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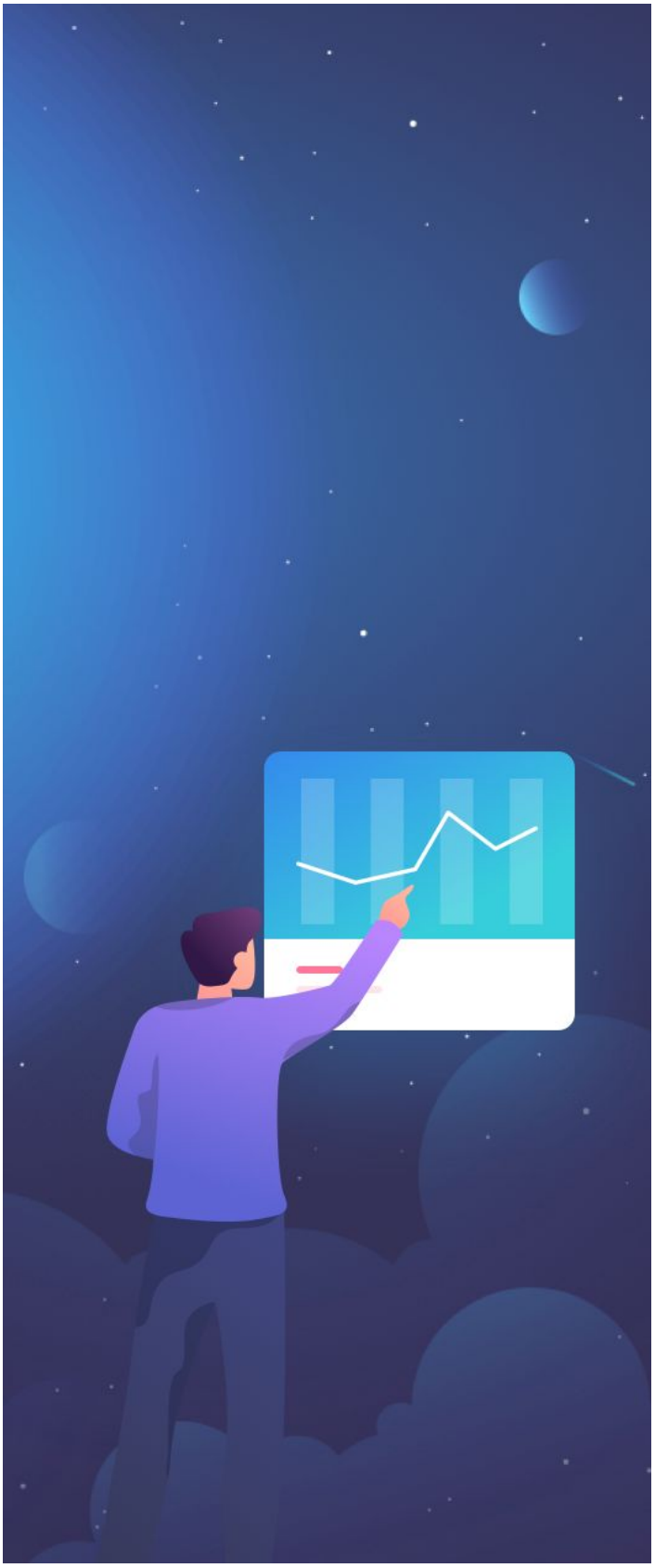

WHITE PAPER

Data Driven Work Management

Becoming a Data Driven Work Management Organisation

Forewords

Matthew Summers

Insiris CEO

For over a decade, we have focused on providing medium and large organisations with transformational technology. We've worked with dozens of businesses but a clear pattern has emerged: those that have adopted a Data Driven approach have consistently achieved more and grown in comparison to their competitors, irrespective of size and irrespective of industry.

This whitepaper has been written to pull together many different threads of what a Data Driven Work Management organisation looks like, and why we think it's one of the most fundamental and transformative changes a business can make. It's tough out there, and we know first hand how competitive this sector is for Field Service, FM, Logistics, Construction and other businesses that plan, execute & analyse work. The advent of technology - particularly buzz words such as AI, IoT, Machine Learning and Big Data - can cause confusion, with many businesses unsure of what direction to take their business in next. We hope that this whitepaper demystifies some of the fog surrounding these technologies, and others.

