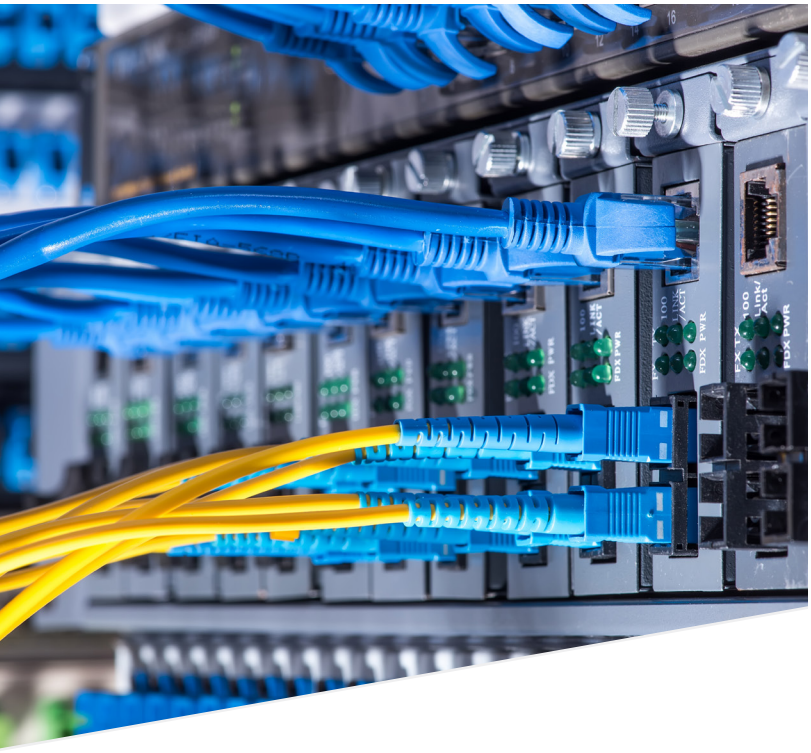

WHITE PAPER

A Journey Towards Digital Operations Excellence

The New Digital World

VITRIA®

Contents

The New Digital World

In recent years, Digital Transformation has become a strategic focus for many businesses. Companies are using new technologies to change how products and services are designed, produced, sold, and delivered. In doing so, they are transforming how they operate and interact with their customers.

Companies such as Uber and Airbnb exemplify the power of innovative business models built with new technologies. There is a feeling in many boardrooms that one must transform or face extinction. And there is clearly a sense of urgency if one judges by the tone adopted by many executives. John Chambers, the Executive Chairman of Cisco recently said that "if you don't transform and use this technology differently, if you don't reinvent yourself and change your organization structure, if you don't talk about speed of innovation, you're going to get disrupted; and it will be a brutal disruption where the majority of companies will not exist in a meaningful way 10 to 15 years out".[1]

But where to start? How to move from generalities to specifics? This is the challenge faced by many executives today. Digital Transformation is not a question of "if" or "when", but rather a question of "how".

Transforming Operations to Thrive

Businesses are defined by the way they operate. Tesla, Netflix and Amazon to name a few, are transforming their industries by using radically different operating models than their historic competitors. These new operating models are not simply a more efficient version of traditional ways. By leveraging new digital technologies, operating models are being re-architected to introduce entirely new classes of products and services. And this is the real opportunity with Digital Operations: a new way to interact with customers, to create new and disruptive offerings and to achieve tremendous efficiency improvements.

Hence, this paper takes the position that moving to Digital Operations represents an essential step in the Digital Transformation journey. Operations are defined as a combination of people, process and technology required to deliver a product or service. This definition is well understood and widely accepted[2]. It highlights the driving role played by technology and underscores the importance of changing associated processes and skill sets.

It is the intention of this paper to provide structure and guidance to any organization that strives to reach Digital Operations excellence. Our knowledge comes from our work with companies in various sectors, helping them to leverage new technologies to master Digital Operations.

