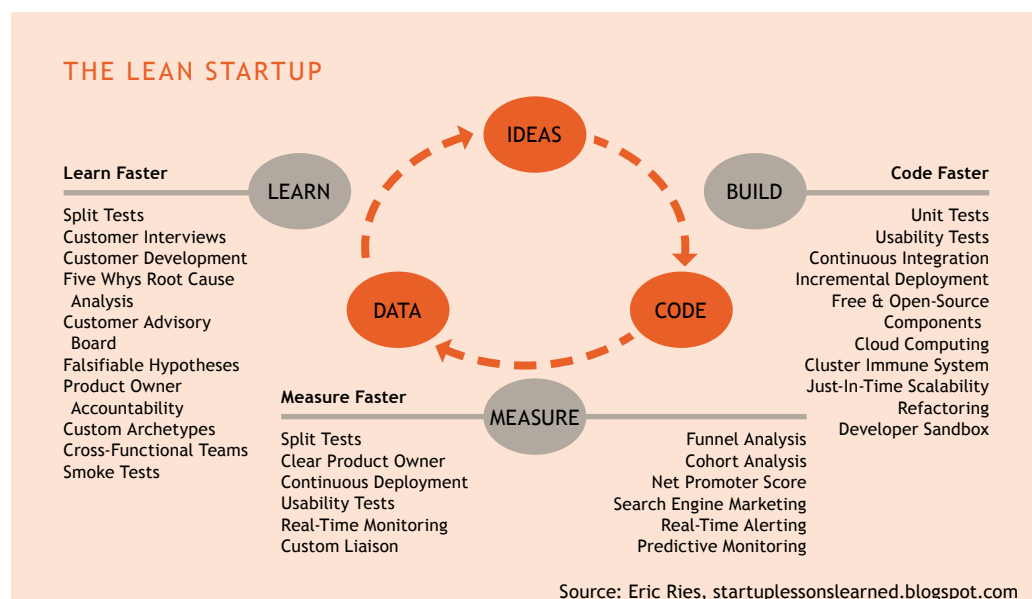
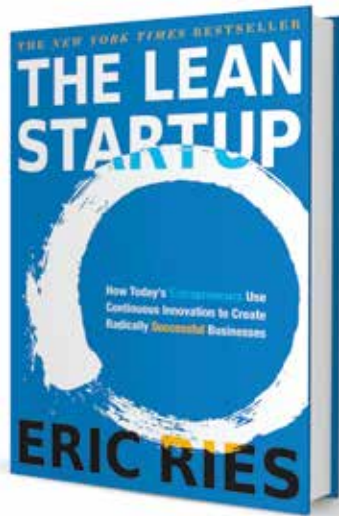## Lean Startup: measuring, learning and building faster

The success cycle starts with specifying ideas in code, following the data and measuring (by means of split-tests, or A/B testing, for example), and adjusting the ideas based on the results. This learn-fast approach, also termed 'validated learning' by Ries, is essential to the improvement of the innovation process.

Initially that approach was simply called 'customer development', a term coined by one of Ries' colleagues, Steven Blank. The essence of this approach is to let real customers evaluate new products as soon as possible. It is a matter of experiments aimed at developing a Minimum Viable Product within the shortest time span possible. An interesting practice, not in the least in the light of Christensen's disruption theory, which considers product functionality the greatest fallacy on the part of incumbent organizations.

CUSTOMER DEVELOPMENT

Source: Steve Blank's Customer Development by Brant Cooper; custdev.com
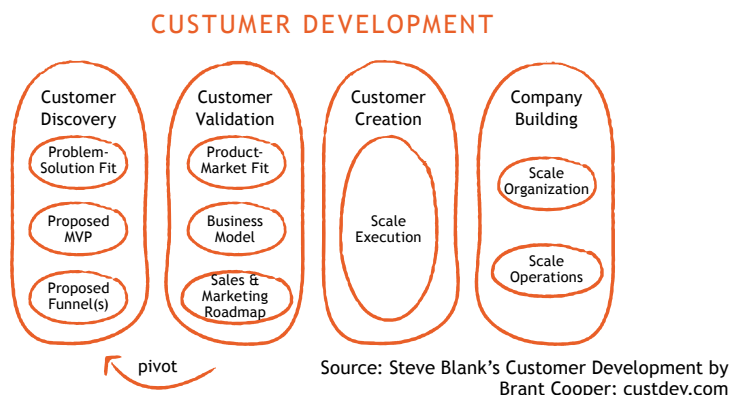
Customer development: the shared basis of Lean Startup and DevOps.

THE LEAN STARTUP

Source: Eric Ries, startuplessonslearned.blogspot.com

Basically, Eric Ries was working on software development, albeit from the perspective of a startup. And although big companies usually have a rosy picture of startups nowadays, almost by definition tending to designate them as superior, Ries came to the paradoxical conclusion that the majority of startups is bound to fail. To prevent this kind of failure, the idea of rapid development — or customer development — emerged. And with the idea of design thinking in mind, we very quickly get to the heart of the matter, where speed and smartness meet. At the end of the day it is the customer, not management, who determines the course of the innovation. It is the same idea that underlies DevOps, only here it is called lifecycle development instead of customer development.

General Electric: the oldest startup ever

One of the organizations claiming Lean Startup-based successes is General Electric (GE). GE has managed to engage Eric Ries to help develop FastWorks, based on his Lean Startup philosophy. FastWorks, as the name implies, aims to accelerate and improve GE's innovations. GE capitalizes on customers' fast feedback loops and is geared towards making a 'pivot' itself. Meanwhile GE is practicing the method to accelerate the roll-out of products, varying from bulbs to turbines and refrigerators. The company has already trained 40,000 employees in view of this new initiative, one of the most extensive programs in GE's 122-year history.

Meanwhile, there is no longer any need to explain this approach to a startup. After all, many startups are trying to reformulate their rationale and use the conclusions of customer experiences to adjust their course, sometimes drastically. In startup language this is called a 'pivot' of a Minimum Viable Product. Just try to come up with such a suggestion in a traditional company... If you say that the entire strategy for a new product needs to be changed diametrically based on consumers' feedback, the customary management meetings or even board meetings and project committees have to be convened first. Startups just do not have the time, the money and the means to do that. And frankly, when you are very critical, nor do you.

Minimum Viable Product

Nowadays, product developers and marketers constantly talk about Minimum Viable Products (MVPs): products and services that have been barely sufficiently developed to be launched. Apart from feedback from real customers, this minimalistic approach to innovation ultimately results in an increase in the number of innovations more than anything else. The faster your assumptions are tested, the sooner you know you are on the right track.