Our continued research into Data Driven WM informs the strategic direction of Insiris, and our focus for the next decade is on innovative next generation technologies, bringing AI, optimisation, machine learning and Robotic Process Automation to our clients. Our research clearly shows that the deployment of these technologies - which promise to turbocharge and revolutionise WM industries - requires businesses to adopt a Data Driven approach, choosing to base their business around data, the value it brings and generating true insight.

I would like to thank the team at Insiris, our customers for their insight in this research, and the wider technology market at large for their complementary research in the creation of this paper. I believe this information and research provides a framework and foundation for those organisations seeking to adopt data driven practices to drive revenue, and provide a platform for growth for years to come.

Dr. Duncan McCaffery
Insiris CTO

Working in partnership with our customers to help make greater sense of their own organisations and drive efficiencies only underlines our belief in the power of data driven approaches to the planning, execution and analysis of work. Putting into practice many of the principles found in this paper we have seen first hand the profound changes that can be made for the betterment of an organisation as a whole.

Data Driven WM is not a new idea. Collect the right data, formulate insightful questions, challenge perceptions with that data and come out with fast, actionable, astute decisions based on history. Feeding and applying those learning outcomes back into the operations process results in improved insight into work as it happens and thus produces a continually evolving and improving organisation.

Many organisations know they have efficiencies to make, but in our opinion, getting to the source of the problem can most reliably be achieved through a data driven approach. Most recently we saw this at an organisation we were working with who knew that dynamic optimisation would help deal with an increasing workload. Interestingly and unintuitively, the data showed that it was the optimisation of workers shift patterns which yielded the most benefit rather than optimising the work itself. As illustrated above a data driven approach not only compliments good gut decision but guides and amplifies them towards better outcomes.

It is well established that data driven work practices are already having a powerful effect in other sectors. Industry research is highlighting how these organisations are adopting new change oriented cultures which give them an agility and competitive edge. We believe data driven practices are a key requirement to respond to the demands of and succeed as a 21st century organisation.

Introduction

Work Management ("WM") businesses (and by this, we mean any organisation that employs teams that carry out work away from a sole 'back office') face a unique set of challenges. The disconnected nature and mode of operation of a scattered workforce (often geographically) brings distinct problems - and opportunities. Extreme competition over the past decade and the increasing democratisation of service, coupled with an increasingly more data-savvy customer base has forced businesses to radically, and in some cases, fundamentally, change their modus operandi. A recent survey[1] of more than 500 senior executives, indicates that companies making decisions based on data tended to do better financially.

Data is the backbone of any modern WM organisation. Without it, companies can languish, blind to the history of what happened, perilously oblivious to what is next around the corner. Becoming Data Driven is one of the most important, transformative steps a business can take. This whitepaper discusses the current landscape of WM technology, current uptake of a Data Driven philosophy and how to implement this key concept moving forward.

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> McKinsey Global Institute reports that data-driven organizations are now 23 times more likely to acquire customers, 6 times as likely to retain customers, and 19 times as likely to be profitable as a result

What is Data Driven Work Management?

Being Data Driven means agreeing with a fundamental principle: that the data a business generates, manages and collects has intrinsic value that, with the correct framework, can be put to work. Many businesses believe that their value lies in the product or service they offer - their unique selling point, or 'secret sauce'. A Data Driven organisation recognises that not only is their service unique, but the data that orbits their operation is just as unique, and just as valuable.

Data Driven businesses understand that data needs to be part of the company culture from the top down and the bottom up, not the exclusive remit of specific 'Data People'. This widespread deployment of data to all employees - the 'democratisation of data' - is a key tenet of the philosophy. Conceptually, the principle is agreeable, but deploying a strategy of data democracy - equipping all employees with access to data - can be a huge undertaking. An undertaking that can reap massive benefits: MassMutual, a Life Insurance Company, undertook a data democratising program to equip workers with access to data through new systems and a company wide App, leading to improved close rates on employer-sponsored retirement plans which grew from a 50% long term average to over 80%[2].

Why become Data Driven?

