I. Introduction

Envisioning Evidence-Based Management

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Abstract

Evidence-Based Management (EBMgt) is an evolution in the practice of management. It is a knowledge-intensive, capacity-building way to think, act, organize and lead. Its practice incorporates 1) use of scientific principles in decisions and management processes, 2) systematic attention to organizational facts, 3) advancements in practitioner judgment through critical thinking and decision aids that reduce bias and enable fuller use of information and 4) ethical considerations including effects on stakeholders. It is a no-fad, no-fluff approach to developing better managers and leading effective and adaptive organizations. EBMgt is a product of the distinct yet interdependent activities of practitioners, educators and scholars. This chapter discusses how each contribute to the advancement and use of EBMgt.

Keywords: **Scientific evidence**
Organizational facts as evidence
Systematic decision making
Ethics
Critical thinking
Decision Aids
Cognitive repair
Logic models
Cognitive bias
Bounded rationality
Practice-oriented research

Management' means, in the last analysis, the substitution of thought for brawn and muscle, of knowledge for folklore and superstition, and of cooperation for force…
Peter Drucker

In science you need to understand the world;
in business you need others to misunderstand it.
Nassim Nicholas Taleb

The world is complex and experience meager.
James G. March

Evidence-based Management (EBMgt) is the systematic, evidence-informed practice of management, incorporating incorporates scientific knowledge in the content and process of making decisions. Part of a broad movement to make better use of scientific knowledge in everyday life, EBMgt is an evolution in management practice and the way professional managers are educated. It deploys well-established scientific findings regarding critical thinking, human judgment, and decision making to aid managers in obtaining quality information and putting it to use. The set of practices that make up EBMgt achieve better-quality results in organizations by improving the practitioner's knowledge, judgment, and competencies. EBMgt offers no one-size-fits-all solutions. It does not oversimplify problems and their solutions in the way that management fads tend to do (Huczynski, 2006). Instead, it supports practitioners in making fuller use of their human, social and technological capabilities. EBMgt is developed and mastered over a career, not a course.

This chapter first introduces the basic facets of EBMgt and how they can be practiced. It then describes how evidence-based approaches can be adapted to the broad array of situations managers face. It concludes by describing the roles of

EBMgt's three critical constituencies: (1) the managers, consultants and others who practice EBMgt and the (2) educators and (3) scholars who provide it critical support. But first, to help the reader envision what EBMgt practitioners actually do, let's meet two of them: Frances Tan, an executive in a global corporation, and Normand Mathieu, a middle manager in a regional bank. What practices are they using that seem "evidence-based" to you?

Frances Tan is the marketing vice president of an international container and packaging firm. She is on the lookout for ways to improve how her division organizes work and makes decisions. Frances champions her staff's development and their efforts to make better decisions. She and her direct reports collaborated with a consulting psychologist to turn a set of principles from decision-making research into practical guidelines for improving their decisions. These covered advance preparation, processes for making an actual decision, and managing its aftermath. At meetings and when she teaches in the company's in-house leadership program, Frances reinforces these principles. At the end of meetings where decisions are made, her staff now takes a few minutes to talk about how they applied the principles and what they learned. These discussions have helped adapt and expand the use of evidence-based decision principles to the division's array of decisions. The results so far include (1) more consistent decision follow through and (2) fewer unexpected customer or employee problems as a consequence of decisions.

Normand Mathieu is the institutional research director for a large bank. As part of his role, Normand regularly analyzes bank data to help address critical

questions the bank's top management team has raised. Searching for ways to improve his management practice, he uses the bank's electronic library to follow research in relevant areas. Recently he looked into the research on demographic diversity. These studies led Normand to examine the results of a naturally occurring experiment inside the bank: comparing units that had included diversity in their performance goals to those that hadn't. Findings from this analysis demonstrated that certain practices led to better retention and advancement of women and minorities at the bank. They also highlighted ways to reduce backlash from white men to the bank's diversity efforts. As a result, Normand changed certain practices in his own group and provided senior management with information on diversity-promoting practices that work at the bank.

Appendix 1 lists evidence-based practices used by these two practitioners. As we go through the chapter, I will provide more details about how they practice EBMgt. The practices Frances and Normand use reflect EBMgt's four facets.

The Four Facets of EBMgt

> Think for yourself upon rational lines, hypothesize, test against the evidence, never accept that a question has been answered as well as it ever will be.
> Billy Beane

EBMgt combines four fundamental activities in the everyday exercise of management judgment and decision-making (Figure 1):

1. Use of the best available scientific findings;

2. Gathering and attending to organizational facts, indicators and metrics in a systematic fashion to increase their reliability and usefulness;

3. On-going use of critical, reflective judgment and decision aids in order to reduce bias and improve decision quality;

4. Consideration of ethical issues including the short- and long-term
    impact of decisions on stakeholders.

---------- Insert Figure 1 about here ----------

These facets are implemented in ways that surmount the limitations and
constraints that operate on unaided human judgment (Simon, 1997). EBMgt's
features are intended to improve information quality while at the same time
providing cognitive aids and decision tools to repair and develop practitioner
judgment and decision making (cf. Heath, Larrick & Klayman, 1998).

Use of Best Available Scientific Findings

> Research is to see what everybody else has seen,
> and to think what nobody else has thought.
> Albert Szent-Györgi
>
> It's not that I'm so smart,
> it's just that I stay with problems longer.
> Albert Einstein

Scientific knowledge is the bedrock of all evidence-based approaches to practice,
from medicine (Sackett et al., 2000) to criminology (Sherman, 2002) to education
(Ambrose et al., 2010; Thomas & Pring, 2004). EBMgt is built on the scientific
premise that there is an underlying degree of order in which a common set of
basic physical, biological, social and psychological processes occur. The
distinctive value of scientific evidence is the explicit knowledge it provides
regarding how the world operates. This includes the natural world and the human-
made sphere of organizations (Simon, 1996).

23

Scientific knowledge is distinct from other forms of knowledge. It is based on controlled observations, large samples sizes (N), validated measures, statistical controls and systematically tested and accumulated understandings of how the world works (i.e., theory). Scientists are human and are generally subject to the same biases and value judgments of other people. The important difference is that the scientific method and related processes I describe below provide checks and balances to reduce these biases, enabling a fuller understanding of the world.

Problems to Overcome.

The information managers use is limited by human biases in interpreting the world and our experiences of it. To take the best advantage of scientific knowledge, it is necessary to overcome these limitations.

Individuals are prone to see patterns even in random events, from the clouds in the sky to the leaves at the bottom of a tea cup (Nickerson, 2002). The patterns that individuals see often reflect systematic misinterpretations that overtime may come to be accepted as fact. One kind of misinterpretation, for example, is the "attribution bias," that is, the tendency to adopt self-enhancing views of failure and success (Zuckerman, 1979). If a slew of customer complaints come in after hiring a new customer service agent, her boss may well blame the new hire, even if complaints have come in bunches before. On the other hand, if sales went up that month, the boss might see that good news as a sign that his commitment to hiring and training great agents has paid off. In either case, there is a real possibility that the observed changes are merely random fluctuations. The fact is that randomness exists everywhere. Our minds, on the other hand, seek

24

certainty, and look for patterns and explanations that create more of it. An EBMgt practitioner confronted with the above complaint and sales data is conscious of the possibility of random fluctuation -- and less likely to draw an unsubstantiated conclusion.

Two very different kinds of uncertainty exist, irreducible and reducible. Randomness creates irreducible uncertainty: it is intrinsic to the phenomenon and cannot be eliminated. *Reducible* uncertainty is that which can be diminished through learning (Montague, 2007). Customer complaints and sales data involve both.

Scientific evidence based on large numbers of observations identifies both random (irreducible) and systematic (predictable and reducible) variation. Knowing how to obtain and use scientific evidence and reliable business knowledge helps practitioners respond effectively to the uncertainty they face everyday in organizations. Customer complaints may be related to staff turnover (the people the new agent might have replaced), which can erode service quality. The EBMgt practitioner who is aware of the effects of turnover on service quality (e.g., Schneider & Bowen, 1985) is less like to rush to blame the service agent inappropriately and better able to appreciate sources of fluctuation in business outcomes. The same goes for the EBMgt practitioner who has gathered data on historical drivers of company sales, making that person better able to judge whether the sales increase is meaningful or explained by outside forces (e.g., the weather or the economy). These practitioners use evidence to make informed judgments. On the other hand, the non-evidence-based practitioner who unjustly

blames the new agent for complaints or takes credit for apparent successes is likely to repeat the same mistaken judgments time and again.

