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Dorsey Multi-Function Process Map™ An Informing Tool to Transition Small Business to Evidence-Based Decision-Making

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An Informing Tool to Transition Small Business to Evidence-Based Decision-Making

by

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DEDICATION

This dissertation is dedicated to my husband and business partner, Tim Dorsey. Tim has worked tirelessly to build a business consulting practice that not only supports our family but also supports organizations of all types in their journey to improve performance.

Tim is passionate about his work and has partnered with his clients to achieve outstanding results. Most often our clients not only achieve their goals; they exceed their goals. This is all due to the extraordinary methodologies and tools that Tim has developed.

In this dissertation I have "hijacked' one of his proprietary tools which is used in nearly every client project and I test its application to assist small business decision-making. This dissertation would not be possible without Tim's keen insight and desire to provide performance improvement initiatives. I thank him for giving me the ability to test a new, novel use of the tool in hopes of generating a new theory. The tool is the  *Dorsey Multi-Function Process Map™*

ACKNOWLEDGMENTS

I would like to acknowledge first my husband, my sons and the many family and friends who have supported my decision to undertake earning the title Dr. Carla Dorsey. Not only does it have a nice ring to it; it has allowed me to focus on and explore a passion of mine. That passion is to help small businesses. The small-business domain is near and dear to me and I have spent much of my career, and lifetime, immersed in it. As I watched some small businesses struggle, and even fail, I wanted to find a generalizable approach to helping them. I wanted to provide them with a resource, a tool, that would put them on a path to achieving their goals.

I would also like to acknowledge the incredible University of South Florida Doctorate of Business Administration (DBA) team which includes the faculty, staff and all the participants. It really does take a village. In my case I had very little exposure to academia and really no experience conducting rigorous research. The design of the DBA program gave me the ability to produce an actual dissertation! The DBA team has "taught me their ways" by investing their time and sharing their experience and vast wealth of knowledge. I have learned much more than I anticipated. Hopefully their investment has paid off as I attempt to narrow a gap in current research and conduct research that is meaningful not only to me, my business, and my clients but to academia as well.

I am especially grateful for all that Dirk Libaers and Grandon Gill have done for me. They are truly brilliant and are outstandingly dedicated and supportive. It was very comforting to know that I could always depend upon them during this process.

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ABSTRACT

In small businesses, underperformance and lack of growth can be the results of poor decision-making based on gut-feel rather than data or evidence. The result is often ad-hoc business processes that do not evolve into efficient organizational routines. Evidence (data)-based decision making (EDM) has proved effective for large firms. This study tests the use of EDM in small businesses by applying an organizational mapping tool called the Dorsey Multi-Function Process Map™ (DMPM), a descriptive visual analytic, as a way to help small businesses transition from gut-feel to data-based decisions.

We tested the DMPM on seven diverse small businesses which indicated that their goal was growth. We collected data through pre-report questionnaires from leadership and on-site interviews with employees about the daily operations, then mapped processes and points of frustration. A detailed process map provided visual representation of each company's workflow, and a companion report stratified the data on the map, noted strengths and weaknesses in the operations, and recommended improvements. Post-DMPM questionnaires tracked changes made as a result of the report. All participants in the study indicated that the DMPM process was useful, and 71% of the participants indicated within 60 days that they had implemented or planned to implement changes based on the process. The study supports use of the DMPM as an effective tool to help small businesses transition to the same kind of data-based decision-making that benefits larger companies.

1. INTRODUCTION

Understanding and optimizing operational performance requires data. In today's competitive environment, relevant and pertinent data is an essential resource to make business decisions by employing evidence-based management. These decisions can be daily, tactical, strategic, short-term or long-term—it does not matter. What does matter is that relying on evidence to make decisions increases the chance of making better decisions, and better decisions lead to better results (Pfeffer & Sutton, 2006a).

Small firms suffer from the liabilities of being small. Larger firms have more resources, better trained management and staff, and superior relationships with banks and other capital providers (Hannan & Freeman, 1984); in other words, bigger is typically better. The liability-of-smallness argument holds that small firms are more likely to underperform or fail because of lack of access to sufficient capital and to attracting, recruiting and retaining talented employees, as well as higher administrative costs (Aldrich & Auster, 1986). Small firms also suffer from problems of legitimacy in the eyes of (large) stakeholders like suppliers, distributors, and government (Baum & Oliver, 1996). Furthermore, these liabilities make small firms more vulnerable to shocks in the economy because they frequently lack slack resources to weather these economic dislocations and are also perceived as more risky by creditors (e.g. banks, suppliers, large customers), especially during severe economic downturns when creditors become increasingly more risk averse (Chowdhury & Lang, 1996).

For small and medium-sized enterprises (SMEs) to grow, they must compete successfully with their larger counterparts. Large organizations become "large" as a result of their ability to

grow; growth requires good, consistent decision-making in the areas of marketing, strategy and operations. A comparison between the characteristics of large, medium, and small enterprises shows that fact-based decision-making is more prevalent in large organizations while "gut-feel" decision-making is more prevalent in small organizations (Ghobadian & Gallear, 1997). Adopting practices used by larger organizations, such as data/evidence-based decision-making (EDM), could improve small businesses' performance and enhance their chances of survival.

From the current literature, we learn that poor decision-making in small business leading to underperformance (Smith et al., 1988) occurs for a variety of reasons: lack of management attention and human resources, ad-hoc business processes that have not evolved into efficient organizational routines, unawareness of EDM, turnover of staff, employee burnout, etc. Additionally, research shows that entrepreneurs differ from managers in large firms in their decision-making practices (Busenitz & Barney, 1997). Small businesses are also less likely to be aware of EDM. Existing literature addresses EDM but it has not addressed the impact EDM has on small business (McAfee et al., 2012; Pfeffer & Sutton, 2006b). We learn from current literature that EDM can produce better decision-making in large organizations because of the implementation of efficient business processes over time, the extensive use of Information Technology, employee training, more management bandwidth by having larger top management teams and a layer of middle managers, etc. But current literature does not discuss the adoption of and impact that evidence-based decision-making may have on small businesses or on a method or tool that could help small firms transition to EDM.

In this dissertation I propose and argue that the Dorsey Multi-Function Process Map™ (DMPM), a descriptive visual analytic developed by The Dorsey Group, can be an effective tool to transition decision-making from gut-feel to evidence-based decision-making in small

businesses. DMPM provides an accurate internal analysis and audit of an organization's business processes, informs the current state of operational processes (pain points, bottlenecks but also processes that work well), and facilitates the creation of systems and measures that produce data which in turn support decision-making with the aim of alleviating the identified bottlenecks and pain points and improve operational processes.

To date, the DMPM analytic has been used for two main purposes: (1) to determine current-state business operations prior to planning a customized process improvement project and (2) to jumpstart employee engagement and build what The Dorsey Group calls High Performance Work Teams. High Performance Work Teams are one type of implementation of High Performance Work Systems (HPWS), which have been shown to drive financial performance (Appelbaum et al., 2000; Guthrie, 2001; Huselid, 1995).

In this dissertation, I assess the effectiveness of DMPM in helping small businesses transition to EDM. Based on the lack of empirical evidence in how EDM would help (or hurt) decision-making in small businesses and on a tool (DMPM) that was originally designed for larger, established firms, I aim to address the following research questions:

RQ1: What are the impacts of EDM on small business underperformance as reported in the extant literature? This research question will be addressed in the literature review section of this dissertation.

RQ2: What changes in a leadership's perception of the business operations are observed before and after DMPM is presented?

RQ3: What change in the business plan (operational goals/priorities/strategies/metrics) occurs after DMPM is presented?

RQ4: What impact does DMPM have on a company's transition to EDM?

The last three research questions will be addressed using a multiple case study analysis.

The importance of this research cannot be understated. This dissertation research offers contributions to both the small business management literature and management practice. The research documented in this dissertation represents one of the first empirical studies that examines EDM in the context of small business. Based on a diverse sample of small businesses, I demonstrate that DMPM is effective as a transition tool to transform decision-making in small firms into evidence-based decision-making. The research also contributes to the practitioner literature in that small firms equipped with this tool finally have a way to address underperformance and, as such, also increase chances for survival. According to a recent report published by the Small Business Administration (SBA), 44% of economic activity was generated by small businesses in 2014 (Kobe & Schwinn, 2018). The widespread practical use of the DMPM analytic and subsequent adoption to EDM could have a significant aggregate impact on economic growth, job creation, and economic resilience. However, in order to realize this large-scale impact, the importance and proper use of this tool need to be evangelized and promoted in the large population of small businesses in order for it to become common (best) practice.

This dissertation is structured as follows. In the next section I review the existing literature on EDM in both large and small businesses, and the impact of EDM practices. The third section presents an overview of the DMPM tool. The fourth section describes the current study, while the fifth section elaborates on the research design. The sixth section reports the results. The last three sections provide a discussion of the results; highlight the limitations, future studies, and business implications of this research; and offer some concluding remarks.