MINIMUM VIABLE PRODUCT
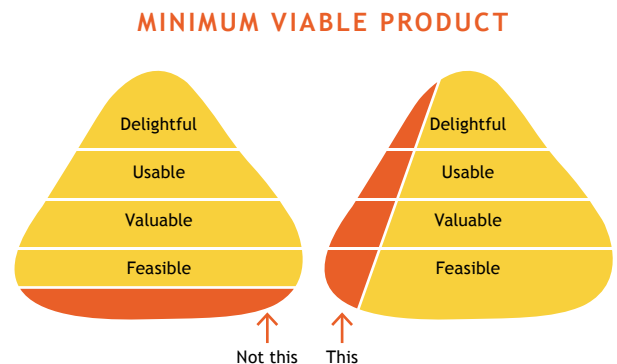
Minimum Viable Product: barely sufficiently developed to be tested, yet with all important elements elaborated sufficiently.
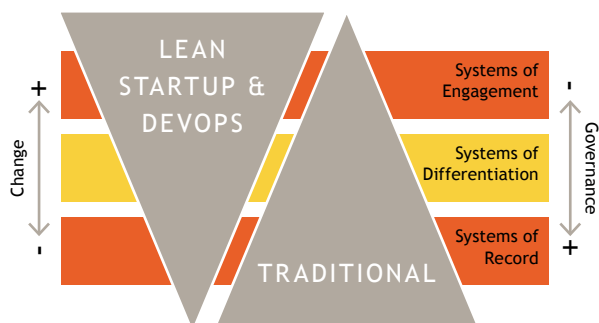
An excellent example of how an MVP can be helpful in this context is Zappos, who wanted to know whether people would basically be ready to buy shoes online. Instead of developing a whole logistic infrastructure to process orders first, Zappos came up with a knocked-together solution. Photos were taken of shoes in existing stores and when someone ordered shoes, they were simply bought in the store and then delivered. Hardly a business model designed to last, but it is certainly helpful in testing the hypothesis that there is a customer demand. The answer was positive, we now know, and Zappos' turnover currently amounts to 2 billion dollars.[17]

After Ries had popularized the term 'Minimum Viable Product', he started his own consultancy practice in 2009, highlighting the 'rapid development' method. Ries is now a consultant for many high-tech startups and has developed a comprehensive methodology, 'the Lean Startup philosophy', which can also be utilized by incumbents. Ries says that the problem of existing companies does not lie in the number of good ideas, as many organizations will recognize. It is rather that organizations have no management process to start up high-risk projects and run them.

*The tragedy of the established order is that the initial spirit of innovation of the early years is nearly always smothered by a firm framework of governance and control mechanisms. Thanks to their history, market posi-*tion and infrastructure, traditional companies devote relatively much time and attention to the 'systems of record'. Here governance & control are predominant. Startups prefer to go for the 'systems of innovation', where many new avenues can be tested and governance, by contrast, is a minor aspect. The question comes to mind whether an incumbent can just try it out as well.*

So Ries definitely speaks against a situation where time is wasted on activities and innovations that turn out not to work and are totally useless. This principle of 'doing the right things' rather than 'doing things right' is based on lean manufacturing: the principle of preventing waste. Like Hamel, Ries is averse to dogmas (Hamel even calls them ideologies) and argues in favor of objectification. Research from the eighties of the last century already showed that the introduction of information systems in major organizations involves a great deal of waste. The Standish Group has reported on this in its Chaos reports for decades.[18] Based on many years of observing the introduction of information systems, London School of Economics professor Claudio Ciborra has outlined where things tend to go wrong frequently. Managements want to be *in control* and find that they are *drifting* because the users of the system do not act according to expectations. This resistance leads top-down to the idea that they are getting *out of control*.[19] Lean Startup and DevOps avoid the problem by reducing the risks and letting major decisions depend on the dialogue between the users and the makers.

17 http://www.forbes.com/sites/danpontefract/2015/05/11/
   what-is-happening-at-zappos/#3f4f0a1231b3
18 *See e.g., the Standish report* Big Bang Boom,
   https://www.standishgroup.com/sample_research_files/
   BigBangBoom.pdf
19 *We described this in* Making IT Governance Work,
   http://www.amazon.com/Making-Governance-Work-
   Sarbanes-Oxley-World/dp/0471743593

5 DEVOPS: DEVELOPING AN ORGANIZATIONAL CULTURE

In the same year that Ries was promoting his Lean Startup philosophy, 'DevOps' was mentioned for the first time as a new way to accelerate the IT organization. And although the term sounds a lot less sexy than Eric Ries' Lean Startup, DevOps is now definitely a match for it in terms of popularity. DevOps has its origin in the software development method Agile, or rather, is the result of Agile's success.

The term DevOps was coined by two IT consultants, Patrick Debois and Andrew Shafer. They met in Toronto in 2008 at a conference where Shafer gave a presentation entitled 'Agile infrastructure' that no one bothered to attend except Patrick Debois. Debois was working on the very same subject matter at the time. His experiences with a database migration, where development and operations were kept strictly separate, fostered his interest. After the conference, Debois and Shafer kept in touch and in 2009 this led to the first DevOpsDays. The history of DevOps and the significance of the DevOpsDays[20] demonstrate that it is a grassroots movement 'from practitioners by practitioners'. Debois was asked to give a presentation on one of the DevOpsDays on the future of DevOps. He expressed the wish that, more than anything else, DevOps remains 'weird' (which fits the engineering culture) and that diversity determines the success of DevOps. By the latter remark he meant that DevOps should allow as many trends and ideas as possi-

THE AGILE MANIFESTO — A STATEMENT OF VALUES

Individuals and interactions	over	Process and tools
Working software	over	Comprehensive documentation
Customer collaboration	over	Contract negotiation
Responding to change	over	Following a plan

ble to explain what it is exactly and which course it should steer. No rigid definitions: anything is possible and should be made possible.[21]

From Agile to DevOps
In 2001, a group of seventeen software engineers published a manifesto as a reaction to anything that went wrong with the way software was being built. The waterfall model was in a bad light. They proposed a different philosophy in the form of value statements and working principles.

20 'The Incredible True Story of How DevOps Got Its Name', https://blog.newrelic.com/2014/05/16/devops-name/
21 Debois, P. (2013): 'The Future of DevOps', https://vimeo.com/65547464

The main principles of this Agile Manifesto are:

1. Customer satisfaction by early and continuous delivery of valuable software.
2. Welcome changing requirements, even in late development.
3. Working software is delivered frequently (weeks rather than months).
4. Close, daily co-operation between business people and developers.
5. Projects are built around motivated individuals who should be trusted.
6. Face-to-face conversation is the best form of communication (co-location).
7. Working software is the principal measure of progress.
8. Sustainable development, capable of maintaining a constant pace.
9. Continuous attention to technical excellence and good design.
10. Simplicity — the art of maximizing the amount of work not done — is essential.
11. Self-organizing teams.
12. Regular adaptation to changing circumstances.