Despite the fact of randomness, greater predictive power and more reliable knowledge are possible. Aggregated events often can be predicted when individual events cannot. Scientific evidence capitalizes on the predictability of averaged data by gathering many observations in a single study. Science's reliance on multiple studies is even more powerful in finding the best explanation that accounts for known facts. Scientific research and careful attention to aggregated information can uncover patterns our unaided minds miss. Nonetheless, there is no such thing as a "scientifically proven" phenomenon (Rovelli, 2011):

> "The very foundation of science is to keep the door open to doubt… a good scientist is never "certain" ... Knowledge itself is probabilistic in nature. … Better understanding of the meaning of probability, and especially realizing that we never have, nor need, "scientifically proven" facts, but only a sufficiently high degree of probability, in order to take decisions and act, would improve everybody's conceptual toolkit."

It has long been understood that the assumptions managers make can be stumbling blocks on the road to organizational effectiveness. William Redfield, the first Secretary of Commerce in the United States, long ago pointed out:

> "EFFICIENCY means keen self-criticism. It means to go out into the shop and find nothing there that is sacred or fixed. It means that the shop six months ago shall be ancient history. It means the dropping of history, the forgetting of

26

ghosts, the questioning of everything." (Redfield, 1912)

The human dilemma is that we actually see the world *through* our assumptions (Dawes, 2001). Chinese research subjects, born and raised in a highly collectivist society, were asked to look at pictures of fish, and were found to commonly see a school of fish moving an individual fish along. American subjects, raised in a more individualistic society, tended to interpret the same picture as depicting a brave little fish leading the others (Morris & Peng, 1994). This is just one illustration of how virtually impossible it is for people to view events without making assumptions about them. Those assumptions reflect and reinforce pre-existing beliefs – a phenomenon referred to as confirmation bias. At the same time, one purpose of scientific research is to investigate the assumptions people make in interpreting the world to better understand how the world works and also how human tendencies affect it and its organizations. Becoming able to recognize and think critically about one's assumptions leads to better judgment.

<u>Using the best available scientific knowledge</u>

Scientific knowledge is potentially applicable to every aspect of management practice. An evidence-based practitioner is familiar with basic research in his or her area of practice. This familiarity is often based on training, self-guided reading, and contact with well-informed sources. A practitioner seeking to make more evidence-based decisions is in the habit obtaining the best available scientific evidence on issues that matter (Zanardelli, this volume). Research in the organization and management fields affirms some personal judgments (like the "common sense" notion that employees derive job satisfaction from the rewards

27

they receive, Porter & Lawler, 1971) and challenges others (pay for performance can actually reduce performance, Airely et al., 2009). As described above, science is less biased than unaided human judgment and thus provides in general more valid knowledge.

Frances Tan, the marketing VP at the packaging corporation, is good at getting the assumptions behind business proposals and practices out in the open. Reacting to the investor press's recent questioning of the firm's growth potential, the CEO of Frances's firm had brought up the need to dominate the competition by getting their market share up. Frances took her boss aside and asked him, "Is market share the kind of growth we need?" Questioning assumptions is fundamental to good evidence-based practice. The craft of it is how to raise the issue especially when it's the boss making assumptions. Frances raised this question at a break in a meeting. She went on to explain that a lot of conventional thinking about market share is wrong (she actually said "not supported by the evidence"). In fact, the market share of firms whose stated objectives focus on beating out their competition is negatively related to their financial returns. Frances's basic point was informed by studies on the costs and benefits of market share. Firms pursuing profitability garner greater returns than those focused on gaining market share (Armstrong & Collopy, 1996; Armstrong & Green, 2007). This isn't to say market share never matters. It's just not a simple linear X➔Y connection (i.e., firms perform better when they pursue market share if they are niched businesses or have lower expansion costs).

28

The advantage science has over individual experience is that scientific research is essentially a project involving many thousands of people using systematic methods to understand the world. Personal experience is plagued by the problem of small numbers: it reflects an individual's interpretation of events in his or her life. With its scale and scope, science can counter the human tendency to over-interpret small bits of information and under-estimate randomness. Scientific research on management and organizations is conducted worldwide, a project of many thousands of researchers. For instance, the Academy of Management, the most prominent research association of management scholars, educators and practitioners has, at this writing, more than 19,000 members from more than 60 countries. Such science-oriented organizations operate worldwide, made up of researchers studying organizations and the behavior of people associated with them.

Scientific knowledge relevant to management and organizations depends on two practices that give it different meaning and utility from other sorts of information, the peer review process and the systematic review.

Peer Review

The peer review process is a central means of establishing the credibility of scientific evidence (Werner, this volume). Independent scientists anonymously review research to determine whether it merits publication in a scientific journal. A big part of this review is to establish the validity of findings by critically evaluating whether bias and alternative explanations can be ruled out. Peer review involves an authentication of research methods, findings and conclusions prior to

a scientific paper's acceptance and publication in a journal. (N.B., certain scholarly books may also undergo critique similar to peer review as in the case of this Handbook, published by a university press). It's good practice to first look to peer-reviewed sources when seeking out what is known about an issue or problem.

The advice to rely upon peer-reviewed sources also applies to popular management books available from a bookstore or on-line retailer. Go to the bookstore and pull a few books off the shelf that look like they might be useful to a manager. Flip to their reference section and check out the extent to which the sources authors have used would pass our basic (peer review) quality test. My own students, who do this as a class exercise, find that the majority of business books make limited use of research evidence. Most fail to use peer-reviewed journals as sources. A few writers like Malcolm Gladwell (2005) measure up quite nicely, offering reader-friendly translations of scientific findings previously published in peer-reviewed journals. The fact remains, however, that most management books rely on popular articles or the opinions of famous people, while ignoring scientific evidence. Peer-reviewed findings merit a degree of confidence, while non-peer-reviewed work and its derivatives must be treated with greater skepticism.

Systematic Reviews

Systematic reviews (SR) also play an important role in providing evidence for practice (Briner & Denyer, this volume). An SR analyzes all studies relevant to a particular question in an explicit, transparent fashion in order to provide the best-

30

available answer. An SR avoids the (often subconscious) cherry picking of individual studies chosen for their support of the reviewer's preferred position.

Because any single study has limitations, the best evidence comes from multiple studies with different kinds of designs and conducted by different scientists, thus providing independent corroboration that a finding is real. Research summaries based on a body of evidence thus are more valuable, because multiple studies can cancel out the limits of any one. As one example, a recent systematic review on employee involvement revealed its positive effects on employees, work groups, companies and countries (e.g., outcomes included greater individual satisfaction, group and firm performance and societal participation in democratic processes) and the importance of training and development to making employee involvement effective (Wegge et al., 2010).

Systematic reviews need to possess certain features if they are to be informative and useful (Briner & Denyer, this volume). These include careful formulation of the managerial question, and a willingness to adapt that question as the review process sheds light on the underlying issues. SRs also pay attention to data quality, to assess whether the body of studies has successfully ruled out possible bias. Under time pressure, a modified SR in the form of a rapid review can be conducted to identify the gist of what the evidence says.

Implications

By using peer review to critique single studies and systematic reviews to answer important questions, we can identify the best available reliable knowledge. Knowledge vetted in this way is explicit and easily communicated. The specific

31

products such knowledge yields include general principles (e,g, specific goals

tend to lead to higher performance than do general goals; Locke, 2009) as well as

action guides -- such as the specific steps to follow in making a quality decision

(Yates & Potwoworski, this volume). Such knowledge products to support EBMgt

are increasingly available. For example, Armstrong's (2011) *Persuasive*

Advertising: Evidence-Based Principles contains 194 principles marketers and

advertisers can use to formulate effective advertising. Locke's (2009) *Handbook*

of Principles of Organizational Behavior: Indispensible Knowledge for Evidence-

based Management contains more than 100 principles managers and human

resource professionals can use in developing effective practices for managing

employees and organizing work. The scientific knowledge explosion is likely to

increase the number and scope of these compendia in future. (Note: EBMgt is not

about putting a hundred principles in play at one time! It is about learning the

principles useful to your practice and looking into additional ones when new

situations arise. See Rousseau and Barends, 2011.)

