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Sahakian, T.

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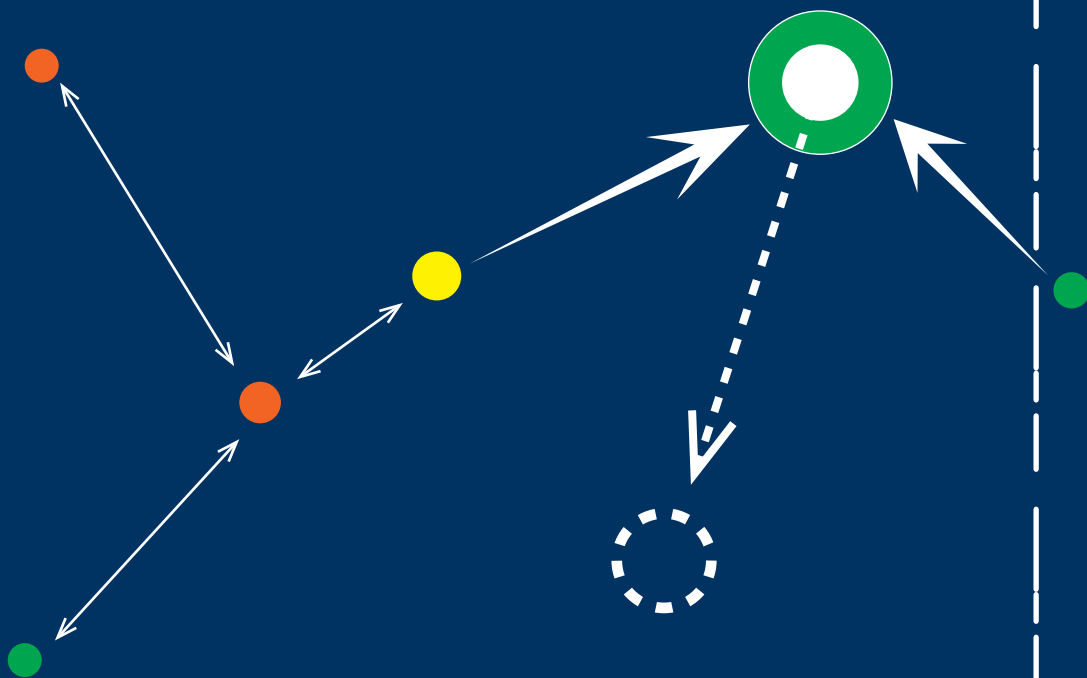
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Evidence-Based Management in Hospital Settings

Unraveling the Process and the Role of
the Person and the Context



Tina Sahakian

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Evidence-based Management in Hospital Settings: Unraveling the Process and the Role of the Person and the Context

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Tina Sahakian,

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promotor: prof. dr. T.A.M. Kooij

copromotores: dr. L. Daouk-Öyry

dr. B. Kroon

leden promotiecommissie: prof. dr. P.L. Lillrank
prof. dr. D.M. Rousseau
prof. dr. R.F. Poell
dr. W. Vandenabeele

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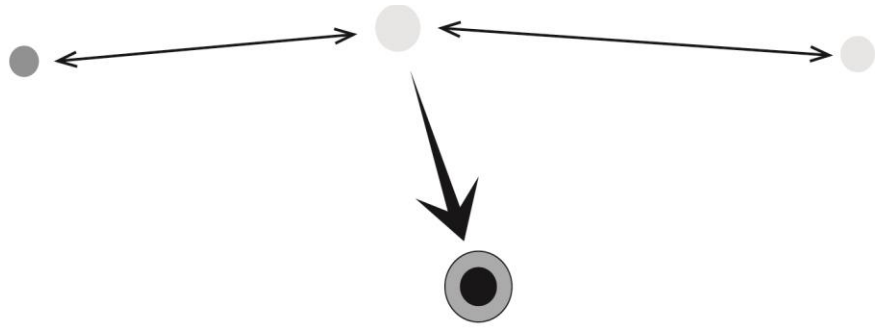
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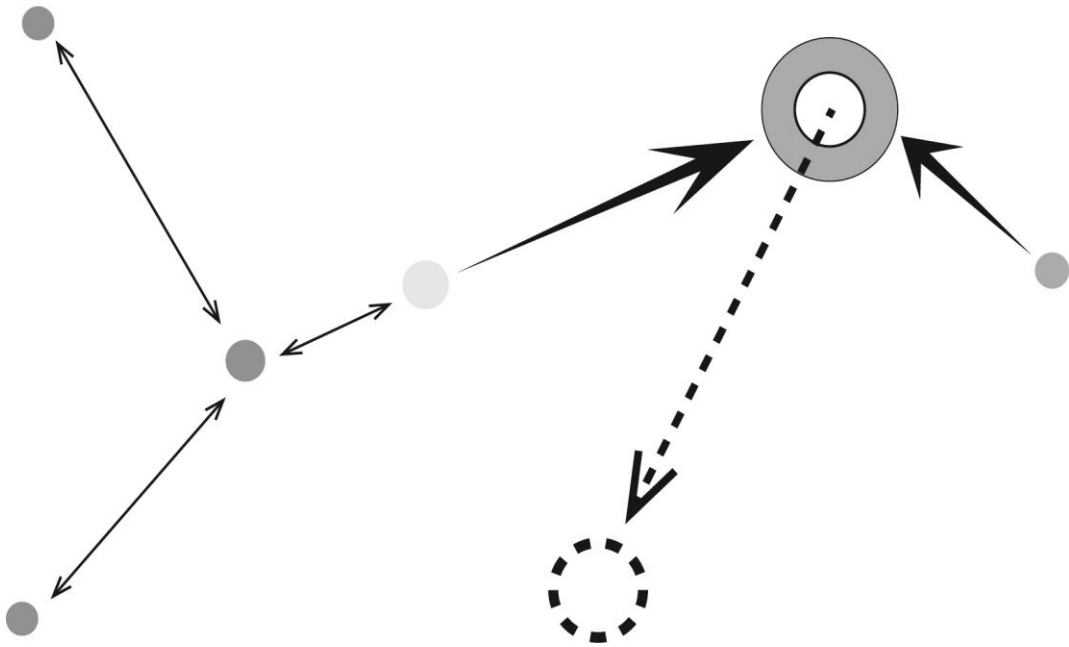
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CHAPTER 1 | Introduction



Introduction

Rapid digitization over the last decade has led to exponential growth in data across different industries, amounting to a 35% to 50% yearly increase in the volume of data in most organizations (Beath, Becerra-Fernandez, Ross, & Short, 2012). This is also the case in the healthcare industry, where digital transformation in the form of electronic medical records, health information systems, and smart devices has led to a rapid increase in the amount and variety of healthcare data (Mehta & Pandit, 2018; Murdoch & Detsky, 2013). This data relates to patients, employees, and operations, and includes clinical data, data describing services provided, and data describing workflow (Dhivyalakshmi & Umamakeswari, 2017; Groves, Kayyali, Knott, & Van Kuiken, 2013). Leveraging this data has wide potential for optimizing the quality and efficiency of healthcare service delivery, not only in terms of medical practice, but also in terms of the management of healthcare organizations. Evidence-based Management (EBMgt) is one approach that could encourage managers to leverage this and other sources and types of data, such as managers' experience, scientific research, and stakeholders' input, to inform decision-making. The importance of leveraging data to inform decision-making has become apparent in the context of the coronavirus COVID-19 pandemic. In our globalized world, COVID-19 has spread across 188 countries in a manner of months (Center for Systems Science and Engineering, 2020). It has not only impacted human mortality and morbidity, but also broken down entire healthcare systems (Ming, Huang, & Zhang, 2020). Across developed and developing countries, hospitals have become overburdened with COVID-19 patients. Within hospitals, managers have been facing exceptional challenges, including rationing decisions in the face of equipment and medication shortages, redeployment decisions in the face of staff shortages, and hospital facility redesign decisions to protect patients and staff and prevent contagion (Cavallo, Donoho, &

Forman, 2020; Fong et al., 2020). In the face of such challenging decisions, hospital managers have had to combine their knowledge and experience with existing data as well as emergent data that is being collected about the virus and its operational management on a daily basis (Cavallo et al., 2020; Reeves et al., 2020; Smith & Fraser, 2020). This emergent data is in the form of, for example scientific articles on priority areas to prepare for the pandemic, internal hospital data about the availability of intensive care unit beds, and stakeholder data about front liners' medical conditions for staffing in high risk sites (Adams & Walls, 2020; Reeves et al., 2020; Toner & Waldhorn, 2020). Additionally, since healthcare systems are organized differently across and within countries (Anell & Willis, 2000; Reid, 2009), hospital managers have had to contextualize the existing and emergent data. They have had to consider it in concert with conditions such as resources, culture, and laws, to develop solutions tailored to their context (Mills, 2014; Tanne et al., 2020). Ultimately, by making apparent the necessity of using and contextualizing data to inform decision-making, the COVID-19 pandemic has put EBMgt at the forefront of facing the exceptional challenges it poses for hospital management now, and the unknown challenges it will pose in the future.

EBMgt refers to gathering data from multiple sources, including managers' experience, the organization, scientific literature, and stakeholders' input, appraising it, and using it as evidence to inform decisions (Barends, Rousseau, Briner, & Center for Evidence-Based Management, 2014). By focusing on the quality of the evidence used in decision-making, EBMgt encourages the use of more effective practices, consequently improving decision-making, and enhancing the quality of healthcare delivery (Axelsson, 1998; Kovner & Rundall, 2006; Walshe & Rundall, 2001). While the adoption of the EBMgt approach is being widely promoted in healthcare management (Kovner & Rundall, 2006; Tourish, 2012; Walshe & Rundall, 2001),

some scholars have presented several critiques of the EBMgt literature (Arndt & Bigelow, 2009; Learmonth & Harding, 2006; Morrell, Learmonth, & Heracleous, 2015; Tourish, 2012). One critique is that the existing literature on EBMgt is too conceptual in nature; offering limited insight into the EBMgt decision process in different contexts (Currie, 2013; Reay, Berta, & Kohn, 2009; Rynes & Bartunek, 2017; Walshe & Rundall, 2001). Another is that EBMgt does not consider contextual contingencies, like issues of ethics, power relations, personal interests, and politics (Morrell et al., 2015; Rynes, Colbert, & O'Boyle, 2018). A third is that EBMgt takes a selective and narrow view of evidence, privileging scientific evidence and valuing quantification (Morrell, 2008; Morrell & Learmonth, 2015; Tort-Martorell, Grima, & Marco, 2011). Given that EBMgt is at the forefront of management practice during the COVID-19 pandemic, it is an opportune time to tackle these critiques and answer the call for more in-depth examination of how different managers apply EBMgt in different contexts (Currie, 2013; Reay et al., 2009; Rynes & Bartunek, 2017; Walshe & Rundall, 2001; Wright et al., 2016).

Therefore, the overarching aim of this dissertation is to empirically develop an in-depth understanding of the practice of EBMgt in hospital settings, by unraveling the process of EBMgt decision-making, how evidence is conceptualized in this process, and the role of the decision-maker and the context in this process. In the remainder of this chapter, I will first discuss the healthcare context, specifically hospitals, as the setting of my investigation. Drawing on the EBMgt literature in the fields of management and healthcare management, I will then introduce the EBMgt approach in more detail, discussing its origins, definition, and principles. I will then discuss the critiques of EBMgt in depth. Finally, I will elaborate on the overarching aim of this dissertation and outline the studies I conducted in the remaining chapters of this dissertation vis-à-vis the critiques of EBMgt.

Healthcare Context Complexity and Challenges for Managing Hospitals

Healthcare organizations, and hospitals as their archetype, are complex and dynamic systems (Begun & Thygeson, 2015). This complexity and dynamism is due to the presence of various diverse, inter-reliant agents, including clinical professionals (i.e. nurses and physicians), technical workers, and administrators, who must interact and work collaboratively to deliver healthcare. This complexity is further compounded because these various agents represent different mindsets of care, cure, control, and community (Glouberman & Mintzberg, 2001). Mindsets, which are all necessary, but are disconnected within hospitals by “unreconciled values, incompatible structures, and intransigent attitudes” (Glouberman & Mintzberg, 2001, p. 65). In addition to the various internal agents and the internal structure, the scope and diversity of the external environment in which healthcare organizations operate contributes to their complexity. This external environment involves a variety of different stakeholders, including governments, pharmaceutical and medical technology suppliers, insurance companies, professional and trade associations, educational organizations, philanthropic organizations, and society at large (Begun & Thygeson, 2015). As a result, healthcare organizations, and the agents within them, are subject to a range of diverse and conflicting technical, institutional, and social influences. Examples include changing professional and legal requirements, to which healthcare professionals, technicians, and administrators must adapt. Other examples include conflicting incentives and cost containment demands of different payers and insurance companies, and societal beliefs regarding healthcare rights (Alexander & D’Aunno, 2003).

Within such complex organizations, the work of healthcare managers is rarely straightforward and predictable. There is low agreement between the different internal agents on the nature of problems, there are many possible alternatives to solve problems but not one clearly right solution, and unpredictability is common; whereby small changes can have small or large

impact, thus making it difficult to determine cause-effect relationships (Begun & Thygeson, 2015). Furthermore, healthcare managers' role is becoming even more demanding with the decrease in healthcare funding, coupled with the increase in healthcare expenditure, resulting from the increase in aging populations, costly medical technologies, labor costs, and healthcare costs related to increased intra and international migration (Baker, 2001; Guidi & Alessandro, 2019; Kaplan & Porter, 2011; Kovner & Rundall, 2006). In this arena of growing complexity and increasing demands, and in light of the exponential growth in data in healthcare and the challenges created by the COVID-19 pandemic, the adoption of EBMgt as an approach to improve decision-making is absolutely imperative (Kovner & Rundall, 2006; Walshe & Rundall, 2001).

Evidence-based Management: Origins and Principles

Origins: Evidence-based Medicine

The evidence-based movement started in medicine, as a result of inconsistencies in medical practice, a gap between medical practice and research, and the heavy reliance on the experience and wisdom of former teachers in decision-making (Barends, ten Have, & Huisman, 2012; Sackett, Rosenberg, Gray, Haynes, & Richardson, 1996; Walshe & Rundall, 2001). Evidence-based medicine (EBM), which involves integrating clinical expertise with clinical research evidence (Sackett et al., 1996), shifted medical education and practice towards identifying and judging the quality and applicability of published research to patient care (Walshe & Rundall, 2001). While EBM faced criticism (Harrison & Martocchio, 1998; Lambert, Gordon, & Bogdan-Lovis, 2006; Tonelli, 1998), it saw a widespread diffusion (Walshe & Rundall, 2001). The basic principle behind the movement – that decisions must be based on reliable evidence – also spread to other fields including policy making (Davies, Nutley, & Smith,

1999), health economics (Donaldson, Mugford, & Vale, 2002), education (Muir Gray, 2004), and policing (Sherman, 1998). These principles also spread to management, including healthcare management specifically, where clinical professionals began to use the ideas of EBM to challenge management decision-making (Hewison, 1997).

The problems of a gap between academic research and practice and the heavy reliance on experience also exist in management (Kovner, Elton, & Billings, 2000). Management practice is influenced by fads and fashions without consideration of their credibility (Starkey, Hatchuel, & Tempest, 2009; Starkey & Madan, 2001), and many decisions are made despite a body of evidence suggesting that at best they will have no positive impact and at worst they will be harmful (Tourish, 2012). Recognizing these limitations and observing the improvement in patient care that resulted from EBM, management scholars began to argue for the adoption of EBMgt (Pfeffer & Sutton, 2007; Rousseau, 2006a).

Evidence-based Management: Concept and Principles

From the start, however, management scholars recognized that applying the EBM principles into management would be challenging, and some level of adaptation would be required (Tranfield, Denyer, & Smart, 2003). The challenges are due to differences in the fields of medicine and management in culture, research base, and decision-making process. In terms of culture, unlike medicine, management is not a profession; managers do not receive a standardized education, there is no control over entry into management via accreditation, and thus there is great diversity among practitioners in terms of educational background (Walshe & Rundall, 2001). Moreover, unlike in medicine, personal experience is valued over scientific research, there is less familiarity and understanding of research, and there is a greater divide between researchers and practitioners (Rynes & Bartunek, 2017; Walshe & Rundall, 2001). In

terms of research base, management research is less developed as a field than medicine, with less agreement regarding the key research questions and how they should be studied (Rousseau, Manning, & Denyer, 2008). Management research is also less well indexed, it is spread across different literature sources; not just management journals, but also clinical and psychological ones, as well as a wide range of books, and reports, and unpublished research in the gray literature. Thus, it is heterogeneous and harder to review systematically or synthesize (Walshe & Rundall, 2001). In terms of decision-making, unlike clinical decisions, managerial decisions are larger in scope, span over a longer period of time, and involve applying different bodies of knowledge. Managerial decisions are usually made by groups of managers, require gathering support from different stakeholders, and are significantly constricted by requirements at organizational and institutional levels. Finally, managerial decision outcomes are more difficult to distinguish because of the time scale of decisions (Walshe & Rundall, 2001).

In light of these differences, since its initial introduction to management, there have been various definitions of EBMgt. Variations are mostly due to differences in the definition of evidence and the factors that are necessary for evidence-based decision-making. Initial definitions emphasized scientific research. For example, Axelsson (1998) defined EBMgt in healthcare management as searching for and evaluating management research evidence and using it as a basis for practice. Similarly, Rousseau (2006a, p.256) defined EBMgt as “translating research principles based on best evidence into organizational practice”. Subsequent definitions emphasized other factors in addition to scientific research. For example, Kovner et al. (2000) and Kovner and Rundall (2006) emphasized personal experience, experience of experts, and organizational data in healthcare management, while Briner, Denyer, and Rousseau (2009) also emphasized stakeholder preferences and values, and the local context. In the most

comprehensive definition, which I adopt in this dissertation, EBMgt is defined as the “conscientious, explicit, and judicious” use of the best available evidence (Barends et al., 2014, p. 4). The best available evidence is evidence which is gathered from multiple sources, including experiential evidence in the form of practitioner judgment and experience, scientific evidence in the form of research findings, organizational evidence in the form of internal data, and stakeholder evidence in the form of preferences and values, and which is critically appraised to be reliable and trustworthy (Barends et al., 2014).

Therefore, in the move from medicine to management, what counts as evidence for evidence-based decision-making changed. The basic principle of the movement, however, that reliable evidence should inform decision-making, remained the same. What also remained the same is the premise that by assessing the quality of the evidence, the evidence-based approach could encourage the use of more effective practices, and consequently improve decision-making and lead to better organizational outcomes (Axelsson, 1998; Kovner & Rundall, 2006; Rousseau & McCarthy, 2007; Walshe & Rundall, 2001).

Evidence-based Management: Critiques

EBMgt is being widely promoted with the intention of having it transform the theory and practice of management (Barends et al., 2012; Rousseau, 2006a, 2006b; Rousseau & Gunia, 2016; Tourish, 2012). Some scholars, however, have been more cautious about the EBMgt movement, encouraging a critical approach and presenting several critiques of the movement and the EBMgt literature (Arndt & Bigelow, 2009; Learmonth, 2008; Learmonth & Harding, 2006; Morrell, 2008; Morrell & Learmonth, 2015; Morrell et al., 2015; Rynes & Bartunek, 2017; Rynes et al., 2018; Tourish, 2012). I will discuss three major critiques of the literature, which motivated this dissertation and the studies in it.

Critique 1: Conceptual Literature Providing Limited Empirical Understanding of Evidence-Based Decision-Making Process

One critique of the EBMgt literature is the scarcity of empirical research on EBMgt generally and research demonstrating its effectiveness specifically (Arndt & Bigelow, 2009; Swan et al., 2012). Several systematic and non-systematic reviews of the EBMgt literature have noted that much of the research on EBMgt is conceptual and prescriptive in nature (Baba & HakemZadeh, 2012; Currie, 2013; Reay et al., 2009; Roshanghalb et al., 2018; Rynes & Bartunek, 2017; Young, 2002). For example, Reay et al. (2009) and later Currie (2013) in a systematic review of the EBMgt literature, found that the majority of the articles used opinions and anecdotal information to encourage the adoption of EBMgt in practice. More recently, Rynes and Bartunek (2017), reviewed the EBMgt literature, clustering the articles into different categories based on their focus, such as advocacy, teaching articles, and empirical articles, and found that empirical articles were still not the majority. Therefore, the call for adoption of EBMgt has been based on conceptual arguments. The existing literature on EBMgt is not well developed and offers limited insight into the nuances of how the EBMgt decision process is implemented by different decision-makers in different organizational contexts and provides limited evidence for the effectiveness of EBMgt (Arndt & Bigelow, 2009; Reay et al., 2009; Swan et al., 2012; Walshe & Rundall, 2001). With limited empirical understanding of the EBMgt decision-making process in practice, existing conceptualizations of EBMgt have been rooted in rational theories of decision-making (Arndt & Bigelow, 2009). EBMgt has been presented as a linear decision-making process where the decision maker uses rationality and logic to gather all available evidence, evaluate alternatives, and make decisions that will maximize organizational goals and lead to expected outcomes (Barends et al., 2014; Kovner & Rundall, 2006; Wright et

al., 2016). Research on organizational decision-making, however, has shown that human rationality is bounded by the decision maker's mental skills, habits, and reflexes (Simon, 1997). It has also shown that decisions may not proceed in a linear fashion (Cohen, March, & Olsen, 1972; Mintzberg, Raisinghani, & Theoret, 1976) and may not lead to the expected outcome (Allison, 1971), especially considering the complexity of healthcare organizations (Arndt & Bigelow, 2009).

This critique triggers questions concerning the process of EBMgt practice in hospital settings, including: *How is the process of evidence-based decision-making manifested in hospital settings? What are the characteristics of managers who apply evidence-based decision-making?* It also triggers questions concerning the nature of the literature on EBMgt in hospital settings, compared to literature on EBMgt in general management, including: *Is the literature on EBMgt in hospital settings, similar to the management literature, primarily conceptual? What insight does the literature provide into the practice of EBMgt decision-making in hospital settings? What evidence does this literature provide about the effectiveness of EBMgt practice? What gaps exist in this literature?*

Critique 2: Neglect of Contextual Contingencies in EBMgt Decision Process

Another critique of EBMgt is that in its focus on quantification and aggregation, and by not deeply examining how EBMgt decisions are implemented by different decision-makers in different contexts, it does not consider contextual contingences, like issues of ethics, power relations, individual personal interests, and politics (Morrell et al., 2015). Ignoring such issues can make EBMgt managerialist, whereby it equates managers' problems and insight with the concerns and interests of employees and thus ignores employees' views (Grey, 2004; Learmonth, 2007; Tourish, 2012). Hypothetically, EBMgt can be used to support the interests of workers, but

this assumes that managers are impartial technical experts with no personal or collective interests in the issues being researched and the evidence being gathered. It also assumes that research findings will be welcomed by managers (Rynes et al., 2018; Tourish, 2012). While in reality, managers are not merely waiting for research to facilitate and direct their decisions. Rather, they are committed to many of their practices which they perceive to be in their own interest and may very well resist evidence against such practices (Rynes et al., 2018; Tourish, 2012). Therefore, without explicit consideration of such situated complexities and contingences, evidence can end up serving power and corporate interest (Morrell & Learmonth, 2015). The individual decision-makers who implement EBMgt can also be considered part of the contextual contingencies that have been ignored in the EBMgt literature (Wright et al., 2016). EBMgt tends to associate poor decision-making, or non evidence-based decision-making, with decision-makers' absence of knowledge. While in reality, decision-makers' lack of reliance on evidence might be a choice to ignore evidence that contradicts their beliefs, knowledge, and self-interest (Rynes et al., 2018). This focus on the decision-maker and the role their perceptions, competencies, and motives play in the EBMgt process is lacking in the EBMgt literature (Wright et al., 2016). Considering the decision-maker is important, because of the role that human beings and their individual characteristics play in driving and producing organizations decisions, actions, and outcomes (Langley, Mintzberg, Pitcher, Posada, & Saint-Macary, 1995). This critique triggers questions concerning the context within which EBMgt is practiced in hospital settings, including: *What contextual factors influence the evidence-based decision-making process in hospital settings? Are these factors at the individual, organizational, national, and international levels? How do the contextual factors influence the evidence-based decision-making process in hospital settings?*

What role does the decision-maker play in the evidence-based decision-making process in hospital settings?