Make no mistake - there are many WM businesses that are incredibly good at what they do, operating on gut and experience. The question is, can operating on gut and experience be sustainable, over a consistent period of time? The simple answer is no, and there are numerous examples of companies that, armed with a data driven approach, have gone from new entrant in an established market, to utter dominator:

- Netflix, founded in 1997, recently surpassed Walt Disney Co as the United States' number 1 media company by revenue.
- Amazon is now the world's largest retailer
- Uber is the largest private transport company, despite owning no vehicles
- Airbnb is the world's largest accommodation provider, despite owning no hotels

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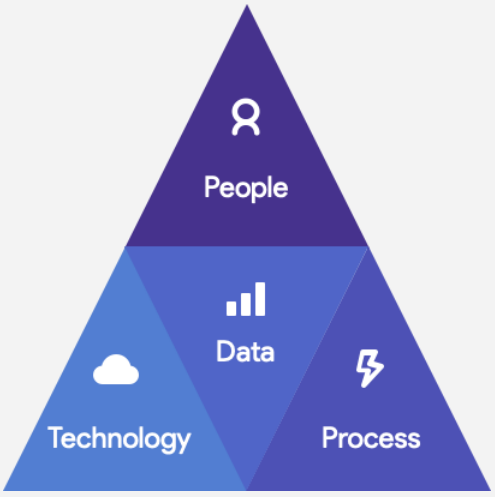
> Data democratization means that everybody has access to data and there are no gatekeepers that create a bottleneck at the gateway to the data. The goal is to have anybody use data at any time to make decisions with no barriers to access or understanding
> - Bernard Marr, Big Data in Practice



Successful implementation of Business Intelligence is often summarised with the 'Golden Triangle' - People, Process and Technology working holistically. Jeremy Wagner, MBA, adds[16] *"having the data that drives your individual business within your organization, can be the difference between being a leader in the market, or floundering when an insignificant company armed with REAL data, the right processes, the right people driving it, and having technology ready to execute on a plan comes into the picture and steals all of your business away from you (Southwest, Blackberry, Taxi/Uber, Blackberry/iPhone)."*

6 Data Driven Benefits

01 Awareness

Understanding if customers are happy, discarding poor business practices and spotting new revenue opportunities are common place and intuitive in Data Driven cultures. The purpose of data is not to reinforce decisions already made. "[Forward-looking companies] are tolerant of questioning - even dissent - about business decisions being made, as long as the questioning is based on data and their analysis."[3]

02 Responsiveness

Being proactive (such as spotting customers that might need work carried out in the field before they realise themselves) and using historical, real-time, 'right-time' and predictive data to inform decisions results in a business that can pivot with the organisational agility of a startup.

03 Consistency

Many WM businesses have individuals upon which thousands or even millions of revenue can be derived. These 'critical cog individuals' operate on intuition and experience to plan, liaise with customers and respond to issues. A big problem arises when these 'walking data silos' leave, when there is a succession issue or something significant changes. "The value of having a data-driven organization is that you have consistency over time."[4]

04 Longevity

Data Driven WM businesses spread data and knowledge around the organisation: people understand how decisions are made. Coupled with consistency, this bolsters company longevity by ensuring operations are based on systems and data in the long term, and not gut and experience: which can be dangerously short term.

05 Feedback

The very best Data Driven WM businesses don't just use data to respond in the now, but actively curate and recycle the insights generated from their data to change and grow their operations. This can provide a significant competitive edge over other businesses that remain stuck in their own echo chambers. Having 'built in market research' provides immediate feedback and organisation agility that can disrupt an entire school of thinking around 'how things should be done'.

06 Fast, confident Decision Making

Human intuition is remarkable and many businesses thrive on the ability of their staff to make gut decisions that outwardly appear almost divine. The truth is, when human intuition is 'on the money' it's because the decision is based on facts and data. Elevating and systemising this process such that it is integral, automated and not 'hit and miss' dramatically increases the speed and consistency of decision making.

Where organisations are today

How far have companies got with initiatives to capture the value in their Work Data? The increased familiarity with the concept of 'data', exploding demand for 'Data Scientist' roles and pervasive terms such as 'Big Data' indicate acceptance of the value of Data. But does this mean Data Driven is a core strategy of businesses?

The Value of Data

59% of respondents in a recent survey[5] say that the data their organizations hold is becoming "a core component of their market value". WM products and services are particularly customer centric - and low margin levels make for an ultra competitive sector. Understanding the customer, their actions, their requirements and their view of you, the supplier, requires a data centric approach. Understanding the value of the data an organisation has, and building a service offering that puts the data facts at the centre, is key.

Companies may understand the 'why' of data, but the 'how' of putting these principles into practice can remain elusive. Only 27% of executives surveyed[5] described their data initiatives as successful. This demonstrates just how hard it can be to enact a Data Driven approach in reality.