2. LITERATURE REVIEW

This literature review includes 54 publications from 1981 to 2018. The intended purpose is to provide insight into potential causes of small business underperformance and what interventions might help minimize underperformance. No single intervention is a cure-all or a fix-all. This literature review will focus on a common cause of small business failure and an intervention that can be broadly applied to most small businesses. The following topics will be covered:

1. Insight into small business underperformance
2. Merits and benefits of evidence-based decision-making (EDM), a suggested intervention to minimize underperformance
3. Barriers to adopting evidence-based decision-making (EDM)

2.1 Small Business Underperformance

Small businesses are vital to our economies and our communities. The Small Business Administration Office of Advocacy reports that the failure rate of small businesses is high and therefore problematic for all stakeholders (Headd & Kirchoff, 2009). Failure of businesses is often the result of underperformance (Berman, 2019). Minimizing avoidable small business failures or improving underperformance would have a positive impact on the organization and the communities and economies (Shepherd, Douglas, & Shanley, 2000).

Small business owners deserve kudos for both the innovative thinking and the willingness to take the risk to own a company. However, as they set their sights on growth, they may need to

evaluate whether what has worked in the past will continue to work as they aspire to scale. Their continued growth can be stymied if they do not adopt the classical management techniques of their larger counterparts. Smaller businesses might not have the abundant resources of their larger counterparts, but a transition to using data to base decisions on can start at a fundamental level and then be diffused throughout the entire business (not only at the top but by employees on the work floor as well).

Determining the exact reason for underperformance is difficult, as many of the causes are self-reported by the underperforming businesses themselves, and independent scientific analysis is limited (Beaver & Jennings, 2005). In existing literature, there is general consensus that poor, weak decision-making, lack of management skills, and lack of resources play a significant role in causing small businesses to struggle with growth (Baba & HakemZadeh, 2012; Beaver & Jennings, 2005; Bornstein & Scarborough, 2007; Knotts et al., 2003; Purves et al., 2016; Perry, 2001; Rolleri et al., 2016; Yallapragrada & Bhuiyan, 2011). A 2010 study by Atamian and VanZante found that the most vital differentiator between a small business and its larger counterparts is that the small business tends to lack the resources to invest in strengthening its support activities that will enable EDM. EDM requires good data to be collected and used in a relevant and timely fashion.

But many small companies do not collect data, going instead with a gut-feel approach: a common characteristic of small businesses is that their decision-making is gut-feel, while a common characteristic of large businesses is that their decision-making is data-centered (Ghobadian & Gallear, 1997). Poorly supported decisions (i.e., decisions that lack data) can cause waste and be detrimental to the future of the organization (Baba & HakemZadeh, 2012).

Corporate failure, like corporate improvement, is not a point in time – it is a process that unfolds over time and the process of failure can be attributed to poor decision-making (Purves, 2016). Therefore, it is imperative to provide guidance to managers with the resources and tools so that they can make better decisions (Baba & HakemZadeh, 2012).

2.2 Merits and Benefits of Evidence-Based Decision-Making

Successful companies utilize certain management techniques that enable their success. These management techniques include performance improvement, data reliance, and enough knowledge and understanding to make correct decisions (Atamian & VanZante, 2010). The common thread in each of those techniques is data.

Data drives performance improvement and improved decision-making. Without data, a business cannot measure performance or analyze its operations, benchmark against past performance or against competitors' performance, or make evidence-based decisions. An increasing awareness of this has caused organizations to shift to using data and data analytics in the way they manage their operations (Evans, 2015). In *Competing on Analytics*, Davenport and Harris (2007) describe how many organizations use data to make better decisions.

Evidence-based decision-making (EDM) refers to using evidence (data) to make decisions, so that decision-making can be improved and thereby enhance the performance of the organization (Rousseau & McCarthy, 2007). A direct, positive correlation exists between success and data-driven decision-making (Cao & Duan, 2017).

Cao and Duan (2017) studied manufacturers that were classified as either top performers or bottom performers by their ability to generate profits in relation to their competitors; they found that the top performers had a larger statistical correlation between the use of descriptive

analytics and organizational process. The study concluded that EDM leads to superior organizational performance.

Another study found that entrepreneurs and managers in large organizations differ in their decision-making. They found that entrepreneurs rely on heuristic decision-making and may be overconfident (overestimating the probability of making the right decisions) and that while this decision-making technique may benefit a company during its start-up years, it may also lead to underperformance as the company matures (Busenitz & Barney, 1997).

A study of the manufacturing sector by Krumeich et al. (2015) found that "companies capable of analyzing their business operations based upon data, predicting the best-proceeding sequence, and proactively controlling their processes based upon this knowledge will be a decisive step ahead of their competitors" (p. 1). To begin this process a company can start with descriptive analytics which provide us the ability to alert, explore and report (Davenport & Harris, 2017) and make informed decisions. Managers acting on superior logic and evidence can trump the competition (Pfeffer & Sutton, 2006c).

Although EDM has generally been perceived as and shown to be beneficial for better informed decision-making, the approach is not universally embraced by scholars (Morrell & Learmonth, 2015). Some research has found that evidence-based management as a managerial practice takes a selective and narrow view of evidence, devalues stories or narrative evidence of knowledge, and is managerialist. That said, this dissertation makes the case that the preponderance of empirical research leans in favor of EDM and that there is a positive association between EDM and better performance.

Another trend that makes EDM accessible and affordable for small businesses is the rapidly changing technologies like Big Data analytics, Artificial Intelligence (AI), Machine

Learning (ML) and Internet of Things (IoT), technologies that promise to bring a continuous stream of data on all pertinent variables governing business processes in both large and small businesses: "The phrase 'big data explosion' is quickly becoming cliché . . . those familiar with how quickly data is being generated are well aware that the phenomenon is not so much a momentary explosion as it is a steady, powerful stream that continues to build momentum and magnitude" (Minsker, 2015, p. 1). In the four years since she wrote that, the capabilities to capture, screen and interpret data have only gotten more sophisticated and better. Small businesses *must* begin to understand the magnitude and importance of business analytics in daily operations. Their larger counterparts are not only creating and analyzing data (descriptive analytics) but are also using data to make predictions (predictive analytics) and use those predictions to select the best course of action (prescriptive analytics) (Del Rowe, 2017; Smith & Mishler, 2016; Evans, 2015). Each of those three business analytics categories—descriptive, predictive, prescriptive—builds on the other, and each moves higher in the sophistication of data usage.

Business analytics generate knowledge to support decision-making (Davenport, 2013). Cao and Duan (2017) found that business analytics are used more extensively in top performing companies. They further state that "Business analytics is seen to offer the possibilities for companies to more effective at making strategic decisions" (Cao et al., 2015, improving organizational performance (Bronzo et al., 2013) and creating competitive advantage (Davenport & Harris, 2007). We are in the age of the Internet of Things (IoT) which allows companies to have remarkable knowledge about their current process and their current state (Wortman & Fluchter, 2015).

Companies are reaping the benefits of using business analytics by enhancing and sustaining their competitive advantage. They understand the value and have the resources to utilize analytics in their daily operations. Size of the company will not matter, as all companies must be attuned to how data can help them achieve their goals and survive in a competitive, global environment. It is safe to argue that in the next five to ten years, companies—large and small—that do not adopt these new technologies will be at a competitive disadvantage relative to their counterparts that have embraced these technologies because the latter will make much more timely, accurate and resource-efficient decisions than the former.

2.3 Barriers to Implementing EDM

The merits of EDM are compelling. However, for a small business the challenges to transition from gut-feel decision-making to evidence-based are real and are significant. Their resources—both money and skills—are limited.

Small business owners also may not follow the classical management theory practices of their larger counterparts (Beaver & Jennings, 2005). SB owners tend to be reactive instead of proactive. While reactive management may have led the small businesses to their current level of success, classical management uses proactive approaches for sustainability and growth. A small business's current level of success can lead to overconfidence and unwillingness to change managerial techniques such as how they make decisions.

Small business owners are unique but need to begin to conform to classical management theories in order to scale successfully. One particular feature of many small business owners is that they tend to "work in the business rather than on the business" (Atamian & VanZante, 2010, p. 1). These owners tend to focus on and think of the product as the business, rather than think of the business itself as being the business (Atamian & VanZante, 2010). This focus can stifle their progress and perpetuate reactive management. The small business owner needs to "be

knowledgeable . . . to make appropriate decisions" (Atamian & VanZante, 2010, p. 2) and knowledge begins with data (Gill, 2016).

Literature shows that organizations can gain a competitive advantage when they take the time to substitute facts for common lore, and to place conventional wisdom against data (Pfeffer & Sutton, 2006a). However, it may be difficult for a small business to know how to generate and use the "right" data, and then get that data to the correct people so that decisions can be made, and do all this efficiently and timely. Evans (2015) proposes that organizations are overwhelmed by data and struggle to understand how to use data to achieve results and improve their business.