Critique 3: Narrow Conceptualization of Evidence

A third critique of EBMgt is the selective and narrow view of evidence (Morrell & Learmonth, 2015). While many definitions of EBMgt include different types and sources of evidence, much of the research on EBMgt seems to have focused on the scientific evidence (Tort-Martorell et al., 2011; Wright et al., 2016). Thus, EBMgt literature has privileged scientific evidence as the foundation of decision-making at the expense of the situated expertise and judgment of the decision-maker (Morrell, 2008). This is particularly problematic given that, as previously discussed, the research base in management is not well developed, is spread across different sources, and is heterogeneous, and thus difficult to review systematically or synthesize (Rousseau et al., 2008; Walshe & Rundall, 2001). Furthermore, when it comes to judging the relevance and trustworthiness of the evidence, EBMgt literature has valued quantification and characteristics prized in positivist research. Borrowing from medicine, hierarchies of evidence that hold systematic reviews and meta analyses at the top level and case studies and narrative reviews at the bottom level have been developed and used (Currie, 2013; Kepes, Bennett, & McDaniel, 2014; Reay et al., 2009). This is problematic because it holds quantitative positivist research as the best available evidence at the expense of qualitative and narrative approaches (Morrell & Learmonth, 2015). This devaluing of qualitative and narrative approaches, which provide contextualized evidence, is particularly problematic in light of Critique 2 about the neglect of context in the EBMgt literature and the need to consider and incorporate contextual contingencies throughout the process. Therefore, some have argued that the rigor of evidence should not be tied to its methods alone, but also to its relevance to the decision at hand (Kohn,

Berta, Langley, & Davis, 2011), and that evidence in EBMgt should include several sources because scientific evidence alone is not sufficient (Tranfield et al., 2003). This critique triggers questions concerning the evidence in EBMgt in hospital settings, including: *What evidence is used by managers in hospital settings to make evidence-based decisions? What implications does this have for the conceptualization of evidence in EBMgt?*

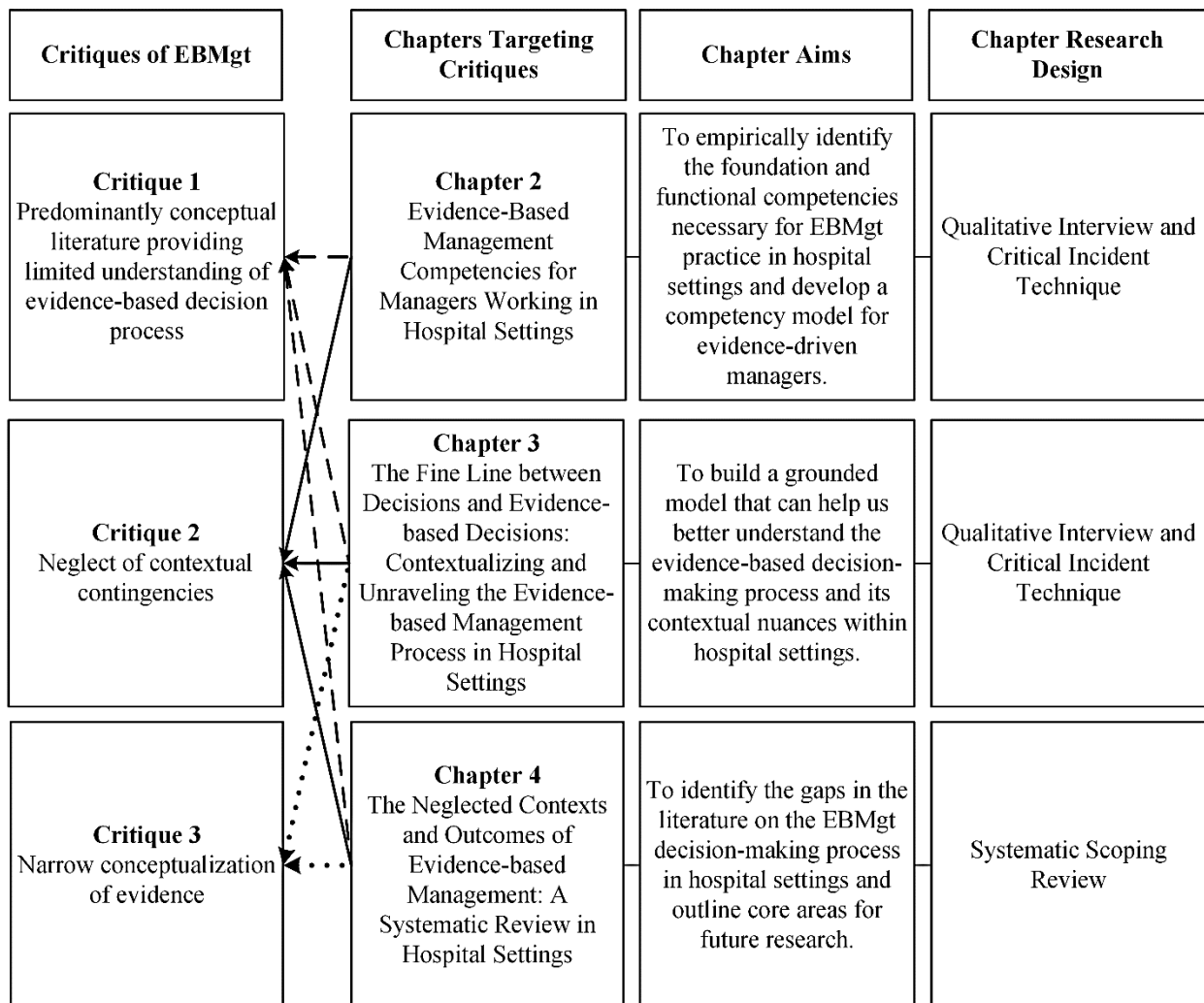
Dissertation Aims and Outline of Chapters

In light of these critiques of the EBMgt literature and the questions they trigger, the overarching aim of this dissertation is to empirically develop an in-depth understanding of the practice of EBMgt in hospital settings, by unraveling the process of EBMgt decision-making, how evidence is conceptualized in this process, and the role of the decision-maker and the context in this process. In pursuit of this aim and as outlined below, I conducted three studies, each tackling one or more of the critiques of EBMgt (Figure 1).

The literature provides limited insight into how different decision-makers practice the EBMgt process (Critique 1) and neglects the role of decision-makers and their perceptions, competencies, and motives in the EBMgt process (Critique 2). As such, I intend to gain empirical insight into the characteristics of the decision-makers who apply the EBMgt decision-making process in **Chapter 2**. Specifically, my aim is to identify the foundational and functional competencies necessary for the practice of EBMgt in hospital settings and propose an empirically-based competency model for evidence-driven managers. I will achieve this aim by conducting a qualitative study using interviews and the critical incident technique among managers in hospital settings. Moreover, the literature provides limited insight into the nuances of how the EBMgt decision process is applied in different contexts (Critique 1), neglects different contextual contingences and their potential impact on the process (Critique 2), and takes

a selective view of evidence (Critique 3). As such, I intend to empirically gain insight into the EBMgt decision-making process, the different contextual contingencies and their impact on the process, and how evidence is conceptualized in **Chapter 3**. Specifically, my aim is to build an empirically-driven theoretical model of the evidence-based decision-making process and its contextual nuances within hospital settings. I will achieve this aim by conducting a qualitative study using interviews and the critical incident technique among managers in hospital settings.

Figure 1. Overview of the Chapters of this Dissertation



Finally, in **Chapter 4** I intend to uncover what insight the literature on EBMgt in hospital settings specifically provides about EBMgt and its three critiques of; conceptual literature

providing limited insight into the EBMgt decision process and effectiveness (Critique 1), neglect of contextual contingences (Critique 2), and selective view of evidence (Critique 3). Specifically, my aim is to scope out the existing literature on EBMgt in hospital settings, identify the gaps in the literature on the EBMgt decision-making process in hospital settings, and outline core areas for future research. I will achieve this aim by conducting a systematic scoping review of the literature on the EBMgt process in hospital settings. In closing, in Chapter 5, I summarize the main findings of this dissertation and discuss its contribution to each of the three critiques of the EBMgt literature.

References

- Adams, J. G., & Walls, R. M. (2020). Supporting the Health Care Workforce During the COVID-19 Global Epidemic. *Jama*, 323(15), 1439-1440. doi:10.1001/jama.2020.3972
- Alexander, J. A., & D'Aunno, T. A. (2003). Alternative perspectives on institutional and market relationships in the US health care sector. In S. S. Mick & M. E. Wyttenback (Eds.), *Advances in health care organization theory* (pp. 45–77). San Francisco, CA: Jossey-Bass.
- Anell, A., & Willis, M. (2000). International comparison of health care systems using resource profiles. *Bulletin of the World Health Organization*, 78, 770-778.
- Arndt, M., & Bigelow, B. (2009). Evidence-based management in health care organizations: A cautionary note. *Health Care Management Review*, 34(3), 206-213.
- Axelsson, R. (1998). Towards an evidence based health care management. *The International Journal of Health Planning and Management*, 13(4), 307-317.
- Baba, V. V., & HakemZadeh, F. (2012). Toward a theory of evidence based decision making. *Management Decision*, 50(5), 832-867. doi:10.1108/00251741211227546
- Baker, G. R. (2001). Healthcare managers in the complex world of healthcare. *Frontiers of Health Services Management*, 18(2), 23-32.
- Barends, E., Rousseau, D. M., Briner, R. B., & Center for Evidence-Based Management, A. (2014). *Evidence-Based Management, The Basic Principles*. Amsterdam: Center for Evidence-based Management.
- Barends, E., ten Have, S., & Huisman, F. (2012). Learning from other evidence-based practices: The case of medicine. In D. M. Rousseau (Ed.), *The Oxford Handbook of Evidence-Based Management* (pp. 25-42). New York: Oxford University Press.
- Beath, C., Becerra-Fernandez, I., Ross, J., & Short, J. (2012). Finding value in the information explosion. *MIT Sloan Management Review*, 53(4), 18-20.
- Begun, J. W., & Thygeson, M. (2015). Chapter 1: Managing complex healthcare organizations. In M. D. Fottler, D. Malvey, & D. J. Slovensky (Eds.), *Handbook of Healthcare Management*. Northampton, MA: USA: Edward Elgar Publishing.
- Briner, R. B., Denyer, D., & Rousseau, D. M. (2009). Evidence-Based Management: Concept Cleanup Time? *Academy of Management Perspectives*, 23(4), 19-32.

- Cavallo, J. J., Donoho, D. A., & Forman, H. P. (2020) Hospital Capacity and Operations in the Coronavirus Disease 2019 (COVID-19) Pandemic—Planning for the Nth Patient. In: *Vol. 1. JAMA Health Forum* (pp. e200345-e200345): American Medical Association.
- Center for Systems Science and Engineering. (2020). COVID-19 Dashboard by the Center for Systems Science and Engineering (CSSE) at Johns Hopkins University (JHU). *Coronavirus Resource Center*. Retrieved from <https://coronavirus.jhu.edu/map.html>
- Cohen, M. D., March, J. G., & Olsen, J. P. (1972). A garbage can model of organizational choice. *Administrative Science Quarterly*, 1-25.
- Currie, K. M. (2013). *Updating Reay, Berta & Kohn EBMgt systematic review*. (Unpublished Thesis), University of Prince Edward Island, Canada,
- Davies, H., Nutley, S., & Smith, P. (1999). *What works? The role of evidence in public sector policy and practice*. Oxford, England: Blackwell Publ LTD.
- Dhivyalakshmi, S., & Umamakeswari, A. (2017). The role of big data analytics in hospital management system. *International Journal of Pure and Applied Mathematics*, 115(7), 31-35.
- Donaldson, C., Mugford, M., & Vale, L. (2002). *Evidence based health economics*. London: Blackwell Pub.
- Fong, Z. V., Qadan, M., McKinney, R. J., Griggs, C. L., Shah, P., Buyske, J., . . . Altieri, M. S. (2020). Practical Implications of Novel Coronavirus COVID-19 on Hospital Operations, Board Certification, and Medical Education in Surgery in the USA. *J Gastrointest Surg*, 1-5. doi:10.1007/s11605-020-04596-5
- Glouberman, S., & Mintzberg, H. (2001). Managing the care of health and the cure of disease—Part I: Differentiation. *Health Care Management Review*, 26(1), 56-69.
- Grey, C. (2004). Reinventing business schools: The contribution of critical management education. *Academy of Management Learning & Education*, 3(2), 178-186.
- Groves, P., Kayyali, B., Knott, D., & Van Kuiken, S. (2013). *The 'big data' revolution in healthcare*. Center for US Health System Reform; Business Technology Office. Retrieved from https://www.ghdonline.org/uploads/Big_Data_Revolution_in_health_care_2013_McKinsey_Report.pdf.

- Guidi, C. F., & Alessandro, P. (2019). Health Care and Migration: What Data Can Tell Us of the Hard-to-Measure Impact of Migrants on the European Health Systems. In P. Dobrescu (Ed.), *Development in Turbulent Times: The Many Faces of Inequality Within Europe* (pp. 153-170). Cham: Springer International Publishing.
- Harrison, D. A., & Martocchio, J. J. (1998). Time for absenteeism: A 20-year review of origins, offshoots, and outcomes. *Journal of management*, 24(3), 305-350.
- Hewison, A. (1997). Evidence-based medicine: what about evidence-based management? *Journal Nursing Management*, 5(4), 195.
- Kaplan, R. S., & Porter, M. E. (2011). How to solve the cost crisis in health care. *Harvard Business Review*, 89(9), 46-52.
- Kepes, S., Bennett, A. A., & McDaniel, M. A. (2014). Evidence-based management and the trustworthiness of our cumulative scientific knowledge: Implications for teaching, research, and practice. *Academy of Management Learning & Education*, 13(3), 446-466.
- Kohn, M. K., Berta, W., Langley, A., & Davis, D. (2011). Evidence-Based Decision Making in Health Care Settings: From Theory to Practice. In J. D. Blair & M. D. Fottler (Eds.), *Biennial Review of Health Care Management (Advances in Health Care Management)* (Vol. 11, pp. 215-234). UK: Emerald Group Publishing Limited.
- Kovner, A. R., Elton, J. J., & Billings, J. (2000). Evidence-based management / Commentaries / Reply. *Frontiers of Health Services Management*, 16(4), 3-46.
- Kovner, A. R., & Rundall, T. G. (2006). Evidence-Based Management Reconsidered. *Frontiers of Health Services Management*, 22(3), 3-22.
- Lambert, H., Gordon, E. J., & Bogdan-Lovis, E. A. (2006). Introduction: Gift horse or Trojan horse? Social science perspectives on evidence-based health care. *Social Science & Medicine*, 62(11), 2613-2620.
- Langley, A., Mintzberg, H., Pitcher, P., Posada, E., & Saint-Macary, J. (1995). Opening up decision making: The view from the black stool. *Organization Science*, 6(3), 260-279.
- Learmonth, M. (2007). Critical management education in action: personal tales of management unlearning. *Academy of Management Learning & Education*, 6(1), 109-113.
- Learmonth, M. (2008). Speaking out: Evidence-based management: A backlash against pluralism in organizational studies? *Organization*, 15(2), 283-291.
doi:10.1177/1350508407087763

- Learmonth, M., & Harding, N. (2006). Evidence-based management: The very idea. *Public Administration*, 84(2), 245-266.
- Mehta, N., & Pandit, A. (2018). Concurrence of big data analytics and healthcare: A systematic review. *International journal of medical informatics*, 114, 57-65.
- Mills, A. (2014). Health care systems in low-and middle-income countries. . *New England Journal of Medicine*, 370(6), 552-557.
- Ming, W. K., Huang, J., & Zhang, C. J. (2020). Breaking down of healthcare system: Mathematical modelling for controlling the novel coronavirus (2019-nCoV) outbreak in Wuhan, China. *bioRxiv*.
- Mintzberg, H., Raisinghani, D., & Theoret, A. (1976). The structure of "unstructured" decision processes. *Administrative Science Quarterly*, 21, 246-275.
- Morrell, K. (2008). The narrative of 'Evidence Based' management: A polemic. *Journal of Management Studies*, 45(3), 613-635. doi:10.1111/j.1467-6486.2007.00755.x
- Morrell, K., & Learmonth, M. (2015). Against evidence-based management, for management learning. *Academy of Management Learning & Education*, 14(4), 520-533. doi:10.5465/amle.2014.0346
- Morrell, K., Learmonth, M., & Heracleous, L. (2015). An archaeological critique of 'Evidence-based Management': One digression after another. *Journal of Management Studies*, 26(3), 529-543.
- Muir Gray, J. A. (2004). Evidence based policy making. *British Medical Journal*, 329, 989-990.
- Murdoch, T. B., & Detsky, A. S. (2013). The inevitable application of big data to health care. *Jama*, 309(13), 1351-1352.
- Pfeffer, J., & Sutton, R. I. (2007). Suppose We Took Evidence-Based Management Seriously: Implications for Reading and Writing Management. *Academy of Management Learning & Education*, 6(1), 153-155.
- Reay, T., Berta, W., & Kohn, M. K. (2009). What's the evidence on evidence-based management? *The Academy of Management Perspectives*, 23(4), 5-18.
- Reeves, J. J., Hollandsworth, H. M., Torriani, F. J., Taplitz, R., Abeles, S., Tai-Seale, M., . . . Longhurst, C. A. (2020). Rapid response to COVID-19: health informatics support for outbreak management in an academic health system. *Journal of the American Medical Informatics Association*, 27(6), 853-859.

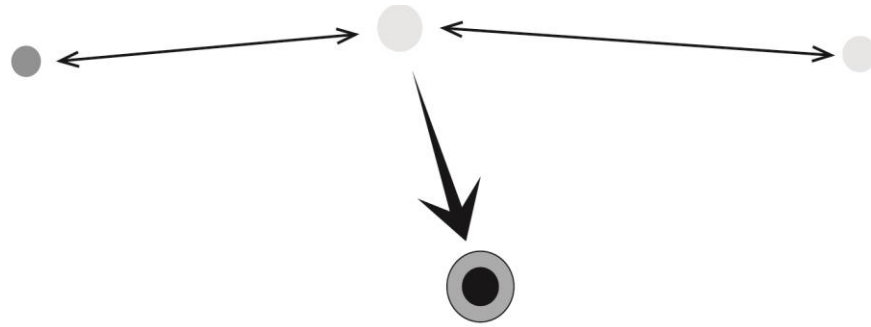
- Reid, T. R. (2009). *The Healing of America: A Global Quest for Better, Cheaper and Fairer Health Care*. New York: NY: The Penguin Press.
- Roshanghalb, A., Lettieri, E., Aloini, D., Cannavacciuolo, L., Gitto, S., & Visintin, F. (2018). What evidence on evidence-based management in healthcare? *Management Decision*, 56(10), 2069.
- Rousseau, D. M. (2006a). Is there such a thing as “evidence-based management”? *Academy of Management Review*, 31(2), 256-269.
- Rousseau, D. M. (2006b). Keeping an Open Mind about Evidence-Based Management: A Reply to Learmonth's Commentary. *The Academy of Management Review*, 31(4), 1091-1093.
- Rousseau, D. M., & Gunia, B. C. (2016). Evidence-based practice: The psychology of EBP implementation. *Annual Review of Psychology*, 67, 667-692. doi:10.1146/annurev-psych-122414-033336
- Rousseau, D. M., Manning, J., & Denyer, D. (2008). Evidence in Management and Organizational Science: Assembling the Field's Full Weight of Scientific Knowledge through Syntheses. *SSRN Electronic Journal*. doi:10.2139/ssrn.1309606
- Rousseau, D. M., & McCarthy, S. (2007). Educating Managers From an Evidence-Based Perspective. *Academy of Management Learning & Education*, 6(1), 84-101.
- Rynes, S. L., & Bartunek, J. M. (2017). Evidence-Based Management: Foundations, Development, Controversies and Future. *Annual Review of Organizational Psychology and Organizational Behavior*, 4, 235-261.
- Rynes, S. L., Colbert, A. E., & O'Boyle, E. H. (2018). When the “best available evidence” doesn't win: How doubts about science and scientists threaten the future of evidence-based management. *Journal of management*, 44(8), 2995–3010.
- Sackett, D. L., Rosenberg, W. M., Gray, J. A. M., Haynes, R. B., & Richardson, W. S. (1996). Evidence-based medicine: What it is and what it isn't. *British Medical Journal*, 312(7023), 71-72.
- Sherman, L. W. (1998). *Evidence-based policing*. Washington, DC: Police Foundation.
- Simon, H. A. (1997). *Models of bounded rationality: Empirically grounded economic reason* (Vol. 3): MIT press.

- Smith, N., & Fraser, M. (2020). Straining the system: novel coronavirus (COVID-19) and preparedness for concomitant disasters. *American Journal of Public Health, 110*(5), 648-649. doi:10.2105/AJPH.2020.305618
- Starkey, K., Hatchuel, A., & Tempest, S. (2009). Management research and the new logics of discovery and engagement. *Journal of Management Studies, 46*(3), 547-558.
- Starkey, K., & Madan, P. (2001). Bridging the relevance gap: Aligning stakeholders in the future of management research. *British Journal of Management, 12*(s1), S3-S26.
- Swan, J., Clarke, A., Nicolini, D., Powell, J., Scarbrough, H., Roginski, C., . . . Taylor-Phillips, S. (2012). *Evidence in Management Decisions (EMD): Advancing knowledge utilization in healthcare management: Final report: NIHR Health Services and Delivery Research Programme.*
- Tanne, J. H., Hayasaki, E., Zastrow, M., Pulla, P., Smith, P., & Rada, A. G. (2020). Covid-19: how doctors and healthcare systems are tackling coronavirus worldwide. *BJM, 368*(1090), 1-5. doi:10.1136/bmj.m1090
- Tonelli, M. R. (1998). The philosophical limits of evidence-based medicine. *Academic Medicine, 73*(12), 1234-1240.
- Toner, E., & Waldhorn, R. (2020). *What US hospitals should do now to prepare for a COVID-19 pandemic.* Retrieved from Baltimore:
<https://www.centerforhealthsecurity.org/cbn/2020/cbnreport-02272020.html>
- Tort-Martorell, X., Grima, P., & Marco, L. (2011). Management by facts: The common ground between total quality management and evidence-based management. *Total Quality Management & Business Excellence, 22*(6), 599-618.
- Tourish, D. (2012). Evidence Based Management', or 'Evidence Oriented Organizing'? A critical realist perspective. *Organization, 20*(2), 173-192.
- Tranfield, D., Denyer, D., & Smart, P. (2003). Towards a methodology for developing evidence-informed management knowledge by means of systematic review. *British Journal of Management, 14*(3), 207-222.
- Walshe, K., & Rundall, T. G. (2001). Evidence-based management: from theory to practice in health care. *Milbank quarterly, 79*(3), 429-457.
- Wright, A. L., Zammuto, R. F., Liesch, P. W., Middleton, S., Hibbert, P., Burke, J., & Brazil, V. (2016). *Evidence-based Management in Practice: Opening up the Decision Process,*

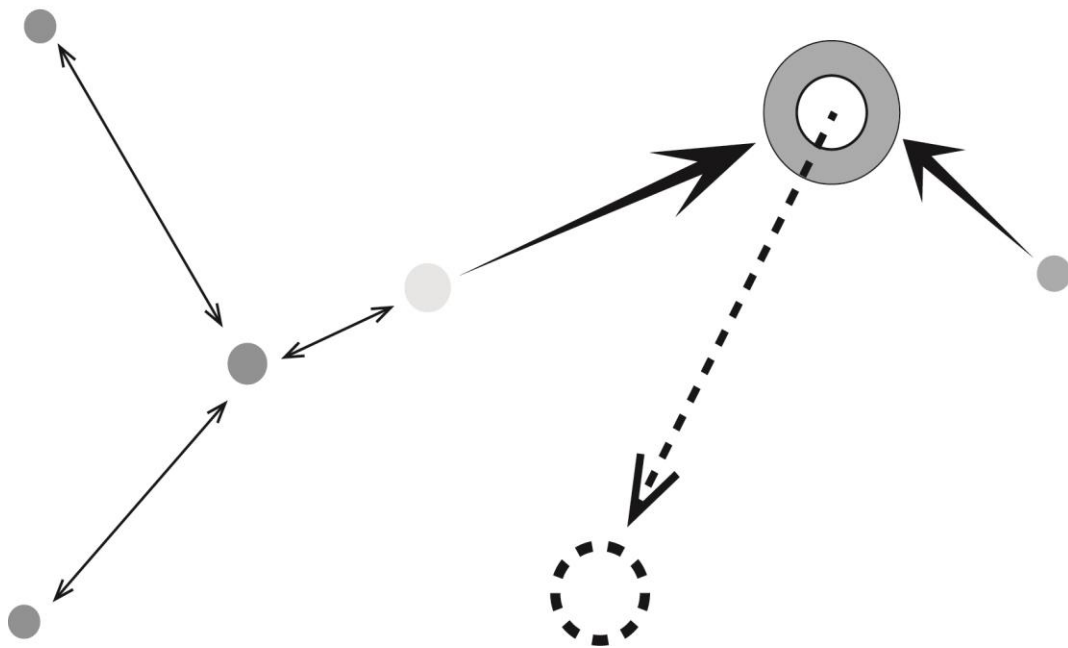
Decision-maker and Context. *British Journal of Management*, 27(1), 161-178.

doi:10.1111/1467-8551.12123

Young, S. K. (2002). Evidence-based management: a literature review. *Journal Nursing Management*, 10(3), 145-151.



CHAPTER 2 | Evidence-Based Management Competency Model for Managers in Hospital Settings



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Abstract

Evidence-based management (EBMgt), which refers to using the best quality evidence from different sources in decision-making, is becoming an imperative for managers in both profit and non-profit sectors. Yet, the competencies underlying EBMgt have not yet received much attention. Therefore, the aim of this study was to identify the foundational and functional competencies of evidence-driven managers working in hospital settings and develop an empirically-based competency model for evidence-driven managers. We collected qualitative data using semi-structured interviews and the critical incident technique from 36 executive managers from 11 hospitals in Lebanon about the competencies of managers who use EBMgt when approaching problems and making decisions. Using inductive coding, we identified 13 competencies that we grouped into four dimensions: technical, cognitive, interpersonal, and intrapersonal. We further classified the specific competencies underlying each of the dimensions into foundational and functional, and highlighted those that are critical for the practice of EBMgt in hospital settings including open-mindedness, research knowledge and skills, ethicality in research, resourcefulness, and relationship management.

Introduction

With the growing volatility, uncertainty, complexity, and ambiguity surrounding businesses today (Bennett & Lemoine, 2014), exploiting data is key to creating competitive advantage (Provost & Fawcett, 2013). Yet, many decisions are still being made primarily based on experience and without reliance on other sources of data (Barends, Villeneuve, Briner, & ten Have, 2015). In fact, many management practices are influenced by fads without consideration of their credibility (e.g. management by objectives, 360 degree feedback, value-based healthcare; see D. Miller and Hartwick (2002) and Porter and Teisberg (2006)) and many decisions continue to be made despite a body of evidence suggesting that they will have no positive impact or will be harmful (Starkey, Hatchuel, & Tempest, 2009). Whilst organizational environments continue to change vastly and rapidly, management practices are not evolving as fast as the increasingly data-driven business environment (e.g. Prahalad & Hamel, 1990). Within this context, evidence-based management (EBMgt) has been proposed as an approach to encourage greater reliance on data in decision-making (Briner, Denyer, & Rousseau, 2009). EBMgt is defined as the “explicit, judicious, and conscientious” use of the best available evidence in management decision-making (Barends, Rousseau, Briner, & Center for Evidence-Based Management, 2014, p.4). Evidence may come from different sources, including professionals’ experience, scientific evidence, organizational data, and stakeholder concerns (Briner et al., 2009). The “best available” evidence is evidence that is collected from these different sources and is appraised to be reliable. It depends on the context of each organization, because the sources of evidence available to managers and the relevance of the available evidence depend on the organizational context.