Emergence of a New Operating Model

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1. *Video Interview with John Chambers published by McKinsey&Company in March 2016*
[https://www.youtube.com/watch?v=9MmTjlUSfOs]

2. See for example:
Global Digital Operations Study 2018 - Digital Champions published by PWC
[https://www.strategyand.pwc.com/media/file/Global-Digital-Operations-Study_Digital-Champions.pdf]

Digital Industrial Transformation with the Internet of Things published by CXP Group and Accenture Digital
[https://www.pac-online.com/digital-industrial-transformation-internet-things-trend-report]

Adopting Digital Operations implies a change in the operating model. In some cases, the change is incremental, in other cases it is drastic; it all depends on the level of digital maturity[3]. The details of these new operating models vary, but they share some common attributes:

New Technologies for a New Model

AWARE	LEAN	RELIABLE	NETWORK-DRIVEN	MONETIZATION-FRIENDLY
Continuous real-time monitoring of operational health and performance, and the correlation with relevant business outcomes such as customer experience, sales, click rates, etc.	A better utilization of resources by connecting processes, leveraging Artificial Intelligence and automation to lower operating expenses.	In addition to minimizing defects, a focus on predicting faults and automating their resolution to avoid disruption.	Value chains are being replaced by value networks where the producer of a good or service orchestrates interactions between suppliers, distributors, promoters, after-sales services, etc.	Using the operational function to create new products and services, or the transformation of business models from standard product to complete service-driven ones.

Among the many new technologies introduced in recent years, Big Data, Streaming Analytics, Artificial Intelligence (AI) and IoT systems are common to most Digital Operations initiatives. They act as foundational blocks to support new operating models and are applied in many verticals, from telecommunications to manufacturing, from finance to healthcare. These technologies rely on fast and ubiquitous connectivity to propagate information across the organization. They can link different processes in real-time to create cohesive views and trigger concerted actions. These technologies offer many possibilities for transforming operations as will be explored further in this paper.

Common Challenges

The opportunity created by moving to Digital Operations is immense, but the challenge is commensurate. In a recent survey conducted by McKinsey & Co.[4], the "Lack of internal leadership or talent (both functional and technical) for digital projects" was cited as the top challenge faced by companies in meeting their digital priorities. Respondents cited Analytics and Data Science as areas with the most pressing needs.

Keeping pace with faster business processes and a lack of adequate technology infrastructure are also often cited as significant challenges. Some legacy operational systems are unfit to support new use cases with fast data ingest and AI. How then to introduce these new technologies into existing processes and make them work with other technologies already deployed? This can be a top concern for organizations looking to forge ahead with Digital Operations, but locked-in with "slow-innovation" vendors. The following section presents a framework to address these challenges.

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3. *See Achieving Digital Maturity published by MIT Sloan Management Review and Deloitte University Press* [https://www2.deloitte.com/insights/us/en/focus/digital-maturity/digital-mindset-mit-smr-report.html]

4. *Cracking the Digital Code, a report published by McKinsey&Company* [https://www.mckinsey.com/business-functions/digital-mckinsey/our-insights/cracking-the-digital-code]

A Framework for Digital Operations Excellence

It is useful to think of Digital Operations as a journey made up of several stages, each stage building on the previous one to eventually achieve a substantial transformation (see Figure 1). This sequential approach ensures that changes introduced are in line with people capabilities and process readiness; it mitigates risks to allow a smooth transformation.

Note that many organizations have already deployed solutions and created processes to address some of these areas. In these situations, it is important to keep in mind that despite its sequential nature, organizations can adopt this framework at any stage, provided they have achieved the required level of maturity described in the previous stage.

Figure 1: Five Stages to Digital Operations Excellence

Stage 1: Real-Time Operational Visibility

This is the foundation stage; data coming from sensors, log files, etc. is collected in real time, integrated and curated. This is the stage where variables that can be controlled are identified and baselines for performance levels are established, linking operational health metrics to business performance indicators such as customer experience and satisfaction. The objective is to obtain information that is meaningful for engineers, managers and executives to understand actual performance and make decisions with appropriate timing. This stage lays out a data foundation on which the entire business can draw knowledge and information on an ongoing basis.

Stage 2: Advanced Anomaly Detection

Once real-time operational visibility has been achieved, anomaly detection can be leveraged. In today's context, operational teams need to monitor performance of a growing number of assets that are based on new technologies for which they have limited knowledge. As a result, complex and nuanced problems can be missed or take too much time to resolve. By leveraging the power of AI and machine learning algorithms, anomalies can be detected faster and with greater accuracy. The work accomplished in Stage 1 plays a critical role in Stage 2 as it provides rich information to characterize various anomalies and eliminates meaningless alarms and false positives.