While challenges and barriers exist for small businesses to adopt EDM, a more evidence-based approach would improve the competence of decision makers (Kovner & Rundall, 2006). Providing small businesses with a tool that can assist and enable better decision-making would help them to be more competitive. Being competitive depends on making "right" decisions, and the literature supports that these right decisions are typically data-based.

3. NEXT GENERATION PROCESS MAPPING AS AN ENABLER OF EDM

For small businesses, transitioning from a gut-feel decision-making culture to an evidence-based decision-making requires some type of tool. Such a tool can first convince them that the movement to EDM should occur so that change can then be implemented. To implement EDM, two steps must be taken (Sackett et al., 2000):

1. Generate the evidence.
2. Use the evidence to make informed decisions.

Traditional process mapping techniques include basic process mapping (Boudreaux, 2010), value stream mapping (Roshani & Mobin, 2016) and flowcharting. The most similar to DMPM is basic process mapping—both contain Key Process and Activities.

The DMPM is an advanced, next generation form of traditional process mapping. It is a tool used in continuous performance improvement programs in large organizations to set the stage for engagement and the implementation of high performance work teams. The DMPM has additional features which enhance and provide its multifunctionality, including

1. Participation of the employees to create the map
2. Operational metrics currently used
3. Frustrations encountered by employees while performing their duties
4. Reliance on outside vendors

The DMPM's interactive data tends to be more effective than static data (Wang et al. 2015). It shows the current state of the business operations through the employees' eyes; its presentation can depict a disconnect between the actual current state and leadership's perceived

current state of operations. The visual aspect of this tool allows for all employees, stakeholders or participants in general to immediately spot bottlenecks and pain points, as well as areas that are performing to expectation. Another major advantage of DMPM is that it can be implemented on a continuous basis, so management and employees gain a dynamic appreciation of the firm's operations over time. They can observe the impact of managerial interventions and even to some extent quantify savings or increased revenue.

The DMPM's color coding (see Figure 2) greatly enhances users' comprehension and often induces the need to act. In a study, 77% of survey respondents said that data visualization led to improved decision-making (Sucharitha & Prekash, 2014). Note the use of varying size and color post-its to tell the story of current state:

1. Key Processes—large yellow post-its
2. Activities—standard yellow post-its
3. Metrics—blue post-its
4. Frustrations—pink post-its

The DMPM example below is for the quoting department within the sales division. They are tasked with preparing and sending quotes from the sales team and from incoming calls. Once the quote is completed it is sent to the originator/requestor. The map shows there are four Key Processes: Request, Check Inventory, Prepare Quote and Obtain Approvals, Submit Quote. The Key Processes are indicated by the large yellow post-its that run horizontal across the map.

Activities for each Key Process are then marked by using small yellow post-its that run vertically under the corresponding Key Process. For example, the Request-Key Process shows seven Activities that occur within the Process.

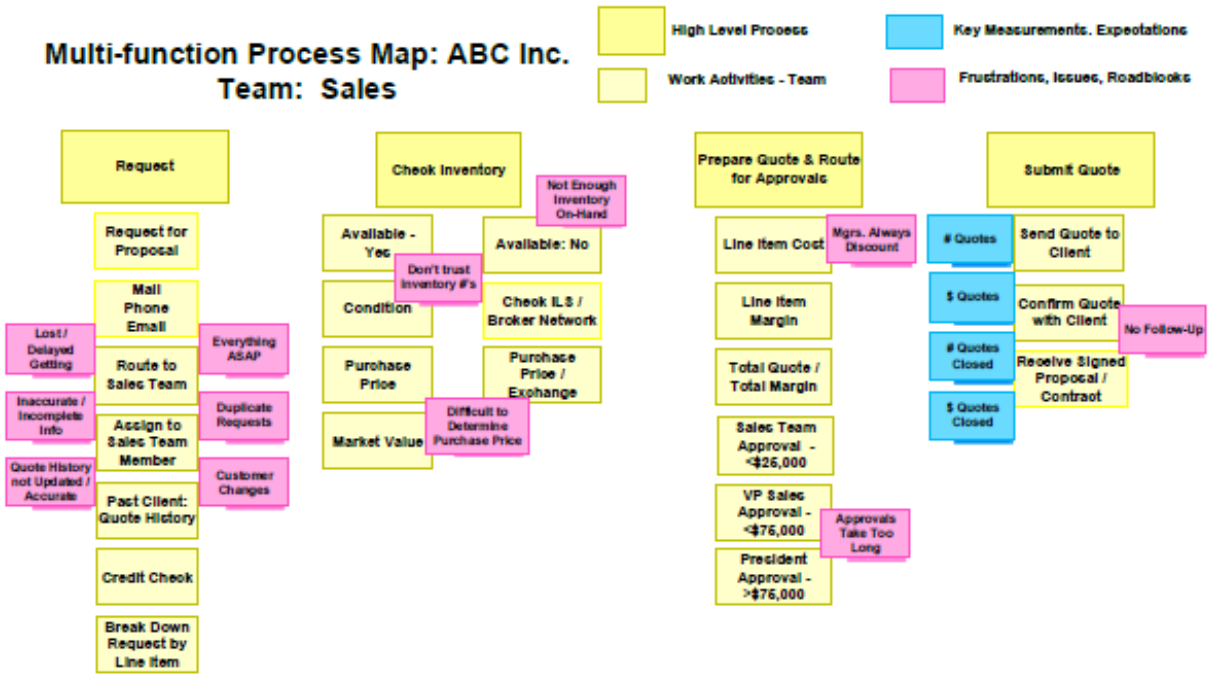

Figure 1– Example of Dorsey Multi-Function Process Map

The blue post-its indicate where Metrics/measurement are currently used in the operations. For this example, four Metrics are indicated. All of these Metrics fall under the last Key Process. No metrics are collected in the first three Processes. Once the final analysis of the map and operations is complete, a determination will be made to see if those four Metrics are sufficient to collect the data needed to evaluate, monitor and trend performance.

The pink post-its indicate Frustrations, as reported by the employees and management, while conducting the mapping process. The Frustrations are also referred to as issues and roadblocks. These Frustrations are stratified and verified and the visual interpretation is used to identify where improvements might be needed. Typically these improvements are relatively easy to accomplish and immediate action can be taken. Other times, the Frustration can be minimal and/or not cost effective to be addressed immediately. In other words, there is a hierarchy of Frustrations that can be ranked according to (1) importance of the Frustration to the

efficient performance of the particular business process or sub-process (high impact, moderate impact, low impact) and (2) when the corrective action should be taken (immediate, short-term, long-term) and the corresponding investment expenditure of the corrective action (minor investment, moderate investment, high investment).

Once the map itself is complete, experts fully evaluate it and create a report which will include a determination of the appropriate Processes and Activities, a stratification of Metrics and Frustrations, strengths and weaknesses and recommendations for improvement. The map and the report together make up a DMPM presentation.

The Dorsey Group (Dorsey) developed the DMPM for several applications, including helping businesses recognize that the problem exists. In this research its application can be summarized as follows: "It is not easy to fix something when people cannot agree it is broken" (AACSB, 2008, p. 4). Before an organization can improve, or know it needs to improve, it first needs to know where it currently is (Dorsey, 2018). The DMPM's application and benefits are well described in an excerpt from Dorsey's book, *Powering Peak Performance* (2018):

> At the end of the exercise (creation of the map), leadership, management, and employees have a visual representation of everything teams do in a day, as workers see it: the fundamentals of their processes; their activities, measures, customers, and vendors; their products and services; and, of course, their frustrations. Whereas before, workers only saw the tasks in front of them, they now view – and consider – upstream and downstream from their processes, which lets them grasp the "big picture" and understand their processes as a whole. (p. 31)

The DMPM report is equally important as it stratifies the data collected on the map, notates strengths and weaknesses found in the operations and provides recommendations for

improvement, both immediate and for future projects. For those who prefer words to images, the report also provides a written, nonverbal map.

4. CURRENT STUDY

There is significant support in existing literature for the idea that that small business underperformance is attributable to poor decision-making skills. Those poor decisions can cause a small business to struggle and underperform (Blank, 2013; Lyon, Lumpkin & Dess, 2000). Underperformance can adversely affect the small business's ability to remain competitive with its counterparts (Staw, Sandelands, & Dutton, 1981). Losing a competitive advantage can lead to decline of the business.

There is also significant support in existing literature that data/evidenced based decision-making helps a company to be more competitive, and therefore, successful. Data analytics are becoming commonplace as a management practice (Davenport, 2009). Companies not using analytics are going to be a step behind their competitors.

What has not been reported in existing literature is the impact of data on small business decision-making and ways to transition small businesses to EDM. For most, "seeing is believing." Telling small business owners that they need to use data in their decision-making is very different from "showing" them they need data. The Literature Review addressed the research gap and RQ1. Since EDM is shown to be an effective tool for large business performance, then we can logically conclude that EDM would also be an effective tool for small business performance.