The EBMgt approach has gained considerable attention as the managerial approach that is most congruent with today’s working environment (Rousseau, 2006a, 2006b), which is

characterized by an increase in the access to and availability of data. As EBMgt seeks to encourage the use of practices supported by strong evidence for their effectiveness, it can lead to improving decisions (Barends et al., 2014). When adopting an EBMgt approach, it is managers who must identify, gather, or mobilize the evidence, collaboratively with other stakeholders, and incorporate it in their decision-making (Swan et al., 2012). Accordingly, insight into the personal knowledge, skills, abilities, and other characteristics (KSAOs), or competencies, of managers who adopt an EBMgt approach can help organizations develop the right capabilities among their managers. In the EBMgt literature, Rousseau and Gunia (2016) conceptualized EBMgt competencies as foundational and functional, with foundational referring to competencies required for engaging in all EBMgt activities, and functional referring to competencies required for engaging in specific EBMgt activities. Therefore, in this study, our aim was to empirically identify the foundational and functional competencies necessary for the practice of EBMgt in hospital settings and develop an empirically-based competency model for evidence-driven managers. We were guided by the research question: What are the individual-level foundational and functional competencies necessary for managers to practice EBMgt in hospital settings? We will first shed light on the healthcare sector and the EBMgt literature in this field, and then present the theoretical framing adopted in this study.

EBMgt in the Healthcare Context

Healthcare organizations are complex and dynamic systems (Begun & Thygeson, 2015) that foster interactions between multiple factors related to patients, health care practitioners, healthcare teams, physical and social environments, organizational contexts, legislation, and accreditation, to name a few, all of which impact the quality and outcomes of care (de Jonge, Huyse, & Stiefel, 2006). With the wide array of problems facing the healthcare sector today

(Porter & Teisberg, 2006), such as the increase in the medical needs of the community and the decrease in funding (Futurescan, 2008), healthcare managers' roles and the decisions they have to make are becoming increasingly challenging (Baker, 2001). Furthermore, technology has had a huge impact on the availability of and accessibility to data for healthcare managers to leverage. For example, the widespread adoption of electronic medical records has allowed the proliferation and capture of unprecedented amounts and types of data, while open source platforms have made scientific literature more easily accessible (Mennemeyer, Menachemi, Rahurkar, & Ford, 2016).

The adoption of EBMgt in this context is being seen a timely strategic step that could enable managers to better cope with the complexity of healthcare organizations by relying on the best available evidence to improve their decision-making, and consequently achieve better organizational outcomes (Kovner & Rundall, 2006). However, the EBMgt literature has been critiqued for having a narrow view of evidence; privileging scientific evidence and quantitative research (Morrell, 2008; Morrell & Learmonth, 2015). Evidence, however, is not only quantitative scientific evidence, rather different types of scientific evidence, intra-organizational data (i.e. quality, effectiveness), professionals' experience, and stakeholders' concerns (Osborne & Strokosch, 2013) are also critical sources of evidence. Additionally, the best available evidence depends on the context of each organization. For example, a hospital that utilizes electronic medical records will have access to different types of evidence than one that relies on paper documentation. What is "best" in one context may be mediocre in another. Highlighting the importance of the context is also critical given that EBMgt has been critiqued for neglecting contextual complexities, such as ethics, power, and politics (Morrell, Learmonth, & Heracleous, 2015). By not explicitly considering these issues, EBMgt has erroneously assumed that managers

are impartial experts who will welcome evidence and use it to serve employee and client interests (Morrell & Learmonth, 2015; Tourish, 2012). Research has shown, however, that managers can be driven by self-interest and might choose to ignore evidence that contradicts their beliefs, knowledge, and assumptions (Rynes, Colbert, & O'Boyle, 2018).

In response to these critiques, the literature has called for developing a more in-depth understanding of EBMgt in practice (Currie, 2013; Reay, Berta, & Kohn, 2009; Rynes & Bartunek, 2017; Walshe & Rundall, 2001) and for better understanding the role of the manager in EBMgt. To this end, some have focused on the competencies of managers, and in fact, EBMgt has emerged relatively consistently, directly or indirectly, in recent generic competency models for healthcare managers. For example, among the 5 competency domains identified by the Healthcare Leadership Alliance (HLA), two domains “knowledge of the healthcare environment” and “business skills & knowledge” included references to EBMgt, specifically to using research findings to establish practice models and teaching others to use research (Stefl & Bontempo, 2008). Similarly, Liang and colleagues (Liang, Howard, & Wollersheim, 2017; Liang, Leggat, Howard, & Koh, 2013) identified evidence-informed decision-making as one of the core competencies for managers working in hospital settings. Moreover, McCarthy and Fitzpatrick (2009) identified promoting evidence-based decision-making, though referring mainly to clinical practice, as one of the competencies for nurse managers.

Other research specifically explored the competencies of evidence-driven healthcare managers. Liang et al. (2017) translated the competency of evidence-informed decision-making into behavioral descriptors, which were primarily process oriented and did not refer to personal characteristics. Wright et al. (2016) on the other hand, focused on understanding the characteristics of evidence-driven managers through a case study where a manager approached

an operational hospital problem in an evidence-based manner. This study, however, was based on the analysis of only one manager in one specific hospital. Other researchers exploring the barriers to EBMgt have also identified certain competencies that are necessary for EBMgt practice such as knowledge in research methods, and acquiring and appraising research evidence (Barends et al., 2015; Liang & Howard, 2011; Niedzwiedzka, 2003). Therefore, as EBMgt is being promoted in healthcare management, research is being conducted on the competencies necessary for its practice. This existing research, however, has been scant, has not systematically delineated all necessary competencies, and has not been driven by a theoretical framework. To overcome these limitations and achieve our aims, in this study we adopted a conceptual framework proposed by Rousseau and Gunia (2016), which we describe below, as our guiding theoretical framework.

Theoretical Framing

In the EBMgt literature, Rousseau and Gunia (2016) proposed a conceptual categorization of the EBMgt competencies into foundational and functional. Foundational competencies refer to general skills and knowledge required for engaging in all EBMgt activities, such as domain knowledge, while functional competencies refer to skills and knowledge associated with specific EBMgt activities, such as acquiring the best available evidence, which is specific to the “acquiring evidence” aspect of the EBMgt process. Furthermore, the foundational competencies form the basis for the development of functional competencies and support their application (Rodolfa et al., 2005). For example, Rousseau and Gunia (2016) note that EBMgt functional competencies include the ability to structure one’s thinking about a problem and about the information needed to solve a problem. They highlight that this functional ability is supported by the foundational competency of domain knowledge because it provides the

necessary mental models that allow managers to organize problems and recognize incomplete information (Rousseau & Gunia, 2016). While this framework offers a promising basis for conceptualizing EBMgt competencies, these foundational and functional competencies still need to be empirically identified and situated within the overall literature on managerial competencies.

Therefore, using this conceptualization as our guiding theoretical framework, and leveraging existing classifications of managerial skills in the management literature (Hogan & Warrenfeltz, 2003; Katz, 1955), our aim is to empirically identify the foundational and functional competencies necessary for the practice of EBMgt and to develop an empirically-based competency model for evidence-driven managers in hospital settings. Competency models include a collection of KSAOs combined into a set of core competencies necessary for effective performance (Campion et al., 2011). Competency model focus on the worker rather than the work, and are the roots that drive the success of organizations (Prahalad & Hamel, 1990; Schippmann et al., 2000). To develop this model, we collected qualitative data from executive managers, working in multiple hospitals across Lebanon, about the competencies of managers who adopt an EBMgt approach to decision-making. Based on this data, we developed the EBMgt competency model for managers in hospital settings.

Methodology

Context

In organizational research, contextualization is strongly encouraged considering the diverse nature of work settings and how that influences the phenomenon being studied (Rousseau & Fried, 2001). In this study, we focused on the hospital setting as the larger umbrella for our investigation considering the uniqueness of this business context and the impact it may have on the manifestation of EBMgt in practice, particularly in Lebanon.

Lebanon is a middle-income country with a population estimated at around 4 million, of which more than 90% live in urban areas (Kronfol, 2006). Lebanon has 165 hospitals and a ratio of 3.73 beds per 1000 population (Harb, 2016). Healthcare expenditure in Lebanon constitutes 7.4% of the national gross domestic product (Miller & Wei, 2018), which is higher than the average healthcare expenditure in the MENA region, and of middle income countries (World Health Organization, 2016). Moreover, in Lebanon hospitals account for 40% of this expenditure (World Health Organization, 2010).

The private sector dominates healthcare service provision, with 88% of the total number of hospitals and 90% of the total number of beds (Ammar et al., 2000). This is due to the long history of conflict in Lebanon, which weakened the public sector and led to the unregulated growth of the private sector. To combat resulting issues the Ministry of Public Health (MoPH), introduced a hospital accreditation scheme, which was developed in line with international standards (Ammar, 2009). The scheme enhanced quality on one hand, but increased expenses on all hospitals on the other (Saleh, Bou Sleiman, Dagher, Sbeit, & Natafqi, 2013). Additional challenges relate to controlling the quality and quantity of physicians as well as increasing the retention of nurses who are increasingly leaving Lebanon for better job offers in the Gulf region (see Kronfol (2006)). Additionally, since 2011, and due to the conflict in neighboring Syria, there has been an influx of an estimated 1.5 million Syrian refugees to Lebanon, corresponding to a 30% increase in Lebanon's population (United Nations High Commissioner for Refugees, 2019). This is threatening the continuity of service delivery in the Lebanese healthcare system, destabilizing governance, and limiting access to care (Refaat & Mohanna, 2013). These factors highlight the unique challenges facing hospital managers in Lebanon today.

While the refugee influx has influenced healthcare outcomes in Lebanon, including increase in maternal mortality rates, mental health conditions, and vaccine-preventable and water-borne diseases outbreaks, other indicators, including life expectancy at birth and infant mortality rate, have improved (World Health Organization, 2018). Furthermore, a handful of international healthcare indices indicate that healthcare coverage and performance in Lebanon is improving (Fullman et al., 2018; L. J. Miller & Wei, 2018). Lebanon ranked 23rd on the Bloomberg Health-Efficiency Index, which calculates the cost-efficiency of medical care based on the national life expectancy and healthcare expenditure (Miller & Wei, 2018). Moreover, Lebanon ranked 33rd on the Healthcare Access and Quality (HCAQ) index, which approximates healthcare access and quality by calculating the level of mortality that would not occur in the presence of effective medical care (Fullman et al., 2018).

Sample

We invited 56 executive managers from 15 hospitals, via email, to participate in the study and 36 individuals from 11 hospitals operating in major cities across Lebanon agreed to participate (response rate of 64.28%). These 11 hospitals had received the highest level of accreditation by the Lebanese MoPH (Ministry of Public Health Lebanon, 2014), and around 36% of these hospitals had received accreditation from different international accrediting bodies. As can be seen in Table 1, the majority of the hospitals were private (72.73%), approximately half were academic hospitals (54.55%), and almost half the hospitals were large in size with bed sizes above 200 (45.5%).

On average, three executives participated from each of the hospitals. Participants (Table 2) were mostly 40 to 49 years old (38.9%) and half of the participants were male (52.8%). Although information regarding gender distribution in healthcare management positions in

Lebanon is not available, gender representation in this sample is comparable to that in healthcare managerial positions in other countries. For example, in the US women make up 50% of senior management in healthcare companies (Krivkovich et al., 2018), and 34% percent of leadership teams in hospitals (Tecco, 2017). The majority of participants had MA degrees (41.70%), MD degrees (16.67%), or both degrees (16.67%). Their education was mostly in the domains of business (22.2%) and healthcare management (22.2%), with many also having clinical backgrounds (13.90% medicine, 5.60% nursing), or both clinical and non-clinical backgrounds (healthcare management and medicine 16.70%, and nursing 2.80%). This representation of clinical professionals in leadership positions is reflective of recent changes in healthcare management and comparable to most countries of the OECD where medical doctors are part of the hospital top structure (Rotar et al., 2016). Participants occupied various positions within the hospitals with most in the positions of CEO or Hospital Director (25%), Human Resources Director (13.9%), and Chief Quality and Safety Officer (13.9%). They had occupied their positions for an average of 9.01 years ($SD = 6.19$) and half of them had 20 to 29 years of experience in healthcare management (50.0%).

Table 1. *Hospital Information*

	Frequency	Percentage
<i>Sector</i>		
Private	8	72.73
Public	3	27.27
<i>Academic status</i>		
Academic	6	54.55
Non-Academic	5	45.45
<i>Bed Count</i>		
< 70	2	18.20
70 – 200	4	36.40
> 200	5	45.50

Table 2. *Participant Demographic Information*

	Frequency	Percentage
<i>Gender</i>		
Male	19	52.80
Female	17	47.20
<i>Age Range</i>		
20-29 years	1	02.78
30-39 years	6	16.67
40-49 years	14	38.89
50-59 years	13	36.11
60-69 years	2	05.56
<i>Education level</i>		
MA	15	41.70
MD	6	16.67
MA & MD	6	16.67
PhD	5	13.90
BA	4	11.10
<i>Education background</i>		
Business	8	22.20
Healthcare Management	8	22.20
Medicine	5	13.90
Healthcare Management and Medicine	5	13.90
Healthcare Management and Business	3	08.30
Nursing	2	05.60
Healthcare Management and Law	1	02.80
Healthcare Management and Medicine and Law	1	02.80
Healthcare Management and Nursing	1	02.80
Health Science	1	02.80
Social Science	1	02.80
<i>Years of healthcare management experience</i>		
1-9 years	5	13.90
10-19 years	18	50.00
20-29 years	11	30.60
30+ years	2	05.60
<i>Position</i>		
Chief Executive Officer/ Hospital Director	9	25.00
Human Resources Director	5	13.90
Chief Quality and Safety Officer	5	13.90
Medical director	4	11.10
Chief Financial Officer	3	08.30
Nursing Director	3	08.30
Director of External Medical Affairs	1	02.80
Associate Dean of Faculty Affairs	1	02.80
Chief Business Development Officer	1	02.80
Chief Medical Information Officer	1	02.80
Deputy to Executive Vice President	1	02.80
Director of Operations	1	02.80
Executive director and senior advisor to administration	1	02.80

Materials

We collected data using 1) semi-structured interviews and 2) the Critical Incident Technique (CIT; Flanagan, 1954) as part of a larger study examining how evidence-based decision-making is practiced by managers in hospital settings. We defined evidence-based decision-making for participants as involving *“the use of best available evidence/data in managerial practice and decision-making”*.

In this study, we focused on analyzing participants’ responses to two questions from the semi-structured interview: **“What do you think are the knowledge, skills, abilities, and other characteristics needed by managers who demonstrate evidence-based management practice in their day to day work?”** and **“How would you distinguish between good experience that yields good decisions and bad experience that yields bad decisions?”** We also used the two CIT questions where we asked participants to describe in detail a scenario where a manager 1) used an evidence-based approach to decision-making and 2) did not use an evidence-based approach to decision-making.

Procedures

Interviews were conducted between December 2016 and November 2017 at the participant’s offices and lasted approximately 50 minutes each. One of the authors, a bilingual in English and Arabic languages, conducted the interviews in English language and either audio recorded or took notes. Some participants, however, sometimes used certain words in the Arabic language. The interviewer transcribed the interviews in their original language and translated the Arabic segments in parentheses next to the original text. The transcriptions were analyzed in their original language using the software QSR Nvivo version 11.

Analysis

We analyzed the data using an inductive coding approach (Lincoln & Guba, 1985). We used an iterative process, which included 4 steps: 1) initial open coding of the data; 2) developing the initial coding template; 3) developing the initial thematic template; 4) expert vetting to develop the final competencies.

Initial open coding

We started the analysis with initial open coding. One of the authors thoroughly read each participant's responses, then, guided by the research question, coded words, phrases, sentences, or paragraphs (hereafter utterances) into categories to capture the ideas conveyed. For example, the utterance "*to have an inquisitive mind*" was coded as 'Being Inquisitive'. The author applied line by line coding initially to 15% of the interviews (5 interviews) and generated a list of categories.

Developing Initial Coding Template

The author then vetted these categories collaboratively with another one of other authors. We re-examined the categories against the utterances they were referring to, as well as, against other categories. Accordingly, we merged some categories and added new ones. For example, 'Knowing How to Search the Literature' and 'Understanding and Knowing How to do a Literature Search' were merged. This led to the development of an Initial Coding Template.

Developing Initial Thematic Template

After coding 50% of the interviews (18 interviews) using the Initial Coding Template, we examined the categories for accuracy and duplication, and reduced them to a more manageable number. We then began assembling the categories into sub-themes and themes. For example, we grouped the categories 'Data Analysis Skills' and 'Knowledge of Comparing Numbers' under a

sub-theme (hereafter sub-competencies) labeled Analyzing Data. We further grouped multiple sub-competencies into themes (hereafter competencies) reflecting the KSAOs emerging from the data. For example, we grouped the sub-competencies Analyzing Data, Searching the Literature, Collecting Data, and Applying Data under the competency Research Knowledge and Skills. Furthermore, we grouped competencies under aggregate dimensions based on the type of KSAOs they reflected. For example, we grouped Research Knowledge and Skills, General Business Knowledge, and Domain Knowledge under the dimension Technical Knowledge and Skills. As further illustration of our progress from categorization to dimension, we labeled the utterances *“I have to think about the problems a decision might cause in the future (...) I have to think ahead”* and *“In 3 months one of the head nurses leaves, so I have to plan ahead, starting today I need to think who should replace this nurse and start training them”* under the first-order category ‘Short and Long Term Implications’. We then grouped this category with ‘Considering Larger Context’ under the sub-competency Long Term Thinking because they both revolved around considering the implications of decisions within the context of current systems and over time. We then grouped this sub-competency with the sub-competency Holistic Thinking under the competency Systems Thinking because both sub-competencies dealt with considering the overall implications of decisions. Finally, since the competencies Systems Thinking, Critical Thinking, and Creativity all reflect cognitive abilities, we grouped them under the Cognitive Dimension. This grouping led the development of an Initial Thematic Template.

Expert Vetting

After completing the full analysis using the Initial Thematic Template, we formed a vetting panel including all three authors and re-examined the template. Guided by the literature

on EBMgt and competencies of evidence-driven managers (Gioia, Corley, & Hamilton, 2013), we refined the categorization and developed the final template situated in the EBMgt literature.

Inter-Rater Reliability and Member Check

To assess the reliability of the categorization, two independent coders, who were unfamiliar with the study, assigned a sample codes to competencies and a sample of competencies to dimensions. We assessed inter-rater reliability by comparing their categorization with ours using Fleiss' Kappa (Fleiss, 1971). We found moderate agreement in the categorization of codes to competencies ($\kappa = 0.58$) and substantial agreement in the categorization of competencies to dimensions ($\kappa = 0.66$, Landis & Koch, 1997). We then met to discuss the discrepancies and made some very minor adjustments to the definitions of some codes and competencies. Finally, we conducted member checks by sharing our results with the participants, who were mainly in support of our categorization, with minor suggested amendments.

Results

Evidence-Based Management Competency Model

We captured participants' 657 utterances and followed an iterative process of analysis (Table 3).

Table 3. *Count of Categories, Sub-Competencies, Competencies, & Dimensions Throughout the Analysis*

Data Analysis Step	Count of Categories	Count of Sub-competencies	Count of Competencies	Count of Dimensions
<i>Open Coding</i>				
Coding 15% of interviews (5 interviews)	70	-	-	-
<i>Developing Initial Coding Template</i>				
Vetting codes	59	-	-	-
<i>Developing Initial Thematic Template</i>				
Coding 50% of interviews (18 interviews)	201	-	-	-
Grouping into initial thematic template	108	20	16	3

Table 3. *Continued*

Data Analysis Step	Count of Categories	Count of Sub-competencies	Count of Competencies	Count of Dimensions
<i>Developing Initial Thematic Template (continued)</i>				
Coding 100% of interviews and refining grouping	80	19	16	4
<i>Expert Vetting</i>				
Refining initial thematic template and developing final competency model	68	35	13	4

The final outcome was the template (Table 4) comprising 4 dimensions, 13 competencies, 35 sub-competencies, and 68 categories. To identify these four overarching dimensions, we leveraged existing managerial skills classifications, including Katz's (1955) three skills approach and its elaborations by (Mann, 1965) and Yukl (2013), and Hogan and Warrenfaltz's (2003) domains. Accordingly, we identified the following dimensions: I) Technical, II) Cognitive, III) Interpersonal and IV) Intrapersonal.

Table 4. *Evidence-based Management Competency Template*

Category	Sub-Competency	Competency	Dimension
Administrative knowledge Project management	General Management	General Business Knowledge	Technical
Knowledge of financial procedures Financial systems knowledge	Financial Management		
Computer Skills Writing capabilities	Digital Skills		
Knowledge of relevant national and international standards Knowledge of benchmarking	National & International Standards	Industry Knowledge	
Lean management Process design	Process Management		
Quality audit and control Proper Understanding of Quality Metrics	Quality Assurance		
Integrity Transparency Confidentiality Fairness Objectivity	Ethicality in Management	Ethicality	

Table 4. *Continued*

Category	Sub-Competency	Competency	Dimension
Transparency in Research Objectivity in Research	Ethicality in Research	Ethicality <i>(continued)</i>	Technical <i>(continued)</i>
Searching for data and literature Reading and understanding	Knowledge in Searching for & Understanding Data	Research Knowledge and Skills	
Data collection methods Auditing accuracy Warehousing and Documenting	Knowledge in Collecting Data		
Basic Mathematics knowledge Statistical analysis	Knowledge in Analyzing Data		
Incorporating data in decisions Applying theory to practice	Applying to Practice		
Intellectual curiosity Asking questions	Inquisitiveness	Critical Thinking	Cognitive
Breaking down Problems Comparing and Synthesizing	Analytical Thinking		
Being methodical and organized Being goal oriented	Systematic Thinking		
Considering impact on others Considering perspectives of others	Holistic Thinking	Systems Thinking	
Considering short- & long-term implications Considering larger context	Long Term Thinking		
New ways of working New ways of solving problems	Innovativeness	Creativity	
Ideas around scarcity of resources	Resourcefulness		
Establishing professional relationships Understanding others and their needs and motivations Regulating one's own and other's emotions	Building Relationships Emotional Intelligence	Relationship Management	Interpersonal
Solving problems between people Refraining from taking sides	Conflict Management Skills		
Serving as an example Motivating team to get results	Role Modeling Motivating Others	Team Leadership	
Willingness to share information Directing to relevant resources	Sharing Information & Experiences		

Table 4. *Continued*

Category	Sub-Competency	Competency	Dimension
Content	Effectively Delivering Information	Team Leadership	Interpersonal <i>(continued)</i>
Verbal and nonverbal skills		<i>(continued)</i>	
Being available for employees	Open Door Policy	Management Style	
Providing opportunity to share mistakes	Accepting Others' Mistakes		
Providing chance to fix mistakes			
Seeking field information	Hands-On Management		
Being part of practice			
Adapting decisions to fit new situations	Adapting to Change	Adaptability	Intrapersonal
Adapting behaviors to fit new situations			
Prioritizing stakeholders' interests based on the situation	Adapting Priorities		
Self-awareness	Self- Development	Self-Initiated Improvement	
Ability to learn from experiences			
Taking initiatives to learn and grow			
Identifying areas of improvement	Process and Quality Improvement		
Finding Solutions	Openness to Receiving Input from Stakeholders	Open Mindedness	
Changing one's mind after decision were made	Openness to Change One's Mind		
Openness to different outcomes			
Tolerance of uncertainty			

I. Technical Dimension

This dimension includes skills and knowledge of methods, procedures, and techniques related to the profession being practiced (Ericsson & Lehmann, 1996). It encompasses 4 competencies and 12 sub-competencies. The first competency, *General Business Knowledge*, refers to knowledge and skills necessary for managing organizational activity (Hogan & Kaiser, 2005). Here participants emphasized general management, which allow for the planning, execution, and monitoring of organizational activity. They also emphasized financial

management, which allow for the budgeting and financial planning of organizational activity, “*Budgeting, feasibility studies, and priority setting are mandatory points*” (P8). Finally, participants emphasized digital skills, referring to having the skills to use relevant tools that support the management function, including software such as Microsoft Excel and statistical software, as well as, having the proper writing skills when using these tools, such as when writing analysis reports and proposals.

The second competency, *Industry Knowledge*, refers to knowledge and skills necessary for coordinating the activities of healthcare facilities (Thompson, Buchbinder, & Shanks, 2012). Here participants emphasized national and international standards, referring to knowledge of the relevant norms and standards of practice. Participants also emphasized quality assurance, referring to knowledge of quality metrics, and tools and techniques for auditing and controlling of healthcare safety and quality. Finally, participants emphasized process management, referring to knowledge of methods, tools, and techniques necessary for improving the quality of healthcare delivery processes (Taylor et al., 2014), “*the skills of doing a PDCA [plan-do-check-act] how to look at a process and break it down into steps*” (P6).

The third competency, *Ethicality*, refers to the use of appropriate judgments in line with ethical standards guided by the benefit of patients, employees, the organization, and society (Kanungo, 2001). We categorized ethicality as a technical competency because it refers to a managers’ knowledge and practice of ethics as it relates to their profession rather than their ethical orientation as a person. Participants emphasized ethicality in management, referring to managing with transparency, upholding confidentiality, and treating others’ with fairness and objectivity. They also emphasized ethicality in research, referring to transparency and honesty about the data used in decision-making, “*being transparent with the numbers and the data you*

use” (P15), and objectivity in terms of being unbiased and letting data rather than initial judgments guide decision-making.

The fourth competency, *Research Knowledge and Skills*, refers to knowledge and skills necessary for conducting research. Here participants emphasized knowledge in searching for and understanding data, whether within the organization or in the literature. Participants also emphasized knowledge in collecting data, from methods of data collection to recording the data and assessing its accuracy. They also emphasized knowledge in analyzing data referring to knowledge of different statistical analysis methods, as a participant stated. “*You cannot be evidence based if you don’t know the basics behind comparison and some form of statistics analysis*” (P1). Finally, participants emphasized the skills of applying data to practice, as in this example “*Knowledge by itself is not enough if you don’t know how to apply (...) how can I move that theory to reality?*” (P23).