CASE STUDY: HEAVY MACHINERY MANUFACTURERS

Some heavy machinery manufacturers are moving towards a service-based model instead of traditional capex-driven sales with maintenance contracts. In this new business context, machine uptime is closely linked to profitability. Real-Time Operational Visibility is used with Analytics to create Advanced Anomaly Detection where algorithms are trained on historic data to establish digital twins' anomaly profiles that quickly identify the root-cause of an anomaly and mute redundant alarms to reduce time-to-repair and increase asset uptime.

Stage 3: Dynamic Populations: Control Over Change Management Activities

Being able to focus only on meaningful anomalies and quickly identify root-cause is highly desirable, but understanding anomalies introduced by "intentional changes" is also crucial. A study by Gartner cited that 85 percent of incidents can be traced back to some sort of change activities. This can be a scheduled software update, a new server coming online, a new OS version for a category of assets, etc. By automatically detecting changes and finding if they are generating anomalies, operations teams have greater control over change management activities[5] and can act quickly.

CASE STUDY: COMMUNICATION SERVICE PROVIDERS (CSPS)

Communications Service Providers (CSPs) do not have control over OS updates for their smartphone customers and this can be hard to detect in a large subscriber base. In this context, it is important to identify clusters of subscribers that change OS version and correlate those changes with anomalies (e.g. dropped calls). This allows CSPs to proactively notify affected customers, potentially push corrective updates and avoid customer complaints and inquiries by the thousands.

Stage 4: Incident Life-Cycle Automation

As new technologies are introduced, a vast quantity of data is generated. As a result, it is increasingly difficult to triage the information, make the right connections between various signals, prioritize actions effectively and determine appropriate courses of action. In a nutshell, operations teams are deluged by data of varying significance, which diminishes their effectiveness at solving core issues.

At this stage, the focus is on applying event-to-event correlations and machine learning techniques to aggregate in real-time all related anomalies and present only meaningful incidents based on historically acquired knowledge from Stages 1 through 3. The entire life-cycle for incidents can be managed, updating the severity and prioritizing its resolution based on actual and predicted business impacts. Using a business process management engine, operations teams can setup automated resolution processes per class of incidents.

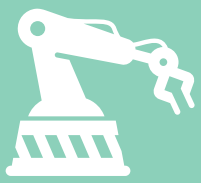
CASE STUDY: MULTIPLE SYSTEM OPERATORS (MSOS)

Multiple System Operators (MSOs) operate complex service-delivery frameworks that support different access technologies and devices to deliver a variety of voice, data, security and video services. Some services are deployed in the cloud or simply come from third-parties. And large parts of the network use virtualization, making it harder to detect issues and even harder to understand whom and what services are being impacted. In this context, Incident Life-Cycle Automation can discover incidents in real-time and trigger automated actions to adjust machine parameters, deflect support calls or to reboot service delivery components. The automation can also be used to improve the collaboration between large operations teams by mapping a complete incident life-cycle and the required actions to be performed by each team member for its resolution.

5. *Causal Analysis Makes Availability and Performance Data Actionable (ITOA)*, 2015, Gartner, Will Cappelli

Stage 5: Dynamic Failure Prediction

The cost of a production / service delivery outage can be very high. For many years, equipment manufacturers and operations teams have provided guidelines on periodic maintenance, based on controlled tests and experiences in the field. Stage 5 is about the ability to predict failures and optimize maintenance activities to reduce outages. The advent of IoT offers an unprecedented opportunity to collect predictors of failure state and AI provides the capabilities to interpret such signals, extract patterns and trigger pro-active resolution. This is potentially one of the most valuable stages as it allows potential problems to be solved before they impact the business or customers.



CASE STUDY: MANUFACTURING

Manufacturers using robots on an assembly line can collect sensor data for vibration and rotation and create signatures that predict likelihood of failure for a given robot. Then, by actively monitoring for occurrences of these signatures, imminent failures can be predicted, and proactive maintenance can be scheduled, avoiding costly downtime. This stage can have a large impact but is also probably one of the most difficult to achieve because of the specialized nature of technologies and knowledge required for its implementation.

