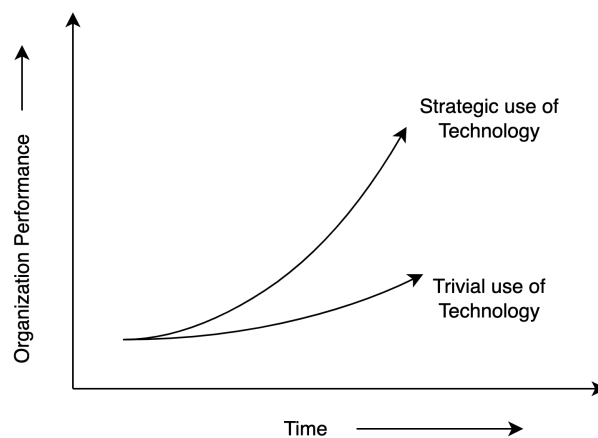


Technology Driven Operation and Delivery Model for Modern Organizations

Introduction

Technology provides competitive advantages to the companies by driving business values to outperform competitors in achieving commercial and non-commercial goals. *James E. Bessen*¹ published a paper in 2017 and concluded, "*Strategic use of technology explains revenue and productivity gains more than mergers and acquisitions and entrepreneurship*". Here, "Strategic use of Technology" is the key as technology itself is pretty static and delivers value only when it is embedded into the operating model to build a high performing organization.

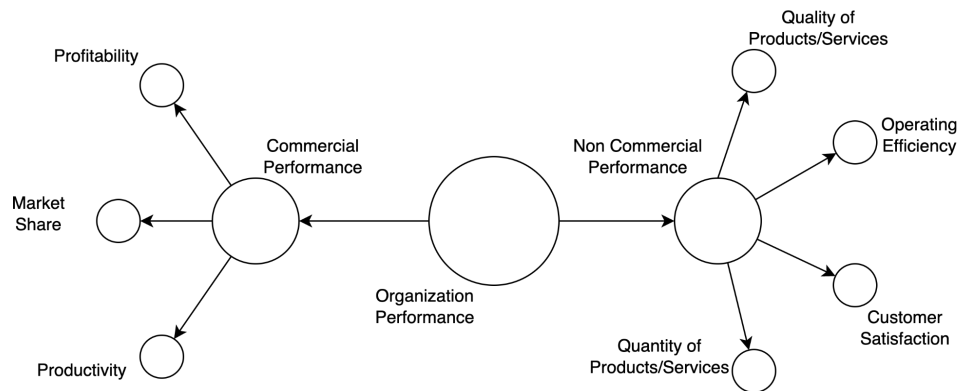


Technology is an integral part of every business today, still only a handful of organizations (like Google, Amazon, Uber, Peloton, Netflix) witnessed the exponential growth fueled by it, irrespective of the business model. These organizations championed this technology driven operation and delivery model to build a wide array of offerings that delight their customers and in turn deliver never seen before values to organizations.

Organization Performance Measurement

Before we define a technology driven model that elevates the organization performance, it is imperative to establish how we measure it. Fortunately, we don't need to invent, a lot of research has already been done in this field and validated over the years. According to studies, organization performance can be broadly categorized into - Commercial Performance and Non-Commercial performance.

*Sally K. Widener*² in his paper in 2007 established commercial performance across three dimensions - *Profitability, Market Share* and *Productivity*. Studies over years found that the likelihood of high performing organizations achieving these goals consistently is twice as high than low performers.



Similarly, *K.S. Cavalluzzo and C.D. Ittner*³ in 2004 validated that non-commercial performance of an organization is defined by *Quality of Products or Services, Quantity of Goods and Services, Operating Efficiency* and *Customer Satisfaction*. Studies have shown that similar to commercial performance, high performing organizations are twice as likely to consistently achieve non-commercial performance than low performing organizations.

Any operation and delivery model that a company adopts should improve the overall organization performance (both commercial and non-commercial) exponentially.