RQ2, RQ3 and RQ4 will be addressed using multiple case study analyses of observing the effects of DMPM on small business decision-making. The DMPM is currently a tool used in continuous performance programs, and the case studies in this research will test its use in a novel

way: The impact on small business transitions to EDM. In the case studies, if the small business takes any action after the presentation of the DMPM, then that action will be assumed to be attributed to using data from the DMPM and that they will have made a decision based upon the evidence provided to them.

This study can have a significant impact on performance improvement of any business, whether service or product, large or small, for profit or not-for profit, established or new. The DMPM is being tested on small businesses because of their general lack of data use in decision-making and also because in a small business the DMPM can be conducted quickly. The DMPM is a great tool for this study because it can be used for immediate decision-making and does not need to accumulate data and track trends for decision-making. The tool itself is data.

This study can impact academia by adding research on interventions to improve small business performance. Much of the existing literature and research addresses the "cause" of small business failure but there is little research on "interventions" to minimize/prevent small business failure. The nature of case analysis is to possibly build theories by observing patterns. This research can be theory building if patterns are observed that show that the DMPM, a descriptive and visual analytic, can change management decision-making techniques. That seeing is believing.

5. RESEARCH DESIGN

5.1 Overview

The research design consists of case (company) study analysis of seven participants. Each company analysis included screening calls, onsite DMPM creation and presentation during site visits and emailed, time-sensitive questions (pre-map, post-map and 60-day follow-up). It is an exploratory approach to observe patterns across a sample of local small businesses that fit eligibility requirements (see next section). This approach was selected because the research was not testing a theory, but was testing a protocol. The protocol is the novel use of the DMPM. This type of approach is inductive and can possibly lead to the creation of new theories.

Seven research participants were selected. This amount was decided after the original decision for three participants was deemed to be too few to make generalizable inferences. The amount was capped at seven because it would provide enough data to observe patterns across a diverse sample and it fit the time constraints of the study.

The research design consists of three distinct phases:

1. Participant Selection
2. Data Collection
3. Data Stratification

5.2 Participant Selection

Eligibility: For eligibility, the business had to meet the following requirements.

1. Fewer than 150 employees. This requirement was set because we wanted to be able to

complete the mapping in one day or less. In our regular course of business we are able to estimate the number of hours needed to map based upon the number of employees; we determined that a maximum of 150 employees would allow us to complete the mapping in one working day. One working day may exceed eight hours especially when more than one shift operates at the client site; we need to observe both shifts is required for mapping. It should be noted that the SBA defines a small business as any business with less than 500 employees (SBA).

2. In business for over two years. This requirement was to ascertain that the company had a viable product/service and so that it would have had time to begin to use data in decision-making.
3. The goal of the company was growth (to scale). This requirement was necessary because companies use gut-feel decisions to "start" businesses and often those gut-feel decisions gets results. It is when a company starts to grow that it "outgrows" that ability to rely on gut-feel and needs to rely on data and second-line managers for decision-making.
4. The company was within driving distance of our office, to minimize travel and time.

To keep the participants diverse, several other factors were considered, including:

- Industry type—mix of manufacturers, service companies, distributors, assemblers.
- Regulated vs non-regulated—this was important as regulated companies tend to have strict reporting and that reporting requires records and data.

The final group of participants had the following attributes (see Table 1 for more detail and see Participant Descriptions that follow this section):

- **Employee Size**

a) 2 with < 10 employees

b) 3 with 10-50 employees

c) 1 with 50-100 employees

d) 1 with over 100 employees

- **Industry Type**

a) 3 manufacturers

b) 2 service companies

c) 1 distributor

d) 1 assembler

- **Regulated**

a) 3 regulated companies

b) 4 non-regulated companies

Table 1 – Overview of 7 Research Participants

Company Details	Participant Number/Reference						
	1	2	3	4	5	6	7
Type of Business	Assembler	Broker	Service	Mfg	Mfg	Distribution	Mfg
Main Product	Packaged Meals	Tickets	IT	Machined Parts	Signs	Coffee / Food	Medical Device
# Employees	30	9	9	85	125	40	12
Regulated Industry	FDA	No	No	FDA / FAA	No	No	FDA
Backlog of Work	No	Yes	No	Yes	Yes	No	Yes
# Years in Business	8	22	17	15	20	3	25

5.3 Participant Descriptions

Participant 1: Participant 1 (30 employees, regulated, no sales backlog, in business for 8 years) is an assembler of packaged meals sold to both military and general retail purposes (typically for those partaking in activities such as hiking). The company produces meals according to specified

nutritional requirements (amount of calories, carbohydrates, protein, etc.).

The owner/founder is the primary salesman and his networking ability dictates the company's ability to generate sales. He is also the primary person to source ingredients for the pre-packaged meals and for meal design. The company purchases in bulk, anticipating future orders but with a careful eye on the expiration date of the perishable products. He had familiarity with the industry prior to starting the business but not in a management capacity.

He uses gut-feel to run the business. The company has no standard operating procedures. He knows he has both efficiency and turnover issues and he feels that the business lacks proper reporting and metrics for decision-making. However, day-to-day operations and lack of knowledge of how to correct this has left this issue neglected. His goal is to scale the company and is open to assistance to set a more stable foundation.

Due to the lack of structure and growing pains, his management style is reactive rather than proactive. This frustrates him as he would prefer to spend his time on strategic growth rather than daily firefighting. His top operational frustration is seeing employees idle which he attributes to uncertainty of their roles and responsibilities and poor planning. The company heavily uses temporary employees for spikes and fluctuations in production needs. This participant was actively searching for someone to assist with performance issues.

Participant 2: Participant 2 (9 employees, not regulated, sales backlog, in business for 22 years) is a broker of entertainment tickets, such as tickets for sporting events, music event and the like. It operates by (1) purchasing tickets in bulk and reselling them to customers and (2) fulfilling orders on demand from the venue. Most orders are emails or online inquiries.

The staff consist of an owner-trained team that fulfills orders and finds customers to purchase blocks of tickets previously strategically acquired for resale. The sole owner is the

founder of the company and began the company after working for a similar company. He has no formal business background.

The company does not have standard operating procedures and most of the daily work is tribal knowledge that the owner has conveyed while training the staff. The success of the business can be attributed to the owner's gut-feel of what tickets to purchase (anticipating demand) and his ability to purchase tickets from vendors (positive networking). The only data the company uses in decision-making is financial data produced by the in-house accounting department; the owner is not confident that the data is accurate to use for managerial purposes. He uses cash flow to estimate success and cash shortage to estimate underperformance. He sees himself as an executive not skilled at running a business. He knows he does "a lot right" to stay in business as he has, but he knows there is a lot that is not done right.

Participant 3: Participant 3 (9 employees, not regulated, no sales backlog, 17 years in business) is a provider of IT services. It services its clients via site visits and/or online, remote dial-ins. The business model is a subscription service for which a set monthly fee includes initial set up and then unlimited hours of 24/7 support. Scheduling during high-demand times can be problematic, as the company tries to run a lean staff.

The owner is the founder but has brought in a partner to help grow the business. The original owner has past experience in the business as a manager. He is organized and open to any improvements, no matter how small, to give both his clients and his employees a good experience. He is hands-on and structured, having standard operating procedures for all they do. The company does not rely on much data for decision-making. It collects employee and client feedback and uses that data to make operational decisions and improvements. The company uses

gamification techniques to motivate employees to achieve customer satisfaction and quality of service, knowing this will give it the ability to scale.

Participant 4: Participant 4 (85 employees, regulated, existing sales backlog, 15 years in business) is a manufacturer of medical devices and aerospace parts. It is highly regulated and has a highly customized product line of standard, repetitive orders plus some one-time production. The sales stream is fairly regular, but customized orders tend to cause both engineering and production issues, resulting in backlog.

The owner is not the founder but has taken that role for the past 15 years. He is an advocate of performance improvement and knows that a misstep could detrimentally impact customer relations and production. His clients rely on a quality, on-time product. The engineering department tends to bottleneck its operations; this can result in on-time delivery issues. The inspection levels on their products is high and unacceptable product is typically caught before it is sent to the customer. This also causes production backlog. Production issues consist of delayed product design and costing, delayed quotes or omission of production instructions. All these issues contribute to waste and re-work. In 2018, it increased sales 30% but increased production only 20%. The company has standard operating procedures and relies on some data to measure performance.

Participant 5: Participant 5 (125 employees, not regulated, existing backlog, 20 years in business) is a manufacturer of indoor and outdoor signs (signage). The product is 100% customized and build to order. A design team assists with quotes and proposals and is the starting team to put an order into production. The strength of the design layout significantly impacts the ease (or challenge) of completing the jobs timely and accurately.