II. Cognitive Dimension

This dimension includes skills and abilities related to the way managers organize and process information (Messick, 1984) and understand relationships between different factors, (Katz, 1955; Yukl, 2013). This dimension includes 3 competencies and 7 sub-competencies. The first competency, *Critical Thinking*, refers to the ability to purposefully reflect on, evaluate, analyze, and synthesize information, and structure an argument to arrive at conclusions (Moon, 2007). Here participants emphasized core elements of the construct (Facione, Facione, & Sanchez, 1994), including inquisitiveness, referring to having intellectual curiosity and frequently asking questions, “*they are always curious, always asking*” (P34). They also emphasized being analytical, referring to breaking down problems into more manageable components and comparing and synthesizing information (Amer, 2005). Finally, participants

emphasized systematic thinking, referring to being methodical, following an approach marked by regularity (Facione et al., 1994), and being “*oriented towards goals*” (P8) referring to setting goals and working to complete them.

The second competency, *Systems Thinking*, refers to the ability to see the organization as a whole, recognizing the different parts that make it up and how they interact together (Katz, 1955). To this end, participants emphasized holistic thinking, referring to considering the implications of decisions for the different stakeholders within and outside the organization, “*people who are going to apply your decision (...) you should think in their perspective*” (P17). Participants also stressed the importance of long term thinking, referring to thinking of both the short and long term implications of decisions, “*even in times of crisis I have to think about the problems a decision might cause in the future...we have to think ahead*” (P23).

The last competency, *Creativity*, refers to the ability to generate original ideas (Amabile, 1988) and to find creative solutions even in the face of resource scarcity. Participants emphasized innovativeness, referring to coming up with new ways of conducting work processes and solving problems. They also emphasized resourcefulness, referring to the ability to generating original ideas vis-à-vis a scarcity in resources, “*If you don't have the financial or other resources (...) then you need creativity to find a way around such shortages*” (P15).

III. Interpersonal Dimension

This dimension refers to skills and abilities necessary for working with and leading people (Hogan & Warrenfeltz, 2003; Katz, 1955), and includes 3 competencies and 10 sub-competencies. The first competency, *Relationship Management*, refers to the ability to initiate, cultivate, and maintain relationships with colleagues. Participants stressed building relationships, being able to establish professional relationships with individuals inside or outside the

organization, so as to facilitate access to information and expert opinion, “*he [evidence-driven manager] has public relations with other people who can help him in specific subjects*” (P33).

They also stressed emotional intelligence, focusing on core elements of the construct (Petrides & Furnham, 2001) including understanding others’ needs and motivations, and regulating one’s own and others’ emotions, “[*When there is a problem] you have to be very understanding of [others’ feelings] without getting emotional and getting into the problem*” (P22). Participants also emphasized conflict management skills, referring to how managers approach and handle conflicts in the workplace, and the importance of refraining from taking sides (Wilson, 2004).

The second competency, *Team Leadership*, refers to the ability to direct individual and group activities towards a shared goal (Yukl, 2013). Participants emphasized the importance of role modeling, of adopting practices to serve as an example and encourage adoption in others, “*when you take a decision...you should apply it first yourself and then expect other people to*” (P17). They also emphasized motivating others, inspiring team member to get results by providing meaning to their work (Bass, 1995). They also emphasized the importance of team leaders sharing information and experiences, either their own knowledge or directing subordinates to relevant sources: “*I answer if I have the information, otherwise (...) I will try to get them the one who can help*” (P33). This is facilitated by managers’ ability to effectively deliver information to peers and subordinates, focusing on both the content and the tone.

The third and final competency, *Management Style*, refers to the way managers relate to and interact with their team members and subordinates. Participants emphasized creating an atmosphere of acceptance where employees can safely express their concerns and share information. This involved having open door policy, referring to being available to employees’ discussion of their concerns or suggestions, “[*encourage the employee not to] hide anything,*

whatever is wrong can be fixed” (P35). According to participants, to allow information sharing specifically about accidents and mistakes, managers must be accepting of others’ mistakes. This involves giving subordinates a chance to admit and fix mistakes, *“It’s ok to make a mistake (...) [the evidence-driven manager] does not crush them [employees], (...) [he/she]lets them sit in a meeting and say: hey you know I did a mistake let’s redo this”* (P24). Finally, participants also highlighted the importance of a manager practicing hands-on management, characterized by seeking ‘field’ information and knowing what is happening in practice, and being part of the practice. This style was differentiated from its opposite *“there is management, by what I call remote control, sitting behind a desk and managing and making decision.* (P10)

IV. Intrapersonal Dimension

This final dimension refers to the KSAOs related to the internal state of the individual needed for changing behaviors (Hogan & Warrenfeltz, 2003), and includes 3 competencies and 6 sub-competencies. The first competency, *Adaptability*, refers to the capacity to shift one’s approach to adjust to dynamic work situations (Johnson, 2001). Here participants emphasized adapting to change by changing behaviors and decisions: *“To adapt...Even if you don’t change your decisions...But maybe some fine tuning; maybe you can change some things”* (P17). They also emphasized adapting priorities, referring to adjusting priorities based on stakeholders’ interest, such as in cases where patients’ needs are determined to be of higher priority than hospital policy.

The second competency, *Self-initiated Improvement*, positions the evidence-driven manager as an agent actively seeking to create change. Improvement can be geared towards self-development, referring to developing personal skills, learning from mistakes, and taking initiative to learn and grow, *“being self-motivated, interested in constantly reading, learning,*

and improving themselves” (P12). In parallel, self-initiated improvement also entails process and quality improvement, which requires identifying problems and finding solutions for them:

“people who come to their managers, and tell them ‘in doing this I discovered that we have a flaw and I did an analysis and I suggest we do this to fix it” (P11).

The final competency, *Open Mindedness*, refers to being tolerant of divergent views (Facione et al., 1994). Here, participants stressed that managers must have openness to receiving input from stakeholders, referring to being receptive to information from stakeholder at different levels and considering their input when making decisions: *“You have to show [employees] that everything that [they] reported will end up being considered in your decision-making process”* (P35). Participants also emphasized the importance of openness to changing one’s minds, referring to being receptive to changing one’s ideas or decisions even after decisions have been made if new evidence points in a different direction. As a participant described an incident with a non-evidence-driven manager: *“[I would] show them articles, designs and the benefits of these...but there is no openness to changing [their] idea”* (P2).

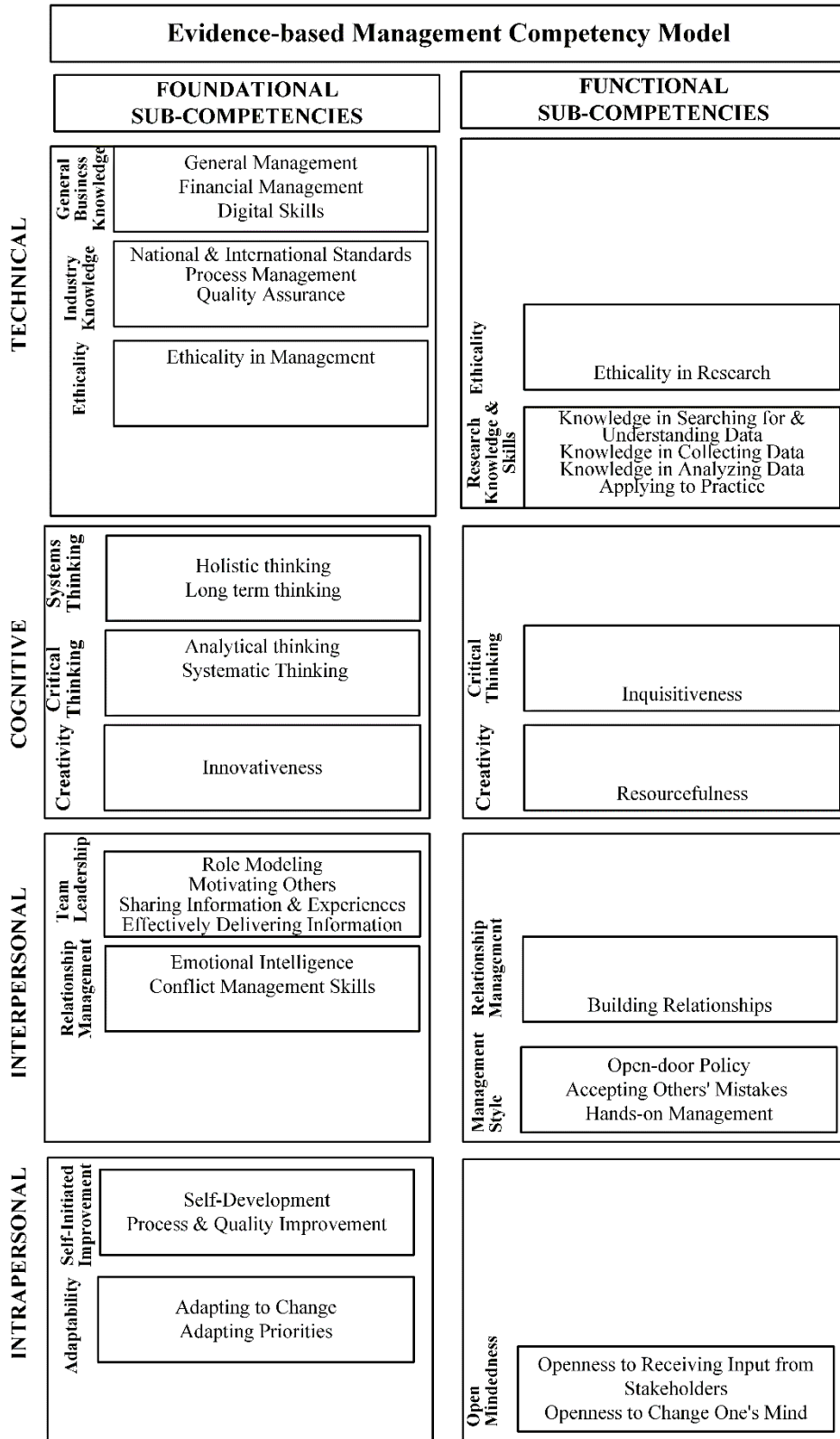
Mapping onto Rousseau and Gunia’s (2016) framework

To explore whether these competencies could fit into Rousseau and Gunia’s (2016) conceptual framework, we mapped our findings onto this framework. The distinguishing feature between the foundational and functional competencies is that the former are required to engage in all aspects of EBMgt, while the latter are required to engage in specific EBMgt activities (Rousseau & Gunia, 2016). Considering that the two core EBMgt activities are acquiring and critically appraising evidence, we categorized competencies specifically necessary for engaging in acquisition and appraisal of evidence as functional and the rest of the competencies as foundational. In doing this mapping, we found that the foundational-functional division is, in

some cases, better expressed at the level of the sub-competencies rather than the competencies. We identified seven functional competencies and/or sub-competencies and present below their link to the core activities of EBMgt (Figure 1).

Within the technical dimension, the competency *Research Knowledge and Skills* can be considered functional as it encompasses sub-competencies that can help managers search for existing evidence and design data collection methods to gather evidence. Additionally, these sub-competencies can help managers assess the quality of evidence, depending for example on how the data was collected and what sample it was collected from vis-à-vis the context it will be applied to. These are critical activities of EBMgt, no matter the type of evidence (Barends et al., 2014; Swan et al., 2012). Furthermore, the sub-competency *ethicality in research*, under the *Ethicality* competency, can also be considered functional because it allows managers to be ethical and uphold ethical principles when acquiring and appraising the evidence. It allows managers to be transparent about the data they acquire and use as the basis of decision-making, and to be objective in appraising the quality of the data and interpreting its meaning. Within the cognitive dimension, under the *Critical Thinking* competency, the *inquisitiveness* sub-competency can be considered functional because it drives the individual to ask question to a better understand the problem and thus acquire the best available evidence. It also drives the individual to ask questions to assess the quality of this evidence. Moreover, under the *Creativity* competency, the *resourcefulness* sub-competency can be considered functional. In the EBMgt context, resourcefulness refers to managers' ability to generate and acquire evidence in novel ways when it is not easily available due to organizational and other constraints. For example, in one hospital, internal information about the average processing time of laboratory tests was not available because of lack of documentation. To collect this data, the manager decided to conduct

Figure 1. Evidence-based Management Competency Model: Mapping unto Roussau and Gunia (2016)



observations over a one-month period; however, considering limited human and financial resources, the manager partnered with a career service at a university and hired student volunteers.

Within the interpersonal dimension, the building relationship sub-competency under *Relationship Management* and the *Management Style* competency can be considered functional as they may facilitate access to information from employees, colleagues, and patients. Both of these represent an ability to develop relationships and create an atmosphere where employees can safely share information with a manager who has a hands-on approach and is accepting of mistakes. Such an atmosphere allows the acquisition of information, and accurate information at that, of events that are happening within the organization.

Finally, within the intrapersonal dimension, the competency *Open Mindedness*, can be considered functional because in the EBMgt context, it involves being receptive to information and accordingly open to changing one's mind. Such openness is critical to EBMgt given how managers' beliefs, knowledge, and interests might come into play in determining what information they take into account and utilize in decision-making (Rynes et al., 2018).

Having identified the competencies and sub-competencies necessary for acquiring and appraising evidence as functional, what remained were the foundational competencies and sub-competencies. These included the competencies *General Business Knowledge*, *Industry Knowledge*, *Systems Thinking*, *Team Leadership*, *Self-initiated Improvement*, and *Adaptability*. They also included the sub-competencies ethicality in management under *Ethicality*, analytical and systems thinking under *Critical Thinking*, innovativeness under *Creativity*, and emotional intelligence and conflict management skills under *Relationship Management*. These are necessary to engage in all aspects of EBMgt practice. To illustrate, *General Business Knowledge*

and *Industry Knowledge* are foundational because they provide managers with the mental models that allow them to anticipate and recognize problems, identify necessary and relevant, and the best way to apply solutions (Ericsson & Lehmann, 1996; Rousseau & Gunia, 2016).

Furthermore, *Adaptability* and *Self-Initiated Improvement* are foundational because the overall process of EBMgt can be long and arduous (Barends et al., 2014), and these competencies give managers the drive and capacity to initiate processes of continuous improvement and adapt to changes throughout the process.

Discussion

The aim of this study was to empirically identify the foundational and functional competencies necessary for EBMgt practice in hospital settings and develop an empirically-based competency model for evidence-driven managers in hospital settings. The outcome was the formulation of the EBMgt competency model comprising 4 dimensions, 13 competencies, and 35 sub-competencies, categorized into foundational and function competencies according to Rousseau and Gunia's (2016) conceptualization. The model developed in this study is the first attempt to empirically delineate the competencies necessary for the practice of EBMgt among managers in hospital setting. The model builds on and contributes empirically and theoretically to Rousseau and Gunia's (2016) conceptualization by identifying the EBMgt competencies that fall under their conceptualization, and by situating the EBMgt competencies within the overall literature on managerial competencies. The value of the proposed model lays in its contribution to understanding the specific competencies necessary for the practice of core EBMgt activities, examined in both the general management as well as the healthcare management literatures.

Competencies Unique to the EBMgt Competency Model

Several of the competencies we identified in the proposed model overlapped with existing competency models in the healthcare management literature (Calhoun et al., 2008; Garman, Tyler, Darnall, & Lerner, 2004; Liang & Howard, 2010; Liang et al., 2013; McCarthy & Fitzpatrick, 2009), though some of these overlapping competencies contribute uniquely to the practice of EBMgt. For example, ethicality as a competency has been highlighted in many existing managerial models in healthcare and outside. However, its emergence in the proposed model is critical because the EBMgt literature has been criticized for ignoring issues of power, politics, and ethics and the role they play in EBMgt practice. Therefore, although ethicality has not been at the center of discussions in the EBMgt literature, it is an integral part of its practice and requires more in-depth investigations. Additionally, some other competencies were unique to our model, and some other popularly cited competencies were not mentioned by our informants. Here we will discuss the competencies that were unique to the current model or had unique contributions. These potentially provide indication of the skills that are critical to the practice of EBMgt and its core activities and extend our ideas about the practice of EBMgt in hospital settings.

Unique Competencies

The competency “Research Knowledge and Skills” was not prominent in the existing literature, and even when it was identified, it tended to be subsumed under other competencies such as Business Knowledge and Skills (Stefl & Bontempo, 2008). This supports the existing EBMgt literature where the scarcity of such skills have been identified as a barrier to EBMgt (Barends et al., 2015; Liang & Howard, 2011; Niedzwiedzka, 2003) and our identification of these skills as a standalone competency highlights its central role for acquiring and assessing

evidence in EBMgt. “Open-mindedness” was also unique to this model, referring not to the personality trait, rather to being open to changing one’s mind even after having made a decision, in case the evidence proves otherwise. The EBMgt literature has tended to associate poor decision-making, or non evidence-based decision-making, with an absence of knowledge (Rynes et al., 2018). Research has shown, however, that managers’ lack of reliance on evidence might be a choice to ignore evidence that contradicts one’s beliefs, knowledge, and self-interest (Rynes et al., 2018). Thus our identification of this competency is in line with the EBMgt literature pinpointing the necessity of managers being receptive to evidence (Rynes et al., 2018).

Competencies Uniquely Contributing to EBMgt Practice

“Relationship Management” has been identified in several existing models of healthcare management competencies (Calhoun et al., 2008; Garman et al., 2004; Liang & Howard, 2010; Liang et al., 2013; McCarthy & Fitzpatrick, 2009). However, its contribution to the practice of EBMgt is unique, in that it plays a critical role in enabling managers to establish and maintain positive relationships with different stakeholders. These relationships, according to the informants, facilitate access to and acquisition of data. This is also true of the “Management Style” competency (McCarthy & Fitzpatrick, 2009), which plays a critical role in facilitating EBMgt practice. It contributes to creating a work environments where healthcare professionals feel safe to share information (Katz, 1955), thus allowing managers’ direct access to more valid data from their subordinates. These skills might be especially important in the healthcare context, where fostering relationships has been challenging given the environment that has traditionally encouraged autonomy but where work is highly interdependent (Hoffer Gittell, 2016).

The acquisition of evidence is also facilitated by the competency “creativity”, which is prominent in the healthcare management competencies literature (Calhoun et al., 2008; Garman

et al., 2004). However, its contribution to EBMgt practice is unique because it might help managers adapt evidence-based solutions to fit the organizational context. It might also help managers find solutions in the absence of certain resources, such as accessing evidence when it is not easily accessible and collecting evidence when it is absent. Therefore, creativity can help managers overcome challenges to EBMgt including the dearth of evidence, its applicability to the organization, and the lack of resources to create or access evidence (Barends et al., 2015; Liang & Howard, 2011; Niedzwiedzka, 2003).

The Dynamic Nature of the EBMgt Competency Model

The EBMgt Competency model proposed in this study can be considered dynamic whereby the foundational competencies form the basis for the development of functional competencies (Rodolfa et al., 2005). Most importantly, not only can the foundational competencies be considered pre-requisites to the development of functional competencies within the same dimension, but also to the development of *some* competencies under other dimensions. To illustrate, the foundational technical competencies can be considered necessary pre-requisites to the technical and the cognitive functional competencies. That is, having general management and industry knowledge (foundational technical competencies) can be considered pre-requisites for managers to know what data to search for or collect and how to interpret it (functional technical competencies). These foundational technical competencies may also be considered pre-requisites for managers to know all the resources they can tap into to generate evidence in resource scarce settings (functional cognitive competencies). Similarly, the foundational cognitive competencies can be considered necessary pre-requisites to the cognitive, technical, and interpersonal functional competencies. That is, being creative (foundational cognitive competency) can be a prerequisite to the acquisition of resources in resource-scarce settings

(functional cognitive competency), and to designing research to acquire necessary evidence (functional technical competency). Additionally, being systematic could be pre-requisite to searching for and collecting data (functional technical competency). Indeed it has been found that in order to formulate a question in a way that would allow searching for and collecting information, one must think in a systematic way, organizing and structuring their thinking (Chi, Glaser, & Farr, 1988). Furthermore, thinking holistically and considering long term goals could be pre-requisites to realizing the value of building and maintaining relationships with key stakeholders (functional interpersonal competency). Overall, these examples illustrate that the foundational competencies can be pre-requisites to the development of functional competencies within and across dimensions, and that to develop EBMgt competencies, both functional and foundational competencies might be targeted. Future research can focus on more specifically exploring these relationships across the four dimensions.

Practical Implications

Selecting and Developing Evidence-Driven Managers

The adoption of EBMgt in practice has been challenging. Several barriers have been identified at different levels, including the individual level (Barends et al., 2015; Liang & Howard, 2011; Niedzwiedzka, 2003). With the advent of technology and digitization in the workplace, managers will surely be surrounded with more data that can be critical for optimizing their decision-making. EBMgt is a promising management approach that can allow managers to make better use of this data. The EBMgt competency model proposed here can aid in refining managerial selection processes, whereby organizations can move beyond the job and more into the managerial competencies that are needed in today's data driven world.

Many of the competencies necessary for EBMgt can be developed through organizational training programs. This is an important safeguard, for management training programs can be designed to target the competencies identified in this model. Furthermore, this competency model can serve as a blueprint to identify which EBMgt practice aspects managers struggle with and direct training initiatives to develop them specifically.

Necessary vs. Sufficient for the Adoption EBMgt Practice

While developing managers' ability is necessary for their adoption of EBMgt, it alone is not sufficient since there are also individual, organizational, institutional level factors that influence the use of data in decision-making (Baba & HakemZadeh, 2012; Wang, Kung, Gupta, & Ozdemir, 2019). That is, the adoption of EBMgt is predicated on a fit between the personal characteristics of the decision-maker and the demands of the context (Wright et al., 2016). So not only do the managers need to possess the EBMgt competencies, they also need to be provided with the opportunity to practice EBMgt from their organization (Rousseau & Gunia, 2016). In order to promote the practice of EBMgt within their context, organizations need to take a proactive approach that transcends developing skills to include creating a supportive culture and structure.

Limitations and Future Direction

This study has several limitations and opens opportunities for future research. First, while it is limited by the inclusion of only executives, rather than evidence-driven managers who are the main focus of the study, it is important to note that there is a scarcity of tools that can be used to identify evidence-driven hospital managers. Additionally, taking the perspective of "other" managers may have been beneficial in controlling for self-report bias. Future research can focus

on developing assessment methods to evaluate current managers on their level of EBMgt competencies and to direct the design of EBMgt development programs.

Second, the competency model developed in the current study was based on managers working in hospital settings in Lebanon. This context might have influenced the competencies identified and defined (Campion et al., 2011). To illustrate, building relationships as a KSAO seems core to the work of healthcare managers generally, it might be even more central in Lebanon given the lack of updated census and norms (Hamdan, 2014). In such cases, managers noted the necessity of building professional relationships with key players in the field to gain access to information. Despite this limitation, the depth of the data led to the identification of competencies which overlapped with the literature as well as others unique to the current model. Additionally, the fact that the data was collected from 11 hospitals provided a variety of perspectives that takes into account multiple organizational contexts.

Third, several healthcare management competencies from the literature, such as negotiation skills and professionalism, were not identified in the proposed model (Calhoun et al., 2008; Garman et al., 2004; Liang & Howard, 2010; Liang et al., 2013; McCarthy & Fitzpatrick, 2009; Stefl & Bontempo, 2008). More research is needed to elucidate whether these are general managerial competencies and, as such, not core to EBMgt practice or whether their lack of identification is a function of the current study context.

Conclusion

In the current study, we set out to identify the foundation and functional competencies necessary for EBMgt practice and develop an empirically-based competency model for evidence-driven managers in hospital settings. We developed the EBMgt competency model, which included a conglomerate of 13 different KSAOs grouped into four dimensions; the first

attempt to empirically delineate the competencies necessary for EBMgt practice in hospital setting. Taking the Rousseau and Gunia (2016) conceptualization as our theoretical framework, and building on it, we empirically identified the EBMgt competencies that fall under their foundational and functional conceptualization, depending on their contribution to EBMgt practice. We also situated these competencies within the overall literature on managerial competencies by grouping the competencies under four dimensions that represent widely used approach to classifying managerial skills. We also built on their framework by arguing that the model could be considered dynamic, whereby the foundational competencies form the basis for the development of functional competencies within and across the dimensions. The value of the proposed model lays in its contribution to understanding the specific competencies necessary for the practice of core EBMgt activities. Its value also lies in that it can serve as a blueprint, to develop training initiatives for healthcare managers. While this study was conducted in the healthcare setting, its implications extent to general management considering the exponential growth in data, which have been witnessed across all industries.

References

- Amabile, T. M. (1988). A model of creativity and innovation in organizations. *Research in organizational behavior*, 10(1), 123-167.
- Amer, A. (2005). *Analytical thinking*. Cairo: Center for Advancement of Postgraduate Studies and Research in Engineering Sciences.
- Ammar, W. (2009). *Health beyond politics*. Beirut: World Health Organization.
- Ammar, W., Fakha, H., Azzam, O., Khoury, R. F., Mattar, C., Halabi, M., . . . Mechbal, A. (2000). *Lebanon National Health Accounts*. Retrieved from <http://siteresources.worldbank.org/INTHSD/Resources/376278-1261143298590/6660179-1280173228245/LebanonNHA.pdf>
- Baba, V. V., & HakemZadeh, F. (2012). Toward a theory of evidence based decision making. *Management Decision*, 50(5), 832-867. doi:10.1108/00251741211227546
- Baker, G. R. (2001). Healthcare managers in the complex world of healthcare. *Frontiers of Health Services Management*, 18(2), 23-32.
- Barends, E., Rousseau, D. M., Briner, R. B., & Center for Evidence-Based Management, A. (2014). *Evidence-Based Management, The Basic Principles*. Amsterdam: Center for Evidence-based Management.
- Barends, E., Villeneuve, J., Briner, R., & ten Have, S. (2015). Managers' Attitudes And Perceived Barriers to Evidence-Based Management. An International Survey. *In Search of Evidence*, 143(179).
- Bass, B. M. (1995). Theory of transformational leadership redux. *The Leadership Quarterly*, 6(4), 463-478.
- Begun, J. W., & Thygeson, M. (2015). Chapter 1: Managing complex healthcare organizations. In M. D. Fottler, D. Malvey, & D. J. Slovensky (Eds.), *Handbook of Healthcare Management* (pp. 1-17). Northampton, MA: USA: Edward Elgar Publishing.
- Bennett, N., & Lemoine, G. J. (2014). What a difference a word makes: Understanding threats to performance in a VUCA world. *Business Horizons*, 57(3), 311-317.
- Briner, R. B., Denyer, D., & Rousseau, D. M. (2009). Evidence-Based Management: Concept Cleanup Time? *Academy of Management Perspectives*, 23(4), 19-32.

