Big Data is "Moneyball" on Steroids

The movie and book "Moneyball" (based on the US Baseball's 2002 Oakland Athletics post season run) highlights how 'big data' and 'data analytics' not only changed the game of baseball but is changing how organizations behave and how we design organizations for the future.

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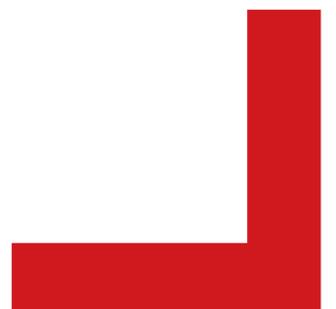
ABSTRACT

This paper explores how big data and data analytics potentially change how organizations behave and are designed. The paper highlights the importance of designing organizations 'to purpose' despite growing data complexity, and offers important insights and perspectives for leaders and organization design practitioners as they face the inevitable future task of transforming and redesigning organizations to thrive, given the rise of big data and analytics.

"Big data is a growing mountain of data, and data analytics is the science of extracting gold nuggets of insight from mounds of complexity."

MONEYBALL WAS JUST THE BEGINNING

Remember "Moneyball," the US movie starring Brad Pitt as a newly hired baseball team manager? Or maybe you read the book? It's the story about how the Oakland A's (Athletics), a United States major league baseball team, won many more games than expected in 2002 given the team's weak revenue situation. The story is about how the team used data analytics to help them find the right players to help the team win despite their inability to pay for top talent. The A's accomplished this feat by using data and statistics to help them make key personnel, resourcing and management decisions. Their groundbreaking approach ultimately changed how baseball (and many other sports) use data.

Today, big data and data analytics surrounds us, touches us, influences us and drives decision making in just about every industry on earth. It's changing the way we shop, the way organizations market themselves, it predicts consumer behavior and it provides a competitive advantage to organizations who can adapt and transform themselves to take advantage of it.

IT'S ALL ABOUT INSIGHT AND PREDICTION

Big data refers to the overwhelming amount of data that is being captured today by society, computers, cell phones, and the internet – huge datasets that are so large and varied in type and format that they are difficult to capture, manage, analyze or extract insight from. Data analytics is the science of gathering, inspecting, transforming, modeling and organizing data with the goal of discovering information and insight helpful in making decisions such as predicting outcomes, reactions or behavior. In other words, big data is the ever-growing mountain of data, and data analytics is the science of extracting gold nuggets of insight from mounds of complexity.

Big data is having an impact on us at every level: personal, familial, societal and organizational, and its powerful reach is often hidden to us.   One example shared by Patrick Schwerdtfeger in an online video lecture, highlights big data's powerful 'reach' and illustrates the value of data analytics in consumer marketing efforts (Schwerdtfeger, 2012). Patrick tells the story of how Target sent discount offerings to a teenage girl that were pregnancy related. Her father was not pleased about how Target had 'targeted' his daughter with product offerings relating to pregnancy. The father assumed that his daughter was not pregnant, but he was wrong. Target knew she was pregnant before the father did because they had captured the daughter's internet browsing and purchase history on the Target website, and through data analytics, predicted she was pregnant. The daughter had simply purchased pre-natal vitamins and scent-free soap, a combination that is highly indicative of pregnancy. Big data and data analytics might know more about us than we know about ourselves, (Erwitt, 2012).

> "Organizations today are forced to change and transform to data-driven decision making because data is telling them new truths"

BIG DATA ANALYTICS MEANS BIG CHANGE

The movie Moneyball provides us with another example of how data analytics is changing our world. In the movie, Brad Pitt portrays the role of

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the Oakland A's General Manager Billy Beane. Beane hires a young data analytics expert named Peter Brand to help him extract insight from data to make baseball decisions. Brand was new to baseball management, so it isn't difficult to imagine the conflict that emerged in the organization when Beane began to rely on this inexperienced baseball statistician to help him make important baseball decisions. Instead of trusting his veteran assistant coaches who had logged over 80 years of collective experience to make key coaching decisions based on their subjective wisdom, Beane relied on 'hard,' objective, statistical data produced by his analyst to help him make important baseball decisions. The coaching staff was offended and tremendously resistant to this new approach to decision making, yet Beane was undeterred. Traditionally, coaches had used intuition, gut feel, and subjective experience to help them make decisions, but Beane saw a better way. He saw the power of data analytics and he demanded that the Oakland A's use it to make recruiting, selection, play-time and batting order decisions. Through the use of data analytics, Beane found ways to win with players who were not considered to be good enough to win.