Systematic Use of Organizational Facts

> A man should look for what is,
> and not for what he thinks should be.
> Albert Einstein

> Facts are stubborn things.
> Ronald Reagan

Organizations and their decisions are as much structured by the information they

pay attention to as by formal roles and reporting relationships. Identifying

organizational facts that are critical to making important decisions requires

32

systematic practices to overcome both the decision maker's cognitive limits and the unreliability of information.

Organizational facts describe the organization, its outcomes and its environment. They come in many forms. These include basic metrics for assessing the health of an organization (cash flow and liquidity) or monitoring its business outcomes (e.g., EBITA, ROI) and customer/client impacts (e.g., for hospitals, the infection rate per patient days or severity adjust mortality). Other facts pertain to the many factors contributing to performance, such as market- or customer-related competencies, employee and customer satisfaction (Drucker, 2003) and organizational processes related to coordination and problem-solving (Goodman, 2001). Additional information related to decisions includes the expected returns from allocating people or money to projects and environmental information relevant to strategy. A major value of all this information is that it can help to surface questions about assumptions and expectations (Drucker, 2003, p. 95-98). This information then serves as a guide to more reflective managerial decisions and actions.

<u>Problems to Overcome</u>

Making fact-based decisions in organizations is not easy. The term "fact" connotes a verifiable truth, however, the basic metrics, outcomes and indicators start out as raw data generated by the efforts of organization members or people outside the organization. Raw data can omit important information (e.g., counting the number of errors made in an air traffic facility doesn't tell whether the errors are consequential or insignificant, or whether they were made by one person or

many). Data are also contaminated in that information may be biased. For example, because business managers might be inclined to underestimate next year's revenues in order to avoid a shortfall, their forecasts may not be reliable.

A second challenge in using business facts is figuring out what they mean. Facts are subjectively interpreted. How they are understood can depend on the practitioner's job or functional background. In the early years of managerial decision research, Dearborn and Simon (1958) observed that the same business case tended to be seem as a personnel problem by HR people, a cash flow problem by finance people and an operations problem by production managers. Entrepreneurs may read opportunities into business situations in which bankers see only the risks (Sarasvathy, Simon & Lave, 1998). Non-managerial employees make judgments about the trustworthiness of management based on the business information shared with them (Ferrante, 2006).

Facts are also political. The business information managers rely on can be highly politicized. Reporting can be spun, framed or downplayed depending on the responses anticipated. From mundane concern for how a CEO will react to a performance problem to the catastrophe that followed Enron's "cooking the books" (McLean & Elkind, 2003), the channels through which facts about the organization's health and well being must travel can resemble baffles rather than conduits of information. In the words of one administrator confronted with problems from a restructuring, "I don't want to know. If you give me data, I will have to act on it."

The facts managers use reveal what they pay attention to. The adage that

"what gets measured gets managed" holds true (Cyert & March, 1963, 1992).

Figuring out what facts to obtain and how to use them is a critical matter.

Recalling the issue Frances Tan raised with her boss, the evidence suggests that

market share growth is a less important objective than pursuing profitability.

Armstrong (2007) says, "The objective should be profitability. In view of all the

damage that occurs by focusing on market share, companies would be better off

not measuring it." Still, it is no mean feat to collect useful and accurate

information. Organizations are made up of different coalitions whose interests are

often widely (even wildly) different (Hodgkinson, this volume; Potwoworski &

Green, this volume). A responsible manager has a lot of ground to cover in

figuring out what data might be useful and then to obtain them (Barnard, 1938).

An evidence-based manager takes certain steps in analyzing organizational data in

order to overcome their inherent limitations.

Facts Differ in their Reliability

Organizational facts may reflect measurement error and randomness. Donaldson

(2010; this volume) describes strategies for obtaining reliable organizational data.

Small firms may need different strategies than large ones, but some general

principles hold. The "small numbers" problem means that data based on a single

point in time are more likely to reflect random processes. . A wise manager is

skeptical of one-shot or single-time data. Instead, it may be better to collect data

over time. It can also be important to interpret certain event data, such as accident

or errors, in terms of ratios (e.g., errors divided by the number of transactions)

rather than absolute counts. Base rates matter to the meaning of certain events.

35

Sixty errors in a hospital that occur over the course of 15, 000 patient days (a rate of 0.004 errors per patient day) may indicate safer healthcare than the 16 errors that occurred over just 1,000 patient days (an error rate of 0.016 errors per patient day -- four times the rate of the other hospital).

Causal Ambiguity

Causal ambiguity compounds the problems associated with organizational data, in that identifying the key factors driving outcomes can be difficult. It can take considerable intelligence-gathering and analysis to figure out the real factors that account for fluctuating results, or the reasons why one department does something one way and gets a good result, while another tries it and doesn't. The higher up the manager is, the more likely that the data flowing in are aggregated. Though aggregated data can be useful, aggregation can disguise important variations. If revenues vary month to month, is this fluctuation across all parts of the organization, or is one area less stable than the rest? So too, fluctuations mean different things if results stem from independent actions by a firm's branch offices or the highly interdependent operations within an investment bank. In the past decade, we have seen very smart executives make big mistakes because they didn't understand the context in which they were operating (Goodman, 2001; McLean & Elkind, 2003).

All of these characteristics of organizational data, and their context, need to be taken into account and managed in order to make informed decisions. Andrew J. Hoffman, a social scientist who has researched the cultural and social underpinnings of the backlash against climate change, has said, "(W)hen I hear

scientists say, 'The data speak for themselves,' I cringe. Data never speak. And

data generally and most often are politically and socially inflected" (Barringer,

2011).

<u>Systematically Using Organizational Facts</u>

Making decisions based on facts requires a set of supporting practices that

increase the reliability and usefulness of available data. A useful first step

involves a decision aid known as a logic model. A logic model spells out the

process by which an organizational intervention, program or strategy is expected

to produce certain outcomes. In making expectations (its logic) explicit, a logic

model helps identify the kinds of data needed to indicate if an intervention is

working and whether actions are needed to revise or correct it. Such models may

take the form of a framework describing resource flows (e.g.,

input→throughput→output) or any structured way of organizing and thinking

about key factors in managerial decisions (e.g., Goodman, 2001; Zanardelli, this

volume).

 One logic model used with success is the type illustrated in Figure 2a. This logic

model, from the University of Wisconsin Extension Program Development

(Taylor-Powell & Henert, 2008), can be used to lay out the process of

implementing a strategy, a program, or a project. In the case of developing a new

instructional program in a public outreach agency, practitioners can use a logic

model to specify the program's important inputs (people, resources, knowledge)

its outputs (activities and participants who engage in them), and desired outcomes

(results measured in the short-term, moderate and long-term; Figure 2b). Once

specified, the concepts and ideas that populate a particular decision's logic model

can be used to identify data that can be gathered to diagnose problems and inform

the decision. For instance, short-term program outcomes include participant

learning and motivation to use their learning. Medium-term outcomes include

changes in their actual decisions and behavior. Longer-term outcomes are broader

societal changes over time. A logic model helps identify the facts and metrics that

provide important information to decision makers. At the same time, it calls

attention to assumptions regarding the mechanisms whereby one stage affects the

next. Since program activities and participants (as output) lead directly to the

short-term outcomes of learning and motivation to use that learning, decision

makers are alerted to the need to ensure that the participants are appropriately

motivated. Since we cannot assume that learning and use are inevitable outcomes

of participating in the program, the logic model calls attention to the need for

interventions that promote both. Logic models make the assumptions and details

of a decision more explicit. Models can be updated or revised based on what the

decision maker learns in the course of their use.

---------- Insert Figures 2a and 2 b about here ----------

With a logic model mapped out, the second step is an analytic plan that

transforms data into reliable information (Donaldson, this volume). As described

above, data typically are raw observations, and are not necessarily reliable or

informative in themselves. Such data may need to be aggregated and/or examined over time to determine their meaning.