- Calhoun, J. G., Dollett, L., Sinioris, M. E., Wainio, J. A., Butler, P. W., Griffith, J. R., & Warden, G. L. (2008). Development of an interprofessional competency model for healthcare leadership. *Journal of Healthcare Management, 53*(6), 375.
- Campion, M. A., Fink, A. A., Ruggeberg, B. J., Carr, L., Phillips, G. M., & Odman, R. B. (2011). Doing competencies well: Best practices in competency modeling. *Personnel Psychology, 64*(1), 225-262.
- Chi, M. T., Glaser, R., & Farr, M. J. (1988). The nature of expertise. Hillsdale, NJ: L. Erlbaum Associates.
- Currie, K. M. (2013). *Updating Reay, Berta & Kohn EBMgt systematic review*. (Unpublished Thesis), University of Prince Edward Island, Canada,
- de Jonge, P., Huyse, F. J., & Stiefel, F. C. (2006). Case and care complexity in the medically ill. *Medical Clinics, 90*(4), 679-692.
- Ericsson, K. A., & Lehmann, A. C. (1996). Expert and exceptional performance: Evidence of maximal adaptation to task constraints. *Annual Review of Psychology, 47*(1), 273-305.
- Facione, N. C., Facione, P. A., & Sanchez, C. A. (1994). Critical thinking disposition as a measure of competent clinical judgment: The development of the California Critical Thinking Disposition Inventory. *Journal of Nursing Education, 33*(8), 345-350.
- Flanagan, J. C. (1954). The critical incident technique. *Psychological Bulletin, 51*(4), 327.
- Fleiss, J. L. (1971). Measuring nominal scale agreement among many raters. *Psychological Bulletin, 76*(5), 378.
- Fullman, N., Yearwood, J., Abay, S. M., Abbafati, C., Abd-Allah, F., Abdela, J., & Abraha, H. N. (2018). Measuring performance on the Healthcare Access and Quality Index for 195 countries and territories and selected subnational locations: A systematic analysis from the Global Burden of Disease Study 2016. *The Lancet, 391*(10136), 2263-2271.
- Futurescan. (2008). *Healthcare Trends and Implications 2008-2013*. Chicago: Health Administration Press and the Society of Healthcare Strategy and Market Development.
- Garman, A. N., Tyler, J. L., Darnall, J. S., & Lerner, W. (2004). Development and validation of a 360-degree-feedback instrument for healthcare administrators. *Journal of Healthcare Management, 49*(5), 307.

- Gioia, D. A., Corley, K. G., & Hamilton, A. L. (2013). Seeking qualitative rigor in inductive research: Notes on the Gioia methodology. *Organizational Research Methods, 16*(1), 15-31.
- Hamdan, K. (2014, 10 March). Lebanon needs a new census. *Executive*. Retrieved from <http://www.executive-magazine.com/opinion/comment/lebanon-census-new>
- Harb, H. (2016). *Statistical bulletin*. Retrieved from <http://www.databank.com.lb/docs/Statistical%20Bulletin%2C%20MoPH%2C%202016.pdf>.
- Hoffer Gittel, J. (2016). Rethinking Autonomy: Relationships as a Source of Resilience in a Changing Healthcare System. *Health Services Research, 51*(5). doi:10.1111/1475-6773.12578
- Hogan, R., & Kaiser, R. B. (2005). What we know about leadership. *Review of general psychology, 9*(2), 169.
- Hogan, R., & Warrenfeltz, R. (2003). Educating the modern manager. *Academy of Management Learning & Education, 2*(1), 74-84.
- Johnson, J. W. (2001). The relative importance of task and contextual performance dimensions to supervisor judgments of overall performance. *Journal of Applied Psychology, 86*(5), 984.
- Kanungo, R. N. (2001). Ethical values of transactional and transformational leaders. *Canadian Journal of Administrative Sciences, 18*(4), 257-265.
- Katz, R. L. (1955). Skills of an effective administrator. *Harvard Business Review, 33*, 33-42.
- Kovner, A. R., & Rundall, T. G. (2006). Evidence-Based Management Reconsidered. *Frontiers of Health Services Management, 22*(3), 3-22.
- Krivkovich, A., Nadeau, M., Robinson, K., Robinson, N., Starikova, I., & Yee, L. (2018). *Women in the Workplace 2018*. Retrieved from <https://www.mckinsey.com/featured-insights/gender-equality/women-in-the-workplace-2018>
- Kronfol, N. (2006). Rebuilding of the Lebanese health care system: Health sector reforms. *Eastern Mediterranean Health Journal, 12*(3/4), 459.
- Landis, J. R., & Koch, G. G. (1997). The measurement of observer agreement for categorical data. *Biometrics, 159*-174.

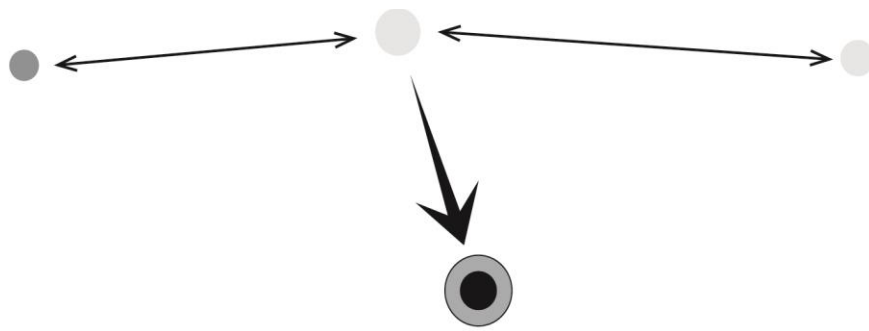
- Liang, Z., & Howard, P. F. (2010). Competencies required by senior health executives in New South Wales, 1990–1999. *Australian Health Review*, 34(1), 52-58.
- Liang, Z., & Howard, P. F. (2011). Evidence-informed managerial decision-making: What evidence counts? (part two). *Asia Pacific Journal of Health Management*, 6(2), 12-21.
- Liang, Z., Howard, P. F., & Wollersheim, D. (2017). Assessing the Competence of Evidence-Informed Decision-Making Amongst Health Service Managers. *Asia Pacific Journal of Health Management*, 12(3).
- Liang, Z., Leggat, S. G., Howard, P. F., & Koh, L. C. (2013). What makes a hospital manager competent at the middle and senior levels? *Australian Health Review*, 37(5), 566-573.
- Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry* (Vol. 75). California: Sage.
- Mann, F. C. (1965). Toward an understanding of the leadership role in formal organizations. In R. Dubin, G. C. Homans, F. C. Mann, & D. C. Miller (Eds.), *Leadership and productivity* (pp. 68-103). San Francisco, CA: Chandler Publishing.
- McCarthy, G., & Fitzpatrick, J. J. (2009). Development of a competency framework for nurse managers in Ireland. *The journal of continuing education in nursing*, 40(8), 346-350.
- Mennemeyer, S. T., Menachemi, N., Rahrurkar, S., & Ford, E. W. (2016). Impact of the HITECH act on physicians' adoption of electronic health records. *Journal of the American Medical Informatics Association*, 23(2), 375-379.
- Messick, S. (1984). The nature of cognitive styles: Problems and promise in educational practice. *Educational psychologist*, 19(2), 59-74.
- Miller, D., & Hartwick, J. (2002). Spotting management fads. *Harvard Business Review*, 80(10), 26-27, 126.
- Miller, L. J., & Wei, L. (2018, 19 September). These Are the Economies With the Most (and Least) Efficient Health Care. *Bloomberg*.
- Ministry of Public Health Lebanon. (2014). *Hospitals Accreditation Results 2014*. Beirut: Ministry of Public Health Lebanon.
- Moon, J. (2007). *Critical thinking: An exploration of theory and practice*: Routledge.
- Morrell, K. (2008). The narrative of 'Evidence Based' management: A polemic. *Journal of Management Studies*, 45(3), 613-635. doi:10.1111/j.1467-6486.2007.00755.x

- Morrell, K., & Learmonth, M. (2015). Against evidence-based management, for management learning. *Academy of Management Learning & Education*, 14(4), 520-533.
doi:10.5465/amle.2014.0346
- Morrell, K., Learmonth, M., & Heracleous, L. (2015). An archaeological critique of 'Evidence-based Management': One digression after another. *Journal of Management Studies*, 26(3), 529-543.
- Niedzwiedzka, B. M. (2003). Barriers to evidence-based decision making among Polish healthcare managers. *Health Services Management Research*, 16(2), 106-115.
- Osborne, S. P., & Strokosch, K. (2013). It takes Two to Tango? Understanding the Co-production of Public Services by Integrating the Services Management and Public Administration Perspectives. *British Journal of Management*, 24, S31-S47.
- Petrides, K. V., & Furnham, A. (2001). Trait emotional intelligence: Psychometric investigation with reference to established trait taxonomies. *European Journal of Personality*, 15(6), 425-448.
- Porter, M. E., & Teisberg, E. O. (2006). *Redefining health care: creating value-based competition on results*: Harvard business press.
- Prahalad, C., & Hamel, G. (1990). The Core Competence of the Corporation. *Harvard Business Review*, 79-91.
- Provost, F., & Fawcett, T. (2013). *Data Science for Business: What you need to know about data mining and data-analytic thinking*: " O'Reilly Media, Inc."
- Reay, T., Berta, W., & Kohn, M. K. (2009). What's the evidence on evidence-based management? *The Academy of Management Perspectives*, 23(4), 5-18.
- Refaat, M. M., & Mohanna, K. (2013). Syrian refugees in Lebanon: facts and solutions. *Lancet*, 382, 763-764.
- Rodolfa, E., Bent, R., Eisman, E., Nelson, P., Rehm, L., & Ritchie, P. (2005). A cube model for competency development: Implications for psychology educators and regulators. *Professional Psychology: Research and Practice*, 36(4), 347.
- Rotar, A., Botje, D., Klazinga, N., Lombarts, K., Groene, O., Sunol, R., & Plochg, T. (2016). The involvement of medical doctors in hospital governance and implications for quality management: a quick scan in 19 and an in depth study in 7 OECD countries. *BMC Health Serv Res*, 16(2), 160.

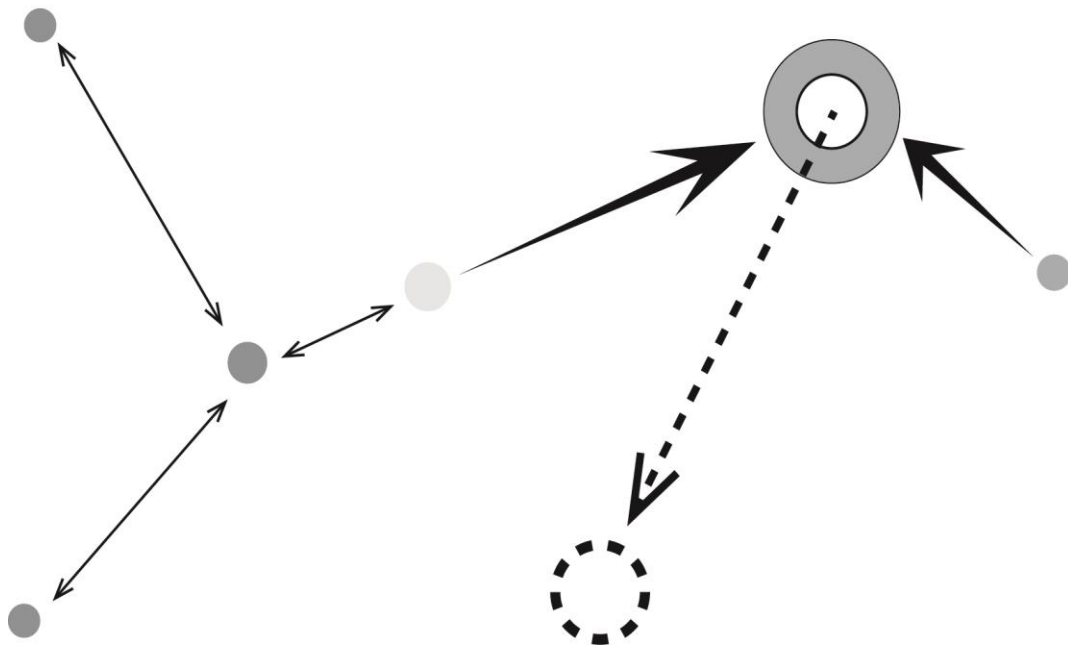
- Rousseau, D. M. (2006a). Is there such a thing as “evidence-based management”? *Academy of Management Review*, 31(2), 256-269.
- Rousseau, D. M. (2006b). Keeping an Open Mind about Evidence-Based Management: A Reply to Learmonth's Commentary. *The Academy of Management Review*, 31(4), 1091-1093.
- Rousseau, D. M., & Fried, Y. (2001). Location, location, location: Contextualizing organizational research. *Journal of Organizational Behavior: The International Journal of Industrial, Occupational and Organizational Psychology and Behavior*, 22(1), 1-13.
- Rousseau, D. M., & Gunia, B. C. (2016). Evidence-based practice: The psychology of EBP implementation. *Annual Review of Psychology*, 67, 667-692. doi:10.1146/annurev-psych-122414-033336
- Rynes, S. L., & Bartunek, J. M. (2017). Evidence-Based Management: Foundations, Development, Controversies and Future. *Annual Review of Organizational Psychology and Organizational Behavior*, 4, 235-261.
- Rynes, S. L., Colbert, A. E., & O'Boyle, E. H. (2018). When the “best available evidence” doesn't win: How doubts about science and scientists threaten the future of evidence-based management. *Journal of management*, 44(8), 2995–3010.
- Saleh, S. S., Bou Sleiman, J., Dagher, D., Sbeit, H., & Natafqi, N. (2013). Accreditation of hospitals in Lebanon: is it a worthy investment?. *International Journal for Quality in Health Care*, 25(3), 284-290.
- Schippmann, J. S., Ash, R. A., Batjtsta, M., Carr, L., Eyde, L. D., Hesketh, B., . . . Sanchez, J. I. (2000). The practice of competency modeling. *Personnel Psychology*, 53(3), 703-740.
- Starkey, K., Hatchuel, A., & Tempest, S. (2009). Management research and the new logics of discovery and engagement. *Journal of Management Studies*, 46(3), 547-558.
- Stefl, M. E., & Bontempo, C. A. (2008). Common competencies for all healthcare managers: The healthcare leadership alliance model. *Journal of Healthcare Management*, 53(6), 360-374.
- Swan, J., Clarke, A., Nicolini, D., Powell, J., Scarbrough, H., Roginski, C., . . . Taylor-Phillips, S. (2012). *Evidence in Management Decisions (EMD): Advancing knowledge utilization in healthcare management: Final report: NIHR Health Services and Delivery Research Programme*.

- Taylor, M. J., McNicholas, C., Nicolay, C., Darzi, A., Bell, D., & Reed, J. E. (2014). Systematic review of the application of the plan–do–study–act method to improve quality in healthcare. *BMJ Qual Saf*, 23(4), 290-298.
- Tecco, H. (2017). *Women in Healthcare 2017: How does our industry stack up?* Retrieved from <https://rockhealth.com/reports/women-in-healthcare-2017-how-does-our-industry-stack-up/>
- Thompson, J. M., Buchbinder, S. B., & Shanks, N. H. (2012). An overview of healthcare management. In S. B. Buchbinder & N. H. Shanks (Eds.), *Introduction to Health Care Management* (Vol. 2). United States: Jones & Bartlette Learning.
- Tourish, D. (2012). Evidence Based Management’, or ‘Evidence Oriented Organizing’? A critical realist perspective. *Organization*, 20(2), 173-192.
- United Nations High Commissioner for Refugees. (2019). *United Nations High Commissioner for Refugees Lebanon Factsheet, January 2019*. Retrieved from <https://www.unhcr.org/lb/wp-content/uploads/sites/16/2019/01/UNHCR-Lebanon-Operational-Fact-sheet-January-2019-.pdf>
- Walshe, K., & Rundall, T. G. (2001). Evidence-based management: from theory to practice in health care. *Milbank quarterly*, 79(3), 429-457.
- Wang, Y., Kung, L., Gupta, S., & Ozdemir, S. (2019). Leveraging big data analytics to improve quality of care in healthcare organizations: A configurational perspective. *British Journal of Management*, 30(2), 362-388.
- Wilson, J. (2004). Conflict management does not have to create conflict. *Account Today*, 9(20), 1-3.
- World Health Organization. (2010). *The world health report: health systems financing: The path to universal coverage*. Retrieved from Geneva:
- World Health Organization. (2016). *World Health Organization Global Health Expenditure database*. Retrieved from: <https://data.worldbank.org/indicator/SH.XPD.CHEX.GD.ZS>
- World Health Organization. (2018). *Country Cooperation Strategy at a Glance Lebanon*. Retrieved from https://apps.who.int/iris/bitstream/handle/10665/136909/ccsbrief_lbn_en.pdf;jsessionid=7F95D939752C5098D83D734CADF7B347?sequence=1

- Wright, A. L., Zammuto, R. F., Liesch, P. W., Middleton, S., Hibbert, P., Burke, J., & Brazil, V. (2016). Evidence-based Management in Practice: Opening up the Decision Process, Decision-maker and Context. *British Journal of Management*, 27(1), 161-178.
doi:10.1111/1467-8551.12123
- Yukl, G. A. (2013). *Leadership in organizations* (7th ed.). Upper Saddle River, NJ: Prentice-Hall.



CHAPTER 3 | The Fine Line between Decisions and Evidence-based Decisions: Contextualizing and Unraveling the Evidence-based Management Process in Hospital Settings



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Abstract

Evidence-based management can enable managers to make better-informed decisions by leveraging the unprecedented amounts and types of data in healthcare organizations. Given the limited knowledge about the underlying decision process in evidence-based management (EBMgt), we aimed to map the process and its contextual nuances in hospital settings and propose an empirically grounded theoretical model. We analyzed qualitative data from 36 executives from 11 hospitals across Lebanon and found that the application of EBMgt is influenced by different factors. These not only act as barriers and facilitators to evidence acquisition, as previously found, but also as criteria that must be balanced alongside the evidence, and lenses coloring decision makers' perceptions, influencing how they make decisions, and what evidence they use. Overall, our findings indicate that the person-decision-context fit is key for the adoption of EBMgt, and they bring about the question of when a decision-making process ceases to be evidence-based.

Introduction

Healthcare organizations today are brimming with unprecedented amounts and types of data, which can provide insight into numerous clinical and managerial processes and outcomes related to health service provision (Groves, Kayyali, Knott, & Van Kuiken, 2013). Within this context, Evidence-based Management (EBMgt), which refers to using the best available evidence when making managerial decisions (Barends, Rousseau, Briner, & Center for Evidence-Based Management, 2014), is being seen as a timely step that could enable managers to leverage this data for better informed decision-making. By encouraging managers to acquire evidence from different sources, assess its quality, and use it to support decisions, EBMgt strives to improve decision-making and consequently enhance the quality of healthcare services (Kovner & Rundall, 2006). There is, however, limited knowledge about the EBMgt process in different work environments (Currie, 2013; Reay, Berta, & Kohn, 2009; Rynes & Bartunek, 2017; Wright et al., 2016) and the contextual factors that influence this process are often neglected (Kohn, 2013).

As such, in this study, our aim is to build a grounded model to better understand the EBMgt process and its contextual nuances within hospital settings by leveraging the Organizational Decision-Making literature (i.e. Langley, Mintzberg, Pitcher, Posada, & Saint-Macary, 1995; Mintzberg, Raisinghani, & Theoret, 1976; Papadakis, Lioukas, & Chambers, 1998; Weiss, 1979). To do this, we conduct an in-depth empirical examination of managerial decision-making within hospital settings and use this qualitative data as a basis to develop a model of the EBMgt process. In what follows, we first present a review of the literature on EBMgt in the healthcare industry. We then present our research questions, methodological

approach, analyses, and findings. Finally, we discuss the key contributions of this study, present the limitations, and provide directions for future research.

Underutilization of EBMgt in Healthcare

Healthcare organizations are complex systems characterized by the presence of various, diverse, interdependent agents, including clinical professionals and administrators, and multiple and diverse external stakeholders, including governmental institutions and professional associations (Begun & Thygeson, 2015). With the increase in aging populations, costly medical technologies, labor costs, and intra and international migration (Begun & Thygeson, 2015; Goldman, Smith, & Sood, 2006), global healthcare spending is expecting an annual increase of 5.4% between 2018 and 2022, from 7.724 trillion USD to 10.059 trillion USD (Deloitte Touche Tohmatsu Limited, 2019). This increase in spending, coupled with the decrease in healthcare funding, is making healthcare organizations more complex and their management more challenging (Begun & Thygeson, 2015; Kovner & Rundall, 2006). The adoption of EBMgt in this context is being seen as a possible approach to help managers better cope with this complexity (Kovner & Rundall, 2006). Its adoption is especially vital since, in addition to tradition sources of data typically available to managers, there has been an exponential growth in healthcare data resulting from the widespread adoption of electronic health records (Murdoch & Detsky, 2013). Leveraging this data can help address the crises of healthcare spending and quality (Groves et al., 2013), but doing so requires that managers seek out and incorporate data from different sources as evidence in their decision-making. However, research indicates that managers are still relying primarily on their experience for decision-making, and that there is limited understanding on how EBMgt can be practiced in different organizational and decisional

contexts (Currie, 2013; Liang, Howard, & Rasa, 2011; Reay et al., 2009; Rynes & Bartunek, 2017; Wright et al., 2016) .

The EBMgt Concept and Nature of the Literature

Models of the EBMgt process have drawn from the evidence-based medicine philosophy and classical rational decision-making theories (Barends et al., 2014; Kovner & Rundall, 2006). However, since recommendations tend to be independent of the context in the field of medicine, these conceptualizations have been criticized for not taking into account the context within which decisions are made (Baba & HakemZadeh, 2012; Morrell & Learmonth, 2015). As a response, Baba and HakemZadeh (2012) conceptualized EBMgt as a multi-level phenomenon, manifested at the individual level, and influenced by individual, organizational, and institutional factors. These factors influence the evidence that managers use and how they generate and select between alternatives. While relying on extant literature, Baba and HakemZadeh's (2012) model remains conceptual in nature.

Several systematic reviews of the EBMgt literature have also found that the majority of the articles tend to be conceptual and prescriptive, using opinions and anecdotal information to encourage EBMgt adoption in practice (Currie, 2013; Reay et al., 2009; Roshanghalb et al., 2018; Rynes & Bartunek, 2017). In light of this, EBMgt scholars have called for more in-depth empirical examination of how practitioners apply EBMgt in different work environments, to gain a deeper understanding of the EBMgt process and its contextual nuances (Currie, 2013; Reay et al., 2009; Rynes & Bartunek, 2017; Walshe & Rundall, 2001).

Theoretical Framing

While many empirical studies have been conducted on EBMgt in healthcare settings, most have focused on specific aspects of EBMgt such as the evidence used and the barriers to

EBMgt application (Guo, 2015; Janati, Hasanpoor, Hajebrahimi, & Sadeghi-Bazargani, 2018; Kohn, 2013; Liang et al., 2011; Liang & Howard, 2011; Niedzwiedzka, 2003). However, only a handful of studies have thoroughly examined the EBMgt decision-making process. Focusing on strategic decision-making, Kohn (2013), found that evidence can be used for different purposes. While most often evidence was used for instrumental purposes, to solve a problem, it was also used for interactive purposes, to gather support for a certain solution, and, for symbolic purposes, to give legitimacy to a certain solution. Kohn (2013) also highlighted the significance of contextual factors (e.g., organization's strategy, government interests, economic context), in shaping the decision-making process. While Kohn's (2013) study adds significant insight into the different contextual factors in EBMgt, it does not shed light onto the interplay between these factors and the process. Focusing more on the process of EBMgt, Wright et al. (2016) conducted a case study of EBMgt application to an operational problem in an emergency department. They identified five stages in the EBMgt process, which they noted resembled rational decision-making models in the literature. They also found that factors related to the decision maker, such as determination, and factors related to the decision context, such as internal stakeholders recognizing the need for a change, enabled the application of EBMgt. Wright et al. (2016) concluded that the person-context fit contributed to effective EBMgt adoption. While their study adds important insight into the practice of EBMgt, it was based on a case study of a single problem in a hospital.

This identification of contextual factors influencing the EBMgt process is reminiscent of Mintzberg et al.'s (1976) decision-making model, which argues that decision-making is not a steady sequence of steps, rather, it is subject to interference from different factors (Mintzberg et al., 1976). Accordingly, building on this literature, and considering Mintzberg et al.'s (1976)

model, the aim of this study is to build a model grounded in data that can help us better understand the evidence-based decision-making process and its contextual nuances within hospital settings. In pursuit of this aim, we explored the following three research questions among managers in hospital settings: (1) How is the EBMgt process manifested in practice? (2) What are the sources of evidence in EBMgt? (3) What contextual factors influence the process of EBMgt? To answer these questions, we collected qualitative data from executive managers working in multiple hospitals across Lebanon and used it to develop a grounded model of the EBMgt process.