These principles were at the basis of a great many steps in software development, such as pair programming (two individuals working together behind the computer), time-boxing, Kanban, Scrum, extreme programming etc. Currently we are applying the spirit of the Agile Manifesto in the context of the end-to-end chain of organizations. We can then add new principles, such as customer satisfaction over SLA compliance, personal attitude and collaboration over certification of employees, managing results over managing activities, and adaptivity over procedures.
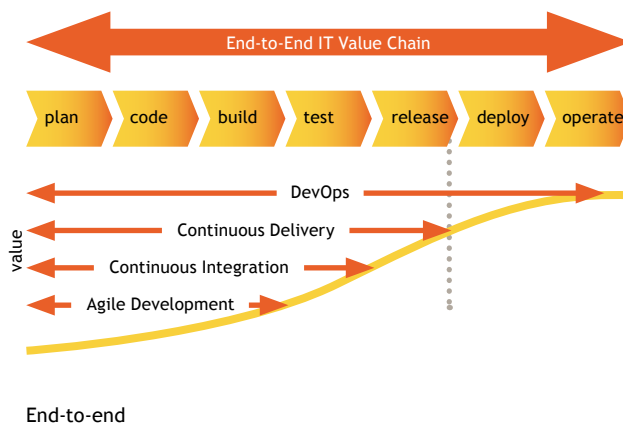
DevOps approaches the organization from head to tail: value creation including the operation at the customer, and deployment. Agile development, continuous integration and continuous delivery involve a smaller part of the production chain. And all meant to create the ultimate customer experience.
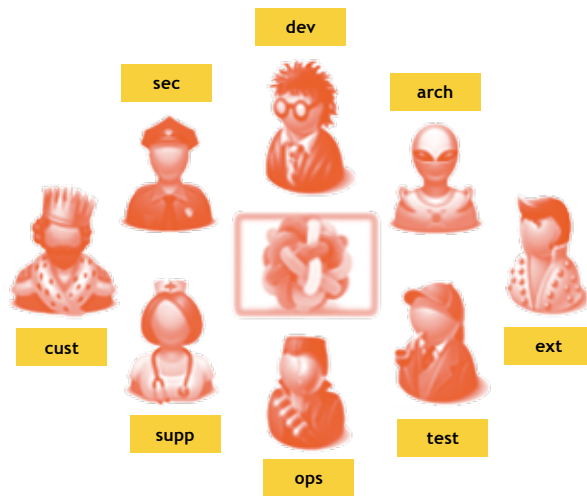
AGILE MINDSET IN THE END-TO-END CHAIN

Customer Satisfaction	over	SLA Compliance
Attitude & Collaboration	over	Certification
Control on Results	over	Control on Activities
Adaptivity	over	Procedures

OPPORTUNITY TO ADDRESS…

End-to-End IT Value Chain

plan · code · build · test · release · deploy · operate

DevOps
Continuous Delivery
Continuous Integration
Agile Development

value

End-to-end

dev
sec
arch
cust
ext
supp
test
ops

Amazon May Deployment Stats
(production hosts & environments only)

11.6 seconds
Mean time between deployments (weekday)

1,079
Max # of deployments in single hour

10,000
Mean # of hosts simultaneously receiving a deployment

30,000
Max # of hosts simultaneously receiving a deployment

Source: John Jenkins, Amazon.com

Amazon's statistics for product releases

This end-to-end approach also offers a solution to a major part of the criticism of Agile: it was said to be less reliable — a cowboy way to handle software. Because a multidisciplinary team is made responsible for both development and operation, the developers feel the pain when things go wrong operation-wise (and the other way around). The DevOps teams (or 'squads', if you like) consist of architects, security specialists, marketers, testers, support services, infrastructure specialists and customers. This is, in fact, a whole organization in a nutshell, or a startup. So the extra added to Agile by DevOps, is removing the walls between the operation and development.[22] Developers are now responsible for the operation, which promotes entrepreneurship and responsibility. This results in the speed and customer obsession — the ultimate customer experience — that we referred to before, although at a far lower risk. The days when everybody had to be ready during the weekend, because some software was being deployed, will then be over for good. To illustrate the contrast: Amazon realizes 1,000 deployments in an hour.

22 In fact, all stakeholders are involved (see the picture on this page).

6 DEVOPS DEFINED

The idea behind DevOps is very simple: 'If only everyone would co-operate more …' Eliminate the silos, to begin with. By working in multidisciplinary teams the conventions of co-operating 'in IT' can be abolished and a merger between IT and the business can take place, which is essential to being successful in this age of digital disruption. The above is based on five elements: Culture, Automation, Lean, Measure and Share. CALMS is a brief definition of what DevOps stands for.

C — Culture: thinking systematically and embracing a 'fail-fast culture'

A must-read to gain insight into what is needed to build a DevOps culture is The Phoenix Project, a book of 2013 subtitled 'A Novel About IT, DevOps, and Helping Your Business Win'.[23] The hero of the book is the IT manager who manages to save his department and make the business successful with the help of a mysterious Yoda-like philosophy of 'three ways': 1) thinking systematically; 2) strengthening feedback loops; and 3) experimenting and learning continuously. Thinking systematically ensures that people look beyond the silos and departments and won't let mistakes stream 'downstream' to other 'departments'. What it comes down to is that local KPIs are not allowed to steer the total achievement. This creates a basis for working in multidisciplinary teams. The feedback loops are necessary to acquire an end-to-end overview of what it is that makes internal and external customers happy. Continuous learning and experimenting is about creating the proper culture that is receptive to taking risks and learning from mistakes. This is one of the main changes one will be faced with when introducing DevOps. The culture of fear that is still predominant in many organizations — the fear to make mistakes, to innovate, to be the odd man out — is translated by DevOps into a fail-fast culture, as many startups know.

Chaos Monkey of Netflix

Would you dare to launch a service that deliberately attacks your own production environment? This is exactly what Netflix does and the product is called Chaos Monkey (open-sourced, by now). Chaos Monkey is a piece of software that aims to destroy things in order to constantly monitor if all software is still being designed in such a way that it remains intact when an error occurs somewhere else. This concept is known as 'rugged IT'. In the new world of interconnected APIs, the fact that some things just don't work should be taken into account. And the code must continue to function. In the old world we tend to rely on other systems that make sure everything is always 'up'.

A — Automation: automate automation

Automation is the simplest and most tangible part of DevOps. The aim is to automate as much of the software process as possible. Eventually DevOps can become CloudOps, and the services can be offered as such in the cloud, the same way the startups go about it. The idea underlying 'automation' is that everything that can be automated, should be automated — from creating an environment for configuration tools and loading datasets, to carrying out performance tests. This automation affects the speed and quality of the process directly (everything is formalized, there are fewer heroes needed to intervene ad hoc to solve the problems). Probably not everything can be automated in practice because human checkpoints will often remain necessary; but since setting up certain environments still implies a lot of fuss for the majority of the traditional organizations, it would be virtually a no-brainer to embrace at least this element of DevOps.

The periodic table of DevOps tools

Plenty of tools are available to help. So which one should you choose? Have a look at the periodic table of the DevOps tools. They are divided into categories such as version management, packaging and test automation. The market is still developing, but the categories are fairly stable. Big suppliers such as Microsoft and IBM like to recommend their own integrated suite of tools, obviously (Visual Studio or Bluemix). A specific tool catching on rapidly is Docker, which enables the use of 'containers'. This is a virtualization solution that allows very simple applications to be moved from one environment to the other, from the desktop to the cloud or from one cloud to the other.

L — Lean: preventing waste with Lean

We probably don't have to explain Lean to you because there is an abundance of management literature about this management philosophy. The main thing we can add

is that what is particularly relevant with Lean in DevOps — as in Lean Startup — is: a) improving innovation and realizing new or latent customer needs, b) measuring and optimizing the productivity flow across the whole system, and c) the fact that Lean is part of DevOps and that DevOps is much more about a culture that guarantees successful collaboration.