The third step involves developing the ability to interpret information so that it can become actionable knowledge. To be actionable, knowledge must involve an understanding of the context of information. In the case of customer complaints, for example, an evidence-based manager can construct a model of the organization's approach to customer satisfaction, including its inputs, outputs and outcomes, to diagnose what might be causing the complaints and take corrective action. The model may specify that the organization's customer-service strategy is predicated on having a stable customer service capability, as in the case where employees know the customer and have latitude in how they provide service. When a personalized relationship is the basis of service, complaint trends might be examined in relation to changes in staffing or employee satisfaction, since turnover intentions and dissatisfaction among employees are known to reduce customer service (e.g., Schneider & Bowen, 1985). Assessing business facts in this case can call attention to staffing issues that must be addressed to ultimately resolve the problem.

As a technical manager in a regional bank, Normand Mathieu headed a department that was having trouble attracting and retaining women and minorities. He first looked for information within the bank, and identified that units with diversity goals in their annual performance assessments were more successful in promoting women and minorities. Persuaded that greater diversity could be achieved in his department too, Normand began working with his

supervisory staff to develop and support diversity goals. Among other things, he sent several of his staff to interview managers in other units, in order to find out the sort of practices units emphasizing diversity had used to meet their goals. The supervisors reported on a variety of practices. Not being sure which of these worked best given the small numbers problem, Normand then searched in an on-line library database to find whether scientific evidence indicated that any of these practices worked to promote diversity. Research evidence indicated that two practices the successful departments employed were known to be effective in promoting diversity: clear performance expectations and staff development plans (Cox, 1994). Normand and his direct reports implemented them both. At the same time, Normand created a logic model to guide future diversity planning and assessment, based on the research he had read and what he had learned from investigating diversity activities within the bank (Figure 2c). The model helped Normand figure out what data to gather in order to monitor and improve diversity efforts in his unit and, subsequently, across the bank.

Implications

Reliance on organizational facts in EBMgt requires on-going effort to both identify relevant data and transform them into useful knowledge. Learning to resolve the qualities of data that introduce error and unreliability helps practitioners make better judgments regarding business indicators (Donaldson, 2010). Finally, gathering useful organizational data is aided by developing frameworks or logic models that help identify the information a decision requires (Zanardelli, this volume).

40

Reflective and Thoughtful Judgment Processes

> Compared with what we ought to be, we are only half awake…
> We are making use of only a small part of our possible mental resources
> … which only exceptional individuals push to their extremes of use.
> William James

> (L)ack of certainty is perceived as a sign of weakness,
> instead of being what it is: the first source of our knowledge.
> Carlos Rovelli

The ways decisions are made in EBMgt practice reflects perhaps the most dramatic difference from business as usual today. Managers will always need to make decisions under conditions of incomplete information and unknowable futures -- yet most decisions fail to take advantage of what is actually known or knowable about the content and process of good decision making. An EBMgt approach involves paying greater attention to the ways a decision might be made, the issues that frame it and the facts that inform it. This approach seeks to overcome what Yates (2003) has termed "decision neglect," failure to use fully the resources at hand that could help make a good decision.

Advances in management science and research have not spread evenly over the varied domain of decision making (Simon, 1986). These advances have had their greatest impact on decisions that are well-structured, deliberative and quantitative; an example would be the case of financial decisions, though these are not without their own issues (Kaplan, 2011). Evidence-based and related practices have less impact when decisions are loosely structured, intuitive and qualitative. EBMgt overcomes decision neglect in two ways, first by increasing the practitioner's capacity for decision awareness, and second by developing and

41

using processes, based on scientific research, that improve the quality of a manager's decisions and what he or she learns from experience.

Problems to Overcome

Science-based practices that drive quality decision-making have been identified, but, executives, mid-level managers and supervisors are inconsistent in whether and how well they apply them (Yates, 2003). The practice of EBMgt makes use of a number of "repairs" to overcome cognitive limits and biases (Heath et al., 1998). In the context of decision making, three additional limitations are targeted for repair and development.

Bounded Rationality

Unaided human judgment cannot fully use the array of information relevant to most decisions, a phenomenon known as bounded rationality (Simon, 1967). It manifests in sporadic use of available facts and considerations (e.g., options, impact on others, ease of implementation, risks) because people can only pay attention to and process a limited amount of information at any one time. It also means that people lack decision awareness and cannot make accurate reports on their decision processes (Nisbett & Ross, 1980).

Overvaluing Prior Experience

Relying on experience can suffer from the small numbers problem, where what occurs may be random or misunderstood but we believe otherwise. Because we tend to give credence to what we have seen with our own eyes, we assume our own experiences are typical. Relying on prior experience in place of more systematic knowledge has a lousy track record (March, 2010). We give ourselves

42

explanations for why one decision worked (our good judgment, careful planning, the right timing) and another didn't (bad luck, wrong partners). We veer toward accounts that confirm our beliefs and filter out explanations that challenge them. In talking with other people about our experiences, we gravitate toward like-minded others, from the people we talk with at work to preferred columnists and writers whose views endorse our own. Even drawing upon the past is uncertain. People generally recall experiences incompletely, if not also inaccurately and in self-serving ways, making it difficult to truly "learn from experience" (March, 2010). Experience may lead at least as often to confirmation of existing beliefs as it does to valid learning. Science offers a good understanding of the world, and can help people make better sense of their experiences.

Valid and reliable learning to make decisions can certainly come from experience. It is greatest in specialized domains (e.g., making decisions in driving or cooking, practicing accounting or law) where good performance is well understood and the learner repeatedly practices certain core processes. Experiential learning works well in domains where complete and accurate knowledge of results is readily available and the learner is motivated and capable of interpreting feedback thoughtfully (Ericsson, et al., 1993; Ericsson & Lehmann, 1996). Unfortunately, management is widely practiced without any special training in making good decisions. Its decision consequences can take years to materialize and involve so many stakeholders that "complete and accurate knowledge of results" is a pipedream.

Reliance of Intuition While Ignoring Facts

Relying on intuition to make decisions in unstructured, diverse domains such as general management is associated with poorer outcomes when compared against the results of systematic decision-making (Meehl, 1954; Highhouse, 2009). A classic example of a problematic reliance on intuition is the baseball scouts who travel the United States look for promising rookies among high school and college ballplayers. Lewis's (2004) book *Moneyball* describes how Oakland A's manager Billy Beane built a successful team on a smaller budget than other teams by the careful analysis of individual performance data. He didn't have to worry that other teams would copy his strategy: Analyzing performance data to make managerial decisions was not a common practice in the sport. His statistician commented, "It's hard to tell what the scouts make of these numbers. Scouts from other teams would almost surely say: who gives a shit about the guy's numbers. …You need to *look* at the guy. *Imagine* what he might become." (p. 32). The Oakland A's performance far exceeded their resources because their manager relied on facts important to success in baseball while other teams continued to relied on "feel." In doing so, Billy Beane was able to recruit players with critical capabilities that were not well understood by other teams.

Making Reflective, Thoughtful Judgments

An evidence-based approach involves developing one's judgment. No new approach can be effective unless it takes human imperfections into account. The repair for unaided human judgment entails checking the logic and the supporting facts related to a decision to be made or a problem to solve. Concern for facts and

logic mean that EBMgt practice often takes the form of active questioning and skepticism, a habit of mind reflecting a critical, rigorous way of thinking that expands use of available information. This habit of mind is referred to as "mindfulness," that is, a heightened sense of situational awareness and a conscious control over one's thoughts and behavior relative to the situation (Langer, 1989).

Critical Thinking

Critical thinking is at the core of evidence-based management. The word "critical" is a loaded term. This usage doesn't mean being negative or oppositional. It means to devote one's attention to thinking, including raising awareness of hidden values, beliefs and assumptions -- those of others and our own. Critical thinking involves questioning assumptions, evaluating evidence and testing the logic of ideas, proposals and courses of action. More than a cognitive skill, it involves the courage to pursue reason and logic to where they lead. Given the limitations to how people process information, critical thinking in EBMgt makes use of heuristics, thinking aids and decision tools to more mindfully make judgments and decisions. These aids and tools constitute another form of cognitive repair that scientific evidence indicates improves judgment and decisions (Heath, Larrick & Klayman, 1998; Larrick, 2009).