Methods

Context

The overarching context for our investigation was the hospital setting in Lebanon. In Lebanon, 7.4% of the national gross domestic product is accounted for by healthcare expenditure (Miller & Wei, 2018), of which 40% represents hospital expenditure alone (World Health Organization, 2010). Lebanon has 165 hospitals, 88% of which are in the private sector and account for 90% of the total number of beds (Ammar et al., 2000). The dominance of the private sector is a result of the history of conflict in Lebanon, which undermined the public sector and allowed the unfettered expansion of the private sector (Kronfol, 2006). It is equally interesting to note that Medical Tourism is an important sector of the Lebanese economy with 10% of tourists to Lebanon indicating that medical treatment is the main reason for their visit (Hassan, 2015).

In the last decade, the Ministry of Public Health (MoPH) developed and implemented a hospital accreditation scheme, in line with international standards (Ammar, 2009). This scheme enhanced quality of care but also increased expenses on all hospitals (Saleh, Bou Sleiman, Dagher, Sbeit, & Natafqi, 2013), thus creating a challenge for hospital managers in Lebanon

today. Another challenge is the influx of an estimated 1.5 million Syrian refugees since 2011, representing a 30% increase in Lebanon's population (United Nations High Commissioner for Refugees, 2019). This influx threatened the continuity of healthcare service delivery (Refaat & Mohanna, 2013). Nonetheless, healthcare coverage and performance in Lebanon is improving with Lebanon ranking 23rd in place on the Bloomberg Health-Efficiency Index, an indicator of cost-efficiency of medical care based on healthcare expenditure and life expectancy (Miller & Wei, 2018).

While the Lebanese healthcare system has witnessed major efforts to move closer towards a more systematic approach to healthcare management (Ammar, Wakim, & Hajj, 2007), a lot of work still needs to be done in this area to ensure its sustainability. Examining the process of EBMgt within this context can further develop our understanding of evidence-based managerial decision-making generally, as well as more specifically in a context that is striving for the adoption of a more systematic approach in dealing with its challenges.

Sample

We invited 56 executive managers from 15 hospitals, via email, to participate in the study and collected data from 36 executive managers from 11 hospitals (64.28% response rate), at an average rate of three participants per hospital. These hospitals operated in major cities across Lebanon, all were nationally accredited (Ministry of Public Health Lebanon, 2014), and some (36%) were also accredited by various international accreditation bodies. The majority of the participating hospitals were private (72.73%) and large in size with bed count above 200 (45.5%) and academic hospitals (54.55%).

The majority of participants were males (52.8%), between the ages of 40 to 49 years (38.9%), held MA degrees (41.70%) or MD degrees (16.67%), or both (16.67%), and came from

business (22.2%), healthcare management (22.2%), or medicine (13.90%) backgrounds. Most participants had 10 to 19 years of experience in healthcare management (50.0%), held positions of CEO (25%), Human Resources Director (13.9%), or Chief Quality and Safety Officer (13.9%), and had occupied their positions for an average of 9.01 years ($SD=6.19$)

Materials

The interview protocol used for this study was part of a larger study examining managers' practice of evidence-based decision-making in hospital settings and related competencies. The protocol began by providing participants with a basic definition of EBMgt, namely: *"the use of best available evidence/data in managerial practice and decision-making"*. Participants were then engaged in a semi-structured interview process, which included a series of open-ended questions as well as the Critical Incident Technique (CIT; Flanagan, 1954). To this end, the four questions analyzed for the current study explored the: 1) definition of EBMgt, 2) decision-making process of managers who, from the executives' perspective, use evidence in their decision-making, 3) sources of evidence in EBMgt, and 4) perceived barriers and facilitators to managers' practice of EBMgt. The CIT questions included in the interview asked participants to describe in detail an incident where 1) a manager in their organization used an evidence-based approach to make a decision and 2) another where the manager did not use an evidence-based approach to make a decision.

Procedures

All interviews were conducted between December 2016 and November 2017 by one of the authors. Each interview lasted approximately 50 minutes, and was conducted in the English language; however, participants sometimes used words in the Arabic language. The interviewer, a bilingual in English and Arabic languages, transcribed the interviews verbatim in their original

language, and included translations of the Arabic segments in parentheses next to the original text. The transcriptions were imported into QSR Nvivo software version 11, and the data were analyzed in their original language.

Analysis

We analyzed the data using a systematic inductive approach proposed by Gioia, Corley, and Hamilton (2013). Two of the authors, both bilingual in English and Arabic languages, with experience in qualitative analysis, worked collaboratively on the data analysis. We used an iterative four-phase process for the first and second order analyses as follows: the first order analysis involved 1) initial open coding into first order categories, and 2) developing the initial coding template; whereas the second order analysis involved 3) grouping into second-order themes and developing initial thematic template, and 4) expert vetting and assessing inter-coder reliability to develop the final template and dynamic model.

First Order Analysis

1) Initial Open Coding

We began with the first order analysis by engaging in open coding of data. One of the authors read each participant's interview, then coded words, phrases, or sentences (hereafter utterances) into first-order categories. For example, the utterance "*we have a strong system of capturing and analyzing data*" was coded as 'Information Systems Software'. We open coded 15% of the interviews and generated a list of first-order categories.

2) Developing of Initial Coding Template

The author then vetted this list, collaboratively with a second author, by examining and comparing the utterances under the categories. This led to merging, splitting, and adding categories. For example, the categories 'Weighing the Benefits' and 'Putting Pros and Cons'

were merged into ‘Weighing the Pros and Cons’. This led to the development of an Initial Coding Template.

Second Order Analysis

3) Developing Initial Thematic Template

Using this initial coding template, we coded 50% of the interviews. We then re-examined the first-order categories to reduce them to a more manageable number. We also began assembling them into second-order sub-themes, second-order themes, and aggregate dimensions reflecting higher order conceptions of the data. The process of grouping was iterative, it involved going back and forth between the different levels of data and resulted in the development of an Initial Thematic Template.

4) Developing Final Template and Dynamic Model

After completing the full analysis using the Initial Thematic Template, we formed an expert vetting panel including the two authors who conducted the analysis and, the remaining authors who were not involved in the first parts of the analysis. We referred back to the existing literature on management decision-making and EBMgt to guide our refinement of the dimensions and themes in the data in a combined exploratory confirmatory approach and developed the Final Template (Gioia et al., 2013).

To bolster our confidence in our categorization, two independent coders, who were unfamiliar with the study, assigned a sample of categories to the themes and a sample of themes to the dimensions. We provided the coders with definitions of the categories, themes, and dimensions and assessed inter-rater reliability by comparing the coders’ categorization and ours using Fleiss’ Kappa (Fleiss, 1971). We found substantial agreement in the categorization of first-order categories to themes ($\kappa = 0.61$), and moderate agreement in the categorization of themes to

dimensions ($\kappa = 0.53$, Landis & Koch, 1997). We then met to discuss the discrepancies and solicited coder's feedback. Accordingly, we made some very minor adjustments to some of the wording of the categories, themes, and dimensions and we edited their definitions to enhance clarity and arrive at consensual interpretations.

To capture the dynamic relationships between the identified concepts, we began thinking about the EBMgt process simultaneously at two levels, the level of the informant terms and the more abstract level of themes (Gioia et al., 2013). Finally, we also mapped the critical incidents onto the emerging model, to verify its representativeness of real-life practice as depicted by our informants. The final outcome of this process was the Grounded Model of the Evidence-based Management Process in hospital settings (Figure 1).

Results

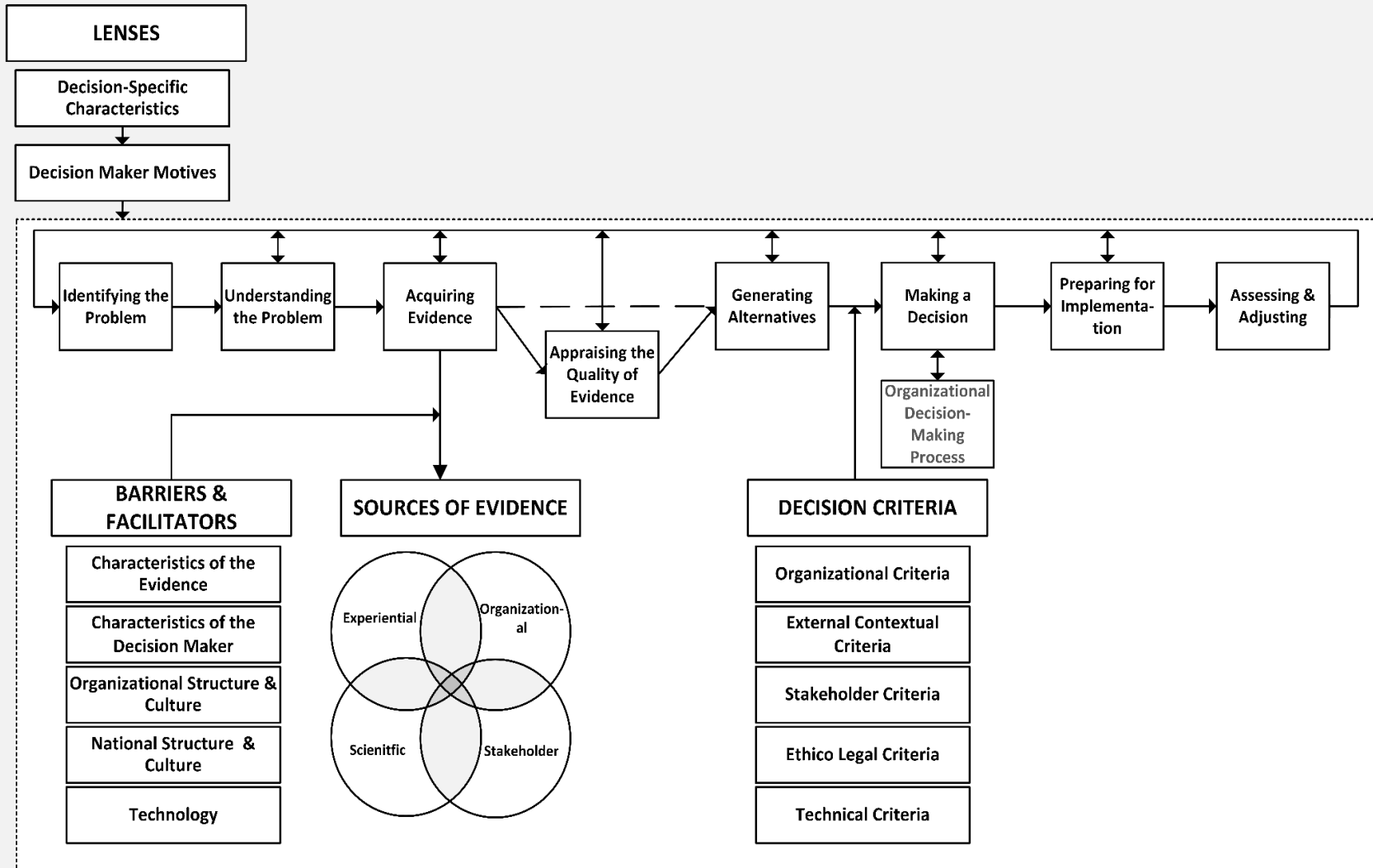
Grounded Model of the Evidence-based Management Process

We identified five dimensions integral to better understanding the Evidence-based Management process in hospital settings: I) the Process of Evidence-based Decision-Making, II) the Sources of Evidence, III) the Barriers and Facilitators, IV) the Decision Criteria, and V) the Lenses. We depicted these dimensions and the relationships among them in the Grounded Model of the Evidence-based Management Process (Figure 1). In the coming sections, we will describe each of the dimensions using the data structures (see Figures 2-6), which represent our progress from raw data to dimensions, and then discuss the place of each dimension within the model.

I. The Process of Evidence-based Decision-Making

At the top and running the length of Figure 1, we present a line of eight boxes which comprise the process of evidence-based decisions-making. Within this dimension, the categories

Figure 1. *Grounded Model of the Evidence-Based Management Process*

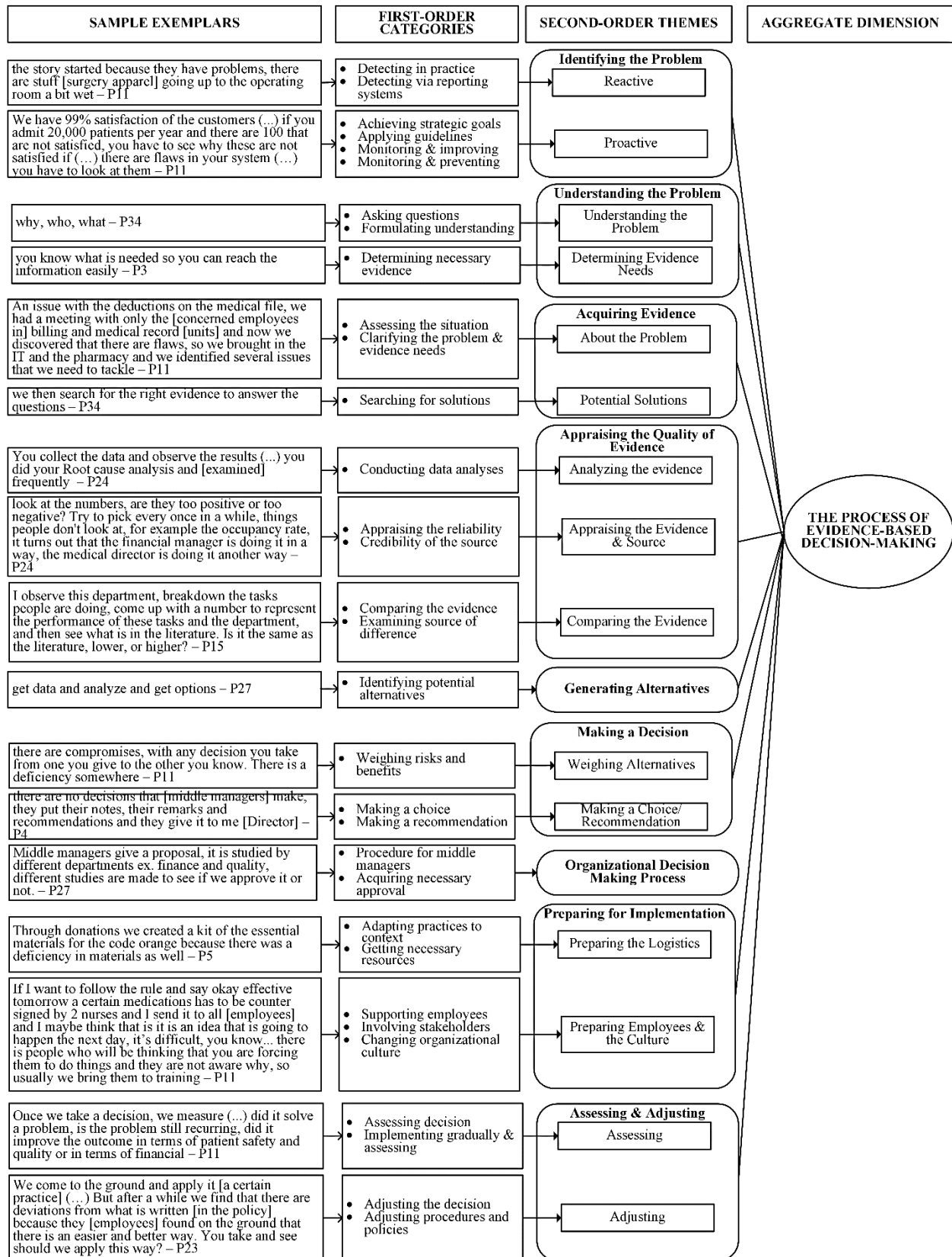


and themes emerging from our data resembled the steps of sequential theories of decision-making and existing EBMgt theories, and thus we borrowed from their terminology and definitions to refine our categorization (Barends et al., 2014; Langley et al., 1995; Mintzberg et al., 1976; Simon, 1947). This dimension represents the process-oriented nature of decision-making and encompassed eight second-order themes, 15 second-order sub-themes, and 29 first-order categories, which are represented in Figure 2 with exemplars from participants' utterances.

The first second-order theme, **Identifying the Problem**, refers to how the decision is triggered. Decisions can be *reactive*, as a response to a problem detected during practice or reported through the reporting system. They can also be *proactive*, created to achieve a specific purpose such as the strategic goals of the hospital or make an improvement or take a preventive action. Next is **Understanding the Problem**, which involves asking questions to clarify and *understand the problem* and its root cause. It also involves *determining the evidence needed* to tackle the problem. The third is **Acquiring Evidence**, referring to searching for and collecting data from different sources. This gathered data can be *about the problem*, to understand its root cause, or about *potential solutions* to address the problem. The fourth is **Appraising the Quality of Evidence**, which involves *analyzing the evidence* to derive information and knowledge from the raw data. It also involves *appraising the evidence*, referring to assessing its accuracy and reliability and assessing the credibility of the source. It also involves aggregating and *comparing the evidence* from the multiple sources.

The evidence is then used for **Generating Alternatives** and identifying possible ways to solve the problem. Next is **Making a Decision**, which involves *weighing alternatives* to identify the risks and benefits of each and accordingly *making a choice or recommendation*. In cases the decision-maker does not have the authority to make a choice **organizational decision-making**

Figure 2. Data Structure of the Process of Evidence-based Decision-Making



processes are followed. For example, there are procedures for middle managers to escalate certain decisions to senior management.

The next is **Preparing for Implementation**. This involves *preparing the logistics*, getting the necessary financial or material resources for implementation. It also involves *preparing employees and the culture*, supporting employees in the transition, explaining the change, and creating new norms. The final theme is **Assessing and Adjusting** the decision, which involves *assessing* if the problem was solved, and accordingly either *adjusting* the decision if it was not or adjusting organizational policies if the decision was successful.

Representing the Process in the dynamic model. We depicted the different steps of the Process of Evidence-based Decision-Making in the model via eight boxes (Figure 1). As can be seen, we drew arrows between the different steps to represent the sequential progress through them, *“The first phase is gathering information. Actually, even before [that] the first phase is going to be to make sure that the question that is being asked is very clear” (P1)*. We drew the traditional relationship between the steps of “acquiring evidence” and “generating alternatives” as a dotted line since our data pointed to the additional step of “appraising the quality of evidence”, which is not usually part of the sequential decision-making model.

Appraising the evidence is a hallmark of EBMgt (Barends et al., 2014) and makes the process uniquely an EBMgt one. We also drew an arrow leading from the final step back to the first step, as well as, back and forth arrows from each of the steps to represent that progress through the steps is not always sequential, but could be ongoing, iterative, and involve back and forth movement, *“You never reach a verdict in a straight line. You gather information, have an idea, sit with people for input, and then you might gather more information, and then come up with a*

way. *You might do this more than once before you reach a final decision*” (P1). This was further verified upon mapping the critical incidents onto the model:

The story started because (...) some [cloth apparel] are going up to the operating room a bit wet. Most of the time you can solve it financially, [middle managers thought] let us buy a new sterilizer, but it costs 100,000 dollars! Let us think if we can do sometime else. And they did! They started fixing the old sterilizer (...) but things kept on coming up wet (...) so they thought, ‘can we move to single use? If we go up to management, they are going to ask how much is it going to cost us, if it’ll cost a lot we don’t want it’. So, they came up with the idea to move to single use in some departments and to study how much it would cost. [They found] evidence that [single use] is better in terms of Center for Disease Control standards and international guidelines but also it will cost us 2 or 3 dollars less per case (P11).

In this case, the decision-makers identified the problem (wet packs), understood its root cause (the sterilizer), acquired evidence, and generated a potential solution (buy another sterilizer). Given that they would not be able to apply this decision due to certain decision criteria (financial constrained and lack of senior management support), they went back to acquire evidence again (on sterilizer norms and calibration). Accordingly, they applied changes, assessed the outcome, and found the problem persisted. They again went back to acquire evidence (scientific and practice standards and internal cost comparisons), this time considering the decision criteria faced earlier, to come up with a new alternative to present to senior management. This incident also indicates the presence of organizational decision-making processes and procedures. To represent this, we drew an arrow leading out of the individual decision-making process and back

into it at the step of making a decision, whereby certain decision makers might make recommendations rather than final decisions.

II. Sources of Evidence

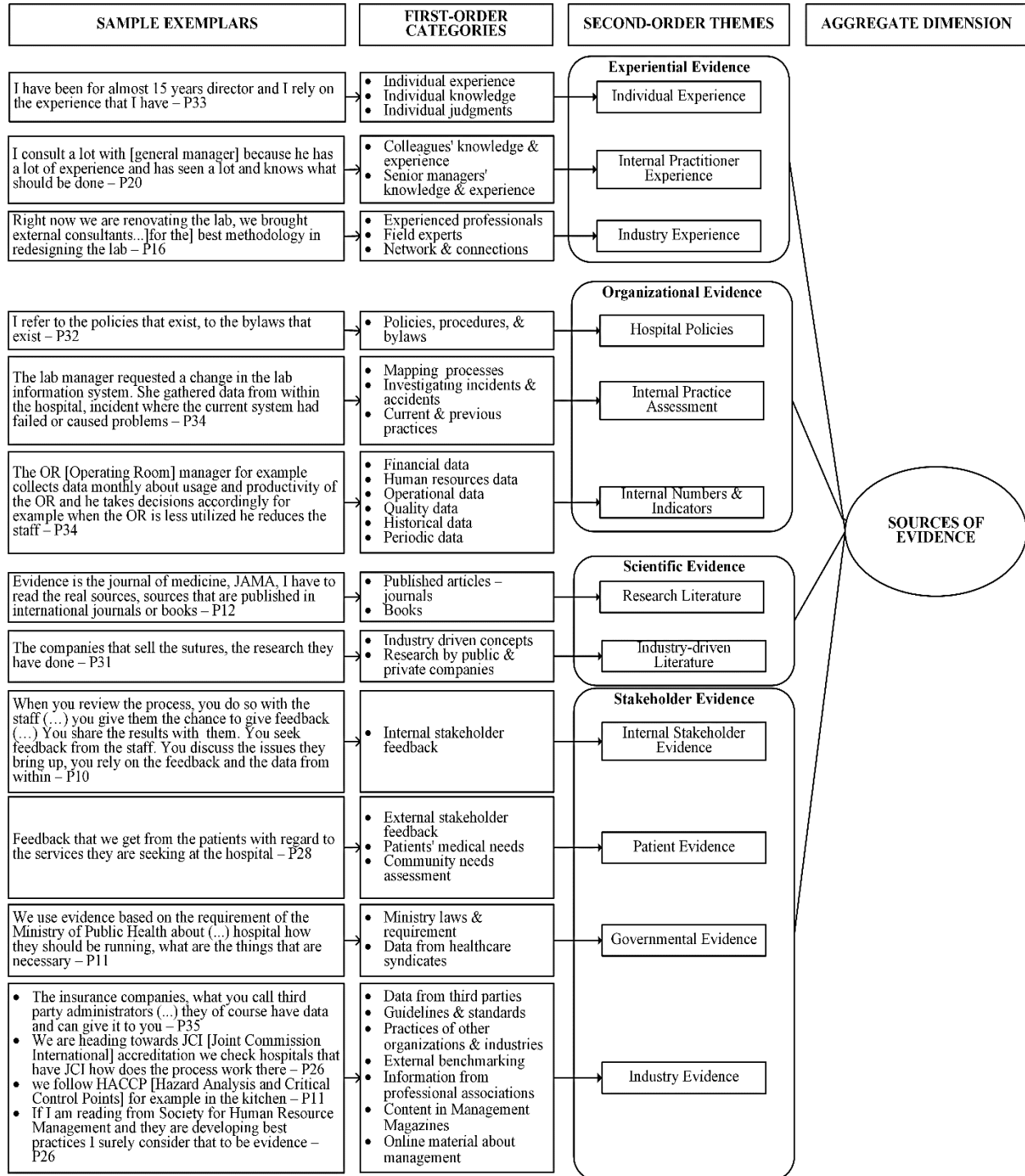
The second dimension refers to the sources from which participants acquire information when making decisions; the *evidence* in EBMgt. In refining the sub-themes and themes in this dimension (hereafter sub-sources and sources), we noticed all the data could fit under the four sources of evidence of Briner, Denyer, and Rousseau (2009). Thus, we borrowed their terminology and used their definitions to refine our categorization while expanding on their proposed sources by delineating the sub-sources that fall under each of them. The resultant was four sources, 12 sub-sources, and 35 first-order categories (Figure 3).

The first source, **Experiential Evidence**, refers to the professional experience and judgment of managers, consultants, business leaders, and other practitioners (Barends et al., 2014). It includes the *individual experience*, knowledge, and judgment of the decision maker. It also includes *internal practitioner experience*, referring to the experience and knowledge of practitioners within the organization. Finally, it includes *industry experience*, referring to the knowledge, experience, and expertise of practitioners within the healthcare industry.

The second source, **Organizational Evidence**, refers to internal data gathered from within the organization. It includes *hospital policies*, referring to the policies, procedures, and bylaws of the organization. It also includes *internal practice assessment*, data that result from examining and mapping organizational practices and processes. Finally, it also includes *internal numbers and indicators*, referring to data in the form of numbers, statistics, and key performance indicators from the organization relating to different functions. They can be

financial data such as risk assessment, human resources data such as employee turnover, or operations data such as emergency department waiting time.

Figure 3. Data Structure of the Sources of Evidence



The third source, **Scientific Evidence**, refers to the scientific research literature. It includes *industry-driven literature*, referring to management concepts generated by industry practice such as Lean manufacturing, or research published by organizations. It also includes the *research literature*, referring to academic literature and research published as journal articles or books.

The fourth source, **Stakeholder Evidence**, refers to data from different stakeholders who might have an interest in the organizations' decisions. It includes *internal stakeholder evidence*, referring to feedback from employees, practitioners, and students about certain problems or the outcomes of decisions. It also includes *patient evidence*, referring to patients' medical needs, feedback from external stakeholders, and data from needs assessment of the wider community. It also includes *governmental evidence*, referring to information from ministries and other public agencies related to healthcare delivery in the country in the form of national requirements and laws and country-specific healthcare indicators. Finally, it also includes *industry evidence*, referring to data from different organizations, agencies, and groups that are stakeholders in the industry both locally and internationally. This can be data from third parties the organization has transactions with such as suppliers or insurance agencies. It can be data in the form of external benchmarking or in the form of the practices of other organizations, in healthcare or in other industries. It can also be in the form of guidelines and standards related to healthcare management, developed, and promoted by different international organizations such as the World Health Organization. It can also be data disseminated by professional associations and well-established institutions and universities. Finally, it can also be content on management magazines such as Harvard Business Review, and other online platforms.