It shouldn't be surprising that traditional organizations around the world today are faced with making a similar paradigm shift from subjective decision-making to data-based decision making. Executives have been making decisions using 'old-school' criteria (subjective data, gut feel, experience and biased judgment) for centuries. Organizations today are forced to change and transform to data-driven decision making because data is telling them new truths they couldn't access previous to the rise of big data analytics.

Some organizations are approaching the challenge of transforming to a digital world by avoiding it. Some organizations are approaching the digital waters slowly and tentatively and they may be confused, not knowing how to make the transition. Progressive firms are already riding the digital waves and swimming with powerful strokes – those who have been intentionally honing data analytics capability for decades (e.g. Procter and Gamble) or

"Some organizations are approaching the challenge of transforming to a digital world by avoiding it."

who have been raised with 'data' pulsing through their veins (like tech giants such as Google, Facebook, and Amazon). Many companies will need organization design help to avoid stumbling blocks and to provide expertise in aligning the organization to execute and perform.

PURPOSE AND STRUCTURE OF THIS PAPER

This paper explores the implications and impact of how big data and data analytics is changing organizations today, and offers insight and design considerations for leaders and organization practitioners who face the inevitable task of redesigning organizations. This paper offers perspectives gathered from various thought leaders, academics and consulting sources and concludes with our own perspectives of what is most salient based on 25 years of experience in helping organizational transformation and redesign worldwide.

To provide needed structure and organization to the paper, we will utilize the 'ON THE MARK Applied STAR Model' (an adaptation of Jay Galbraith's original STAR Model) as a framework for categorizing various considerations, perspectives, and points of view (see OTM's Applied STAR Model and Model Components illustrated below).

OTM's Applied STAR Model
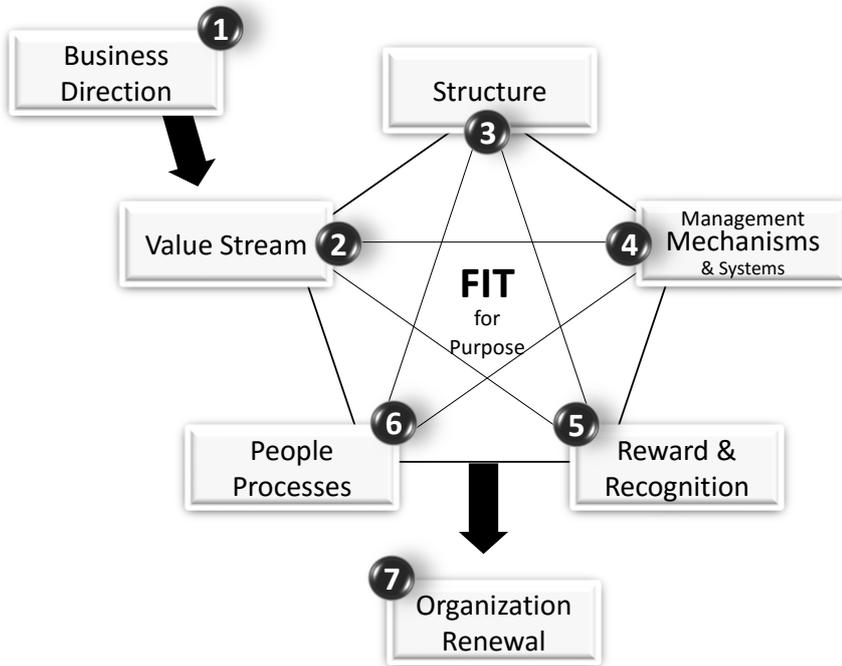
Model Components