The obsessive focus on customer value (end-to-end) ensures that little time is wasted on matters that have no added value. A fail-fast culture is part of it, just like the Minimum Viable Product approach. All these holistic elements that we observed at an earlier stage in Lean Startup, we see again in DevOps. This includes the empowerment of the self-organizing teams and the concept of 'validated learning': everything is focused on the ability to anticipate as quickly as possible, with a view to doing the right things instead of taking the wrong turn.
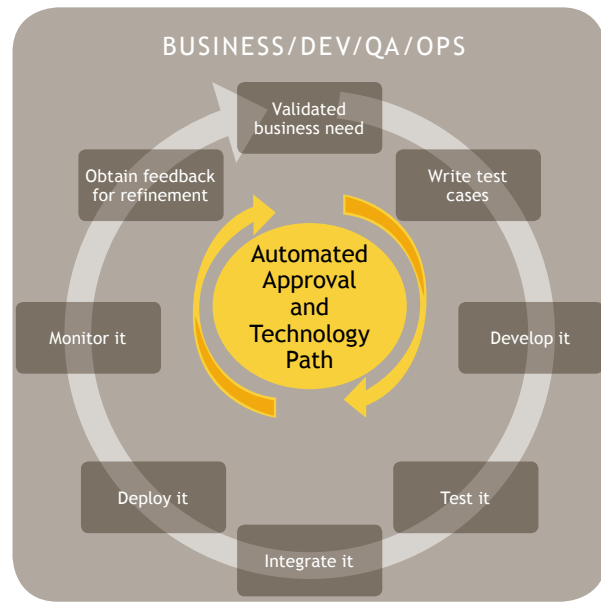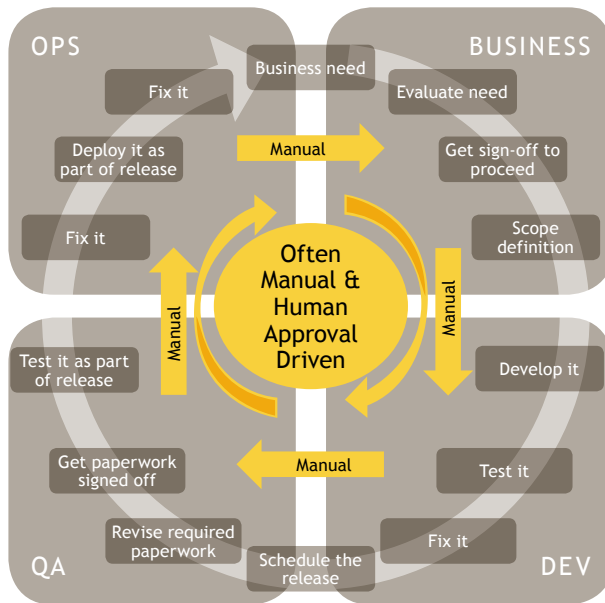
DevOps: the elimination of organizational silo's, together with thinking systematically and the elimination of manual actions (Automate) enable accelerated learning and customer-oriented innovations.

M — Measuring: measuring throughout the chain

How many releases were there in the past week? Where did things go wrong? How did customers respond and which improvements were really effective? The automation of the operational process results in a wealth of information, which can now become available to the whole chain thanks to DevOps. The developers are faced with the inadequacies of the operation and the people on the side of the operation see how it affects the customer. Where measurements used to be made, but information was presented in silos, the DevOps team now has a view of the whole field at a glance. And the responsibility for the improvements to all these metrics rests with the same multidisciplinary team. But more importantly: in addition to performing measures in the chain, these kind of feedback loops offer the opportunity to test business

hypotheses that can result in new innovations (as in A/B-tests, or in the Zappos example outlined above). There is a great deal of information available on good and actionable DevOps metrics.[24]

S — Sharing: accelerated learning by sharing

Sharing expertise and experience inside and outside teams is crucial to the success of DevOps. Some call this element of DevOps the realization of an 'open-source culture'. The sharing principle does not only apply to working within the DevOps teams, it also involves sharing tools, experience, an architecture or code among the teams. This way the learning experiences in the various teams can scale up quickly.


24 See e.g., http://www.nonlinearcreations.com/Digital/how-we-think/articles/2015/03/4-metrics-measuring-Dev-Ops.aspx

7 SPOTIFY INTO DEVOPS

It is already called the Spotify model; the way the online music business models for the new method of working. Some say it's easy talking for Spotify. It is, after all, 'just' a bit of software and they are not bothered by legacy. And the employees can cash in when the business with an estimated value of 8 billion dollars is floated on the stock market — no wonder there is so much 'engagement'! Still, Spotify is an inspiring example of an organization that has made very consistent choices and implements them in terms of culture, the 'all digital' strategy, and the way they treat customers etc. In short, the holistic approach DevOps stands for.

Spotify calls it the 'Spotify Engineering Culture'. Self-organized teams, called 'squads', call the shots. One of the main principles in Spotify is to let these squads operate as autonomously as possible and convey 'a startup feeling'. Each squad has a product owner and is grouped together with other squads that do related things in a 'tribe'. A tribe has a specific focus, like — in the context of Spotify — the front-end music player or the back-end infrastructure. A tribe may be compared to an incubator for the startup-like squads. A tribe must not exceed about one hundred people, based on the safe maximum number to share a social relationship with ('Dunbar's number'[25]).

To enable an exchange of experiences with regard to testing or security, for example, there are two other structures: 'chapters' and 'guilds'. A chapter is a group of people from various squads addressing problems they have in common.
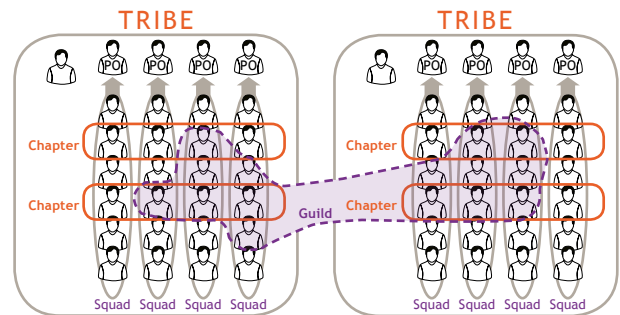

A guild is a less coherent entity, and may consist of people from the entire organization; it is a community of interest, exchanging knowledge, tools, code and experiences. This results in a kind of matrix, but differs from the traditional matrix organization: the squads are stable and keep to the product. This is the overriding structure, whereas in traditional matrices people with the same skills or interests are put together and 'deployed' for a project.

Henrik Kniberg played a major role at Spotify to set up the organization. He worked for them for many years as an Agile/Lean coach, and now fulfills the same role with Lego. Kniberg produced two videos with infographics in which he gives a very detailed explanation of the method of working.[26] The ten highlights below provide a good understanding.

25 See https://en.wikipedia.org/wiki/Dunbar's_number
26 https://labs.spotify.com/2014/03/27/spotify-engineering-culture-part-1/
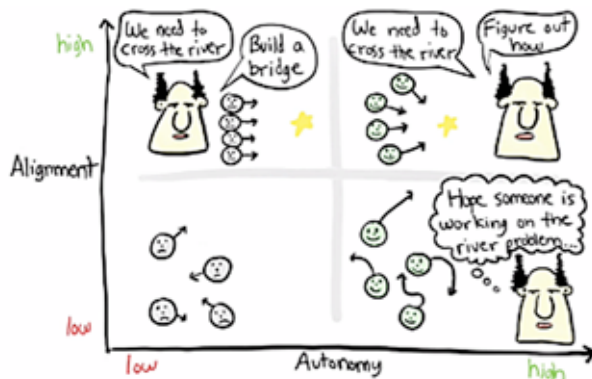
1 Business alignment versus autonomy

How to solve the discrepancy between the freedom to innovate, and the wish to align the actions and the business targets? The alignment-autonomy quadrant provides the four options for the best method of working for Spotify. The Spotify model is based on the business asking the question and the 'practitioners' having the autonomy to come up with the answer.