The Role of Analytics

It is important to note that by focusing on objectives such as visibility, detection, automation and prediction, the proposed framework relies heavily on Analytics. Whether it is about predicting equipment failures or achieving better customer targeting for marketing promotions, Analytics is a key enabler. Thus, Analytics should be considered the keystone for many Digital Operations efforts and be embedded in most processes.

Finding the Right Solution

Technology plays an important role in Digital Operations. For each stage of the framework presented above, different technologies are called upon, with Analytics providing the foundation. This section looks at requirements for Analytics solutions in order to support Digital Operations using the framework presented above.

To facilitate the analysis, requirements have been divided into two categories: implementation and ongoing operations. In other words, what is required to get a solution up and running and tackle Stage 1 of the framework vs. what is required to operate a solution on an ongoing basis and progress through all five stages of the framework. The distinction is useful to avoid point solutions that cannot grow with business needs.

Implementation Requirements

The main focus for the implementation phase should be to achieve tangible results quickly. The objective is to find a solution that can be customized, but not require months of efforts and costly consulting services. Thus, the solution should offer a large library of configurable routines that can be assembled in a low-code, visual environment to support quick iterations.

A low-code or no-code approach will also greatly reduce the need for highly-skilled resources. As mentioned earlier in this paper, the availability of skilled resources for Analytics and more specifically for Data Science and AI is problematic. Because of that, the solution should not require expert knowledge to be used and operated. This means that operations personnel can use it with minimal training because the complexity has been abstracted.

Another important aspect to consider is completeness. In this context, it means the ability to handle end-to-end data processes, from data collection to automated problem resolution in passing by adaptable AI algorithms. The objective is to maximize the reach of each engineered solution and limit the user and integration requirements with third parties.

From a technical point of view the solution should not be limited in terms of number of sites, number of users, systems it supports, quantity of data it can store, etc. In other words, it should be scalable. And it should be open, that is capable of connecting to third-party systems, especially legacy systems for data collection and any relevant operations system already deployed.

Operations Requirements

The most important aspect to consider for this phase is the ability for a solution to be extended and support new use cases throughout the journey. It is also useful to think in these terms because businesses are not static and constantly evolve creating new needs over time.

In a similar vein, the solution should have self-learning capabilities to adapt to changing conditions. More specifically, this means a solution where models that underpin AI algorithms can update themselves with minimal human intervention. This is not only to save time and trigger greater agility but also to avoid hiring specialized resources such as data scientists.

Finally, even if it was cited as an implementation requirement, the need for achieving results quickly cannot be understated and has to be considered in this phase as well. The goal is to select a solution that can improve performance within days, not months and deliver quick wins. This will allow an iterative approach to fine tuning the solution and minimize risks on the path to Digital Operations excellence.

Conclusion

Most companies have adopted a Digital Transformation strategy to remain competitive in the long-term. They are using new technologies to change fundamentally how they operate and interact with their customers. In this effort, Digital Operations plays a central role because it offers the opportunity to create new and disruptive offerings and to achieve tremendous efficiency improvements.

Adopting Digital Operations implies transforming the operating model so it becomes:

- Aware
- Lean
- Reliable
- Network-Driven
- Monetization-Friendly

In this context, new technologies such as Big Data, Streaming Analytics, AI and IoT play an important enabler role. But, these technologies present challenges because they often require users to have highly-specialized skills; something many organizations lack.

To overcome these challenges, Vitria has developed a five-stage framework to be used in conjunction with its VIA Digital Operations solutions. Each stage builds on the previous one to help businesses progress on their journey towards Digital Operations excellence. This sequential approach ensures that changes introduced are in line with people capabilities and process readiness.

By focusing on objectives such as visibility, detection, automation and prediction, the proposed framework relies heavily on Analytics. This is why Analytics should be considered the keystone for many Digital Operations efforts and be embedded in most processes.

Finally, in order to achieve Digital Operations excellence, businesses should seek Analytics solution that can be used by non-specialists, that can deliver results quickly, that can accommodate new use cases and grow with the business.