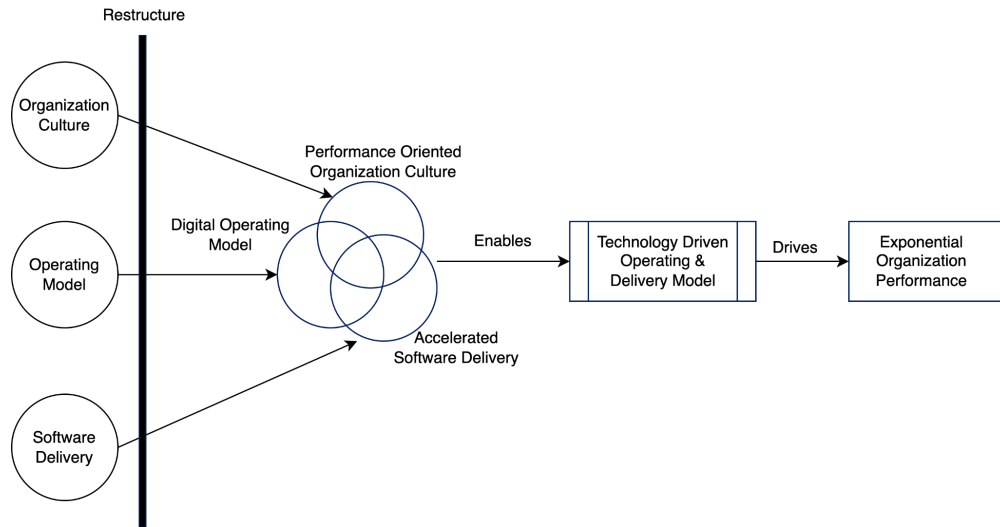
Technology Driven Operation and Delivery Model

This model allows organizations to experiment with new products and services, deliver work in small increments and often, and create a feedback loop to respond rapidly to customers and market needs. Google launched Gmail back in 2004 in beta version. I remember that for over a year, it was in experiment mode and once the Gmail team was satisfied with their product, they called it an actual product. Similarly, Google has discarded many products in the past that failed to meet consumer expectations. Furthermore, it keeps on releasing new updates to existing products very frequently.

This model mandates fundamental changes to the fabric of an organization. It requires a complete restructuring of Organization Culture, Operating Model and Software Delivery. In other words, an organization will require to:

- Practice a performance-oriented organization culture
- Adopt a digital operating model

- Accelerate software delivery



These characteristics are not mutually exclusive, rather they complement each other and always overlap.

Organizational Culture

People and Information flow are at the core of any organization and a human-centric organization culture that allows fast-flow of good information is necessary to not only sustain but to thrive. An environment where people feel empowered and confident, and where information flows paths are well defined and optimized, motivates people for innovation, diligence and collaboration.

*Ron Westrum*⁴ in his paper in 2004 proposed a typology of organization culture in context to their response for signs of trouble and opportunities of innovation. He established three types of organizations - Pathological, Bureaucratic and Generative.

A pathological organization is power oriented, where messengers are shot and people are constantly in search of a scapegoat. In such an environment, collaboration and innovation are discouraged and information flow is minimal. In my experience, this kind of environment forces people to leave companies too soon and organizations fail to build stable teams that comprise motivated and intelligent individuals. Few years ago, when I engaged with such a team, I hardly found a person who was motivated and driven, the attrition rate was very high and people were unwilling to share any information. Such culture should be avoided at all the cost.

A bureaucratic organization is rule oriented, where following protocols is more important than accomplishing the mission. Traditionally, large organizations practice this culture and for good

reason as bureaucracy ensures fairness through well-defined processes. However, this model is department centric where people do not care for the overall goal and driven by their rules. It does not shoot the messenger but neglects him and does not seek a scapegoat, but finds the culprit to punish him. In my experience, such an environment people resist every change and it also introduces significant delays due to red tape between departments. This type of organization can sustain but fail to elevate their performances. Large banks that are inherently bureaucratic in nature are still doing fine but the new breed of Fintech organizations are eating into their market share.

A Generative organization is performance oriented where mission is most important. Ownership and risks are shared and failure leads to inquiry with the purpose to avoid a repeat and not to find the culprit. These types of organizations have high trust across the hierarchies, teams and individuals. Teams collaborate with each other to achieve a common goal and information flows freely and in a timely manner. New ideas are celebrated and encouraged. This type of organization culture fuels the organization performance and is the foundation to become a high performer.

A Generative Organization (Performance Oriented)

Focus on Outcomes and not on Output

Result of an action is an output and the effect or impact of the output is the outcome. Organizations often measure their performances from the lens of outputs whereas the focus should be on outcomes. Evaluate the impact of an activity and the difference it makes.

The Indian government in 2014, launched a scheme named “*Jan Dhan Yojna*”⁵ to open bank accounts for people who did not have access to banking. Outputs of the scheme: Over four hundred eighty million beneficiary and over 12 billion USD in accounts. Outcome of the scheme: Inclusion of almost every adult into the formal financial sector that allowed the Indian government to deliver benefits to them without any middleman.

Focus on Teams and not on Individual

In an organization, it is not the individual but the teams that deliver. Success and failures are of teams and not of individuals. Reward the whole team for any achievement and inquire the team dynamics for any trouble.

*Google*⁶ did a two-year study to find the key ingredients for a successful team and converse to their belief they found, “*Who is on a team matters less than how the team members interact, structure their work, and view their contributions*”.