2 Focus on staff motivation

Exemplary for the focus on motivation is an email from the HR department. After a customer satisfaction poll, 91 per cent turned out to be satisfied and 4 per cent dissatisfied. The email sent by the HR department reads: 'This is of course not satisfactory and we want to fix it. If you're one of those unhappy 4 per cent please contact us. We're here for your sake and nothing else'.

3 Making mistakes faster as a mission

'We aim to make mistakes faster than anyone else', says Spotify's CEO Daniel Ek. This is not about making mistakes, but much more about a learning organization, about validated learning. Spotify is a 'fail-friendly environment'. It is about *failure recovery* rather than *failure avoidance*. Some squads in Spotify even have a fail wall. The post-mortem of projects is a fixed item in the approach; in hospitals, for example, where learning from mistakes is extremely relevant, this is part of the culture.

4 Experiment-friendly culture

New ideas begin as experiments. Instead of killing an innovative idea by pushing the discussion too far, you simply try it out. Techniques such as A/B tests are often used to this end. Experiments begin with a hypothesis, followed by a measurement and the question 'what's next?'

5 Minimum Lovable Product

A variant of the MVP is the Minimum Lovable Product of Spotify, which focuses on developing a story which hides the innovation hypothesis to be tested. For example, 'radio you can save', a product idea with an intriguing name hiding an intriguing history.[27] Would that be attractive to customers? And how would you test it?

6 Minimum Viable Bureaucracy

The growing pains of Spotify end in a balancing act between chaos and bureaucracy. Kniberg launched the term 'Minimum Viable Bureaucracy' in this context, which stands for a minimum number of rules to prevent bureaucracy from destroying the organizational culture to prevent chaos.

7 Staff Engagement

One of the squad leaders at Spotify formulates this as follows: 'I think of my squad as a group of volunteers that are here to work on something they are super-passionate about.' Kniberg adds that in the case of engineers super-passion rarely springs from spreadsheets, but more frequently from meaningful innovations.

8 Releasing is easy

Product innovations are often delivered in small portions, so that it also becomes a routine. So-called release trains and feature toggles ensure that the collaboration between the various teams can be streamlined.[28] By disconnecting the work from other activities, the squads can continue to work autonomously, without being in the way of other squads.

9 The employees are the innovators

Where do the ideas come from? Give people 'hack time' and 'let them play around', because people are innovators by nature. Spotify employees are encouraged to spend 10 per cent of their time on 'hack days'. This is similar to Google's 20 per cent rule (sometimes cynically called the 120 per cent rule[29]). Here the new, sometimes trail-blazing ideas are born. The first thing that matters is creativity, not the question whether the idea is viable or whether there is a demand on the part of customers. So the slogan for the Spotify hack week is: 'Do whatever, with whoever, in whatever way'.

10   Don't waste time on nonsense

The focus on waste in the Lean method has resulted in a list of experiences that provides a pretty good insight into how things are done with Spotify. Kniberg lists what does not work: 'Time reports, handoffs, useless meetings, separate test phases, task estimates, corporate bullshit.' What does work: 'Google docs, daily standups, GIT, unconferences, retrospectives.'

28 *See e.g., http://scaledagileframework.com/agile-release-train/ en https://en.wikipedia.org/wiki/Feature_toggle*
29 *http://www.businessinsider.com/google-20-percent-time-policy-2015-4*

8 ING BANK INTO DEVOPS

More and more organizations are becoming aware of the possibilities of DevOps, but few traditional organizations are carrying through the ambition to introduce DevOps to such an extent as ING Bank. Paraphrasing a statement of Bill Gates of 1990, Wouter Meijs, head of ING Bank's delivery center, does not mince his words when it comes to the 'why': 'people need banking, not banks'. Twenty-five years later all banks are struggling with the problem how to respond to the FinTech storm. ING Bank's response is to address the culture, which means introducing a different way of working. Like Google, CIO Ron van Kemenade aims to attract the best talents in the market. With the engagement resulting from DevOps, the bank feels it holds a winning card.

ING's first step was to speed up the development of software iterations, initially by introducing Agile, but soon after that by fully concentrating on DevOps. According to ING, the following tangible results were achieved with this approach:[30]

- *Accelerated innovation:* the time-to-market for new functions and ideas was reduced from more than 20 weeks to approximately four days.
- *Risk reduction:* the test coverage rose from 20 to 80 per cent and the overall risk fell.
- *Customer satisfaction:* the app rating for ING apps in the appstore went from one to 4.5 stars.

Around 2012, ING still went all-out for CMMI, Prince2 and ITIL, but the bank experienced increasing instability in the production. This crippled innovation, as they had to cope with an increasing number of acceptation criteria. It was becoming evident that if ING Bank did not change course, it would increasingly be faced with disruptive developments. By that time some of the teams switched

to Agile and Scrum, and to be honest: this proved a fruitless exercise at first. But as they gained more experience with this approach, they gradually outstripped other teams. To such an extent, even, that it led to a clash between development and other activities: operations could not handle the amount of new releases produced by development. So it was decided to merge the two teams and work on DevOps. There are currently over 150 teams in the bank basing their work completely on DevOps. And not just at the front-end, building apps and websites: there are ten DevOps teams working on the core-banking systems, which form the basis for the services. Following Spotify, ING Bank introduces 'tribes' and 'squads' and abandons the existent compartmentalized departmental functions.[31]

TRANSITION OF THE ORGANIZATION

2011   **2013**   **2015**
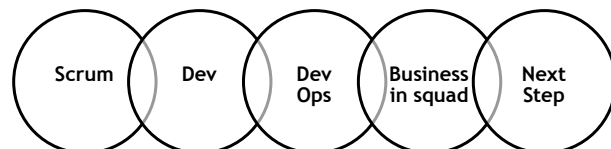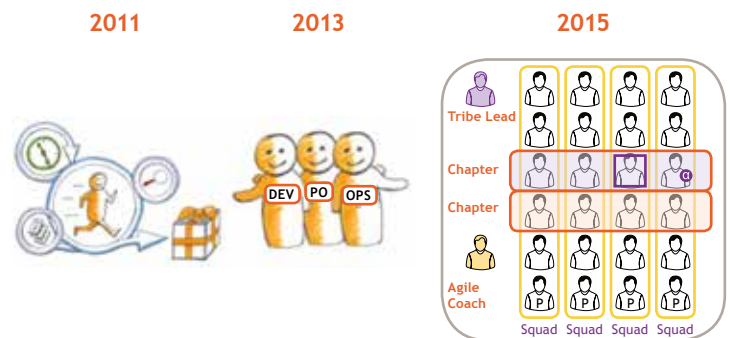
ING's DevOps trek: from Scrum to Dev and DevOps, having the business work in squads, and now formulating the Next Step.