A useful heuristic includes questions probing the logic underlying assumptions and proposals. In their book on EBMgt, Pfeffer and Sutton (2006) raise powerful questions. A key one is, "Why do you (management practitioner) think the past practice you intend to use again has been effective?" Their point is

that if you cannot specify the logic of why you believe a practice works, it is unlikely that you know whether it really does work. It is important to be thorough in any logical analysis of practice matters. The evidence-based decision maker pays attention to the kinds of information being used to formulate a policy or practice, and actively scrutinizes assumptions to see if they are reasonable.

Systematic Decision-Making

EBMgt is predicated on paying explicit attention to actual decision processes (Yates, 2003; Yates & Potwoworski, this volume). As the example of Frances Tan illustrates, the process by which evidence-based practitioners make decisions is itself guided by research. Of course, no process can ever guarantee a perfect outcome. Considerable research demonstrates that certain considerations in making decisions can improve their quality, leading on average to better outcomes. These include attention to alternatives, risks, and stakeholders, and advance specification of criteria for a successful decision (Yates & Potwoworski, this volume). Decision quality can be improved by using evidence-informed action guides such as Yates and Potwoworski propose, and by feedback from decision tracking.

Decision tracking, obtaining feedback on the outcomes of decisions, is way of getting accurate feedback on results in order to improve both learning and the decision process. Decision makers record a decision they have just made along with the outcomes they anticipate from it, and later read that document to reflect on and learn from the decision's consequences. Repeating this practice over time helps develop better decision processes (Drucker, 2003; Evans &

46

Wright, 2009). Divisions of Bosch, the automotive parts manufacturer, use tracking to improve both business and engineering decisions. Tracking supports another important aspect of decision management: monitoring the aftermath of a decision to see if its steps and timeframe are being followed (Yates, 2003). The feedback and reflection decision tracking supports improves decisions by promoting critical thinking and awareness of decision processes.

Frances Tan provides an example of how these practices can be used. Frances and her staff, with the help of a consultant, built a decision framework or guide to help them touch all the important bases in making a good decision. She first familiarized her direct reports with the reasons why improved decision processes were important. They agreed to try using the framework, and after exploring what issue would be best to begin with, Frances and her staff elected to test out the framework by piloting it on a set of changes required by new governmental regulations. They gathered preliminary information regarding the new requirements and benchmarked what other facilities were doing. Ultimately, they chose to make one coherent set of changes to reduce disruptions over time. In the core decision process, they considered a set of alternatives and how employees, customers, and state regulators would likely react to each approach. They developed a plan that assigned responsibilities and created milestones. Included was a series of follow-up meetings to monitor progress. At one meeting, several team members talked about what they were learning from decision process and the adjustments they'd made in making their own decisions.

These discussions led to use of an adapted version of the framework, suited to the division's particular decisions.

Evidence-based managers like those I describe in this chapter use scientific findings in two ways. First, they make decisions and develop practices informed by scientific evidence and reliable organizational facts. Second, they build standard procedures based on what the evidence and their data say works. The kinds of scientific knowledge that might be used in making an evidence-based decision cover the waterfront from research in marketing, operations, finance, and information systems to knowledge of human behavior in organizations.

<u>Implications</u>

The basic work of management is decision making. Refining one's judgment and using decision aids is essential to improving decision quality. Indeed, decision makers at top of the pyramid are known to more commonly use decision techniques to improve quality (Pavic, 2008). Such techniques have value at all organizational levels.

Ethics and Stakeholder Considerations

> There is surely nothing quite so useless as doing
> with great efficiency what should not be done at all.
> Peter Drucker

> The hardest hit, as everywhere, are those who have no choice.
> Theodor Adorno

Ethics are standards of conduct that guide our actions as human beings and as professionals. Business schools have discussed ethics since there have been business schools (Khurana, 2007). Ethics is not science per se; they are moral

48

standards that promote goodness, justice and fairness. Evidence-based

practitioners, by virtue of their awareness of how things work, have considerable

power to impact the lives and well-being of many, and a professional obligation to

make ethical decisions. Indeed, ethical considerations are part of the decision

process that Yates details (Yates, 2003; Yates & Potwoworski, this volume).

Nonetheless, rather than treat ethics as part of systematic decision-making, its

importance warrants its own place in our discussion of EBMgt.

Problems to Overcome

Making ethical managerial decisions is subject to the array of human biases

described above. Ethical decision-making is effortful in the face of role demands,

situational pressures and conflicting interests, standard fare in modern

organizations. As managers advance up the organizational hierarchy, changes in

role and vantage point are known to shift their views regarding the stakeholders

important to their decisions. Managers at lower levels are inclined to focus on

their subordinates and supervisors (Hill, 2003), while those at higher levels tend

to pay attention to issues important to the top management team (Sutcliffe &

Huber, 1998). Given the salience of local concerns, ethical decision-making

requires both mental effort and information gathering in order to avoid one's

limited vantage point creating a disservice to others. Research has identified one

antidote: Seeking the opinions of "reasonable third parties." These are people

without vested interests in the situation who can offer perspective on what may be

fair, ethical and appropriate conduct (Bok, 1978).

Stakeholder considerations are an inherent feature of systematic decision models (Yates, 2003). Attention to the often diverse interests of stakeholders helps managers appreciate how their organization fits into its larger environment and how its standard operating procedures affect stakeholders, within the company (employees, managers, stockholders), immediately beyond (customers, suppliers, financiers), as well as the general public. Stakeholders can differ with respect to the immediacy with which organizational decisions impact them. Thus, it can be important to broaden the time frame considered in weighing the consequences of corporate decisions. In particular, broader time frames call attention to "externalities," outcomes borne by others not party to the decision. Some externalities are positive, such as the corporate development activities that bring jobs to an impoverished neighborhood. Negative externalities create costs or burdens for others, including pollution or job loss.

Heuristics and frameworks, like the action guides for decisions described above, exist for making ethical decisions (e.g., Makkula Center, 2011). Such frameworks advise developing a trained sensitivity to ethical issues and a practiced method for exploring the ethical implications of a decision. As with decision making generally, it is easier to regularly attend to ethics in making decisions when a framework outlining decision steps or a heuristic specifying important questions is available.

Consider the tough call Admiral William J. Fallon, head of the American military in the Middle East, made in 2007. A stream of intelligence reports

50

showed Al Qaeda and Taliban leaders would be meeting in the Tora Bora region of Afghanistan. New York Times reporters Eric Schmitt and Thom Thanker (May 5, 2011) wrote that there had been hints Bin Laden might travel there to hatch suicide attacks against Europe and North America. The U.S. military planned a large strike with bombers, attack helicopters and artillery targeting this mountain valley along the Afghanistan border with Pakistan. Six B-2 bombers had made it halfway to their target when they were ordered to return to base. The size of the mission, coupled with the ambiguity of the intelligence, alarmed some senior United States commanders, including Admiral Fallon. "Fallon's view was you're swatting a fly with a 16-pound hammer," said a senior American officer familiar with the commander's thinking. "This was carpet bombing, pure and simple," said another top military officer who had openly voiced disagreement with the operation. "It was not precision-targeted. There was no way to separate the Al Qaeda leadership that might be on hand, and the fighters, from the local population and the camp followers." In place of a huge airstrike that might kill hundreds of civilians, a smaller attack was carried out, killing dozens of militants. Osama bin Laden was not there. These deliberations made at a time of considerable pressure, where ethical decision-making could have taken a back-seat to the immediacy of the goal of taking out one of America's most sought-after enemies, later informed the successful 2011 commando raid that culminated in the killing of bin Laden in his urban hideout in Pakistan.

Ethical considerations in decision-making primarily pertain to the impact of

decisions and organizational actions on stakeholders, particularly with regard to

how costs and burdens are allocated to various groups. In line with other aspects

of EBMgt practice, critical thinking and regular use of evidence-based heuristics

and frameworks can call attention to ethical issues in organizational decisions.

Careful exploration of the problem, aided by the insights and perspectives of

others, helps practitioners make ethical choices.