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> Established and incumbent WM businesses are realising that data silos and a failure to centralise and extract data value is making innovation difficult. This in turn is leading to threats from competitors and start-ups.

The organisations that are succeeding are those that are successfully implementing three key transformations:

- Evaluating and transforming their operational processes to put data at the very center
- Supplementing IT's skillset with other departments, such as Operations, to enhance and spread the value of Data
- Implementing technology platforms that support Data Driven businesses

Increased Productization & Feature Explosion

WM businesses have never had more choice when it comes to technology solutions designed to help manage the planning and carrying out of work. Traditional products, typically providing a web based tool and mobile app for field/mobile teams are varied and target the very smallest to the very largest enterprise. These technology providers, occupying a traditionally niche sector, now face competition from tech giants, encroaching on their space - such as Salesforce with Field Service Lightning, SAP's Field Service Management and Oracle's Field Service Cloud. These technology solutions have gradually increased the productization of the offering, with many players offering a 'one stop shop'. Certainly, the market is experiencing feature explosion with providers competing on breadth of offering. Integrated inventory management, time and attendance and other features traditionally procured from specialist players now occupy a dedicated area of Work Management tech solutions. The choice is vast: organisations have never had it better, right?

Maybe not. The fundamental problem with many of these 'off the shelf' service management solutions is that they are not built for the Data Driven business. A Data Driven business - and thus a Data Driven solution - puts the data first, every time, no matter what. Out of the box solutions often do the opposite - they enforce a prescribed data model on a business, and a prescribed way of working. They can work against the principle of Data Democracy - often providing mobile apps and field teams with keyhole access to the business' data. Analytics offerings promise to get businesses started quick - but a Data Driven business doesn't want to start 'quick'; they need to start 'right'.

Off the shelf solutions can provide immediate wins for many organisations - operational processes encoded in the software speeds up rollout and does indeed further standardisation and digitisation of processes. The issue is, those processes rarely match the processes of the organisation using it. A Data Driven business seeks to extract value not just in the capture of its data, but in the processing and transforming of that data through digitisation of its operational processes. The way an organisation does its business (those operational processes) is its USP - its secret sauce. If a Work Management solution doesn't allow the modelling and complete digitisation of those processes, then the end result can include:

- Delegation to manual processes, by people, outside of the data environment and a loss of visibility
- Compromising on the value - and the service - offered to customers

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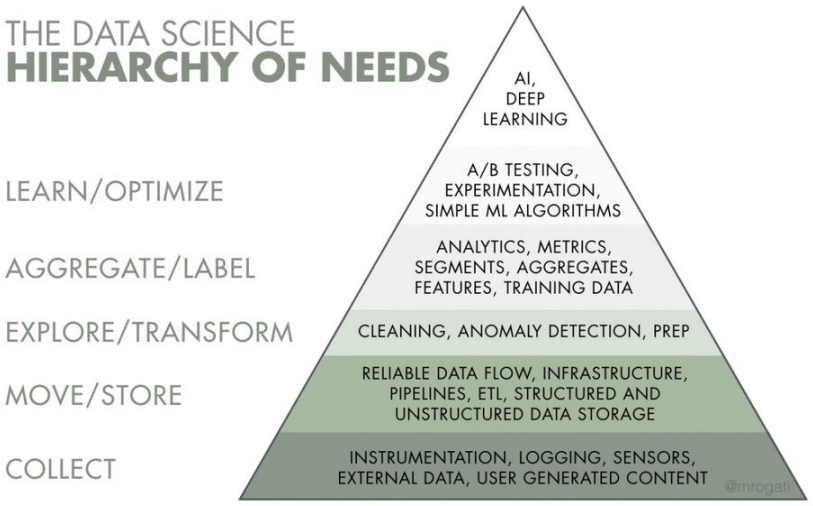
> Off the shelf Work Management tech asks you to sacrifice your data, and compromise your vision by trading Data Value for quick technology deployment wins.

Larger organisations, with complex operations can be particularly affected by this issue and often defer to building systems in house to cope with the complexity of their product and service, creating costly specialist IT teams to enact the Data Driven requirements.