1	**Business Direction**	Strategy, Product & Service Offering, Customer Demand and Experience
2	**Value Stream**	Core production processes that deliver customer value.
3	**Structure**	Boundaries, Shape, Power, Vertical & Horizontal Glue
4	**Management Mechanisms & Systems**	Governance & Compliance, Metrics & Measures, Management Roles, Reporting, Decisions, Information Flow
5	**Reward & Recognition**	Compensation, Reward, Recognition, Incentives, Leadership Styles
6	**People Processes**	Performance Management, Employee Lifecycle, HR Work
7	**Organization Renewal**	Cultural Change, Engagement, Design Capability, Joint Optimization

We will address how big data analytics is impacting organizations by capturing the OTM 'point of view' as it relates to each component in the OTM Applied STAR Model. The STAR Model is an assessment and design tool we use with clients as we collaboratively help them design their organizations for success. In this paper we will use the model to highlight key findings, capturing them in the following table format:

What is Changing?	Impact, Insight and Design Considerations
How is big data and data analytics changing organizations?	What are the implications of big data and data analytics? What options, perspectives or insight should executives and organization designers consider as they lead organization design and transformation efforts?

Business Direction and Strategic Intent

Business direction and strategic intent articulate how the firm intends to compete in the marketplace.

What is changing?	Impact, Insight and Design Considerations
New data, information, and insight, presents new business opportunities to pursue that may extend beyond their original strategic intent or areas of current competence. For example, Nike moved beyond shoes and running to provide new products such as devices that capture personal running and health information through sensors and chips (Galbraith, 2014).	• Organizations often need to review company strategy and business models given the rise of big data analytics. Additionally, when data analytics identifies new business opportunities, executives can be confused about which businesses to pursue. New business opportunities must be carefully assessed to determine if they will align with the competitive intent of the organization or create confusion. When companies try to focus on too many things, they will likely lose competitive differentiation.
Some firms are just now implementing data analytics, but data and insight is 'dated'. Progressive companies are making every effort to find new ways to provide 'real time' data in order to speed decision-making and action taking. Imagine creating a new ad campaign within an hour after the first commercial ran to improve consumer reactions.	• Organizations who seek to implement 'real time' analytics hope to gain a competitive advantage by acting quickly and with agility. However, transforming to 'real-time' work processes demands significant changes in workflow and resourcing.
Satya Nadella, Microsoft's CEO suggested that "every business is a software business" (Nadella, 2015). Big data, data analytics, online shopping and mobile computing demands new skillsets and capabilities for growing organizations.	• Firms must anticipate the need for software, data analytics, programming, and other key skillsets and create long-term strategies that will give them a competitive advantage in building key organization capabilities.
Firms, functions within firms, and business entities often struggle to define simple and traditional business strategies. Adding big data and data analytics as a new trend adds increased complexity to strategy making.	• Big data and analytics are a market force that must be considered in strategic planning discussions. Each function should consider how to best utilize data analytics to provide greater value to the firm.

Using big data and taking time to analyze it naturally adds increased <u>complexity</u> in organizations, but complexity is not the enemy... <u>complication</u> is the villain. Good organization design is the remedy that eliminates complication in organizational systems.

Business direction plays an important role in organization design because strategy should directly influence how the organization works. Strategy suggests how a firm differentiates in the marketplace and suggests the design criteria critical for designing the organization to be 'fit for purpose'. Clearly articulated business intent reduces

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complication and provides insight to how firms should focus their data analytics energy and resources. If the company is focused on differentiating through customer intimacy, then data analytics can be used to anticipate customer needs, predict customer reaction, and provide products that will please. If the company differentiates by being the low cost provider, data analytics can provide insight for optimizing pricing, logistics and manufacturing. Aligning big data and data analytic strategies to business strategy ensures that we focus our data analysis efforts on what is most important strategically, even when all around us is data, data, data and the temptation to spread ourselves too thin. Perhaps Albert Einstein had big data, complexity and complication in mind when he quipped: "Not everything that can be counted counts, and not everything that counts can be counted" (Erwitt, 2012).