The co-owners purchased the company from its founder 20 years ago and have grown the company since then. They are both seasoned business professionals with financial backgrounds but lack experience in manufacturing. To compensate for their lack of manufacturing experience they rely on a high-level Operations Manager with significant experience in the field. Their employee turnover at all levels, including management, is high. They have issues with on-time production and delivery of the product and their backlog can be high due to re-work. They do have standard operating procedures but those may not be updated. They collect some metrics but are unsure of usage and accuracy. They are machine intensive but many machines are idle or underutilized because employees lack training on them or refuse to use unfamiliar (new) equipment. The company attempted an ERP implementation, but it was unsuccessful. Looking for waste in the organization, they internally process-mapped themselves but did not really "find" anything. They were curious how the DMPM would differ from what they had attempted internally.

Participant 6: Participant 6 (40 employees, not regulated, no sales backlog, 3 years in business) is four coffee shops (with food) and a distribution center. We process-mapped the distribution center because it supports all the coffee shops and it has experienced efficiency issues.

The founder has an accounting background and is familiar with business operations. He has taken on two partners, one tasked with the IT part of the business and the other tasked with marketing. The original founder runs the operations and does most of the strategic business planning. They have no standard operating procedures and no use of metrics; turnover is problematic in the cafes but not in distribution or management. Management is reactive and addresses whatever emergency might arise. Most emergencies are that the coffee shops run out of stock (coffee, paper products, food products). The daily activities are hectic and

responsibilities and roles not well defined as a "whatever it takes" management approach prevails. There is one manager that functions as a general manager. She is relied on to "make it all happen."

The founder wants to scale and scale fast, as there is a high current demand for their coffee and their cafes. He knows that the company must standardize and improve the efficiency in order to scale. The warehouse tends to be the root of most problems; it welcomed the opportunity for the mapping in hopes it would be able to make immediate improvements. As of this writing, the company has opened its 5th store, which they said opened on-time, without issues. The owner attributed this to what they learned in the DMPM presentation. It has already helped the company become more efficient and create some standardization in the shops.

Participant 7: Participant 7 (12 employees, regulated, existing sales backlog, 25 years in business) is a medical device manufacturer. The majority of the sales come from long-term, repeat orders but customized specialty orders are welcome and utilize some of the excess machine capacity. The company relies on financial data to make operating decisions but keeps all the necessary records to document their production for FDA purposes. Standard operating procedures exist. The company tried to implement ERP twice but both attempts failed. The company felt that the ERP would alleviate the production and inventory issues. They attributed the failed ERP implementations to lack of process knowledge and lack of trained staff to lead the launch.

There are two co-owners. One is the CEO who runs all aspects of the business while the other focuses only on operations. They run a "skeleton" crew. They feel the lean staffing and lack of training for their staff contributes to their inability to meet production schedules. They have invested in a considerable amount in machinery and find that it is not fully utilized. The

CEO wants to implement more metrics so that he can determine the root cause of the production problems. He would like to double his sales in three years and move to a larger facility.

5.4 Data Collection

Once the participants were confirmed, the data collection phase steps commenced:

1. The mapping date was confirmed.
2. Pre-DMPM questions were emailed asking that they be completed by Leadership only and returned one week prior to the mapping date.
3. The mapping was conducted with ONLY the employees. Leadership was excluded. Then the map was analyzed. A full DMPM report was generated for the participant.
4. The DMPM was presented to the participant.
5. The client emailed the "initial reaction" to the DMPM within one week of the presentation.
6. Post-DMPM questions were emailed asking that they be completed by Leadership only and returned within one week.
7. Sixty days after the DMPM we emailed another set of questions and asked that they be returned within one week.

The research data was collected from the comparison of pre-DMPM and post-DMPM questions (Table 2) and 60-day questions (Table 3). Participant comment data was collected from all questions and from the "initial reaction" email and used to validate question responses.

Table 2 – Summary of pre-DMPM and post-DMPM questions

■ pre-DMPM Questions:

1. Organization data – type, product, number of employees, sales backlog, regulated, years in business
2. Perception data – goals, operational changes, frustrations, roadblocks to achieve goals, data used in the operational process
3. Business plan data – goals, operational changes, resource planning (equipment, structure, employee)

■ post-DMPM Questions:

1. Impact of DMPM – new data available, was it useful, operational changes due to DMPM, change in future decision making due to DMPM
2. Perception data – goals, operational changes, frustrations, roadblocks to achieve goals, data used in the operational process
3. Business plan data – goals, operational changes, resource planning (equipment, structure, employee)

*** Note: pre-DMPM and post-DMPM questions for 2 & 3 above were identical and any CHANGE was noted

Table 3 – Summary of 60-Day Follow-Up Questions

■ 60-day follow-up Questions: Identifying changes sustained over the 60 days

1. Change in Perception
2. Change in Operational Goals
3. Change opinion of metrics/data needed
4. Data now being used due to DMPM
5. Utilize more data in decision making
6. Impacted communication in company
7. Impacted engagement in company
8. Enable improvements in company
9. Frustrations from DMPM useful/addressed
10. Metrics from DMPM useful
11. Recommendations being used/intend to use
12. Actions as a direct result of DMPM
13. DMPM useful
14. DMPM necessary to progress your operations
15. Would you recommend DMPM

5.5 Data Stratification

Prior to analysis the data was stratified. The pre-DMPM and post-DMPM questions both collected data on leadership perception of their business and leadership's business goals. The two sets of answers were compared and any change was indicated by assigning a value of "1" to it. No change was assigned a value of "0." This change addressed RQ2 and RQ3 (see page 3).

The stratification for the 60-day follow-up questions used the same change indicators of "1" and "0." While the stratification technique was the same, the RQ it addressed was not the same. The 60-day data was looking for a "sustained" change as a result of the DMPM presentation, addressing RQ4.

6. RESULTS

The pre-DMPM and post-DMPM data was analyzed after the stratification (Table 4) and the 60-day follow-up data was analyzed after stratification (Table 5). Relevant comments were also collected and analyzed.

Table 4- Stratification of data from pre-DMPM and post-DMPM questions

			Participant								
			1	2	3	4	5	6	7		
CHANGE IN PERCEPTION/PERSPECTIVE (RQ2)		Line #								**Total**	**%**
1	Change in Roadblocks to Achieve Goals	28	0	1	1	1	0	0	0	3	43%
2	Change in Operational Frustrations	29	1	0	0	1	1	1	1	5	71%
3	Change in Available Information	31	1	1	1	1	1	1	1	7	100%
4	Was the DMPM Useful?	30	1	1	1	1	1	1	1	7	100%
	Total		3	3	3	4	3	3	3		
	Percentage		75%	75%	75%	100%	75%	75%	75%		
CHANGE IN BUSINESS PLAN (RQ3)											
1	Change in Resource Planning	18-22	0	1	1	1	1	1	1	6	86%
2	Change in Operational Changes Planned	25	1	1	1	0	1	1	0	5	71%
3	Changes Considered due to DMPM	27	1	1	1	1	1	1	1	7	100%
4	Change in Decision Making due to DMPM	37	1	1	1	1	1	1	1	7	100%
	Total		3	4	4	3	4	4	3		
	Percentage		75%	100%	100%	75%	100%	100%	75%		

Table 4 stratifies two sets of data and accordingly has two parts: One that measures the "Change in Perception/Perspective" addressing RQ2 and the second that measure the "Change in Business Plan" addressing RQ3. The pre-DMPM questions and the post-DMPM questions were compared and "1" indicates when a change was noted. Not all lines on the pre-DMPM and post-DMPM were used as some of the questions where intentionally redundant and other questions did not have the significance expected when designing the question.

6.1 Change in Leadership's Perception

With regards to observing a change in Leadership perception/perspective of their businesses after the presentation of the DMPM, we see from the first portion of Table 4 that all companies had a 75% or higher change in their perception/perspective in the measured categories. One company had a 100% change in all measured areas. This number comes from the calculated percentage in the bottom row. The seven participating companies were observed to have changes in four distinct categories: Change in perception of roadblocks that the participants felt were stopping them from achieving their goals, change in their perception of operational frustrations in the organization and change in their perception of available information in the organization. A fourth question of whether they thought the DMPM was useful was also used in this analysis. The reason for including this question was because if they felt the DMPM was useful then they must have found a "use" for it and therefore, they were using it to take some type of action.

In the stratification, we analyzed each question for indications of changes in leadership perspectives. It was useful to know if some categories changed more or less than others so that we could further investigate or draw conclusions. The categories of the change in available information and whether the DMPM was useful both scored 100%, meaning all seven companies reported that the DMPM caused changed. Five of the seven companies, or 71%, reported that the DMPM caused changes in their perception of operational frustrations. Three out of seven, or 43% of the companies, reported that the DMPM caused a change in their perceived roadblocks.

6.2 Change in Leadership's Business Plan

With regards to observing a change in Business Plan, with Business Plan being defined as operational goals/ priorities/ strategies/ metrics), after the presentation of the DMPM, we see from the second portion of Table 4 that all companies had a 75% or higher change in their business plans per the four measured categories. Four of the seven companies reported 100% change in all the measured categories. This number comes from the calculated percentage listed in the bottom row. We observed the seven participating companies as having changes in four distinct categories: Change in resource planning, change in operational changes they planned to make, any changes planned that were attributable to the DMPM and any changes in decision-making resulting from the DMPM presentation.