Artificial Intelligence

Gartner predicts that by 2020, “10% of emergency service work will be both triaged and scheduled by artificial intelligence”[6], and that by 2022 “one- third of complex field service organizations will utilize machine learning to predict work duration and/or parts requirements”[7]. The single biggest inhibitor to the deployment of AI powered technologies is lack of quality, timely data. The Data Science Hierarchy of Needs[8] (shown right) outlines the need to gather the right data, in the right formats and systems, and in the right quantity. Any application of AI and ML will only be as good as the quality of data collected.



Professor Gary Marcus, of New York University (and former Head of AI at Uber) concludes that a “General Purpose AI” - one that can address any problem - is problematic and not attainable in the near future[9]. In the meantime therefore, AI and Deep Learning are techniques that must be applied to businesses in specific, targeted ways. Even generalised AI in areas such as “Dynamic Scheduling” require a Data Driven focus, and complete understanding of the data captured; it’s the reason why one of the only consistently well performing scheduling software functions is Route Optimisation - a problem that is singularly well understood.

Businesses have had mixed results with the deployment of automated scheduling technology, where project failure relates to complexity of operational processes.

AI in Work Management

Intelligent, Automated Scheduling
Robotic Process Automation
Chatbots
Predictive Maintenance
Image Classification

The second critical inhibitor to the deployment of intelligent, AI driven solutions, is the lack of skills in this arena - and relatively high level of specialism required to understand the design and application of the technology. The August 2018 LinkedIn Workforce Report found that there were more than 151,000 data scientist jobs going unfilled across the U.S[10]. In terms of skills shortages, big data and analytics is the number one place of need, according to a recent survey with 46% of CIOs who participated in the survey said they suffered from a skilled shortage, followed by a shortage in AI skills at 38%[11]. Organisations are increasingly turning to tech providers to fill data science and AI gaps in their Data Driven strateg

Data Driven is not Big Data

Organisations are beginning to understand the value in data through the media buzz in recent years around ‘Big Data’. New reports[4] indicate that ‘small data’, however, can be just as useful - and transformational.

“There is little correlation between financial performance and a company’s definition of ‘big data’ the number of datasets that a company uses, or the number of employees whose job responsibilities include analysing data”[4]

Where organisations are going

In this section we look at the 3 pillars of Data Driven WM organisations, and how unlocking the gate to Data gives businesses the keys to AI-Driven technology.

01 Treating Data as a Commodity

Data Driven WM businesses treat their data as a commodity - one that is generated as a 'free' by-product of their service offering. The focus here is on quality data not big data. Once an organisation commits to being Data Driven the next step is to automate the ingestion, consumption and transformation of data to make the best use of it - subsequently curating the expert knowledge and data relevant to the operation. By learning to recognise opportunity from insights through data, past, present and future, and discovering and ingesting every data touchpoint, a business can drive remarkable value and truly transform the way they do business.

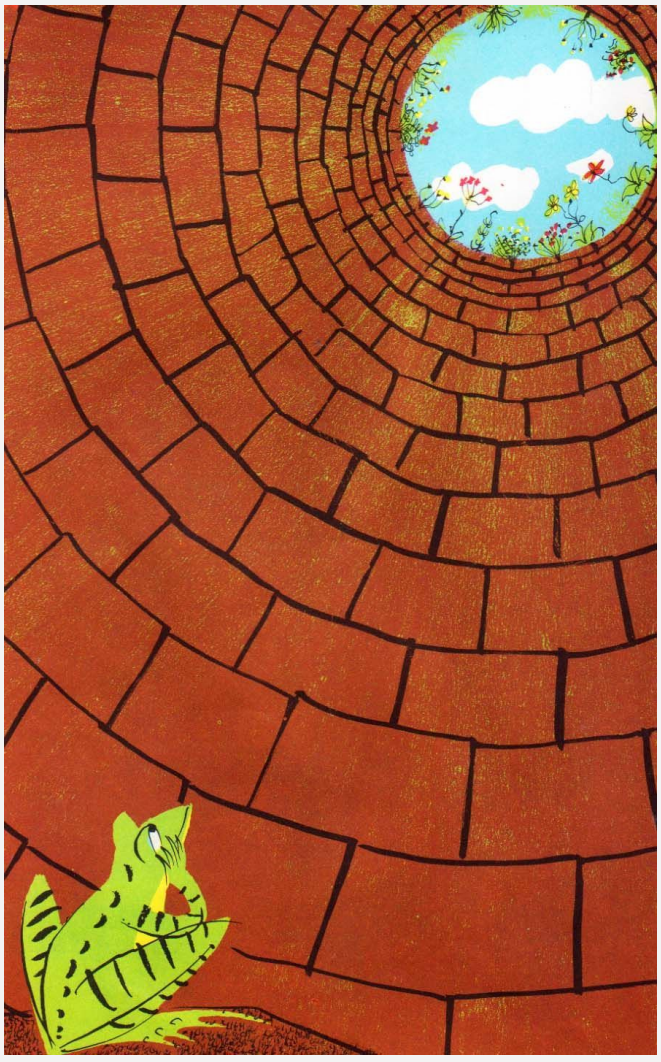
Data is the new revenue generator. By treating Data as the commodity it is, WM organisations can pursue relentless data improvements. Better business predictions fuel current and future decision making, thus a data-driven organisation can outsmart their competition and improve business innovation to unlock new revenue streams and drive more revenue year-over-year.