Value Stream

The value stream in organizations is the work flow or set of key activities that are essential for the firm to achieve its primary purpose of delivering a service or product. In theory, an efficient value stream is one that is unencumbered by inefficiencies, hindrances and barriers. We might compare the efficiency of a mighty pipeline channeling water from point A to point B vs. a meandering mountain stream that is hindered by boulders, felled trees and landscape topography. A pipeline, of course, is more efficient at water delivery than the wandering stream. Unfortunately, most company value streams are not efficient pipelines but are work streams that need optimization.

What is changing?	Impact, Insight and Design Considerations

When data intervenes with the work flow, it changes things. Data intervenes in the system by either hindering the value stream, or helping the value stream achieve its purpose.
 	
Big data and analytics <u>hinders</u> the value stream when it slows decision making, interrupts or impacts the smooth flow of work. It is tempting to gather data, collate data, analyze data and crunch it over and over. Crunching data without extracting insight is wasteful. If the data isn't the right data and the insight isn't helpful, then it slows the flow of the value stream.
 	
Data helps the value stream by offering insight that improves the flow, making it more efficient and streamlined.
	• It may seem obvious that a critical first step toward optimizing the value stream is to review the value stream to identify how it is working. Focus on critical pain points and inefficiencies is important and critical, but may not fully take advantage of data analytics.
	• A second, but simultaneous step, might be to analyze the value stream to determine where key decisions need to be made, then look for ways that data analytics can help make better, quicker and more accurate decisions. Questions to consider in designing to optimize the value stream might include:
	   o What data is needed to help us make the most important decisions?
	   o How can we get the data we need in the most efficient way so that our gathering causes no hindrance to the organization?

Data analysis can only provide insight – it can't act. It can only make suggestions to those who have power to change it.	• Data analytics properly placed in the value stream can also provide feedback, measurement and input to other elements within the work system. • We suggest looking for and eliminating data gathering efforts that are not adding value to the flow of work, that doesn't help decision making, or that needlessly usurps people's time and effort.
Progressive companies seek ways to use 'real time' data analytics to make quicker decisions, market to consumers and adapt promotions and advertising as well as product availability to user needs.	• Adobe offers data analytics tools to help marketing managers worldwide modify and improve product advertisements in real-time. A marketing manager might change the words "Act Now" to read "Don't Forget to Act', then monitor immediate consumer reaction to the change.

The Value Stream must be designed to support the overall strategy of the organization. Decisions supported by data analytics should help stream efficiency and avoid hindering flow. Historically, organizations have designed value streams with 'Evaluate' as a step at the end which feeds back to the beginning to drive continuous improvement based on process and outcome data. Real time data analytics means that the Evaluate step/activity can be brought upstream and located at multiple points leading to faster real-time responses within the value creating work. Big Data should drive organizations to review their value stream and consider where 'review and evaluate' work now best fits. Ultimately, organizations may choose to move further upstream in their redesign process and reconsider the design of the fundamental business model that drives the operating model.

Structure

Structure outlines boundaries, shape, power, and hierarchy in the organization.

What is changing?	Impact, Insight and Design Considerations
For decades firms have alternated between centralized and decentralized structures. In the 1950's and beyond, as the 'quality' movement gained credibility, organizations struggled to decide whether 'quality' should be a 'specialty' role sitting in a centralized organization, or whether 'quality' should be decentralized and spread across the wider organization. Firms today still struggle with how to structure 'quality' within the organization.	• Our experience in designing organizations leads us to believe that data analysis capability should be embedded at the lowest level or closest point in the organization to where real work is being done and where data driven decisions can be made. This implies that generalization and decentralization is preferred and that decisions made closest to where the work is done increases the speed of decision making in the organization.