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30 This demands a short comment. In the period January to September 2014, ING were bothered by major breakdowns for 18 days, and led the field in this area. Source: http://tweakers.net/nieuws/98740/ing-is-koploper-met-storingen-bij-gemiddeld-twee-storingen-per-maand.html

31 Source: ING, 'Agile way of working at ING Netherlands', https://www.youtube.com/watch?v=NcB0ZKWAPA0
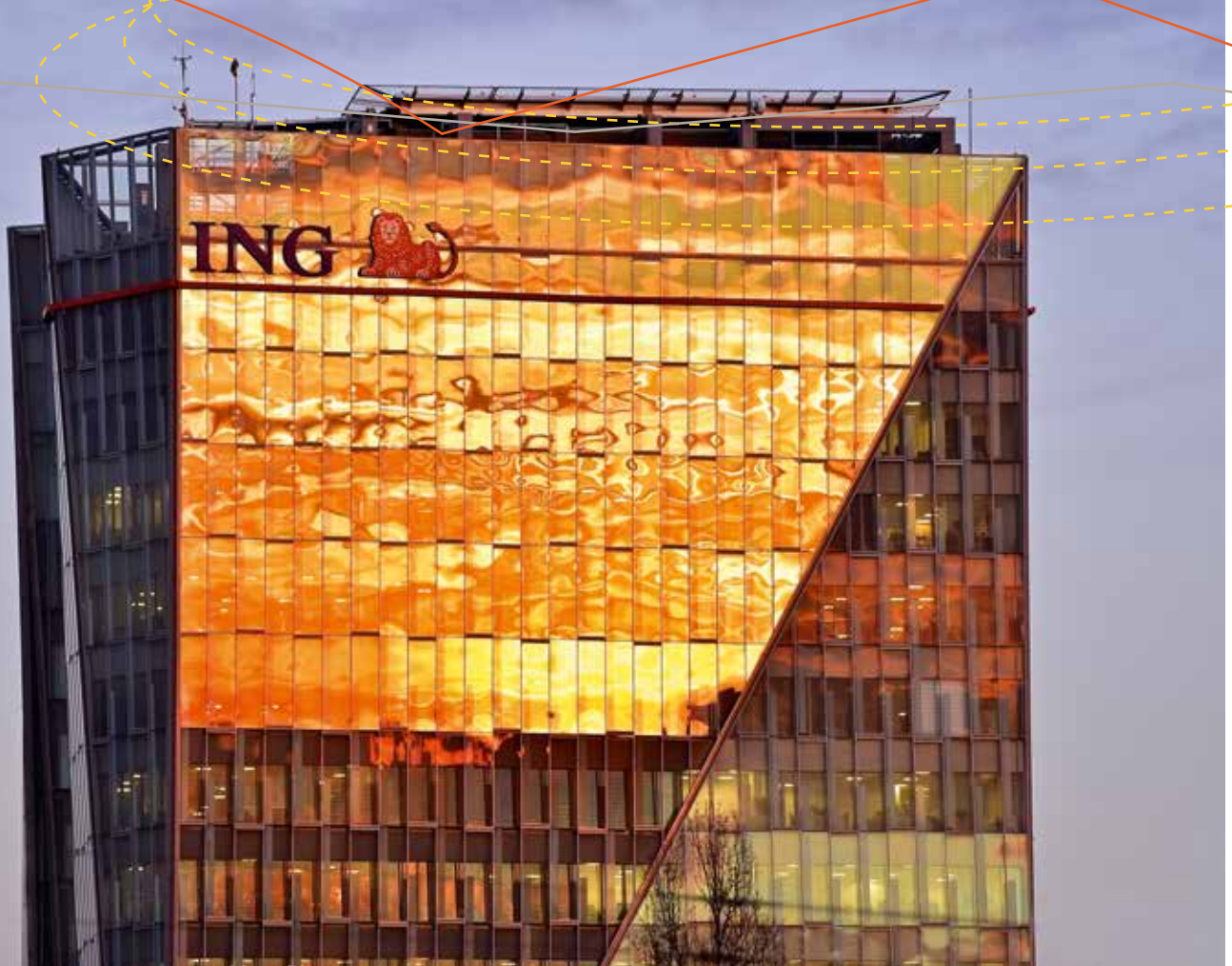
The issues ING was faced with were huge and many: how do you guide people in this transition? How do you train them, and how do you attract new talent? And how do you sell this policy inside the organization? Even the relationship with suppliers has changed: instead of large SLAs with releases of six to twelve months, ING now has many smaller and far more frequent releases, 100 percent availability and co-sourcing. And where the distance between business and IT was fairly large initially, the commercial stakeholders are now directly involved in prioritizing and defining the Minimum Viable Products. In the progression from Scrum to DevOps, the step has been made to really make the business a part of the squads and cooperate even more closely. For ING this meant a major transition, but not an optional one. Or, in the words of Henk Kolk, chief architect of ING: speed = market share and 'software is eating the world'. Kolk is convinced that existing firms have no future if they do not step up and drop the old dogmas.
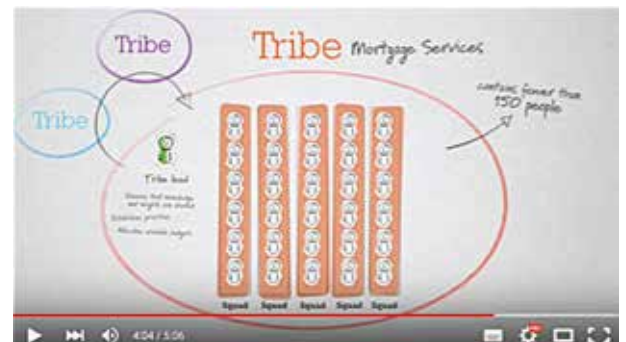
The video 'Agile way of working at ING Netherlands' can be viewed on YouTube, https://www.youtube.com/watch?v=NcB0ZKWAPA0

9 SUCCESS STORIES AND EARLY PRACTICES

Apart from ING Bank and Spotify (and numerous other digital startups), we see DevOps initiatives with Nasdaq, retailer Target and Lego (who employed Spotify expert Kniberg to this end) and General Electric (in the process of setting up one of its largest turnaround projects), and the list is getting longer by the day. The direction is clear: more and more organizations are seeking the answer to digital disruption in the combination of accelerating the innovation process, a culture with self-organizing employees and customer obsession as the focus for every activity. A few more examples are listed below.

Government

When the new healthcare act was passed in the USA, a website was needed where people could sign up. When it was launched, the site was far from user-friendly. It contained a lot of bugs and was instable. In consequence people protested strongly against this ramshackle course of things. The situation changed completely when a new team was engaged, a DevOps team, which introduced all the principles listed above. This turn proved a great success.

The British gov.uk also deploys DevOps successfully. They pride themselves on the way they deal with their mistakes. Or, as they put it themselves: 'Serious incidents trigger blameless postmortems.' The person involved in an incident writes a report that is widely disseminated in the organization. Shortly afterwards all people involved meet for a postmortem to figure out how this problem can be avoided next time. The reaction time to solve problems has been increased considerably. They claim, for example, that thanks to the DevOps method of working,[32] rapid intervention could take place after the discovery of the Heartbleed bug.

Insurance

The American insurance company Nationwide claims success thanks to DevOps.[33] They started small and have now implemented DevOps everywhere. The productivity has increased, the quality has gone up and the downtime for the end user has fallen by 70 per cent.

Retail

Target recently financed an in-house incubator to teach engineers and senior IT managers to work in a DevOps model. The DevOps initiative at Target began over three years ago as a grassroots movement, but is now making good progress.[34] The new organizational approach is primarily focused on a closer co-ordination between engineers and product deployment, and on more flexible development and testing of applications.

And there are others, such as Western Union, airline company Qantas, health insurer Humana, GE Transportation and Verizon, in different sorts of industries, in different countries and each with a specific focus and maturity.