Adaptive Practices Within EBMgt

> However, we do know we aren't going to be more wrong
> than the way we did it before.
> Billy Beane,

> Science is organized knowledge. Wisdom is organized life.
> Immanuel Kant

EBMgt practice is not a cookbook or a formula. It is a variety of science-informed

approaches that can be adapted to make better-quality decisions in the service of

organizations, their members, stakeholders and the public. Indeed it may be that

calling this array of practices "evidence-based" puts people off, making it sound

like the evidence decides and managers just comply. Nothing is further from the

truth. Evidence is not answers. It is input to the information and processes that

help practitioners to make better judgments and decisions. It doesn't matter if a

manager or consultant using these practices labels them differently. Feel free to

call them "evidence-informed," "adaptive decision making" or whatever you like

("scientific management" of course is taken.). In real world use, thoughtful

practitioners will adapt EBMgt's four facets as needed. Here are some common circumstances in EBMgt's adaptive practice.

Situations Where Lots of Scientific Evidence Exists

Scientific findings provide considerable guidance for certain decisions. But using science requires practitioners to interpret the evidence and turn it into useful practices. For example, a hospital's chief executive initiated an innovative labor-management arrangement in response to the increase in employees seeking early retirement. After considering various approaches, he learned from a consulting psychologist about findings from research that colleagues and I have done on flexible arrangements negotiated between workers and their employers (Rousseau, 2005; Rousseau, Hornung & Kim, 2010; Hornung, Rousseau & Glaser, 2008). To motivate his employees to stay rather than take early retirement, the CEO and his HR staff met with managers and employees to encourage them to negotiate development plans and flexible arrangements.

The process this CEO and his staff created adapted the general findings of research on negotiated flexibility to the hospital's circumstances (e.g., a fund was created for each individual employee that could be expended only via discussion with the immediate manager). The approaches used in the settings on which past research were based had focused more on informal negotiations between employee and supervisor. In the context of this hospital, located in the Netherlands, a more formal approach was considered culturally more acceptable. In keeping with the spirit of EBMgt, after an evaluation of this intervention, a

more comprehensive program was developed to promote both greater development and flexibility via negotiation.

Critical thinking and use of evidence are not limited to executives. Subordinates can bring evidence and related issues to the attention of their boss, the organization's board or others in a position to make decisions. The CEO and top management team in one firm had long participated in in-house education on research evidence. Sometimes local university faculty gave workshops, while other times senior management led the sessions. When the company president indicated his intention to cut back on employee benefits, the president's executive assistant decided to contact two business school faculty members who had lead recent workshops. Their question to the faculty was what research suggested as the likely implications of such a cut. A conference call was then organized that included the CEO and two business school professors. On that call, the executive assistant raised her concerns about how various stakeholders would be affected by the planned cut. She worried that employees would think the cuts were unfair and find the sudden change too drastic. With the CEO listening, the executive assistant probed the issues of fairness and justice (Tyler, 2006) and psychological contract violation (Rousseau, 1995), resulting in the president's decision to delay a change in benefits until staff were informed of the company's financial predicament and alternative ways of reducing costs were explored. The result was a less radical health insurance change (adding a modest employee co-pay) plus considerable savings achieved through employee efforts to reduce inefficiencies.

A by-product was increased employee awareness of the organization's economic predicament. This awareness made subsequent changes more acceptable.

In both examples, it wasn't the evidence that solved the problem – rather, individual managers and employees sought out evidence to answer a particular question and then presented it to others. Judgments still need to be made and the facts in the situation taken into account. In doing so, practitioners develop skills in applying evidence. These skills lead to practices that suit the situation while acting on the underlying principles the evidence supports (e.g. Parnas & Clements, 1986).

Using Evidence from Very Different Populations and Settings

Adapting evidence from one population to another requires thoughtful judgment. Veterinarians face this situation frequently. The shortage of clinical research on animals has led veterinarians to regularly use studies conducted on humans in caring for dogs and cats (and a host of other animals). As veterinarians come to use evidence much as physicians do (e.g., Olivery & Mueller, 2003), this adaptation leads to special care in its application, including attention to the animal's body size and metabolism.

Asking questions about how evidence from one domain might apply to another can lead to new angles of thinking and ways to solve problems. The U.S. Army implemented a program to train more than a million soldiers in emotional resiliency (Carey, 2009). Its basis is a program developed by Martin Seligman to reduce mental distress in children and teens. At this time, there is no evidence that mental toughness can be taught in a classroom; nonetheless, the experiences of

veterans of the Iraq War and incidence of post-traumatic stress syndrome upon returning home have motivated the Army to make use of the "best available evidence" and careful monitoring of outcomes (Carey, 2009). Soldiers at all levels participate in this training (Lester, 2010), which emphasizes "the immutables" of positive psychology including focusing on one's strengths, knowing what is controllable and what's not, recognizing positive outcomes even in negative events and building strong relationships. Evaluation of this training's effectiveness is on-going and tools have been developed to assess outcomes over time.

Lots of Organizational Data but Little Relevant Research

Practice decisions can involve circumstances for which little research exists. Benchmarking against other settings is sometimes used in these circumstances (Kovner, Fine & D'Aquila, 2009). Practitioners should also step back and ask whether relevant facts are available in-house or easily obtainable to help understand the issue.

Consider the case of whether a hospital should continue its palliative care unit (White & Cassel, 2009). Consultants were brought in to help manage the unit's costs without compromising quality. Their initial analysis indicated that their hospital's cost per patient discharged from palliative care was considerably greater than the reimbursement they received from insurance agencies and other payers, and they recommended that the unit be closed. At the time, virtually no published literature existed on the financial contributions palliative care programs made to hospitals. Some articles offered the opinion that financial viability was

56

unlikely unless the average daily occupancy was over 70% (this unit's utilization

fluctuated between 55% and 77%).   Careful re-analysis of hospital cost data

indicated that the consultants had assigned all the costs of each patient's treatment

to the palliative care unit, including any inpatient days prior to admission to unit.

But patients typically did not transfer into palliative care until after 10 days or

more of hospitalization. Analyzing costs day by day following patient transfer to

palliative care, the unit's management realized that its costs were considerably

lower than those incurred from previous stays in other units, a savings of several

hundred thousand dollars per patient. They then used a "what if" analysis to

explore the implications if more of the hospital's terminally ill patients were

transferred to palliative care after spending two weeks or more in conventional

treatment. Evidence suggested considerable additional savings. Based on this

assessment, the program continued. Further, having become sophisticated in

analyzing outcome data, the unit's managers were able to turn their attention to

assessing and improving the quality of care. This case illustrates that even with

little scientific evidence on the decision itself, the process for making decisions

can be informed by reliable local information, with attention to decision

formulation, framing of alternatives and stakeholder concerns.

Novel Decisions with neither Evidence nor Experience

The future is uncertain, and complex interactions can cause events never before

seen including technology-related disasters and economic catastrophes. Scientific

study on unpredictable environments has identified several findings of use to

managers in these circumstances.

Novel, unpredictable events may require us to adjust to them once they occur, rather than to try and anticipate them (Taleb, 2009). According to current evidence, such events are likely to be best addressed by high levels of situational awareness. Situational awareness involves scanning the situation in order to interpret its features in discriminating, observant ways (Weick & Sutcliffe, 2006). In this process, the decision maker generates a large number of distinctions that helps to refine his or her existing concepts or create new ones to better understand the uncertain situation. A danger in dealing with truly novel and potentially consequential events (e.g., a tsunami that generates a nuclear disaster) is that decision makers will focus on some aspect of the situation that seems familiar and generalize from it to things that remain unobserved. For example, treating a financial crisis today in the same way one responded the last time might ignore fundamental differences in their causes and consequences. A more informed approach is to keep an open mind and pursues multiple avenues for action, since any understanding can only be tentative (Weick & Sutcliffe, 2006).

Implications

Evidence-based approaches can apply whether a decision's circumstances are recurrent or novel, replete with prior research or radically new. The examples above illustrate that the practice of EBMgt can differ depending on the decision and the relevance of existing knowledge and scientific evidence. New circumstances may have little research to illuminate them. Yet practitioners can still take advantage of scientific findings on judgment and decision making. The

practice of EBMgt depends on its practitioners' informed judgment in choosing those EBMgt approaches that best apply.