Data analytics also faces a similar situation today. Organizations don't know how to organize, embed and utilize data analytics in the organization structure. Should analytics be a centralized function? Or decentralized? Treated as a specialism or generalism?	A review of recently published literature on design choices (Galbraith, 2014) illustrates that different choices are being made: • Merging of SW and HW engineers into the product development function and grouping digital marketing and social media experts into the marketing team. (Multi-skilling) • Giving the CIO both IT and data analytics responsibility. (Centralising) • Creating a new role - Chief Digital Officer to focus solely on analytics.(Centralizing) • Purposefully separating data analytics apart from traditional IT. (Specialising) • Increasing analytic capability organization-wide (through training and selection) to build analytic capability across the system. (Multi-skilling)
As data analytics provides increased capability to employees to make decisions at lower levels, managers who previously had decision authority may feel disempowered (Era Martin Berner, n.d.).	• In our experience, decision authority change is difficult for some individuals to bear. However, organizations can help established leaders increase their capacity to process more information (Galbraith, 2014).

Data analytics improves decision making. Our belief is that pushing decision making lower in the organization and closest to where the data and the customer reside reduces complication in the value stream and increases speed of decision making in the organization.

The big Organization Design decisions being made here relate to organization Boundaries and numbers of layers within the organization.

Is the organization going to put Data Analytics work in its own boundary with specialist roles, or is the work going to be placed within the Boundary where the work that needs the insight is done thus creating more multi-skilled roles?

Organizations also need to decide on the impact real time self-service analytics will have on their numbers of layers. We know that structure must be optimally designed to support strategy (Form follows function), with the right grouping of work activities and number of management layers to ensure decisions are made in the right group at the right organizational level by people with the right time horizon perspective. As data and insight becomes more easily available the time span of discretion*, the time horizon over which individuals and teams are making decisions, can be increased, thus reducing the need for the escalation of decisions to 'management' who can be trusted to make decisions of longer time horizons. Putting both the data and the decisions close to the work will inevitably lead to a reduction in the number of layers. (* The time span of discretion refers to the time period over which the job holder makes decisions. A CEO may have a 5 year time span of discretion making decisions about

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what should happen 5 years out, whereas a front-line supervisor may only have a 1 week time span of discretion making decisions about what will happen over the next week.)

Management Mechanisms & Systems

Management Mechanisms & Systems include governance, metrics, management roles, reporting and decision structures and information systems that bind the organization together to enhance organization performance.

What is changing?	Impact, Insight and Design Considerations

Sharing of data - getting all the right data to all the right places in the organization is a critical management mechanism challenge. For example, key customer data is critical not only to marketing, but to product design, call centers, and sales.	• An integrated digital infrastructure is needed that will allow sharing of data that will govern the use and reliability of data.
	• Internal structures designed to encourage sharing of data and insight should be considered.
	• Key questions for consideration may include the following:
	   o What data is needed by which groups across the organization?
	   o How will data and insight be shared?
	   o Who will own which data to ensure it is accurate and useable?
	   o What structures will encourage sharing of data and insight?
	   o What data gathering mechanisms can be coordinated and shared across functions?

Data governance is critical because data is transferred from one system to another, passed from one function to another and used in various ways across functions.	• Governance strategies, processes, and structures should be in place to ensure that data is gathered, transferred and remains 'clean' as it is utilized by various customers. Clear ownership should be maintained for data sets.
Report design and data analysis design becomes a critical management mechanism since reports should produce insight needed at the right time, the right place and for the right purpose.	• In order to provide 'insight' to various customers across the business, data analysts must understand what outcome that is being sought, what data will predict various outcomes and the format that will provide the most insight to the end customer.
Reports, scorecards or dashboards are primary vehicles for communicating data and insight to the organization, and, therefore, the design of reports, scorecards and dashboards are critical management mechanisms to share the data insight needed at the right time, the right place and for the right purpose.	• In order to provide the right 'insight' to various customers across the business, data analysts must listen carefully to internal customers to understand what outcome is being sought, what data will predict various outcomes, and the format that will provide the most usefulness to the end customer.

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Communication systems are critical mechanisms carrying data insight across the organization. When data information is passed throughout the system, it impacts and changes roles throughout the system.	• Communication pathways and processes must be formed to pass information to the functions that require it. Routines and individuals involved in communication routines should be clear about new communication responsibilities. • Organization design should consider who needs what data in what function, when, etc. Clearly, various roles will change as the communication flows change. • Communication processes should be streamlined to ensure decisions can be made quickly within determined parameters for decision making.