32 http://heartbleed.com/
33 https://www.youtube.com/watch?v=_uprgTAMA_Q
34 http://blogs.wsj.com/cio/2015/10/19/target-rebuilds-its-engineering-culture-moves-to-devops/

10 TEN FINAL DEVOPS QUESTIONS

Particularly after sharing these success stories, the question arises if it is all too good to be true. Where are the limits of what is possible? Do we know precisely what the consequences are?

1 What are we letting ourselves in for?

This is a major operation. 'No easy fixes' may sound easy, but it requires enormous discipline and conviction. It is about a top-down power and control shift. About introducing new roles and functions, and disappearing management layers. It is a new method of working that everyone has to get used to. Finance, HR, operations, marketing, project management, IT: nothing will be left untouched. Similarly, the Minimum Viable Product approach demands perseverance, and there is no such thing as a watertight guarantee for success. We refer to the critical remarks in this context by Scott Anthony ('The Dangers of the Minimum Viable Product'), from the school of Clayton Christensen.[35]

2 Is DevOps suitable for everyone?

Like the question 'Is the cloud for everyone?', this question can be answered with a simple 'yes'. You may also ask yourself what alternatives you have to innovate faster and keep up with your customers, to flesh out the 'focus on the customer' concept and ensure more engagement on the shop floor. Or how do you think you can prevent mistakes in the operation without optimizing the IT processes (Automate)? In short, chances are that you will end up with the very same elements as those of DevOps. But this brings us to the next question.

3 Does DevOps apply to the entire IT organization?

DevOps is a new method of working that has its origin in digital production environments. Here the deployment of DevOps for the back-end environment (which is not designed to be operated in a DevOps manner) is being questioned. A solution that is often suggested is a 'two-speed IT' approach. IBM, for example, proposes to separate the 'Cloud Native' and the 'Cloud Enabled' teams. The one type of team focuses on the fast release cycles, the other on matters such as uptime etc. Both use DevOps, however. It is true that we find similar separations with the digital startups, but they strive for the same 'engineering culture'. Two-speed IT, or 'bimodal IT', seems to suggest that a watershed can be realized quite easily.

4 Can DevOps be effective for the entire organization?

Some call it the 'Spotify next step': DevOps for the entire organization, including non-IT sections such as sales and the legal department. For the majority of the organizations that have adopted DevOps, this territory is now being explored. In this context, it is important to realize that what is perhaps still 'non-IT' today, will have a substantial digital component tomorrow. Sales automation and digital legal consultancy, for example, are advancing. Organizations are already experimenting with 'agile sales', in which many DevOps principles can be recognized. Challenge centers, where 'decisions can be collected' as an alternative to endless meeting, are other examples of DevOps.

35 https://hbr.org/2012/04/the-dangers-of-teh-minimal-via

DIGITAL PLATFORM
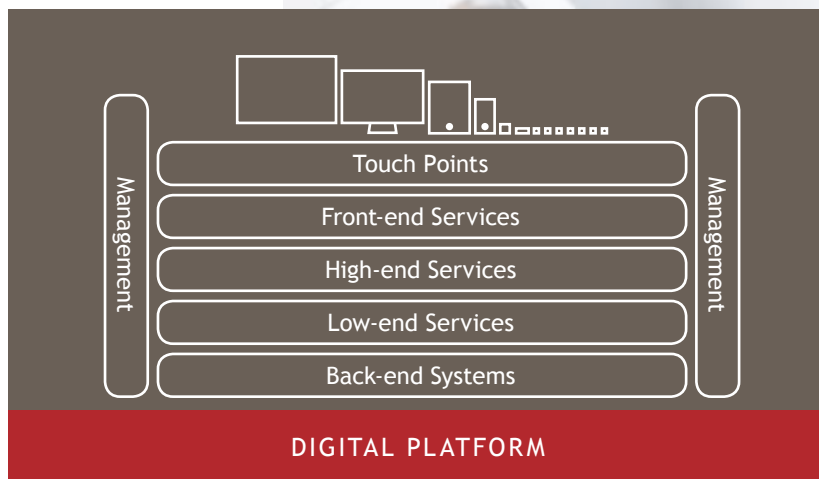
5 But what about portfolio management, security, architecture and compliance?

Basically, the DevOps approach can be applied to any organizational duty, from closing a data center to answering the supervisor's questions. These activities demand a different kind of co-ordination — some would say 'military discipline'. Supervisors should not be burdened with answers from different DevOps teams. Certain competencies, tasks and authorities rest with the guilds. They occupy themselves with matters that transcend the tribe.

6 What does this mean for my software architecture?

DevOps leads to an architecture that enables changes in one place without necessitating adjustments elsewhere. This applies to the architectural strata as well as the functions. This is the reason why *microservices* and *APIs* go so well together. An argument against this is that it is easy to do many things quickly. When it comes down to implementing a major transition, a more comprehensive plan and another blueprint are required.

7 Can you prove that it works?

Real hard figures are missing. This is tricky obviously, because where would you start? Calculating the ROI of the possible survival of disruption? You can prove that test automation is paying off, that standardized deployment models entail fewer mistakes. That business is faster. We see ING's figures. We see successful startups. The real figures have to come from your own customers. How much more satisfied are they? And your employees — are they more engaged, do they behave more like the entrepreneurs in the organization? At the end of the day you will have to prove that DevOps helps you survive in the age of digital disruptions.

8 Can you learn lessons from others' mistakes?

We started this report with this very disclaimer. As in the case of many 'approaches', DevOps too has to deal with the problem that it is applied instrumentally. Here the focus is on the process and on the standardization of methods of working, instead of what DevOps stands for: a culture of collaboration, individual initiative and mobilizing bottom-up forces, of self-organizing teams. To prevent the pitfall of an instrumental approach, you need good people. Or conversely: the final result will be mediocre when mediocre people are made responsible for the implementation of DevOps.

9 But those self-organizing teams — surely this has been tried before?

We have known self-organizing teams for a long time, and in fact they were never really gone. Elements of self-organization are found in many management theories. The question is whether self-organization will make a break-through and become more dominant. That prediction has also been made before but has never proved to be correct. The only thing we can add is that over the years technology has changed. And that there is a more natural match between current technology and self-organization. The manager's coordinating job as a middleman and supervisor is increasingly taken over by technology, from a simple WhatsApp group for a team, to dashboards that provide real-time insight into the performance. And finally we can state that the pressure to organize management differently, on account of the inertia in the traditional culture versus that of the digital disruptors, is substantial. Self-organization is currently regarded as a solution rather than a problem.

10 How to introduce it?

ING's drive to introduce DevOps evokes respect. But at the same time, people refer to the risks that are being taken. Which approach is to be preferred — the rigorous or the careful one — remains to be seen. But the fact that DevOps is introduced with continuous feedback loops in order to learn is obvious: it is inherent in its philosophy. Some say: 'For the time being I'm not going to turn everything upside down' (when referring to the existing organizational structure) and start off by aiming to create a situation where values are paramount. This in itself will drive away parochialism and promote collaboration.

11 DESIGN TO DISRUPT CONCLUSIONS

In this final report in the series of four about digital disruption one tricky question is central: what should an organization do to suppress the startups assailing his market? Or, to put it differently: what can we learn from them? In two earlier reports we looked at aspects such as the character of those startups, their design principles *(New digital competition)* and the acceleration of innovation *(An executive introduction)*. In these reports, as well as in the third (on blockchain disruption), we already drew conclusions as to what challenges organizations are faced with. A summary follows next.