In the stratification, each question was analyzed to observe if there was any change by category. It was useful to know if some categories changed more or less than others so that we could further investigate or draw conclusions. The change considered due to the DMPM and the change in decision-making both showed 100% of the companies reporting change. The change in operational changes (changes the way they produce their product/service) showed 71% change (five of the seven participants); 80% of the participants (6 of the 7 companies) reported change in resource planning.

For a full discussion of the results from Table 4 please see the Discussion section of this dissertation.

Table 5 stratifies data from the 60-day follow-up questions. Most questions had Yes/No responses. A "1" indicates a "Yes" (that some type of benefit was realized from the DMPM). Not all lines on the 60-day follow-up questions were used as some of the questions were intentionally redundant and other questions did not have the significance originally expected.

Table 5 – Stratification of data from 60-day follow-up questions

		Participant								
Question #	Question	1	2	3	4	5	6	7	Total	%
1a-c	Change in Perception	1	1	1	1	1	1	1	7	100%
2a-c	Change in Operational Goals	0	1	1	1	1	1	1	6	86%
3a-d	Change opinion of metrics/data needed	1	1	1	1	1	1	1	7	100%
4	Data now being used due to DMPM	0	0	0	1	1	1	1	4	57%
5a-d	Utilize more data in decision making	0	1	0	1	1	1	1	5	71%
6a-6d	Impacted communicaiton in company	1	1	1	1	1	1	1	7	100%
7a-7d	Impacted engagement in company	0	1	1	1	1	1	1	6	86%
8	Enable improvements in company	0	1	1	1	1	1	1	6	86%
10a-e	Frustrations from DMPM useful/addressed	0	1	1	1	1	1	1	6	86%
11a-c	Metrics from DMPM useful	1	1	1	1	1	1	1	7	100%
12a-12b	Recommendations being used/intend to use	1	1	1	1	1	1	1	7	100%
13	Actions as a direct result of DMPM	0	1	1	1	1	1	1	6	86%
14a-14c	DMPM useful	1	1	1	1	1	1	1	7	100%
16a-d	DMPM Necessary to progess your operations	1	1	1	1	1	1	1	7	100%
18	Would you recommend DMPM	1	1	1	1	1	1	1	7	100%
	Total	8	14	13	15	15	15	15		
	Percentage	53%	93%	87%	100%	100%	100%	100%		

Using the bottom row for each participant, for each category addressed in Table 5 it shows that four of the companies reported a 100% change due to the DMPM, one company reported a 93% change, one company reported an 87% change and one company reported a 53% change.

The categories were broad and included items such as perception, business plans, metrics, communication, decision-making, usefulness, and considering the DMPM to be necessary. In all, 15 categories were evaluated and analyzed and used in the stratification Table 5. For eight of the categories, all seven companies (100%) reported change/benefit. For five of the categories, five companies (86%) reported change/benefit. For two of the categories, each reported 71% and 57% change/benefit.

For a full discussion of the results please see the Discussion section of this dissertation.

7. DISCUSSION

7.1 Overview

The primary goal of this research was to address the following research questions: (1) What are the impacts of EDM on small business underperformance as reported in the extant literature? (2) What changes in leadership's perception of the business operations are observed before and after DMPM is presented? (3) What change in business plan (operational goals/priorities/strategies/metrics) occurs after DMPM is presented? and finally (4) What impact does DMPM have on a company's transition to EDM? A combination of a literature review and a cross case analysis of seven companies was used to address whether EDM would be a possible intervention in small business to address underperformance and enhance its chances for survival and that DMPM would be a tool to transition to EDM.

The existing literature supports EDM as an intervention and then the multiple case analysis "tested" the intervention via observations made before and after the presentation of DMPM. The change from gut-feel decision-making to data-based decision-making is not as simple as flipping a switch. It requires "showing" the benefits of data so that transition can occur.

The research addressed the following questions:

1. How do we know what data a small business is currently using?
2. How do we know that data (the DMPM) will impact leadership to take some type of action, thereby making a change?

A full description of the research design can be found in section 5 above.

The results of this study were far more robust than I anticipated. The study both

accomplished what I sought to find and also brought to light some unexpected findings. This discussion will start with describing the analysis of the data collected with regards to addressing RQ1, RQ2, RQ3 and RQ4 (see page 3) and then move to unexpecting findings. It will conclude with some thoughts on generalizability and practical implications.

7.2 EDM Impact on Small Business Underperformance

Small business underperformance can be attributed to poor decision-making. Poor decision-making can occur when decisions are made on gut-feel versus evidence. Many small companies still rely on their gut-feel while their large counterparts, eventual competitors, use data. A review of existing literature suggests that EDM would have a positive impact on the decision-making of small businesses and, consequently, improve their performance. This provides an answer to RQ1 that EDM would help minimize small business underperformance.

7.3 DMPM Ability to Cause Change

RQ2, RQ3 and RQ4 were designed to observe whether change occurred as a direct result of the DMPM presentation. Specifically, we wanted to observe any change in the leadership's perception of their business, change in the company's business plans and any other change in attitude towards making improvements and /or adding data in their organization. This was accomplished by first comparing the responses to the pre-DMPM and the post-DMPM questions and second, by gathering responses to 60-day follow-up questions. In addition, an initial response email and any comments made by the participants were reviewed and used to validate the responses to the questions.

7.4 Change in Leadership's Perception

In Table 4 the responses from the pre-DMPM questions and the post-DMPM questions were stratified, assigning a value of 1 if change was found and a value of 0 if no change was found. The values were used to calculate a percentage of the companies that made a change. The following results were found:

1. Change in known roadblocks – 43% reported change
2. Change in operations frustrations – 71% reported change
3. Change in available information – 100% reported change
4. Was the DMPM useful – 100% reported it was useful

The stratification allowed me to observe how much the participants' perceptions of their operations changed. It appears that the DMPM definitely provides changes in leadership's perception about changes in information that is useful (needed) and change in perception of operational frustrations. Roadblocks were found to be neutral with most companies stating they already knew the problem existed, although the response to this question was not consistent with the responses to other questions. For this reason, the responses were not given as much weight in the observed finding as the other responses. All in all, the DMPM tool acts as a real eye-opener as to what the problems are in the organization since the data it produces reveals roadblocks and frustrations but also areas in the company's operations that run smoothly.

The post-DMPM included the questions asking if the DMPM was useful because if it was, then it must have provided them with information that the leadership previously did not know. One hundred percent of the companies found the DMPM to be useful, which indicates that the tool unearthed roadblocks or frustrations that were not known to management, which makes DMPM useful to the leadership of the participant companies.

Some of the participant comments that support the observation:

- Participant 1: “Looking at the mapping in a whole picture gave us a better perspective…of areas that need improvement.”
- Participant 2: “How can I expect peak performance if they (employees) don’t know what that means (no metrics in place)?”
- Participant 6: “It was an eye-opener to see the different resources we are not utilizing in our operations.”

7.5 Change in Leadership’s Business Plan

Table 4 describes the four responses used in the findings:

1. Change in resource planning – 80% reported change
2. Change in operational changes planned – 71% reported change
3. Change in other areas considered due to the DMPM – 100% reported change
4. Change in decision-making due to DMPM – 100% reported change

Our observation from the data stratification is that the presentation of DMPM will definitely trigger changes in business plans (plans being defined as goals/strategies) and will trigger changes in decision-making and in most instances will trigger changes in human resources and capital investment. Seventy-one percent of the respondents indicated that they planned to make operational changes after the presentation of the DMPM. Again, DMPM triggers changes in decision-making and subsequently actions.

Some of the participant comments that support the observation:

- Participant 1: “DMPM will help us structure and better face our challenges, establish metrics and give us a good base to start monitoring.”

- Participant 3: “We are immediately implementing team meetings and using the bottlenecks highlighted to fine tune our operations.”

7.6 Change in 60 Days

Table 5 is a stratification of the data collected during the 60-day follow-up questions.

The purpose of the 60-day follow-up was to see if any report change was sustained or if their perspective/business plan changed after 60 days. The questions asked for Yes/No responses.

All participants except for Participant 1 were making changes due to the DMPM. I used 15 items on the extensive 60-day questions in the stratification. They included but were not limited to (see Table 5 for full listing):

1. Change in perception – 100% said Yes
2. Change in business goals – 86% said Yes
3. Change in opinion of metrics – 100% said Yes
4. Data now being used due to DMPM – 57% said Yes
5. Utilize more data in decision-making – 71% said Yes
6. Impacted communications – 100% said Yes
7. Impacted engagement – 86% said Yes
8. Enabled improvements – 86% said Yes
9. Actions as a direct result of DMPM – 86% said Yes

From the stratification of the 60-day questions, it is observed that the DMPM caused changes in leadership perception, business planning and goals, how data is viewed and utilized, communications and employee engagement. The presentation of the DPMP has caused companies to take some type of action and therefore use evidence/data in their decision-making.