EBMgt's Three Communities

As the saying goes, "Vision without execution is hallucination." In offering our vision of evidence-based management, we recognize that execution is both important and difficult. Making EBMgt a reality requires contributions from practitioners, educators and scholars and, in many ways, requires collaborations among all three of these groups. Evidence-based practice is what practitioners do. But the infrastructure required to make EBMgt possible involves the combined efforts of practitioners, educators and researchers.

The Most Diverse Category: Practitioners

Practitioners -- including consultants, managers and others working in organizations -- are EBMgt's central actors. Ultimately, its success lies with them. Not only must practitioners embrace the concept to make it work, they will largely determine how it is practiced. From the present early stages of "EBMgt 1.0," like software and other knowledge products, EBMgt will undoubtedly evolve.

Practitioners are not monolithic. Insofar as practitioners are diverse in their roles, settings and attributes, EBMgt will take an array of forms. Management is as much an activity as a role or group of people. People make decisions on their organization's behalf at all levels, from the ground floor to the executive suite. The organizations for which they make decisions include single-person businesses, mom-and-pop shops, mid-size concerns, global corporations

59

and networked organizations existing in cyberspace. Across these organizations EBMgt will mix and match various processes and practices. Practitioners should feel free to adopt, adapt, and innovate (and evaluate the outcomes!).

Management is not a profession in the traditional sense. Unlike medicine or accounting, there are no required credentials, agreed-upon base of knowledge, or code of conduct. Like parenting, people can become managers without education or preparation. The results of management decisions echo those of parenting: They are consequential, sometimes beneficial to individuals and the broader society, and sometimes not. The movement promoting EBMgt aspires to promote better quality decisions and organizational practices by developing our capacity to use what we can know more effectively. Management may not be a profession, but an individual manager can be a professional.

Managers committed to EBMgt must sometimes make their way in settings not particularly friendly to evidence (see Speicher & Adams, this volume). In doing so, it might be best to focus first on improving one's individual decision-making skills and knowledge of evidence (Rousseau & Barends, 2011). This entails priming the pump by developing a more critical mindset. Learning how to access evidence is a next step (Werner, this volume), keeping in mind that when confronted with a demanding situation, decision makers tend to go with the information in hand. It can help to identify in advance where evidence might be especially useful. Targeting reading, seeking out evidence-informed consultants and scholars as contacts can enable rapid reviews on important practice issues.

60

Such activities help the individual practitioner deepen his or her expertise as an evidence-based professional.

Building a more evidence-supportive organization starts with awareness regarding the existence and utility of scientific research for organizational decisions (see Rousseau & Barends, 2011, for more details). Getting the word out can involve discussing new findings in conversations and meetings, citations used in memos to present evidence-based ideas, and a host of other small but cumulative acts.

Basing one's professional practice on evidence often involves managing up as well as down. It is less about becoming an evidence fundamentalist and more a process of influencing by education, persuasion and example. Two practices apply in managing up as well as down. The first is asking the important questions, "Why do you think that? Do we have the best evidence?" The second is commissioning and/or conducting systematic reviews of evidence on important practice questions. The latter gets people involved in the search for and synthesis of evidence and builds their capacity for critical thinking. Similarly, certain routines such as feedback gathering and systematic decision making can improve a manager's practice while helping him or her learn better from experience. Consultants who ground their practice in science such as those at Ten Have Change Management in Europe and Valtera in North America can provide organizational leaders with the procedures and tools that translate evidence into solutions.

Educators

61

The obituary of long-time dean of the Harvard Medical School, Daniel Tosteson,

quotes him as saying, "Knowing people would have long careers and that so much

will be proven wrong, we cannot have a curriculum based only on facts, but on

making learning and expanding knowledge a part of the process" (Weber, 2009).

Tosteson is renown for shifting the teaching of medicine away from "ingestion

and regurgitation of vast amounts of information, and more on patient care and

problem solving." Combining scientific knowledge with solving problems and

updating repertoires as new knowledge emerges are as challenging for self-

improving managers as for physicians. The professional schools that educate them

face the same difficulties.

A big gap exists between what management educators teach and what the

research says. The founding of the first business school, Wharton, preceded the

first management research by several decades. What existed then were how-to

manuals and industry examples, including the structures of railroads and retail

stores. Insofar as management education emphasized practices used in existing

firms, management was taught as a craft. The emergence of management research

(Frese et al., this volume; Mahoney & Madhavan, this volume; Rousseau, this

volume) brought scientific knowledge into the business-school curriculum. Yet B-

schools typically have difficulty balancing practice and research (Simon, 1967).

The evidence-teaching gap in business schools remains especially problematic in

courses in strategy, organizational behavior and human resources (Charlier, et al.,

2011).

Contemporary practitioners, even those with MBAs, tend to lack fundamental management knowledge. Not being a formal profession, management has not been subject to the forces in place in other fields to promote use of evidence. No licenses or credentials exist to guarantee that managers have certain requisite professional knowledge. Credentialing bodies such as the Association to Advance Collegiate Schools of Business focus more on faculty education and research productivity than on the quality of knowledge taught. Reasons for educators failing to teach evidence include the fact that many management educators don't know the evidence themselves. They also fail to help students learn how to access and make use of research to be produced after they graduate.

Teaching Evidence, Search and Use

Management education needs to help students think critically and pursue learning goals aligned with the features of EBMgt (Carroll, Jelley & Rousseau, this volume). This includes teaching evidence-based principles and decision processes as well as how to obtain reliable and useful business information. Fortunately, there is a new effort to develop evidence-based textbooks and teaching materials (Pearce, this volume), which ease the process.

A major challenge for educators is preparing managers to update their knowledge as the evidence base expands. A key task educators face is preparing practitioners to learn how to obtain important scientific knowledge in a timely way when decisions are at hand. EBMgt requires the capacity and willingness to search for and evaluate evidence. Much has been made of speed as a business

63

resource, but using research can take time. It is important that professionally

educated managers acquire a sound knowledge base regarding human behavior,

decision-making and organizational design during their formal education. At the

same time, we need to prepare them to access information while on the job too. A

good deal of information on how to obtain relevant scientific evidence is provided

in this Handbook (Barends, et al., 2011; Briner & Denyer, 2011; Werner, 2011)

and elsewhere (Rousseau & Barends, 2011). Such preparation is non-trivial, as

practitioners often need to learn how to state their question at a level of

abstraction suitable for searching in research databases.

Teaching in an Evidence-Informed Fashion

Teaching evidence well coincides with teaching well, period. By this I mean

teaching in an evidence-informed fashion, incorporating effective teaching

principles into the design of courses and learning experiences (Goodman &

O'Brien, this volume). An educator goes into a certain field because he or she is

good at the kind of thinking it requires and his or her expertise in that area has

deepened over time. However, being deeply expert at something can at times

interfere with one' ability to recognize that barriers exist for new learners.

Middendorf and Pace (2004) point out that having faculty from other disciplines

sit in on one's classes can make it easier to identify key concepts, termed

"threshold concepts," that the experts have mastered but many learners never

grasp. For a molecular biology professor, the recognition may be to teach students

to visualize complex molecular structures. In the case of learning how to diagnose

an employee performance problem, learners may need to develop a mental

64

representation of the individual, group and organizational factors that affect employee behavior.

Evidence is easy to ignore or misunderstand when poorly taught. Useful findings can be at odds with users' values or mindsets. Effective teaching may require the use of motivating stories and attention to the applications of evidence. Learners need to practice turning using evidence into appropriate problem solutions.

<u>Researchers</u>

Scholars have four important roles to play in EBMgt. The first is to conduct research that explicates the actual content and processes of decisions made in organizations. Field research on the way actual decisions are made is especially needed. Closing the gap between research and practice in this and other areas requires greater researcher contact with the problems and decisions practitioners face.