02 Data Democracy

"Collecting data is just part of it. Data often exist in silos, for example, sometimes overseen by protective divisional heads. For one thing, people need training in how to use data — especially since hiring data specialists can be hard and expensive. Moreover, concerns about security and privacy often stymie data sharing. On the other hand, there's not much use in collecting more and more data if you don't let people see it."

The goal of data democracy is to nurture a culture where everyone can learn from data - and anyone can challenge preconceptions. "Data silos are a serious business problem…companies need an operational data layer that is core to business processes and supports data sharing"[12], writes Walter Scott of Devvo Inc. The end goal is to spread data as far and wide in an organisation as possible, ensuring high quality decisions are made by all. Wm businesses have specific problems due to the mobile/dispersed nature of their operations - enabling non office-based teams mobile access to data has particular benefits:

- Less time spent in back office, on non productive tasks
- Reduction of work failure in the field
- Better outcomes through more accurate data



Is your company a Frog in a Well?

An ancient chinese fable about “The Frog in the Well”[13] tells the story of a frog quite happily living in a well - always bragging to the other animals about how wonderful his home is. The other animals, outside the well can see the frog’s narrow viewpoint: he can only see the sky, plants or animals if they pass over his well. One day, a turtle decided to educate the frog about the world, describing the vastness of the sea, richness of the land and diversity of life. Only then does the frog realise how much more of the world there is beyond his well.

This enduring story illustrates a universal phenomenon: Your view is limited by what you can see - the only way to change that view is to get out of the well: to ensure there are no frogs (teams) in any wells (data silos) in your organisation.