Participant 1 said the company simply did not have time to work on making the observed changes but intended to. For this particular participant, the 60-day follow up was too soon. They volunteered to complete the follow-up at a later day. However, this was unnecessary for purposes of this research. For research purposes, Participant 1's response shows a limitation in the research in the determination of ample follow-up time. We propose that a 90- or even 120-day follow-up may be more realistic for certain companies.

Fifty-seven percent of the participants said they are using data now due to the DMPM. The written responses for the participants saying they are not using data now said they intend to but have not have ample time at the 60-question mark. Participant 1 said the company intends to add additional metrics but in the 60 days it focused more on communications, engagement and alignment. This supports that the above-stated limitation that 60 days may not have been ample follow-up to allow the companies to implement additional metrics. While 57% is barely over half and may have one questioning whether the small business will ever have "ample time" to implement data collection and analysis for decision-making, the low response is not given much weight. The reason for this is that the same participants who answered they have not used data, answered that they are making some type of change. Any change, any action they take is using data because the DMPM itself is data. The questions may have been misleading in that they left the interpretation of "data" to the participant. So, some participants may not be even aware that they already have adopted EDM, since they have made changes based on facts/data gathered.

Participant comments from the 60-Day Follow-up that support the observation:

- Participant 5: "Allowed us to poll our production associates to gain their input on the most important issues to attack. Recommend for anyone who is looking for more

efficient ways to overcome roadblocks, or wanting to ensure the right metrics are being used to measure success."

- Participant 6: "We implemented two strategies right after the initial assessment because we now know how to look at our workflow."
- Participant 7: "DMPM emphasized the need to implement lean activities and served to highlight some area for improvement. The DMPM has proven valuable for the analysis of our business activities and will continue to be used for improvement activities."

7.7 Unexpected Findings

While the primary goal was to look for change in perception and change in business plans, another finding we observed was unexpected: Most if not all participants commented on how the DMPM improves communication and employee engagement. Here is a sampling of the comments:

- Participant 2: "We are having more meetings and most importantly are sharing information."
- Participant 3: "There is definitely a much greater level of communication within the organization."
- Participant 4: "The DMPM has energized our team."
- Participant 5: "Allowed us to show the production teammates that we are listening and willing to respond to their feedback."
- Participant 6: "It boosted our morale 100%."

The creation of the map is employee-driven. Often it is the first time the employees' voice is "heard," and, in most cases, then acted on. The inclusion of the employees builds empowerment and accountability, both which are precursors to a full culture of employee

engagement that helps drive productivity and job satisfaction. We start every project with a DMPM and use it to jumpstart employee engagement, but I did not anticipate the reaction by the small business participants. The DMPM provided them with data and, as a consequence, opened communication and discussions around the data and insights gleaned from the data and resulted in more engaged employees. Leadership was very pleased with this consequential effect.

This finding is very important to the further development and growth of small businesses. The small business owner needed to engage the employees on a daily basis as the employees are their greatest resource to grow their business.

8. BENEFITS, LIMITATIONS, FUTURE STUDIES AND BUSINESS IMPLICATIONS

8.1 Benefits

In the cross-case analysis, the participants were varied and diverse. Regardless of the diversity, the general consensus is that the DMPM is a useful tool. One hundred percent of the participants responded "Yes" when asked if the DMPM was useful. That question was asked on both the post-DMPM questions (Table 4) and the 60-Day follow-up questions (Table 5). In addition, 100% of the participants said they would both (1) recommend the DMPM and (2) found the DMPM necessary to progress their operations. So, whether they have nine employees or 125 employees, whether they are a manufacturer or a service provider, they all agreed that the DMPM is beneficial. This suggests that the findings of this research are generalizable to almost all small businesses.

This research generates a new theory: A tool that is used primarily in large business performance improvement programs is a tool that can also be used to assist small businesses to improve their performance and ultimately boost their chances for survival, especially when market conditions become hostile and increasingly dynamic. This tool could be instrumental to the world of small businesses who need a way to " 'see' their operations as they really are" so that they can know where and how to make performance improvements that may positively impact their chance of success in achieving their goals.

As my business partner so succinctly states the need for the DMPM: "Before an organization can improve, or know they need to improve, they must first need to know where they currently are" (Dorsey, 2018, p. 29). Small businesses need to know where to improve or if

they need to improve in order to minimize underperformance. DMPM appears to be a tool that can provide them with this knowledge and begin their transition to EDM.

The DMPM's affordability, ease of use and color-coded, visual accessibility make it particularly relevant to small business needs. All participants immediately related and reacted to the map. Some are enthusiastic about the next steps and some are slightly discouraged with their current state as depicted in the map. What mattered for this research was not the type of reaction they had, but the fact that they did have a reaction. This shows the true merit of this tool to cause change.

8.2 Limitations of the Research

During the 60-day follow-up questions, it was observed that 57% of the participants were not using additional metrics as a result of the DMPM. However, in their comments they said they intend to but have not had sufficient time. While the research does indicate that DMPM causes changes in the decision-making of a company, it does not indicate the immediate use of additional metrics. For a company to truly improve, the use of data and metrics is critical. A longer follow-up may, or may not, have given the participants the time they needed to implement new reporting and metrics. This of course provides another consulting opportunity, in that the Dorsey company can help companies put in place a system of metrics and measurement tools, and in addition, advice on what courses of action would be appropriate to alleviate the roadblocks/frustrations identified. A key lesson is that in order to fully realize the benefits of the DMPM tool as an instrument to transition a small business from ad-hoc decision-making based on gut feelings to EDM-based decision-making, the transitioning business needs more time.

A second important limitation is the fact that the research is based on only seven, albeit very diverse, small businesses. The question of complete generalizability lingers, and until an

empirical study can be done on many hundreds of small businesses, firm and conclusive statements cannot be made about DMPM as a transition tool for EDM in small businesses. That said, the results based on this diverse sample are an indication that generalizability can likely be established.

8.3 Future Research

First, this study can be replicated using larger samples and small businesses, across a broad variety of industries and countries, in order to fully establish the generalizability of the DMPM as a transition tool.

Second, the tool can be extended so that it deep-dives into areas that managerial accounting uses for reporting purposes. Managerial accounting has a critical role in organizations. While financial accounting addresses financial reporting mainly for stakeholders and taxing purposes, managerial accounting produces reports that permit management of the company. Those reports must be accurate so that accurate decisions can be made. The DMPM verifies all key processes, activities and metrics currently used so that the managerial accounting team can verify the data they are relying on. A very interesting study could be evaluating managerial accounting documentation reliance before and after the presentation of the DMPM.

8.4 Business Implications

This research has the following business implications:

* improved decision-making and improved cash flow management, reduction in conflicts on workfloor, better cost control.

* increased rates of survival. This has huge societal economic and social impacts. It will drive economic growth, and job creation.

9. CONCLUSION

The focus of the present research was to explore an intervention that would assist small businesses in improving their performance and that helps them adopt evidence-based decision-making. A review of existing literature supports that EDM positively impacts the performance in larger organizations and that it can be inferred that it would have the same effect on small businesses. This inference was made because existing literature indicates that small business underperformance can be linked to poor decision-making (not using data to make decisions).

If EDM is an intervention to assist small businesses, then the question was "how" do we entice small businesses to use data? How do we transition them from gut-feel decision-making to evidence-based decision-making? This research tested the DMPM as a tool that might be useful in the transition; seven participating companies were included to observe the change, if any, that occurred after the presentation of the DMPM.

The DMPM was selected because it is easy to use, easy to understand and provides positive improvements in a relatively short period of time. While it can be used for short-term decision-making, it can also be used for long-term, strategic decision-making. It has been used successfully to implement process improvement in larger companies; this research tested a novel use in small companies.

The cross-case analysis observed that DMPM did cause the participating companies to take some type of action. Action is a change. Therefore it is concluded that the DMPM is a tool that can be used to transition the small business to EDM.

As I conclude this dissertation, I am happy to note that several of the participating companies have asked for additional work from our company. These requests validate that the DMPM provided the companies with evidence and that that evidence was used in their decision-making to take the journey to improve their performance – and it is indeed a journey!

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APPENDICES

Appendix 1

THE DORSEY GROUP
Propelling Growth through Peak Performance

Engagement Survey

Name/Team/Department: _____ **Date:** _____

	Executive Strategic Goals & Objectives	Answers / Comments	
1	Organization Focus: Manufacturing, Distribution or Service		Manufacture Distribution Service
2	Are you Regulated? FAA, FDA, ...		Yes or No
3	How is your Sales Team structured?		Internal Agents Distributors
4	Do you have a Sales Backlog?		Yes or No
5	Is there a significant vendor or few vendors that you place extreme reliance on? If so, have they ever been late or disrupted your operations		
6	How many emoployees How many were hired in the last 3 months, 6 months, year?		
7	What are your top 5 priorities? Why		
8	What are your top 5 operational changes planned? Why		
9	What capital investments (physical & infrastructure) do you plan to make in the short-term and the long-term?		
10	What staffing changes do you plan to make in the short-term and the long-term?		
11	For each item in 7--10 above, What do you feel might cause you not to achieve your goals/plan?		
12	For all items in 7-10 above, What data did you use to help make the decisions?		
13	What do you think are the main frustrations encountered by leadership, by management, by your emplyees?		
14	Is there any other data than that listed in #11 above that you use in operational decision making?		