The second is to support evidence use in the ways scholars approach peer review. This peer-review process should include attention to the implications a particular study has for practice. Scholars have begun advocating for more explicit prescriptions in management research publications (Bazerman, 2005). I concur, while recognizing that there are difficulties with this idea. The education level required to read the "Implications for Practice" sections in management journals increased by nearly a full grade (from 16.6 to 17.5 years) between 1992-3 and 2003-7 (Bartunek & Rynes, 2010). Most of the advice offered says "be aware of x or y" -- i.e., what *not* to do -- rather than explaining what to do, when and

how. Scholars are trained to be critical and are often reluctant to claim benefits from acting upon evidence. Such caution is justified by an important factor: A single finding in itself may be neither reliable nor generalizable. In this regard, practice implications in research articles should reflect the balance of evidence, a matter that scholars supporting EBMgt may be in a position to assess and provide useful comment. More balance in the review process may be achieved by including reviewers who are knowledgeable practitioners (e.g., consultants and experienced managers with a Ph.D. or executive doctorate) -- something that practice-oriented research publications (e.g., *Academy of Management Perspectives* and *Human Resource Management*) already do.

Third, researchers can support and participate in systematic reviews, including meta-analyses, to identify conclusions the evidence supports. In my teaching, I am repeatedly struck by the usefulness of meta-analyses and systematic reviews for giving non-scholars more ready understanding (and confidence) regarding research findings. At the same time, many subfields of management research, including organizational theory and strategy, place less emphasis on the accumulation of findings (Madhavan, & Mahoney, this volume). This is a source of repeated frustration for practitioners seeking research-based facts on strategy, organizational design and organizational-environment relationships. Scholars can advance both practice and their own fields by doing more to build cumulative bodies of research and evaluate what we can know from them.

66

Research in organizations has always been motivated by practical problems (Rousseau, this volume). In the 19th Century, it identified causes and remedies for telegrapher's cramp, an occupational injury comparable to carpal tunnel syndrome today (Telegrapher's Cramp, 1875). Now after decades of management and organizational research, bodies of evidence exist relevant to a host of practical matters, from incentive pay to organizing, and mergers to downsizing. Innovative techniques for answering practical questions fuel the growth of meta-analyses and systematic reviews to overcome the academics' reluctance to draw practical conclusions (Rousseau, Manning & Denyer, 2008). This zeitgeist is aided by the fact that more practitioners, particularly executives and consultants, are raising questions for research reviews to answer. Executive programs for practicing managers, such as Cranfield in the United Kingdom and Case Western Reserve University in the United States (Salipante & Smith, this volume), increasingly have participants conduct systematic reviews as part of their education.

The last important scholarly contribution to EBMgt is the weakest link: practice-oriented research deliberately undertaken to provide scientific knowledge that informs practice. Practice-oriented research examines how practitioners currently practice. In its various forms, practice-oriented research provides information regarding conditions and support practices that make scientific knowledge more useful. Its purposes are twofold: 1) to find solutions to practical problems and 2) to ease their adoption by identifying required supports while reducing factors that work against their adoption or effective implementation. In

67

medicine, this kind of research has been termed "translation science." At one time progress in medicine was almost exclusively from basic research on the biology of disease. Turning these advances into clinical practice was slow and sporadic. Progress has only recently been made in the rate of improvement in evidence-based clinical practice (Ebell et al., 1999). Translation science, that is, practice-oriented research targeting the needs of clinicians, has increased the quality of clinical practice by making evidence-based medicine easier to practice. In management, too, most advances have been from general scientific knowledge, and these are slow in reaching both management education and practice. Practice-oriented research exists but it is limited. The management equivalent of translation science begs for further development.

Design science is a form of practice-oriented research that has made in-roads in organizational and management scholarship (van Aken & Romme, this volume). It is a collaborative approach involving managers, engineers, scholars and others to develop practical knowledge out of scientific research. It field tests research-based principles and develops its own "grounded technological rules' to be used in designing, configuring and implementing solutions to specific problems. Design science and practice-oriented research generally are essential to better inform evidence-based management as well as to alert scholars to significant research questions that can only be identified in practice.

Practitioners, Educators, and Researchers Working Together

Whether research findings are used depends a lot on the quality of the relationships between researchers and users, the timeliness of the research's

68

availability to non-researchers, and whether users believe they have control over the factors research identifies as important (Beyer & Trice, 1982). In working to make research findings easier to access and use, organizational scholars may need to develop even deeper understandings of the phenomena they study. This understanding can be fostered by organizations as they encourage greater collaboration with researchers (Cyert & Goodman, 1997; Mohrman Gibson & Mohrman, 2001, Peile 2004). Educators who provide practitioners with basic scientific knowledge and coach them in applying it contribute to the practitioners' lifelong learning in evidence-based practice. Those consultants grounded in science have a special role to play as knowledge brokers, by helping organizations apply evidence effectively. By making evidence-based decisions and practices possible, scholars, educators, and consultants all have a key contribution to make in building the essential supports for the practice of EBMgt. At the same time, it is in managerial work and everyday organizational practice where EBMgt is performed.

The absence of a critical mass of evidence-based managers today translates into pressures to conform to more ad hoc and experience-based approaches. Physicians historically practiced in much the same fashion of those who trained them, with little updating except occasional new ideas picked up from other doctors. The same is true of managers. The fact is that most new ideas gain momentum by contagion and ease of uptake -- somebody tells another about an idea that is easy to try. Else, changes come about via generational shifts supported by education, media, and other institutions. (The television show House

portrays an evidence-based physician who ultimately holds all the answers. No word yet on the managerial equivalent, but the show Office is not it.) Mainstreaming new professional practices takes time. An entire generation of managers educated to use and access evidence may be needed before organizations make wide use of behavioral science. Until that time, networks among evidence-based practitioners can help individual practitioners develop their knowledge and skills. Partnerships with researchers and educators also provide on-going access to the latest research while helping practitioners learn how to turn evidence into action (see Zanardelli, this volume).

Conclusion

As we round out this discussion of EBMgt, some concluding remarks are in order. EBMgt is a very different thought world from that of conventional managers (the same can be said for conventional management researchers and educators too). There is an historical, cultural perspective that management is self-taught and learned from hands-on experience. Business history and lore are filled with companies built by college dropouts (Bill Gates, Steve Jobs, and Charles Schwab to name a few). The idea that academic research can inform business decisions simply doesn't fit this image. EBMgt introduces new dimensions to what it means to be a manager.

Would-be EBMgt practitioners must confront some psychic costs. Making one's management practice more evidence-based can be emotionally threatening. The systematic processes advocated by EBMgt can feel like they take control away from practitioners (e.g., Dipboye, 1992). They can threaten a manager's

self-image as a person of good judgment (Highhouse, 2008). When first starting to practice EBMgt, it can seem like another layer of evaluation and pressure in a busy manager's life (e.g. Dipboye, 1992). EBMgt requires engaging in a learning process that may ultimately move through the stages of novice, intermediate, and expert. It takes time, effort, and good support to become an evidence-based professional manager.

Not everyone is motivated to use evidence. Some people fail to learn new things because they don't want to make the effort. Non-evidence-based practices tend to be the norm for decisions regarding managing people, structuring work, and developing business strategy -- and people tend to be comfortable with the status quo (Kahneman & Tversky, 1979). People who are confident about the quality of their own expertise and performance tend to see no need to change. Ironically, it is poor performers who are most likely to overestimate their expertise. Their lack of ability makes recognizing their personal deficits difficult (Ehrlinger et al., 2008). EBMgt is not for everybody.

EBMgt is for practitioners at the opposite end of the spectrum: those willing to invest time and effort to expand their knowledge, expertise, and personal depth. Practitioners attracted to EBMgt are its innovators and early adopters, drawn to a it because of the benefits it offers and less threatened (or perhaps more intrigued) by the personal changes it involves. Interpreting and acting on evidence requires active thinking and reflection, a certain curiosity or hunger for understanding (cf. McAuliff & Kovera, 2008). EBMgt equips those

prepared to work at it with an exciting and productive professional career over the course of ever-deeper experience and substantive learning.

EBMgt is a family of adaptive practices, inspired by the improved decision outcomes using research evidence makes possible. EBMgt focuses educators on helping practitioners become critical thinkers, acquire relevant scientific knowledge and apply evidence-informed methods to make better decisions. It calls for scholars to pay more attention to the cumulative nature of research and to make their findings more accessible and easier for practitioners to use. It engages managers in a deliberative, life-long effort to develop their professional knowledge, judgment and impact. Turning EBMgt into a mainstream practice ultimately changes what managers, educators, and scholars do – for the greater advancement of all.

72

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74

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