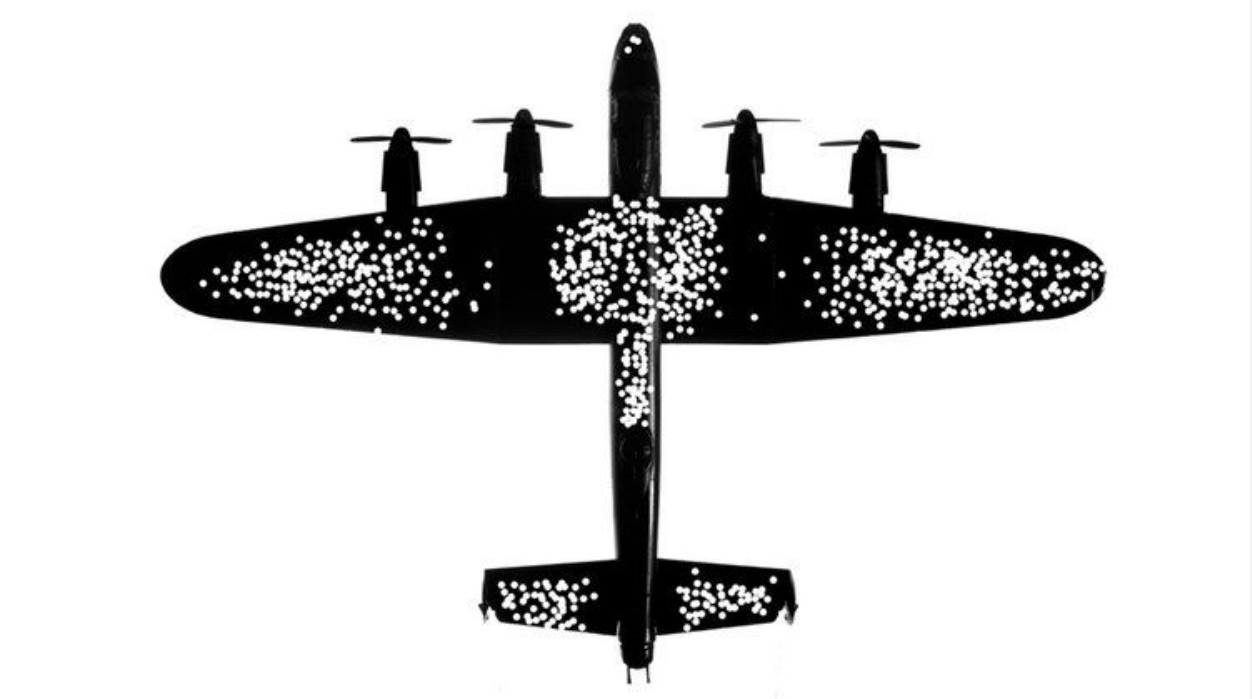
03 Metrics Driven

Data Driven organisations do more than just measure KPIs. They become truly metrics driven, seeking insight from their data first and foremost - making decisions with hard, empirical evidence, and not just gut feel. Technology tools that help automate intelligent processes and sift through data to aid human decision making are critical adoption pieces - tight integration of data and analytics enhance an organisation’s core competencies to unlock hidden business opportunities and become more efficient and effective.

Fundamentally, metrics driven operations end up with a high level of ‘data literacy’, analysing and arguing with data, developing a curiosity and willingness to make organisational changes. Targeted data analytics render key insights and play a paramount role in decision making - defining the future, entering new markets and disrupting existing ones.

Making Decisions based on the Right Data

During World War II, researchers at the Center for Naval Analysis faced a critical problem. Many bombers were getting shot down on runs over Germany. The naval researchers knew they needed hard data to solve this problem and went to work. Each mission catalogued the bullet holes from the planes[14] and the data showed a clear pattern: most damage was to the wings and body of the plane:



The solution was clear: increase the armour to the wings and the body. But the analysis was entirely wrong. Abraham Wald, a Hungarian-Jewish statistician reviewed the data and spotted the critical flaw: the researchers were only looking at the bombers that hadn't been shot down. The surviving bombers had little damage in the cockpit, engine, and the tail. These areas didn't have superior protection - these were the most vulnerable areas on the entire plane. The researchers had arrived at the exact opposite conclusion they should have - because of missing data.

Data bias is everywhere; Data Driven WM companies must take steps to ensure the entirety of data is captured, processed and analysed to ensure they make informed decisions that move their business forward.

Examples of a Metrics Driven Ethos

Automated, Intelligent Scheduling
Predictive Analysis (mean time to failure incorporating internet enabled sensors on hardware/IoT)
Detecting efficiency bottlenecks, such as congested areas, repeated failure of specific parts
Setting KPI targets based on real history
Identifying cost savings

Removing barriers to implementing next generation Tech

The “Data Science Hierarchy of Needs” illustrates the problem with deploying next generation technology in businesses that don’t have a data focus. The very best organisations will seek to become increasingly Data Driven, pouring a foundation of good quality, relevant, timely data upon which to build advanced, AI powered solutions.

For example, Gartner predicts[6] that dynamic scheduling solutions will become critical capabilities for Field Service Management businesses by 2022. Businesses must evaluate the technology provider space to understand whether ‘generalised’ AI-powered solutions - such as off-the-shelf scheduling - or more bespoke offerings better suit their organisations.

Becoming a Data Driven Work Management Organisation

As can be seen, there are a number of considerations in migrating to a Data Driven WM business. As a result of over a decade working in this sector here are our 6 guiding principles for transforming into an organisation that seeks to embrace the advantages of becoming data driven.

Choose Platforms that are flexible over Products that are fixed

When designing a solution and building a technology landscape that serves your Data Driven requirements it is key to keep in mind the importance of choosing products and services that mould themselves around your data. Choosing platforms that allow you to rapidly build a model of your data - in your language - is a fundamental requirement. Additionally, your IT landscape is likely complex and varied, with multiple systems and software in operation. Pick a platform that is designed to integrate and work with this data, not a siloed 'workforce management system' that draws you into a walled garden of one supplier's solution.