Become a human-centric Organization

People are the primary asset of any enterprise and are pivotal in bringing success. Always look for an opportunity to elevate people’s experience, create policies from a human centric

viewpoint to make work sustainable. The goal is to provide an environment where people identify themselves with their organization.

In my experience, there are certain problem areas that are common to almost all the organizations and they should be addressed without delay. An organization must invest in learning, ensure high job satisfaction, build a diverse workforce, establish an effective and inspirational communication channel between leaders and employees, and focus on reducing burnout.

Prefer Evolution over Maturity

We are living in a dynamic world where beliefs, principles, technology and every other thing is constantly changing. Organizations often believe in maturity which is static by nature. Organizations that follow a maturity model often get stuck at maturity level. Organizations need to be evolutionary to keep pace with rapid changes happening in industry. Kodak and Nokia are two great examples of organizations that were doomed because of not being evolutionary.

Go Lean

Delivering work in small increments requires organizations to join the Lean Movement (originally from the manufacturing industry) and map their business model to lean practices. The basic principles for lean practice are to have self-sufficient and empowered small teams that have capability to make decisions, limit work in progress, slice work in very small batches, provision for constant customer feedback and scope for experimentation.

Matthew Skelton and Manuel Pais in their book *Team Topologies*⁷ have proposed a model for team structure and their communication model to build high performing teams. This is not the only model but a very effective and popular one. I can vouch for it myself because I implemented it in one of my engagements, and outcomes were remarkable.

Operating Model

Business model defines the value that it wants to create for its customer, however it is the operating model that realizes it. Research work in economics and management showed that for organizations to thrive, they need an operating model that can deliver value at scale, offer a wide range of products and services, and learn consistently to improve and innovate. Traditional, human centric operating model becomes quite inefficient after reaching a certain threshold in all three dimensions and becomes unmanageable.

Modern organizations overcome this limitation by adopting a digital operating model that replaces human activities by technology. This new model allows firms to deliver a broader range of products at a never seen scale with learning and adapting at a faster rate. Unprecedented success of technology first organizations like Google, Amazon, Uber, Peloton, Netflix, Ant

Financials or Zerodah confirms the impact of the digital operating model to excel in delivering value to customers.

Digital Operating Model

Automation Centric

Human intellect is unrivaled in strategizing, discovering, innovating, designing and analyzing but it is equally inefficient in performing operational activities. Humans are bottlenecks for operational efficiency. Automation of operational processes is the answer to this question. Technologies and artificial intelligence are capable of replacing people for every trivial operational function and trivial decision making. Automation can achieve scale and efficiency that is impossible for human beings. *Anne Marie Neatham*, COO of Ocado Technology said, *“Human beings can do everything that AI can do, they just can’t do it to scale”*⁸. Automation requires an organization to restructure into a modular unit so that every operational process can be plugged into both internal and external units, partners, providers and even individuals.

In a traditional financial institution, customers often rely on their broker for status updates, advice and recommendations, and so scale is limited by the number of licensed brokers. Modern automation centric fintech organizations remove human barriers from most of the operational activities and so can onboard as many customers as possible. Ten minutes grocery delivery business that has gained popularity in India is made possible only by use of technology and AI.

Focus on Data, Analytics and AI

Data is the new gold as it opens the door for creating customer centric products and services by leveraging data analytics and Artificial Intelligence. It enables AI models to learn and automate trivial decision making that otherwise requires humans. Unsupervised learning helps organizations to find new ways to create values for both customers and organizations. At the bare minimum, organizations should build a data platform that allows data analytics and AI tools to process it. Remember, every data is important and should not be ignored.

Netflix uses customer data to not only provide recommendations but this data allows Netflix to create content that people want to watch. Fidelity built a data platform that allowed it to improve its offering to customers and provide a better experience.

Data, Analytics and AI are still in their early stage and have the potential to revolutionize the way we operate today. Early adopters already have an edge but it is not late yet and should be part of strategy for each organization.

Software Delivery

The heart of the technology driven operation and delivery model is the efficiency and effectiveness of software and its delivery. Setting up a generative organization or adopting a digital operating model is strategic in nature but the real work happens at software delivery. Traditional tools and methods are not capable of supporting this type of organization culture or operating model and requires a complete rethinking. In my experience, unless an organization is ready to revisit, unlearn and learn its software delivery models, it cannot compete with modern, technology-oriented organizations.

DevOps is the modern methodology to deliver software by bringing business, development, quality assurance, operations and infosec together to work towards common goals of delivering high quality software that matters to its users with high architectural characteristics (reliability, availability and much more). A Forrester report suggests that DevOps is an accelerating technology for software delivery and a must for every organization. The good news is that in the past few years, its adoption rate has been increasing exponentially.