Representing the Sources in the model. One of the factors that makes this model uniquely EBMgt is the sources from which evidence is acquired (Baba & HakemZadeh, 2012;

Barends et al., 2014). We depicted these sources in Figure 1 as overlapping circles to represent that decision-makers acquire evidence from a combination of these four different sources:

To decide on the sutures to use (...), the research shows statistically if [a type of suture] is of good quality or not. But then you have to see the price as well (...). We get a lot of input, from inside the hospital through consultations and experience, (...) from international guidelines, the companies that sell the suture and the research they have done (P31).

In this case the decision maker relied on scientific evidence (research), stakeholder evidence (international guidelines), organizational evidence (financial considerations), and experiential evidence (experience of internal practitioners). This is similar to studies in the EBMgt literature that have found that managers use an amalgam of different types of evidence from internal and external sources (Guo, 2015; Kohn, 2013; Liang et al., 2011; Wright et al., 2016).

III. *Barriers and Facilitators*

The third dimension refers to the factors that either deter or ease decision-makers' acquisition of evidence from different sources. In refining this dimension, we referred back to the extensive literature examining barriers to EBMgt in healthcare settings (Janati et al., 2018; Liang & Howard, 2011; Niedzwiedzka, 2003) to minimize redundancies. Accordingly, we identified five second order themes, 10 second-order sub-themes, and 30 first-order categories (Figure 4).

Some barriers and facilitators related to the **Characteristics of Evidence**, referring to the nature of the evidence itself. This includes the *availability of evidence*, referring either to the scarcity of evidence on a topic, whether scientific research, internal data, or local norms in Lebanon, or to the abundance of evidence to the point of information overload. It also includes the *appropriateness of evidence*, referring to its reliability, its presentation in clear form, and its

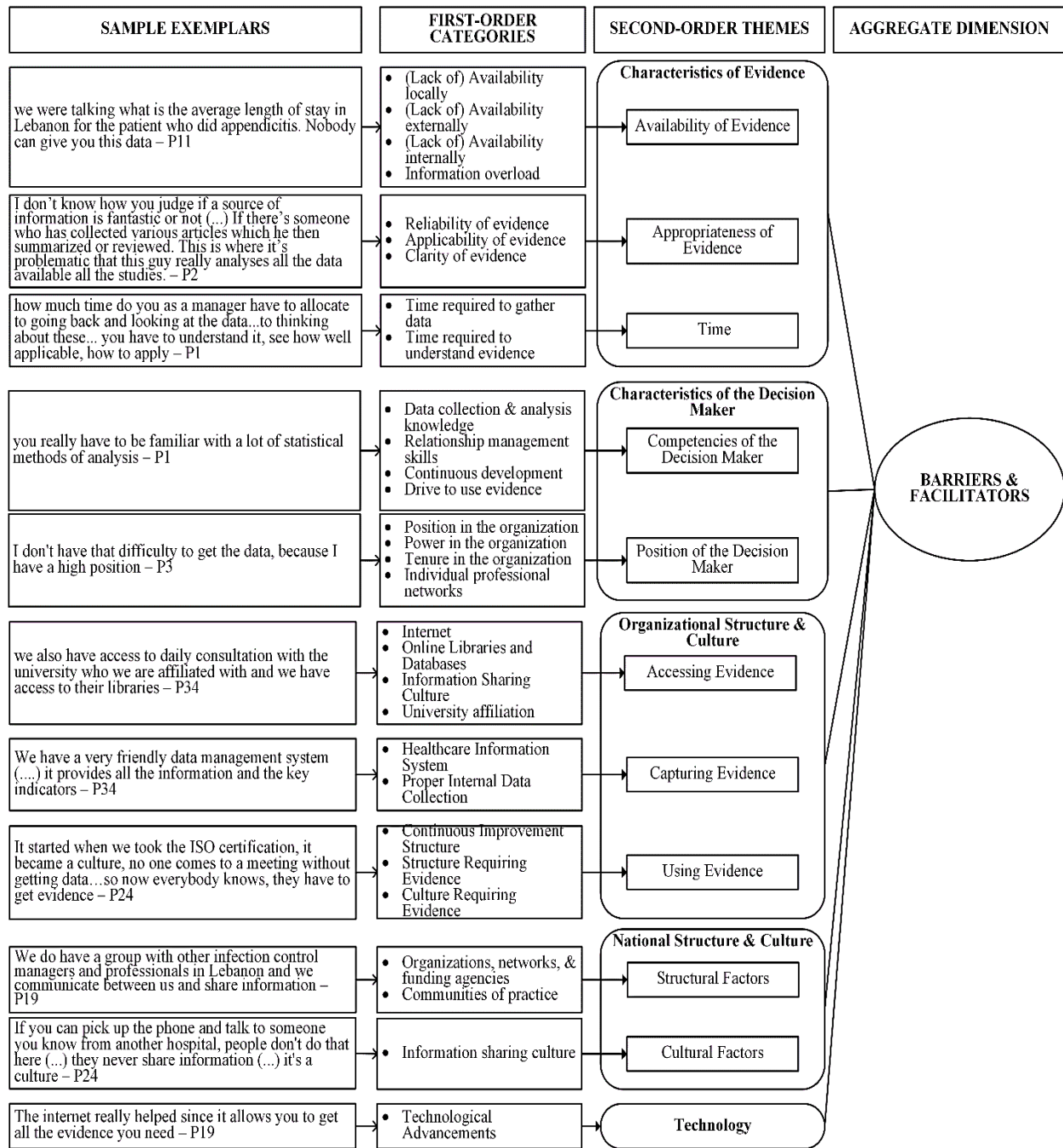
applicability to the organizational context. Finally, it also includes the issue of *time* and the time-consuming nature of acquiring, analyzing, appraising, and interpreting evidence.

Other barriers and facilitators related to the **Characteristics of the Decision Maker**, including the *competencies of the decision maker*, and their knowledge, skills, and abilities in gathering and analyzing data, building positive relationships, continuous development, and drive to use evidence. They also included the *position of the decision maker*, referring to their function, status, and power within the organization and the industry, which allows information access. For example, decision maker's job position within the organization influences the information they have access to and their position within a professional network, both internally and externally, helps evidence acquisition.

Other barriers and facilitators related to the **Organizational Structure and Culture**, including factors that influence *accessing evidence*, such as having access to the internet and online libraries, being affiliated with universities, and having an organizational cultural of information sharing. They also included factors that influence *capturing evidence*, such as having healthcare information systems software and systematic internal data collection methods. Finally, they also include factors that influence *using evidence*, such as having specialized departments that encourage continuous improvement. As well as, having a culture and structure that supports evidence use; where decision-makers are expected to support their ideas with evidence, and where senior management supports managers in their efforts to gather and use evidence and invest in their development and learning.

Still others related to the **National Structure and Culture**. *Structural factors* refer to the existence of public organizations and communities of practice which generate and disseminate evidence related to healthcare delivery. *Cultural factors*, refer specifically to having a national

Figure 4. Data structure of the Barriers and Facilitators



information sharing culture, where healthcare managers are willingness to share information with colleagues in other organizations. Participants highlighted that this is important for evidence acquisition but is a rare practice in Lebanon. Finally, participants noted **Technology** among the

barriers and facilitators emphasizing how advancements such as the internet and health information systems and healthcare medical records have enabled information access.

Representing Barriers and Facilitators in the model. These barriers and facilitators influence the step of acquiring evidence from the four sources, as depicted in the model (Figure 1). Moreover, several barriers and facilitates can at once impact the acquisition of evidence to support a decision such as the example below:

For a restructuring decision, she [middle manager] was super impressive in doing her research (...). She always takes her time, she does her analysis, she takes things seriously (...). In this case [of restructuring], before even presenting the idea to me, she had already gone and researched articles that have been published on this particular topic (...). The challenges [were] in the evidence (...), scholarly publications and research never [match] our context 100% or even close to 100% (P32).

In this incident, the barrier was related to the characteristics of the evidence (the lack of applicability of the evidence to the context) and the facilitator was related to the decision maker (knowledge of data analysis methods and being driven). Thus, managers' reliance on the different sources of evidence, and consequently, the size of each of the four circles representing the sources in Figure 1 varies according to each decision as a result of these barriers and facilitators (Briner et al., 2009).

IV. Decision Criteria

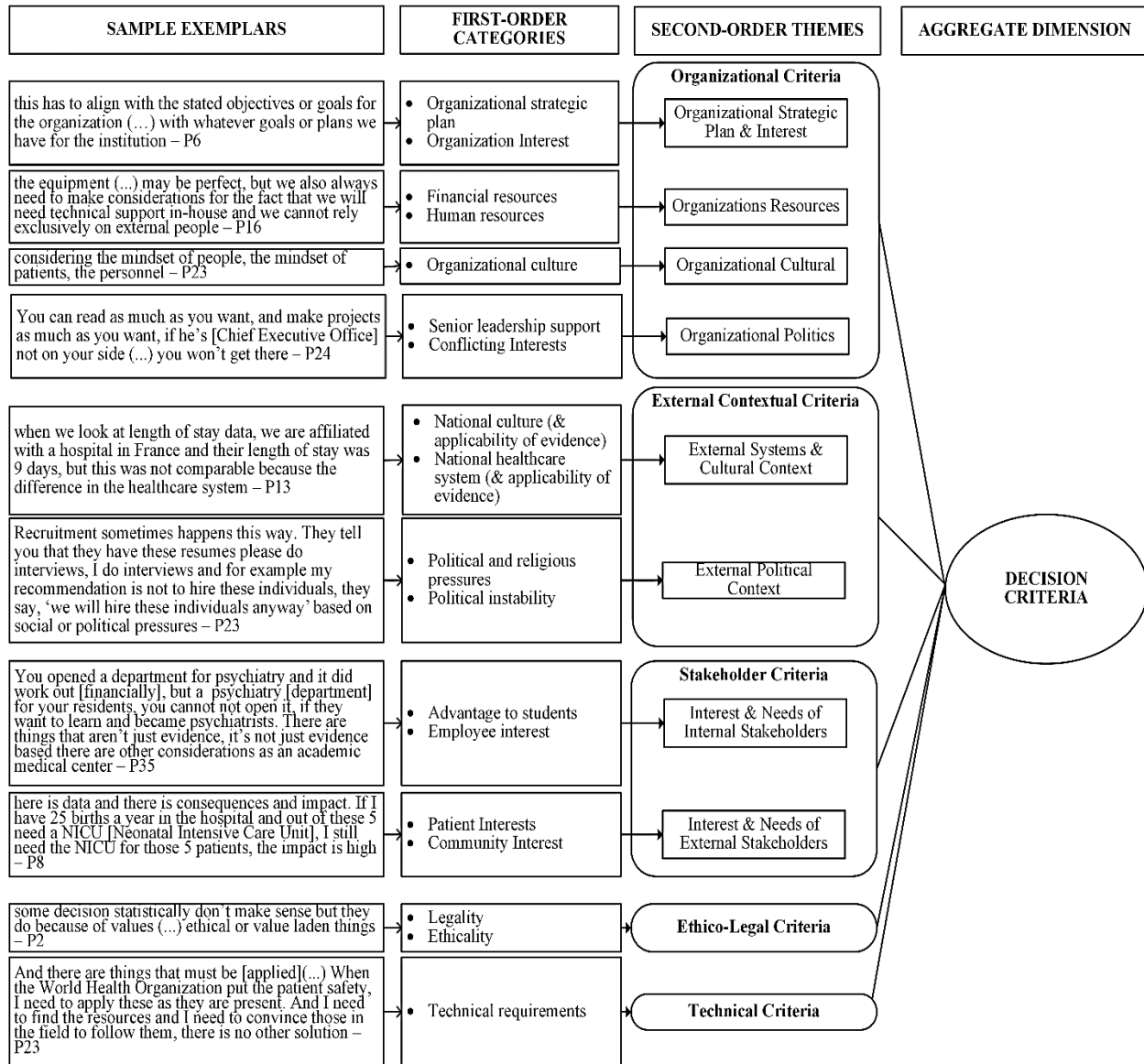
The fourth dimension refers to critical contextual conditions that must be considered alongside the evidence when weighing the decision alternatives. These conditions emerged throughout participants' discussion of the evidence-based decision-making process, "*So you balance all these factors. You have to weigh these things; this is why it is not always evidence-*

based” (P11). This dimension encompasses five second-order themes, 8 second-order sub-themes, and 18 first-order categories (Figure 5).

These criteria include **organizational criteria**, internal organizational conditions that must be considered alongside the evidence, including the **organizational strategic plan**, referring to the alignment with the strategic plan and interest of the organizations. They also include the **organizational resources**, referring to the availability of the necessary human, material, and financial resources. They also include the **organizational culture**, referring to the unique social and psychological environment of the organization and the applicability of evidence to this culture. Finally, organizational criteria also include **organizational politics**, referring to the relationships between different groups within the organization and conflicting priorities of these groups. Here participants emphasized the importance of having support from senior leadership, which could contribute to the success of the decision.

These criteria also include **external contextual criteria**, referring to contextual conditions related to the environment in which the organization operates that must be considered. They include **external systems and cultural context**, referring to considering the national culture and healthcare system and the applicability of evidence to these. They also include considering the **external political context**, referring to the relationship between different groups outside the organization and the overall political stability of the region, which might influence the organization and its operations. This could manifest as making certain decisions under political pressure to appease different groups or as political unrest in the region that could influence decisions, “we wanted to build a new building, and there was a kind of conflict, a possible war, that was going on. This [made us] hesitant about our decision” (P17).

Figure 5. Data Structure of the Decision Criteria



These decision criteria also include **stakeholder criteria**, referring to considering the needs and values of different stakeholder. This involves considering the *interest and needs of internal stakeholders*, such as employees and students, and considering the *interest and needs of external stakeholders*, including patients and the wider community. They also include **ethico-legal criteria**, referring to considering the legality of the decision alternative, as per the laws of the institution and the country, and the ethicality and morality of the decision. A final criterion is

the **technical criteria**, referring to the need to consider technical requirements of different specialties and domains. For example, participants emphasized the importance of adhering to certain guidelines that cannot be compromised.

Representing Decision Criteria in the model. As depicted in Figure 1, after generating alternative solutions based on the best available evidence, managers must consider these internal and external decision criteria alongside the evidence. Accordingly, they must weigh the different alternatives to come up with the solution that not only is based on the ‘best evidence’ but also is the best fit for the context. Managers’ weighing in of these criteria is demonstrated in several of the critical incidents reported by participants, including the one summarized below:

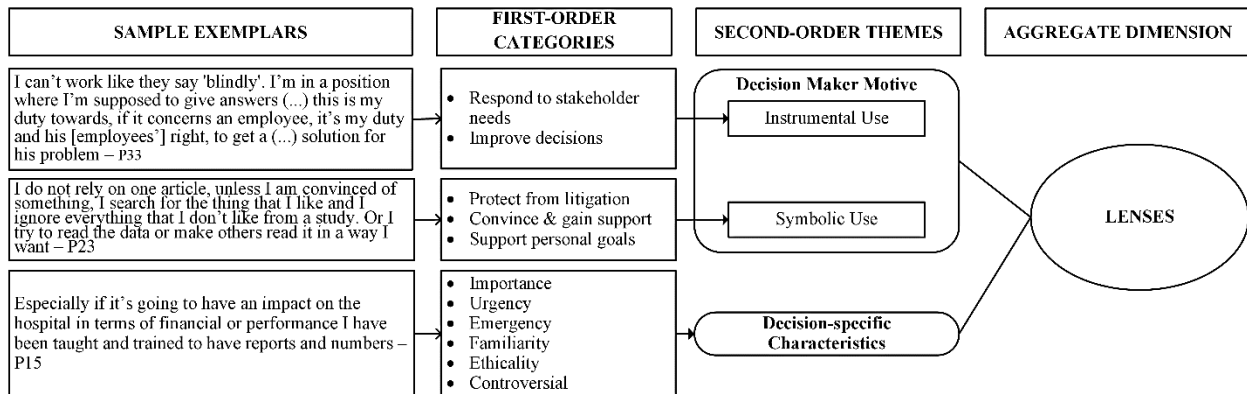
How to define the headcount (...) finance department say we need to save money, nursing department say we need to follow the international ratio (...) nursing have the ratio so I'm forced to secure the quality of care to have that ratio (...) The challenge mainly is the financial resources, at the end I want to follow specific norms, I'm forced to respect them (...) but the finance departments says I already set the headcount because I can't afford more than that cost, so here what happens is a conflict between the two (...) every patient that comes, I'm supposed to give him the proper care required from us (P26).

In this incident, the criteria were organizational (financial resources and conflicting needs of different departments), stakeholder criteria (interests of patients), and technical criteria (meeting the international ratio). These findings are in line with research on decision-making that has found that several criteria are used in the decision-making processes. Many of these are non-quantitative, and they are not identified and weighted prior to making a choice, rather this is done implicitly while choosing between alternatives (Mintzberg et al., 1976).

V. Lenses

At the top of Figure 1, we include reference to “lenses”, these represent the different perspectives that may influence a person’s perception, assessment, and understanding of situations leading them to focus on certain variables and relationships while neglecting others (Ancona, Goodman, Lawrence, & Tushman, 2001). In the current data, we identified factors that act as lenses influencing managers’ perception of the situation, shaping their decision-making process, and directing their attention to certain sources of evidence and certain decision criteria over others. These lenses are captured by two second-order themes, two second-order sub-themes, and 11 first-order categories (Figure 6).

Figure 6. *Data Structure of the Lenses*



The first second-order theme is the **Decision Maker Motives**, referring to the managers’ reason for utilizing evidence in the decision-making processes. Guided by literature on knowledge and research utilization (Denis, Lehoux, & Champagne, 2004; Weiss, 1979) we identified two motivations for evidence use in the current data, instrumental and symbolic. *Instrumental use* refers to utilizing evidence to solve the problem and to act on the evidence to make the decision. Here participants noted using evidence to respond to stakeholders’ problems and improve the decision by identifying the best course of action and reducing errors. *Symbolic use* refers to utilizing evidence deliberately in the decision-making process to legitimize or sustain pre-

determined position, and to persuade others to adopt a course of action. Here participants noted using evidence to protect from litigation, to convince and gain support for the decision internally, and to fulfill personal goals by selectively including favorable data or interpreting evidence to fit with pre-determined positions.

The second second-order theme is **Decision-specific Characteristics**, referring to managers' perception of the nature of the problem at hand. Guided by the strategic decision-making literature (Nutt, 2008; Papadakis et al., 1998; Shepherd & Rudd, 2014), we identified six such characteristics, three which overlapped with characteristics in the strategic decision-making literature, and three unique to this study. We also mapped their influence on the sources of evidence, the decision-making process, and the decision criteria when possible.

Among the characteristics overlapping with the literature, one is decision *importance*, referring to the potential impact of the decision on the operations or financial resources of the organization. In this case organizational evidence is more likely to be used, especially in the form of internal numbers and indicators, *“Especially if it’s going to have an impact on the hospital in terms of financial or performance I have been taught and trained to have reports and numbers”* (P15). Another is decision *familiarity*, referring to situations when the person taking the decision is knowledgeable in the area of the decision, has taken such decisions before, or when the organization has policies related to this decision. In such cases the decision maker relies on experiential evidence or organizational evidence in the form of hospital procedures and policies. According to participants, in the case of unfamiliar decisions scientific literature is more likely to be used, *“I also read the literature if it is not something I am familiar with”* (P15). A third is the decision *urgency*, referring to the time-sensitivity of the decision and the need for immediate action. In this case experiential evidence, especially individual experience and

knowledge of the decision maker, is more likely to be used “*sometimes you would need to take a decision quickly (...) rely on the background that I have of the hospital (...) the information I have, the experience that I have*” (P21). Organizational evidence, especially input from internal stakeholders, is also more likely to be used “*I try my best to collect, so I collect quick information from people on the ground*” (P33). Furthermore, in urgent decisions the decision-making process also changes whereby the focus becomes on making and applying the decision, less so on acquiring evidence from several sources, appraising it, and generating alternatives, “*rely on the experience that I have and I go forward with the decision*” (P21).

Among the unique characteristics is the decision **emergency**, where there is risk to patient(s) life if the decision is not taken in a timely manner. Emergency decisions did not refer to clinical decisions rather to managerial ones that can have immediate clinical implications or critical clinical problems that require managerial input to be resolved. For example, a case where a patient needed a transplant immediately and the organs were readily available, however, the process for completing the necessary paperwork is lengthier than the lifetime of the organs. In case of emergency decisions, similar to urgent decisions, the decision-making process changes and the focus becomes on making and applying the decision, rather than on acquiring evidence from several sources, assessing it, and generating alternatives. The medical needs of the patient becomes the core driver of the decision, patient life is the decision criterion that is prioritized, and the individual experience, knowledge, and judgment of the decision maker becomes the most important source of evidence “*especially with us here in the hospital there is lifesaving so you cannot say ‘I will see what to do, take my time, I’ll think about it’. You take the decision, (...) your experience would be the most important evidence in this moment (...) and it could be that it is the wrong decision but it was the best solution that you could think of in this moment*” (P23).

The fifth characteristic, also not previously identified in the strategic decision-making literature, is the *ethical* nature of the decision, referring to situations where there is a conflict between the interests and needs of different stakeholders and/or the organization such as financial interests of the hospitals conflicting with the patients' experience. According to participants, in this case stakeholder evidence and the individual judgment of the decision maker are more likely to be used and the stakeholder and ethical-legal criteria are given most weight. The sixth and final unique characteristic, also not previously identified in the strategic decision-making literature, is the *controversial* nature of the decisions, referring to decisions that might give rise to controversy, debate, or stakeholder disagreement. According to participants, in such cases the decision maker is more likely to rely on scientific and organizational evidence: "*The more the decision is controversial the more likely you want to have it supported [and] backed by facts like the literature [and] numbers*" (P2).

Representing Lenses in the model. Since managers' perceptions of the decision-specific characteristics and their motives for using evidence seem to influence several aspects of EBMgt, we tried to depict this overarching influence in the model (Figure 1). The critical incidents provided further indication of the lenses' influence on different aspects of EBMgt:

To see if we are overstaffed [in the lab], we sent a team to two other hospitals to look at how many tests they do and how many employees they employ (...). We discovered that we employ almost twice the people, so the first thing that would come to mind is that we are overstaffed. But when we looked at why they can perform the same function with a smaller number of staff, we discovered they have invested in information systems that make their staff more efficient. We tried to be evidence based, to base our decisions not

on gut feeling (...) before we take collective action and as we followed the project to the end our conclusions changed (...). (P1).

In this case, the manager had already made their decision but given that it was an important decision they were motivated to gather data and use it symbolically (to support their pre-determined position). As such, rather than thoroughly engaging in the decision-making, they bypassed certain steps including attempting to understand the problem, and tried to gather specific information that shows they are overstaffed. However, as they collected the data and analyzed it, their motivation shifted to instrumental (using the data to solve the real issue). Overall, this incident shows that managers' perceptions of the decision-specific characteristics interplay with their reason for using evidence, which we depicted in the model (Figure 1).

Discussion

To gain a better understanding of how managers in hospitals can incorporate evidence to make evidence-based decisions, we conducted an in-depth empirical examination of the EBMgt process in practice. As a result, we identified the core constituents of the EBMgt process within hospital settings and developed the Grounded Model of the EBMgt Process. Our proposed model is a dynamic process model which provides an empirically-driven theoretical explanation of how managers engage in EBMgt when making decisions in hospital settings.

The model makes several key contributions to the EBMgt literature, which we will briefly mention here and elaborate on in the next section. First, we provided empirical evidence to support Briner et al.'s (2009) four sources of evidence, in addition to expanding their categorization by delineating 12 sub-sources subsumed under these overarching sources. Second, unlike previous conceptualizations of the EBMgt decision-making process (Barends et al., 2014; Kovner, Fine, & D'Auila, 2009; Wright et al., 2016), we found that the progress

through this process is not necessarily strictly sequential and might involve back and forth movement between the different steps. Third, we identified two factors, Decision Criteria and Lenses, which influence managers' progress through these steps and which have not gained much attention in the EBMgt literature. In identifying the Decision Criteria, we support Kohn et al.'s (2013) findings and build on them by reporting a wider range of these criteria, categorizing them, and pinpointing the step of evidence-based decision-making at which they come into play. In identifying the Lenses, specifically the decision-maker motives, we also support Kohn et al.'s (2013) findings. However, our identification of the decision-specific characteristics among the Lenses is unique, providing the first indication of the relevance and influence of such characteristics in EBMgt. Overall, these novel contributions expand our understanding of EBMgt practice, particularly in hospital settings. Additionally, these Lenses also bring about the question of when does a decision-making process ceases to be evidence-based. We recognized these contributions by exploring the overlap between our model and the existing EBMgt literature, and we will discuss them in further detail below.

The 'Best-available' Evidence: Evidence Sources and Decision Criteria

EBMgt represents an expansion and refinement in scholarly thinking about the evidence utilized in decision-making, both in terms of the sources of evidence and evidence quality (Baba & HakemZadeh, 2012). In terms of the sources, four overarching sources have been conceptualized in the literature; scientific research evidence, organizational data, professional experience and judgment of managers, and the values and concerns of stakeholders (Briner et al., 2009). These sources of evidence have also been identified in empirical studies on EBMgt (Guo, 2015; Janati et al., 2018; Kohn, 2013; Liang et al., 2011); however, there has not been an attempt to delineate the specific types of evidence or data affiliated with specific sources. In our

proposed model, we broke down these four overreaching sources of evidence, into 12 sub-sources. In identifying these sub-sources, we expanded upon existing conceptualizations of the sources of evidence offered in the literature (Barends et al., 2014; Briner et al., 2009). More practically, we provided a detailed mapping of the different sources, which healthcare managers can refer to in order to acquire evidence.