Management mechanisms and systems focus on the coordination of data and insight across the organizations. Mechanisms should provide opportunities to collaborate, protect the data, govern the use of data and the sharing of data across the organization to leverage its hidden insight.

Big Data has two major impacts on the management mechanisms an organization designs. The <u>first</u> is on the decision making processes which are driven by decisions made about structure and time span of discretion* that is allowed at the point the work is done; the longer the time span is, the less there is a need to put management layers in to escalate decisions to. However, the decision making processes need to be simple and clear if the agility benefits gained from Big Data are not lost to slow decision making.

<u>Secondly</u>, data governance becomes important as more people are using the data to make thousands of decisions throughout the value chain without reference to centralized specialists. Building mechanisms that ensure that data is collected, stored, secured and appropriately accessed becomes a highly important to the organization's success.

(* Note - The time span of discretion refers to the time period over which job holder makes decisions. A CEO may have a 5 year time span of discretion making decisions about what should happen 5 years out, whereas a front-line supervisor may only have a 1 week time span of discretion making decisions about what will happen over the next week.)

Reward & Recognition

What is changing?	Impact, Insight and Design Considerations
Big data and data analytics require a transformation from command and control hierarchies to structures where employees at all levels can be empowered. As mentioned earlier, this can be a difficult issue because it changes the power structure within organizations and also changes the reward systems.	• Inserting data scientists and analytics into the decision-making process flow could mean empowering individual contributors and disempowering the current management 'establishment' who have a vested interest in the status quo.

	• Data analytics may need protection from weak managers who are threatened by data workers who have inherited decision authority.
Data analytics can be used to assess employee performance and reward based on new meritocracy criteria.	• Organizations should seek out new ways to use data analytics and other performance measures to reward employees who make decisions based on databased criteria (Era Martin Berner, n.d.).

Reward and Recognition systems should reward behaviors that will provide the firm with the greatest competitive advantage. Data insight-based decision making is a new skillset that is important to the organization. The focus of reward and recognition needs to shift towards both how employees are using data and making decisions as well as how they are contributing the development of insight. Reward and recognition must reinforce a culture that drives performance through insight. Part of an organization's big data set will allow them to build insight into the impact of employees on performance. This should be used to inform reward and recognition decisions, moving from 'I think performance is good, to I know performance is good'.

People Processes

What is changing?	Impact, Insight and Design Considerations
A new form of leadership will emerge that can lead the organization to the data analysis future.	• Leaders will need to lead with data and use data to make decisions. • Leaders will apply big data and analytics in managing people performance where possible. • Leaders will need to effectively lead others even when they resist change. Some will want to hold onto decision power rather than passing it downstream to those who have the data at lower levels. • Command and control style of leadership will need to diminish in the organization. • Data analysis leadership is needed, someone who can define a vision and strategy for implementing data analysis in the organization for years to come.
Organizations must build a data analytics capability across the organization.	• Defining how to recruit, select, hire and develop data analytics and other related software skills will be critical to extracting insight from data. • Increasing individual capability and organizational data analytics capability should be considered a strategic imperative.

	• Defining hiring practices to recruit, select for data analytic capability • Hiring social media experts, marketing data analytics, data scientists, etc. • Some companies create rotational assignments internally and occasionally with other external companies to learn new ways of dealing with complexity in the system.

Recruiting for, and building increased leadership and data analysis capability across the organization will be an imperative. As big data hits every level, from the front-line to the CEO, everyone will have to upskill to be able to ask the right questions of the data to be able to make insight informed decisions within their time span of discretion.

Organizational Renewal and Final Conclusions

A new organization intentionally redesigned to leverage big data and data analytics will be an organization where the culture honors truth-in-data and where decisions are made based on data-driven insight rather than assumption. The effective redesign of an organization that has data analytics in its DNA will see its culture shift to one which is agile and proactively driving performance from analytics; an organization that both knows and acts ahead of its competitors. All elements of the organization will align to the strategic intent of the organization, and will provide differentiation.

Data analytics and big data will continue to unfold before us and challenge us as organization design consultants. We must learn to use big data to inform all organization design decisions, helping us model and understand the impact of the design options we have before us – big or small.

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