Make sure procurement of systems & solutions is a joint task between Operations & IT

Transformation projects can fail because of a lack of involvement from multiple departments. Getting all departments involved in choosing technology suppliers and specifying solutions minimises the chances of missed requirements. We've seen many instances where a solution was procured by IT, without Finance's involvement - with Finance ultimately responsible for analytics and discovering missing data. Or Operations not being involved and operational processes being codified into software that were incomplete or plain wrong. Remember the principles of data democracy - and that although IT may be tasked with the procurement of 'software' the actual end users tend to sit elsewhere in the organisation.

Automate your business processes & logic as much as possible

Your goal should be to maximise the value of your data. This means preventing 'bad' data as much as possible, and one of the most effective ways to minimise this is by automating and codifying business processes. Robotic Process Automation (RPA) should be a key capability of whatever solution you choose. Automating processes doesn't just keep data clean, it reduces business risk and forces you to systemise and codify your business rules and decisions - bringing them out of operator's heads and visible for all to see, critique - and change.

Embrace Anywhere Working & make it a core requirement of your systems

Provide data democracy for all users - particularly your field teams. Anywhere Working means no matter what platform or device a user is accessing your data through, they are provided with the same level of data, insight and automation tools as those operating in the back office. Ensure that your technology solution is capable of operating every function - even automation functions - when the user is offline. By treating the capture and flow of data equally across all types of workers, online or offline, on all platforms empowers teams (especially those that are field based) with the most up to date data to make the right decision, every time.

Put Analytics - particularly Real-Time Analytics - front and center of your IT Solution

Analytics is often the 'afterthought' when deciding on a Work Management solution. Conventional thinking is that whatever data capture solution is deployed can simply be 'reported on' after the fact. Data Driven Analytics requires organisations to understand the importance of analytics up front. More often than not, the value of the data captured is extracted through Analytics and insight. By considering the requirements of Analytics at the beginning helps define the data points that need capturing - and any transformation of data. Start out with a solution that provides real-time analytics: that is reports that operate on data now, not 15 minutes or 24 hours ago. Finally, recognise that your Analytics requirements will absolutely change and your work management tool must allow for data and model changes as your understanding becomes greater.

Follow a Transformation program that delivers incrementally - agile over waterfall

92% of senior executives[15] interviewed stated they believed organisational agility is critical to business success. Setting out on a journey to implement a Data Driven WM solution can reap incredible benefits, but also includes a certain amount of risk. Implementing technology, and changing business processes and approaches requires an incremental approach to manage this risk. Picking a technology provider, and a tech strategy that not only supports, but actively encourages change means a greater likelihood of successful rollout. Work with suppliers that pitch themselves as partners, that are 'in it' with you for the long term, that have clear rollout processes and teams with demonstrable expertise that can become an extension of your business.

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> Don't be dazzled by the draw of another favorite industry buzzword, the "data lake." Things aren't as beautifully simple as the image of clear water and mountain springs might conjure. We can't just pour all our data into one system, expecting goodness to result. Your business is unique, and you can't buy unique advantage off the shelf. Care, planning, and investment is required. Otherwise, you're certain to end up with a data swamp, seething with liability, confusion, and rotting bits.
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> - Edd Wilder James, Vice President of Technology Strategy at Silicon Valley Data Science, Harvard Business Review

Conclusion

Today's business is all about data - and recognising that your data can be a powerful commodity that provides a competitive edge, in a competitive industry.

Your ability to successfully challenge new entrants in your market (the Ubers and the Netflixes of your industry) and compete with existing players, relies on your ability to become more Data Driven. Understanding the value of the data you produce, capturing it, nurturing it and putting it to use towards your customers, and against your competition is key to remaining relevant. Developing new business models relies on a platform of data that describes your operation, how work is scheduled and executed, what your customers needs are - and how they view you.

Those organisations looking to level up to next generation, AI-Powered technologies such as machine learning, predictive maintenance and intelligent scheduling should be particularly focused on becoming Data Driven, creating data democracies amongst staff and encouraging a culture of questioning of the status quo to produce the most efficient target operating models.

Technology and software solutions play a critical role in fulfilling the requirements of a Data Driven WM business. Picking platforms that eschew closed ecosystems, encourage partnering and integration are critical requirements for businesses. You need technology that has been built with this in mind, and that encourages a cohesive, organisation-wide strategy that involves everyone.

Profiting from being Data Driven is the goal. Implementing this mindset, transformational change and the supporting technology platform can produce remarkable results; indeed it may be that ultimately your data becomes more valuable than the product or service you offer.

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The authors would like to thank contributing partners and research studies sourced in this Whitepaper:

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