DESIGN TO DISRUPT
An Executive Introduction

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DESIGN TO DISRUPT
New digital competition

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Blockchain: cryptoplatform for a
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Ten conclusions from the previous reports

1. CIOs should lead the way in disruption. The CIO operates in the digital heart of disruption — his language is digital.
2. Make a sacrifice in terms of efficiency, and go for effective disruption. Your chances will increase: nowadays the ROI on innovation is a lot more favorable.
3. Continuous Disruption is a rule rather than an exception. Prepare yourself by setting up an organization with Continuous Design as the basic principle.
4. It is not the technology alone, but also how trust is organized in markets. Employ distributed and bottom-up systems that use different design principles when it comes to generating trust.
5. 'Rethink business models.' Platform organizations dominate markets and the business models for these markets do not work along the same lines as in the traditional markets.
6. Learn from the bilateral market players and their design principles. We formulated ten in the second report.
7. Experiment with blockchain technology to quickly familiarize yourself with new organizational paradigms.
8. Go for APIs and make them the spearhead of your digital strategy.
9. Design customer obsession. In the digital age customer contacts are generated in their 'mobile moments'.
10. Transform in four steps:
    1) create a transformative vision on your digital future;
    2) involve employees in this vision;
    3) develop a powerful new governance model;
    4) merge IT and business and transform into technological platforms.

Mastering disruption with DevOps

In this last report we put forward the following proposition: you can keep disruption under control if you start working with DevOps. This position is bold and as attractive as what Eric Ries claims in his website: 'You don't have to work in a garage to be a startup.' Innovation expert Clayton Christensen is equally positive: organizations 'Can Survive and Thrive Disruption'.[36] In this context, Kevin Kelly, founder of *Wired Magazine,* said earlier: 'you are not too late': traditional organizations can still catch up to yield digital success. We are, after all, only at the very beginning of this new era, Kelly says. We have summarized the conclusions from this report in the following six points:

I   The age of business disruption has begun

The digital startups are a phenomenon of these times. They respond to the changed needs and opportunities in this technological *roll-out stage*. This neo-Schumpeterian view of the developments sheds a new light on innovation. In this roll-out stage technological eruption is no longer predominant, but business disruption is. The digital infrastructure, which has been built up over decades, is taken into production. Adapting to this new era, which in earlier reports we also called 'The New Normal', starts with a transformative vision on your own organization. There is no blueprint for this, but the digital enterprise we described provides a number of clues.

II   The digital enterprise as a beacon

Everything the digital enterprise does is digital: every product and every service is digitally enriched. The digital enterprise is *antifragile*: a match for market disturbances. It is end-to-end secure by design and swiftly transforms changing customer wishes into new services. The digital enterprise is data sensitive: feedback loops from assets and customers (empathic pulses) feed the actions and it goes for facts over guesswork. The digital enterprise works ecosystemically: all internal systems are data-driven and opened up with APIs. The digital enterprise is built on value networks instead of value chains. The digital enterprise is experienced as 'delightful': as-a-service delivery has removed all handovers in the processes. And the digital enterprise is experience-oriented: it generates world-class customer experience.

III There are no easy fixes: management innovation is unavoidable

We sketched a picture of the path that could lead to this digital enterprise: management innovation as an alternative to seemingly easy fixes. It seems attractive: buy a startup and be successful. Or engage your attorneys to enter into combat against the unfair competition of startups. Or start up your own incubator, get on your soapbox and proclaim your proposition that every employee is an entrepreneur. Produce a couple of Power-Point slides saying that the customer must once again become the focus of attention. Get on a plane to Silicon Valley to copy the art. These are all mere trifles in comparison with the real challenge that organizations are faced with: bending the rules and adjusting the culture with a view to operating much faster, making the customer the focus of attention once again and ensuring that your employees are becoming engaged.

IV Address the hierarchy and the culture; kill bureaucracy

Management was once just an invention among many others, a 'product' of a certain era, says Gary Hamel. And, just like innovating products, management will need to be innovated to guarantee the success of an organization. Existing management and governance models are often in the way of organizations that are trying to keep pace with developments. After all other forms of innovation that we have witnessed over the last few decades, it is now innovation of management that will increasingly hold the spotlight.

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36 C.M. Christensen & M. Wessel, 'Innovating over the Horizon: How to Survive Disruption and Thrive', webinar, March 13, 2013, https://hbr.org/2013/04/innovating-over-the-horizon-ho.html

V Speed, customer obsession and engagement

Startups are faster, customer-obsessed and have a team of extremely engaged employees. Many organizations would give anything to have those elements. Our conclusion is that if the gap between your organization and the startups concerning these three elements is not bridged, the disruptive forces will win.

VI DevOps and Lean Startup are forms of applied management innovation

DevOps and Lean Startup are disciplines that practice management innovation. In either case, the origin is in managing digital products and services. It is only obvious that the transformation should start there. It is understandable that the marketers first work with Lean Startup, where product innovation is just a little bit more central. The IT people, who are also responsible for building and maintaining those services, rather tend to end up with DevOps. But these are only minor differences. Because when you start working on it, you start innovating management: responsibilities in self-organizing teams, the customer setting the course of the innovation, minimizing bureaucracy.

VII Disclaimers

DevOps is not going to work if ... And we could now make a long list of arguments why business transformation could fail. Let's leave it at these three:
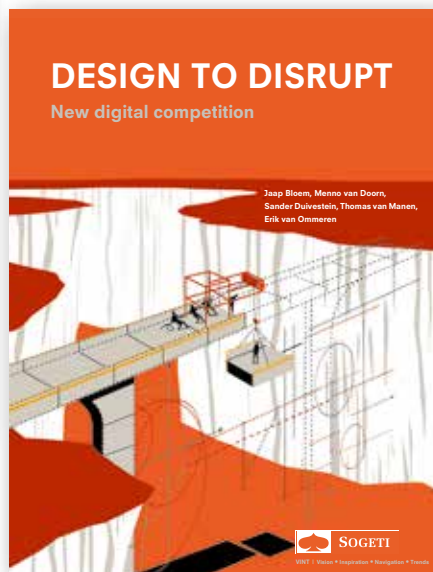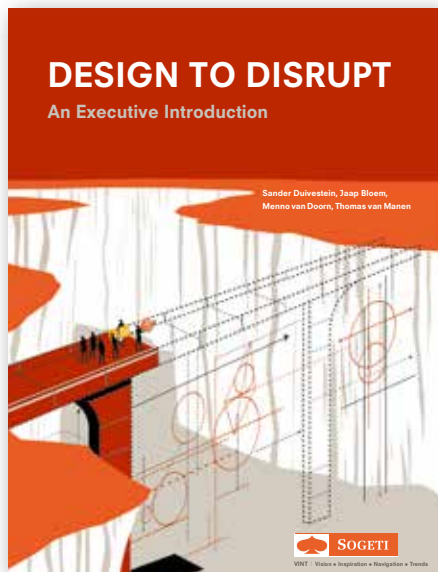
- There is no transformative vision on digital disruption.
- Mediocre people start dabbling with it and the result is an instrumental approach.
- There is a lack of true perseverance. It requires a great deal of discipline and attention to make the transformation succeed.

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