*Jez Humble*⁹ defines Continuous Delivery as “*the ability to get changes of all types—including new features, configuration changes, bug fixes and experiments—into production, or into the hands of users, safely and quickly in a sustainable way*”. It is a fabulous definition and sums up why continuous delivery is at the core of software delivery.

DevOps Enabled Software Delivery

Measure Delivery and Quality in Right Way

In a typical setting, lines-of-code, velocity and utilization is used for measuring software delivery performance and the quality of delivery is completely ignored. Unfortunately, lines-of-code can not be a measure of *efficient code*¹⁰, velocity maps to *team capacity*¹¹ and utilization above a threshold *negatively affects the performance*¹². Moreover, these measures are merely outputs and do not tell anything about outcomes.

Two dimensions of software delivery matters for organizations, firstly the velocity of software delivery, i.e., how frequently software is being delivered to its end customers and secondly the quality of it, i.e. how stable is the application after software delivery. Software delivery velocity can be measured using delivery lead time and deployment frequency, whereas time to restore a service and delivery fail rates can be used to measure stability of software delivery. *Nicole Forsgreen, Jez Humble and Gene Kim*¹³ in 2017 did a comparative study to find that high performers consistently outperform the low performers in these four metrics.

Build Capability-As-A-Service

A comprehensive and overwhelming system that encapsulates all the capabilities at one place appears to be an ideal choice, however such systems pose challenges to build small teams to

work in parallel, to adapt to new technologies, to experiment with new features and to the cognitive capabilities of an individual. This type of system often ends up being a big ball of mud as described by Brian Foote and Joseph Yoder¹⁴ in 1997.

Modern product lines are built with the philosophy of Everything-As-A-Service with any architecture style be it monolithic (A bouquet of applications) or microservices. Build a capability by a single team and offer it as a service via interfaces. Cloud platforms have already championed this concept by offering infrastructure, platform and software as a service. Same concept can be adopted by organizations for developing a product line. For example, in one of my recent engagements, an IAM team developed single-sign-on as a service which means no other team in the product line had to worry about it at all.

This type of software development requires a disciplined approach, as termed The Twelve Factor App by Adam Wiggins¹⁵ where he summarizes learning from building applications on Heroku platform. In my experience, it should not be an afterthought but teams should consider it from the beginning.

Trunk Based Development

Adhering to the philosophy of lean development, we need to keep a check on work in progress and keeping a small number of branches in a version control is essential for that. In a trunk based development, team members work on short-lived branches and merge them often (at least once a day) with the main branch. This practice streamlines merging and enables continuous integration.

Interface Based Communication Between Applications and Teams

In 2002, Amazon's CEO *Jeff Bezos*¹⁶ sent an email to all employees mandated, "*All teams will henceforth expose their data and functionality through services interfaces. Teams must communicate with each other through these interfaces*". It was a key milestone in Amazon's journey. Interface based communication allows sovereignty of a team and application over its functionality. This loosely coupled team structure allows teams to work, experiment and adopt new technologies without affecting others. It allows them to choose their own tools and methods to elevate their performance. Inter-dependencies among teams often induce wait state and conflict. It can be achieved by following API first methodology and Contract Testing. API first methodology requires to define the contract first and then hide the implementations so that clients of APIs are not affected by any change in implementation. A contract testing ensures independent and parallel development by both clients of API and API developers itself. The API version is used for any restructuring of API interface.

Automate Testing

Delivering software at scale requires a fast and reliable testing mechanism. Humans are good at exploration but fare poor in repeating tasks, machines on the other hand perform fairly well in doing trivial and repeated tasks. Restricting manual testing for exploration only and automating

all other types of testing ensures a reliable and fast build each time. Trunk based development and API first methodology is possible only by adopting automated testing.

Static code analysis is another component of automated testing and tools like SonarQubes have championed in identifying trivial issues related to code quality, best practices and security without any manual intervention.

Footnote

The model I described here is strategic in nature and is inspired by my own experience that I learnt the hard way, case studies and scholarly studies already happened in this space. During this, my companion has been two books - *Accelerate*¹³ and *Team Topology*⁷. These two books helped me to connect the dots and come up with a model that I have seen being successful. I applied these principles to my engagements and reap the benefits. Human aspect of this transformation is a really daunting task because it requires unlearn and learn. This unlearning and learning process is specifically more challenging for senior leaders who are deeply rooted in an already established setup. These leaders are often opinionated and powerful. As an architect it this has been my Achilles heel to bring these people on board but using the right strategy and taking the right stakeholder into confidence make it possible.

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