Appendix 2

THE DORSEY GROUP
Propelling Growth through Peak Performance

Engagement Survey

Name/Team/Department: _____ **Date:** _____

	Executive Strategic Goals & Objectives	Answers / Comments
1	Did you find the Dorsey Multi-function Map (DMPM) and its presentation to be useful? Why?	
2	Do you consider the DMPM to be a visual analytic? (provide data in a visual format)	
3	Did the DMPM provide data / information that you previously did not have / were unaware of? If so, please list.	
4	Are you considering any changes to processes, procedures or KPI's (metrics) based on the DMPM presentation? If yes, what are you considering?	
5	On a scale of 0 to 3, rate how helpful was the DMPM process: 0 = not helpful, 1 = a little help, 2 = helpful, 3 = very helpful	
6	The below questions are the same as the Pre-Mapping questions. I am looking for any change due to the DMPM. If there is change, then what data from the DMPM are you now using in your decision making. Attach additional sheets if needed.	
7	What are your top 5 priorities? - Any changes from your Pre-Map answers? If so, was it data from the DMPM that caused the change? If so, please list.	
8	What are your top 5 operational changes planned? Any changes from your Pre-Map answers? If so, was it data from the DMPM that caused the change? If so, please list.	
9	What capital investments (physical & infrastructure) do you plan to make in the short-term and the long-term? Any changes from your Pre-Map answers? If so, was it data from the DMPM that caused the change? If so, please list.	
10	What staffing changes do you plan to make in the short-term and the long-term? Any changes from your Pre-Map answers? If so, was it data from the DMPM that caused the change? If so, please list.	
11	For each item in 7-10 above, what do you feel might cause you not to achieve your goals/plan? Has this been influenced or changed (from your Pre-Map answers) by the DMPM and its presentation?	
12	For all items in 7-10 above, what data did you use to help make the decisions? Is there data from the DMPM that was used in your decision making?	
13	What do you think are the main frustrations encountered by leadership, by management, by your employees? Is there a change from your Pre-Map answers? If so, was this due to the DMPM?	
14	What information did the DMPM provide you that you consider to be helpful in your future decision making?	

Appendix 3

THE DORSEY GROUP
Propelling Growth through Peak Performance

USF – Research: 60 Day Follow-Up Questions

Notes Before Completing:

A. Thank you for your time in completing these 60 Day Follow-Up Questions. These questions are instrumental to my research and I truly appreciate both your time and your effort. Please provide as much detail as possible.
B. Most questions have a **Yes/No** option, please **BOLD your response** and then provide detail in the space provided.
C. The last section asks you to rank and rate some pre-chosen responses.
D. When "MPM" is referred to, it refers to the Dorsey Multi-Function Process Map™ (MPM) AND the Report presentation. You may need the Report to complete some of the questions.
E. When you type into the form, it will move everything down and the page numbers will increase. Any questions please feel free to contact me 954 695 0592. Again – THANK YOU VERY MUCH!

#	Answer By BOLDING	Question
1a	Yes / No	The MPM changed the *perception* of your company's workflows?
1b	Yes / No	The MPM changed the *perception* of your company's efficiency and effectiveness?
1c	Yes / No	The MPM changed any *perception* of your company including resource allocation (people, equipment, funds), training, skillsets, organization, communication? **Please provide as many details as possible** to support your answers in regard to change of perception due to MPM:
2a	Yes / No	The MPM caused you to change operational goals?
2b	Yes / No	The MPM caused you to change operational strategies?
2c	Yes / No	The MPM caused you to change operational processes? **Please provide as many details as possible** to support your answers in regard to change of operational plans due to MPM:

Appendix 3 (Continued)

3a	Yes / No	The MPM caused you to change your opinion of metrics/data needed in your company?
3b	Yes / No	The MPM caused you to think you need more metrics/data in your company?
3c	Yes / No	The MPM caused you to collect metric/data in your company that you were not collecting prior to the MPM (you are currently collecting this data)?
3d	Yes / No	The MPM caused you to plan to collect metric/data in your company that you were not collecting prior to the MPM (you plan to collect in the future)? **Please provide as many details as possible** to support your answers in regard to change in metrics/data due to the MPM:
4		**Please list data** that you are now using due to the MPM and list data that you plan to use due to the MPM (please show if now using or plan to use): 1. 2. 3. 4. 5. (of course, list as many that apply)
5a	Yes / No	The MPM caused you to utilize more data in your managerial and operational decision making?
5b	Yes / No	Are you currently using the MPM to make decisions?
5c	Yes / No	Are your managers currently using the MPM to make decisions?
5d	Yes / No	Are your employees currently using the MPM to make decisions? **Please provide detail** explanation:

Appendix 3 (Continued)

6a	Yes / No	The MPM impacted communications in your company?
6b	Yes / No	The MPM has caused you to share/communicate information in your company?
6c	Yes / No	The MPM has caused you to conduct more meetings in your company with the purpose of collecting and/or sharing data?
6d	Yes / No	If any of the above are yes, is it happening on a daily basis? If yes, exactly what is being conducted daily that is due to the MPM. Provide detail here or below. **Please provide as many details as possible** to support your answers in regard to change in communication of data (via meetings or otherwise) due to the MPM:
7a	Yes / No	The MPM impacted engagement in your company?
7b	Yes / No	The MPM impacted how leadership is engaged?
7c	Yes / No	The MPM impacted how managers are engaged?
7d	Yes / No	The MPM impacted how employees are engaged? **Please provide as many details as possible** to support your answers in regard to change in engagement due to the MPM:
8	Yes / No	The MPM enabled you to make improvements in your company? **Please provide improvements** that you made. If you plan to make improvements in the future, please list those and notate as "future":

Appendix 3 (Continued)

9		What problem(s) would you say the MPM eliminates or lessens for you?
		The MPM presentation included “frustrations” indicated by pink post-its.
10a	Yes / No	Was the inclusion of the frustrations useful to you?
10b	Yes / No	Was the inclusion of the frustrations useful to your managers?
10c	Yes / No	Was the inclusion of the frustrations useful to your employees?
10d	Yes / No	Have you worked on/addressed any of the frustrations? If yes, **please list** the top 5 frustrations that you have addressed and explain how you prioritized/selected that frustration: 1. 2. 3. 4. 5. **How selected:**
10e	Yes / No	Are there any frustrations that you would like to work on but cannot due to resource limitations? If yes, which ones? And what is restricting you from working on them (time, money, staff, skills, training, knowledge). **Please provide details**: **Please provide as many details as possible** to support your answers in regard to frustrations included on the MPM:
		The MPM presentation included “metrics” indicated by blue post-its.
11a	Yes / No	Was the inclusion of the metrics useful to you?
11b	Yes / No	Was the inclusion of the metrics useful to your managers?
11c	Yes / No	Was the inclusion of the metrics useful to your employees?

Appendix 3 (Continued)

		The MPM report contained recommendations.
12a	Yes / No	Are you actively using any of the recommendations? If yes, **please list** the recommendations that you are using and explain how you prioritized/selected that recommendation 1. 2. 3. 4. 5.
12b	Yes / No	If you are not actively using a recommendation, do you plan to use the recommendation in the future? **Please provide details and list**: If you are not actively using a recommendation and do NOT plan to ever use it, **please explain why:**
13		Please list the top 5 *actions*, if any, that you have taken that were a *direct result of the MPM and its presentation*. You can list more if you have over 5. (Actions defined as any operational change, improvement, addition, elimination in process and/or data and/or resource (people/equipment/funds). 1. 2. 3. 4. 5. **Please provide as many details as possible** to support your answers in regard to actions that you took that were a direct result of the MPM and its presentation:
14a	Yes / No	The MPM was useful to you as the leadership of your company?
14b	Yes / No	The MPM was useful to your managers?
14c	Yes / No	The MPM was useful to your employees? **Please provide as many details as possible** to support your answers in regard to the usefulness of the MPM:

Appendix 3 (Continued)

15		What has the MPM done for your business? Please elaborate as much as possible even if your response appears to be redundant in relation to previous answers.
16a 16b 16c 16d	Yes / No Yes / No Yes / No Yes / No	Before this research, were you aware that MPM was a tool available to you? If yes, did you previously consider it? Would you have you paid for the MPM? If so, what amount/range? Now that you have seen the MPM as a product/service, do you consider it "*necessary*"? Something you needed in order to progress your operations? **Please provide details** to support your answer:
17		What was going on in your business that made you decide to participate in the research and try the MPM?
18	Yes / No	Would you recommend the MPM? If yes, to who specifically (do not list names)? What would you tell them about the MPM?