In terms of the quality of this evidence, in EBMgt once evidence is acquired, its reliability and trustworthiness must be assessed (Barends et al., 2014). This is to determine the ‘best-available’ evidence, which is the evidence that is available to the decision-maker and that has been appraised as reliable. In our proposed model, in addition to using the evidence to generate and choose between alternatives, participants considered other factors alongside the evidence. These factors, which we labeled decision criteria, included considering, among others, stakeholder needs, organizational culture, national culture, legislation, and ethics. Kohn et al. (2013) also identified some of these factors in their study of EBMgt in strategic decisions in hospitals. They noted that these factors are not evidence, but are used in concert with the evidence to contextualize the decision. Thus our findings expand upon Kohn et al.’s (2013) by identifying a wider range of these criteria, categorizing them, and pinpointing the steps at which they come into play in the EBMgt process in practice. These findings indicate that certain factors other than the ‘best-available’ evidence are being used in the decision-making. Thus, there might be a need to reconsider the ‘best-available’ evidence, as not only the evidence that is available and is reliable, but also the evidence that best fits with the context of the organization.

Exploring Overlap between our Model and the EBMgt Literature

In line with the EBMgt literature, our proposed model depicts EBMgt as a micro-level phenomenon – an approach adopted by an individual manager (Baba & HakemZadeh, 2012;

Wright et al., 2016). Moreover, as in this literature, our proposed model is reminiscent of rational sequential decision-making theories, in that it involves structured decision-making steps (Barends et al., 2014; Kovner & Rundall, 2006; Langley et al., 1995; Wright et al., 2016). However, unlike this literature and classical sequential decision-making theories, in our model, progress through these steps is not strictly sequential. In this aspect, our proposed model resembles the decision-making theory of Mintzberg et al. (1976), which has been described as an iterative sequence (Langley et al., 1995). Here decision-making includes the stages of sequential processes but movement from one step to another is not always linear, rather it is subject to interference from different factors, which could knock the decision-making “off the linear track” (Mintzberg et al., 1976). Similar to this theory, and in line with the EBMgt literature, we also identified different factors in our model, which influence the evidence-based decision-making process (Baba & HakemZadeh, 2012; Wright et al., 2016). These factors include the barriers and facilitators, which influence evidence acquisition, and which have been heavily documented in the EBMgt literature (Guo, 2015; Kohn, 2013; Liang et al., 2011; Niedzwiedzka, 2003; Wright et al., 2016). They also include the decision criteria, discussed earlier, and the lenses, which represent concepts and relationships unique to our proposed model. In subsequent sections, we will shed light on the potential boundaries of EBMgt practice, and the role of power, politics, and ethics in EBMgt.

Lenses: Shaping the Process of Evidence-based Decision-Making

As more studies are examining the practice of EBMgt and refining its conceptualization, the clearer it is becoming that the adoption of EBMgt depends upon the interplay between the decision maker and the decision context (Baba & HakemZadeh, 2012; Wright et al., 2016). This is demonstrated in several areas in our proposed model, most crucially; in the lenses where we

identified two factors, the decision maker motives and decision-specific characteristics. Decision maker motives refer to the managers' reason for utilizing evidence in the decision-making process. Relying on the research utilization literature (Weiss, 1979), we identified two main motivations for evidence use, instrumental and symbolic. This is also aligned with Kohn et al. (2013), who not only found that managers use evidence in decision-making for these and other reasons, but also that the initial reason managers bring evidence into a decision might be different than the way they actually use this evidence. This is also reflected in our data, where we found that initially evidence might be gathered to support a pre-determined course of action, but then might be used instrumentally, to find the most appropriate solution. In our study, this shift was influenced by the decision-specific characteristics, referring to the perceived nature of the decision, especially the importance of the decision (its financial or operational impact). This indicates that the motives of the decision maker might be interacting with the decision-specific characteristics.

The decision-specific characteristics, of importance, urgency, familiarity, emergency, ethicality, and controversiality, influence EBMgt in several ways. They influence manager's progress through the decision-process, whether they attempt to understand the problem, how extensively they search for evidence, whether they assess the quality of this evidence, and whether they generate variant evidence-based alternatives. They also influence the sources of evidence that managers rely on and the criteria they prioritize. Our identification of decision-specific characteristics in EBMgt is unique to our proposed model but in line with the strategic decision-making literature. Within this literature some of the characteristics we identified, namely importance, urgency, and familiarity, have been found to be related to the tactics used to search for and analyze information, and decide between alternatives using different methods

including rationality, intuition, and political behavior (Nutt, 2008; Papadakis et al., 1998). Thus, our study is the first in the EBMgt literature to find empirical evidence for decision-specific characteristics in the EBMgt process and the first to identify novel characteristics of emergency, ethicality, and controversiality.

All in all, the way these lenses are shaping the evidence-based decision-making process brings about the question of when this decision-making process stops being evidence-based. In some cases, the lenses seem to be influencing the extent to which a manager practices the core principles of EBMgt, collecting evidence from multiple sources and assessing the quality of the evidence. When these principles are compromised, does the decision cease to be evidence-based? What if, as was demonstrated in the current data, these principles are compromised in emergency cases to save a patients' life? Could whatever data used in this case without assessment of quality be considered the 'best' available evidence? While more research is necessary to answer these questions, it can be argued that there are certain contextual constraints to the adoption of EBMgt, in the presence of which, the decision ceases to be evidence-based. It could also be argued that similar to Mintzberg et al.'s (1976) decision-making theory, where certain factors interfere with sequential decision-making and push it "off track", so too in EBMgt, the factors captured by these lenses may push the decision off the 'evidence-based' track. Thus, we could conceptualize evidence-based decision-making on a continuum, ranging from least evidence-based (or not evidence-based) to most evidence-based. These lenses influence the placement of a specific decision on this continuum, because they influence different elements of EBMgt, most importantly whether the available evidence from several different sources is gathered and whether its quality is appraised.

Incorporating the Evidence: Politics, Ethics, and Power

The factors we identified in our proposed model— barriers and facilitators, decision criteria, lenses – also contribute to the conversation regarding issues of politics, ethics, and power relations in EBMgt (Morrell, 2008; Morrell & Learmonth, 2015) highlighting the interplay between the decision maker, the context, and the decision. It has been argued that by not explicitly focusing on these issues, EBMgt has been built on the erroneous assumptions that managers are impartial technical experts with no interests in the evidence being gathered and that they will welcome the evidence and use it to serve employee and client interests (Morrell, 2008; Morrell & Learmonth, 2015; Tourish, 2012). It has been shown that the reality of it is different (Tourish, 2012), and the current study attests to that because issues of politics, ethics, and power relations manifested across different dimensions and themes. Among the barriers and facilitators, the decision-makers' position and power within the hospital and within professional networks was an important facilitator for the acquisition of different types of evidence. Additionally, among the decision criteria, while participants noted considering ethics and the interests and needs of internal and external stakeholder, they also noted that there are internal and external political aspects that also must be considered.

Finally, among the lenses, participants noted the influence of the decision-makers' perception of the decision and their motives for using the evidence, on several aspects of the EBMgt process. This focus on the influence of managers' perceptions is in line with Morrell and Learmonth (2015), who stressed that to understand politics, power, and ethics in EBMgt we should not focus solely on how managers acquire the evidence but also, and more fundamentally, on how they frame situations. They argued that focusing on this aspect would make us more cognizant of the different ways people might perceive situations and make us more aware of the

limitations and benefits of these perceptions. This is also in line with Baba and HakemZadeh (2012) who noted that ethicality is constrained at the organization and individual level, whereby at the individual level different people might perceive ethicality and fairness differently. While Baba and HakemZadeh (2012) proposed that this ethicality comes into play when choosing between alternatives, we expand upon this in our proposed model and showed that it is also a lens influencing their decision-making process and the evidence they rely on. All in all, the identification of such factors reflecting ethics, power relations, and politics through the EBMgt process model is noteworthy because it represents a step towards making these factors explicit in the EBMgt literature, highlights their pervasiveness at different stages of the process, and sets the stage to better understand their role.

Practical Implications

While the proposed model indicates that EBMgt is a micro individual-level phenomenon, it also indicates that its adoption is influenced by different individual, organizational, and national level factors. Thus, the burden of practicing EBMgt is not only on individual managers but also on organizations. To promote the practice of EBMgt within their context, organizations need to take a proactive approach, ensuring that managers have the ability, the motivation, and the opportunity to practice EBMgt (Rousseau & Gunia, 2016). The Grounded Model of the EBMgt Process can help organizations critically reflect on their managers' decision-making process of in order to identify the steps their managers' struggle with most, such as acquiring or assessing evidence, and target training programs accordingly. The model can also help organizations identify the evidence their managers are knowledgeable of and introduce them to novel sources of evidence. The model can also help organizations identify the influence of their organizational structure and culture on EBMgt adoption. They can identify and adopt practices to

overcome barriers unique to their environment to ensure managers are supported in their pursuit of EBMgt.

Limitations and Future Directions

This study has some limitations which create opportunities for future research. First, it is limited by the inclusion of only executives, rather than evidence-driven managers who are the main focus of the study. It is important to note, however, that there is a scarcity of tools that can be used to identify evidence-driven hospital managers. Additionally, using executives as informants may have been beneficial in controlling for self-report bias. Future research can focus on examining evidence-driven managers' decision-making process. Second, the model developed in the current study was based on managers working in hospital settings in Lebanon, which possibly influenced the themes identified. To illustrate, among the barriers and facilitators, participants cited a scarcity in research conducted in Lebanon and a lack of availability of national-level indicators and norms, as has been characteristic of Lebanon (Hamdan, 2014). Despite this limitation, the depth of the data led to the identification of dimensions and themes which overlapped with the literature, as well as dimensions and themes unique to the current model. Additionally, since we collected data from 11 hospitals, this provided a variety of perspectives and multiple organizational contexts.

Conclusion

In the current study, we set out to better understand how managers in hospitals apply EBMgt in practice and identify the contextual nuances of its application. We developed the Grounded Model of the Evidence-based Management Process. The model contributes to the EBMgt literature and expands our understanding of EBMgt practice in several ways. It indicates that the adoption and application of EBMgt, an individual-level practice, is influenced by factors

at different levels such as individual, organizational, and national. These factors not only act as barriers and facilitators to evidence acquisition, as previously found, but they also act as criteria that must be balanced alongside the evidence, as well as, lenses coloring decision makers' perceptions of situations, influencing how they make decisions and what evidence they use. Overall the findings indicate that contextual nuances and the person, decision, context fit is key for the adoption of EBMgt.

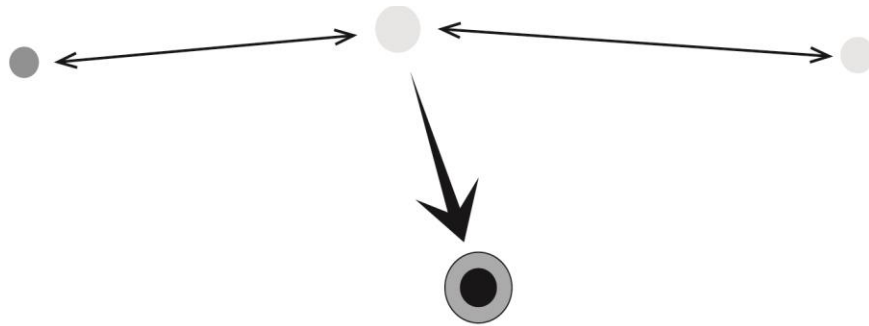
References

- Ammar, W. (2009). *Health beyond politics*. Beirut: World Health Organization.
- Ammar, W., Fakha, H., Azzam, O., Khoury, R. F., Mattar, C., Halabi, M., . . . Mechbal, A. (2000). *Lebanon National Health Accounts*. Retrieved from <http://siteresources.worldbank.org/INTHSD/Resources/376278-1261143298590/6660179-1280173228245/LebanonNHA.pdf>
- Ammar, W., Wakim, I. R., & Hajj, I. (2007). Accreditation of hospitals in Lebanon: a challenging experience. *East Mediterranean Health Journal*, 13, 139-149.
- Ancona, D. G., Goodman, P. S., Lawrence, B. S., & Tushman, M. L. (2001). Time: A new research lens. *Academy of Management Review*, 26(4), 645-663.
- Baba, V. V., & HakemZadeh, F. (2012). Toward a theory of evidence based decision making. *Management Decision*, 50(5), 832-867. doi:10.1108/00251741211227546
- Barends, E., Rousseau, D. M., Briner, R. B., & Center for Evidence-Based Management, A. (2014). *Evidence-Based Management, The Basic Principles*. Amsterdam: Center for Evidence-based Management.
- Begun, J. W., & Thygeson, M. (2015). Chapter 1: Managing complex healthcare organizations. In M. D. Fottler, D. Malvey, & D. J. Slovensky (Eds.), *Handbook of Healthcare Management* (pp. 1-17). Northampton, MA: USA: Edward Elgar Publishing.
- Briner, R. B., Denyer, D., & Rousseau, D. M. (2009). Evidence-Based Management: Concept Cleanup Time? *Academy of Management Perspectives*, 23(4), 19-32.
- Currie, K. M. (2013). *Updating Reay, Berta & Kohn EBMgt systematic review*. (Unpublished Thesis), University of Prince Edward Island, Canada,
- Deloitte Touche Tohmatsu Limited. (2019). *2019 Global health care outlook: Shaping the future*. Retrieved from <https://www2.deloitte.com/global/en/pages/life-sciences-and-healthcare/articles/global-health-care-sector-outlook.html>
- Denis, J. L., Lehoux, P., & Champagne, F. (2004). Knowledge Utilization Perspective on Finetuning Dissemination and Contextualizing Knowledge. In L. Lemieux-Charles & F. Champagne (Eds.), *Using Knowledge and Evidence in Health Care: Multidisciplinary Perspectives* (pp. 18-40). Toronto: University of Toronto Press.
- Flanagan, J. C. (1954). The critical incident technique. *Psychological Bulletin*, 51(4), 327.
- Fleiss, J. L. (1971). Measuring nominal scale agreement among many raters. *Psychological Bulletin*, 76(5), 378.

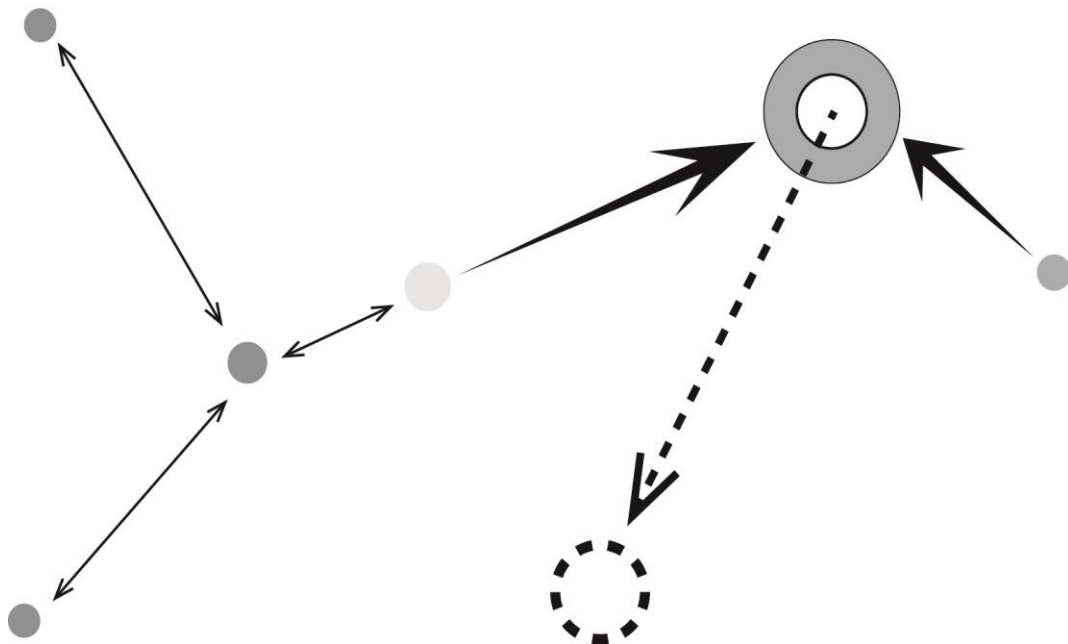
- Gioia, D. A., Corley, K. G., & Hamilton, A. L. (2013). Seeking qualitative rigor in inductive research: Notes on the Gioia methodology. *Organizational Research Methods, 16*(1), 15-31.
- Goldman, D. P., Smith, J. P., & Sood, N. (2006). Immigrants and the cost of medical care. *Health Affairs, 25*(6), 1700-1711.
- Groves, P., Kayyali, B., Knott, D., & Van Kuiken, S. (2013). *The 'big data' revolution in healthcare*. Center for US Health System Reform; Business Technology Office. Retrieved from https://www.ghdonline.org/uploads/Big_Data_Revolution_in_health_care_2013_McKinsey_Report.pdf.
- Guo, R. (2015). *Prediction of intention to use evidence-based management among healthcare administrators in the United States*. (Dissertation), Central Michigan University.
- Hamdan, K. (2014, 10 March). Lebanon needs a new census. *Executive*. Retrieved from <http://www.executive-magazine.com/opinion/comment/lebanon-census-new>
- Hassan, V. (2015). Medical Tourism in Lebanon: An Analysis of Tourism Flows. *Athens Journal of Tourism, 2*(3), 153-166.
- Janati, A., Hasanpoor, E., Hajebrahimi, S., & Sadeghi-Bazargani, H. (2018). Evidence-based management–healthcare manager viewpoints. *International Journal of Health Care Quality Assurance, 31*(5), 436-448.
- Kohn, M. K. (2013). *Evidence Based Strategic Decision Making in Ontario Public Hospitals*. (Unpublished PhD Dissertation), University of Toronto, Canada,
- Kovner, A. R., Fine, D. J., & D'Aquila, R. (2009). *Evidence-based Management in Healthcare*. Chicago, IL: Health Administration Press.
- Kovner, A. R., & Rundall, T. G. (2006). Evidence-Based Management Reconsidered. *Frontiers of Health Services Management, 22*(3), 3-22.
- Kronfol, N. (2006). Rebuilding of the Lebanese health care system:Health sector reforms. *Eastern Mediterranean Health Journal, 12*(3/4), 459.
- Landis, J. R., & Koch, G. G. (1997). The measurement of observer agreement for categorical data. *Biometrics, 159*-174.
- Langley, A., Mintzberg, H., Pitcher, P., Posada, E., & Saint-Macary, J. (1995). Opening up decision making: The view from the black stool. *Organization Science, 6*(3), 260-279.

- Liang, Z., Howard, P., & Rasa, J. (2011). Evidence-informed managerial decision-making: What evidence counts?(part one). *Asia Pacific Journal of Health Management*, 6(1), 23-29.
- Liang, Z., & Howard, P. F. (2011). Evidence-informed managerial decision-making: What evidence counts? (part two). *Asia Pacific Journal of Health Management*, 6(2), 12-21.
- Miller, L. J., & Wei, L. (2018, 19 September). These Are the Economies With the Most (and Least) Efficient Health Care. *Bloomberg*.
- Ministry of Public Health Lebanon. (2014). *Hospitals Accreditation Results 2014*. Beirut: Ministry of Public Health Lebanon.
- Mintzberg, H., Raisinghani, D., & Theoret, A. (1976). The structure of "unstructured" decision processes. *Administrative Science Quarterly*, 21, 246-275.
- Morrell, K. (2008). The narrative of 'evidence based' management: A polemic. *Journal of Management Studies*, 45(3), 613-635.
- Morrell, K., & Learmonth, M. (2015). Against evidence-based management, for management learning. *Academy of Management Learning & Education*, 14(4), 520-533.
doi:10.5465/amle.2014.0346
- Murdoch, T. B., & Detsky, A. S. (2013). The inevitable application of big data to health care. *Jama*, 309(13), 1351-1352.
- Niedzwiedzka, B. M. (2003). Barriers to evidence-based decision making among Polish healthcare managers. *Health Services Management Research*, 16(2), 106-115.
- Nutt, P. C. (2008). Investigating the success of decision making processes. *Journal of Management Studies*, 45(2), 425-455.
- Papadakis, V. M., Lioukas, S., & Chambers, D. (1998). Strategic decision-making processes: the role of management and context. *Strategic Management Journal*, 19(2), 115-147.
- Reay, T., Berta, W., & Kohn, M. K. (2009). What's the evidence on evidence-based management? *The Academy of Management Perspectives*, 23(4), 5-18.
- Refaat, M. M., & Mohanna, K. (2013). Syrian refugees in Lebanon: facts and solutions. *Lancet*, 382, 763-764.
- Roshanghalb, A., Lettieri, E., Aloini, D., Cannavacciuolo, L., Gitto, S., & Visintin, F. (2018). What evidence on evidence-based management in healthcare? *Management Decision*, 56(10), 2069.

- Rousseau, D. M., & Gunia, B. C. (2016). Evidence-based practice: The psychology of EBP implementation. *Annual Review of Psychology, 67*, 667-692. doi:10.1146/annurev-psych-122414-033336
- Rynes, S. L., & Bartunek, J. M. (2017). Evidence-Based Management: Foundations, Development, Controversies and Future. *Annual Review of Organizational Psychology and Organizational Behavior, 4*, 235-261.
- Saleh, S. S., Bou Sleiman, J., Dagher, D., Sbeit, H., & Natafqi, N. (2013). Accreditation of hospitals in Lebanon: is it a worthy investment?. *International Journal for Quality in Health Care, 25*(3), 284-290.
- Shepherd, N. G., & Rudd, J. M. (2014). The Influence of Context on the Strategic Decision-Making Process: A Review of the Literature. *International Journal of Management Reviews, 16*(3), 340-364. doi:10.1111/ijmr.12023
- Simon, H. A. (1947). *Administrative behavior*. New York: Macmillan.
- Tourish, D. (2012). Evidence Based Management', or 'Evidence Oriented Organizing'? A critical realist perspective. *Organization, 20*(2), 173-192.
- United Nations High Commissioner for Refugees. (2019). *United Nations High Commissioner for Refugees Lebanon Factsheet, January 2019*. Retrieved from <https://www.unhcr.org/lb/wp-content/uploads/sites/16/2019/01/UNHCR-Lebanon-Operational-Fact-sheet-January-2019-.pdf>
- Walshe, K., & Rundall, T. G. (2001). Evidence-based management: from theory to practice in health care. *Milbank quarterly, 79*(3), 429-457.
- Weiss, C. H. (1979). The Many Meanings of Research Utilization. *Public Administration Review, 39*(5), 426-431.
- World Health Organization. (2010). *The world health report: health systems financing: The path to universal coverage*. Retrieved from Geneva:
- Wright, A. L., Zammuto, R. F., Liesch, P. W., Middleton, S., Hibbert, P., Burke, J., & Brazil, V. (2016). Evidence-based Management in Practice: Opening up the Decision Process, Decision-maker and Context. *British Journal of Management, 27*(1), 161-178. doi:10.1111/1467-8551.12123



CHAPTER 4 | The Neglected Contexts and Outcomes of Evidence-based Management: A Systematic Review in Hospital Setting



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Abstract

The COVID-19 pandemic has made apparent the necessity of using data to inform healthcare management decision-making, that is, the necessity of practicing Evidence-based Management (EBMgt). Existing reviews of the EBMgt literature in hospitals, however, provide limited insight into the EBMgt process and its contextual nuances. Therefore, it is critical to review our knowledge of EBMgt and identify the gaps. Doing so will develop our understanding of how to use EBMgt to face the challenges of this pandemic. Accordingly, our aim in this study was to identify the gaps in the literature on EBMgt in hospital settings and delineate areas for future research. We conducted a systematic scoping review using an innovative methodology that involved two systematic searches. One using EBMgt terminology, similar to previous reviews, and a second using terminology associated with the EBMgt concept, which we derived from the results of the first search. We identified 218 relevant articles, which we mapped onto Sahakian et al.'s (2020) Grounded Model of the EBMgt Process to identify the gaps. We found that the gaps in the literature relate to the influence of contextual factors, in the form of managers' perceptions and motives, on the evidence-based decision-making process, the practice of evidence-based decision-making in the context of countries of the Global South, and the outcomes of applying the evidence-based management approach. We contributed to the EBMgt literature by identifying the major gaps and delineating areas for future research, and to the systematic review literature by developing a novel scoping review method.

Introduction

The coronavirus COVID-19 has rapidly become a global pandemic effecting at least 188 countries since its initial recognition (Center for Systems Science and Engineering, 2020). To manage the crisis, which resulted in hospitals becoming overburdened with COVID-19 patients and stretched beyond their capacity, large amounts of data are being collected on a daily basis about the virus and its clinical and operational management (Cavallo, Donoho, & Forman, 2020; Reeves et al., 2020; Smith & Fraser, 2020). In this context, physicians are facing challenging decisions about patient care. To make these decisions, they are expected to rely not only on the existing scientific literature and their clinical knowledge and judgment, but also on emergent data that is rapidly, and sometimes radically, changing their understanding of the virus (del Rio & Malani, 2020). In parallel, hospital managers are also facing extraordinary operational challenges, including reorganizing hospital space to prevent COVID-19's spread, equipment and medication shortages, staff shortages and redeployment decisions, as well as rationing decisions (Cavallo et al., 2020; Fong et al., 2020). To face these challenges, hospital managers, similar to physicians, must combine their knowledge and experience with existing and emergent data. This data includes scientific data, such as research articles on priority areas for preparing for the pandemic, internal hospital data, such as availability of intensive care unit beds, and stakeholder data, such as healthcare workers' medical conditions for staffing in high risk sites (J. G. Adams & Walls, 2020; Reeves et al., 2020; Toner & Waldhorn, 2020). Additionally, since the way healthcare systems are organized differ across and within countries (Anell & Willis, 2000; Reid, 2009), data must be contextualized and solutions adopted by hospital managers need to be tailored to their context (Mills, 2014). This is done by considering data in concert with contextual conditions such as resources, culture, and laws (Tanne et al., 2020). Ultimately, this

pandemic has made apparent the necessity of using data and contextualizing it to inform decision-making, and hence, has put Evidence-based Management (EBMgt) at the forefront of facing the extraordinary operational challenges it poses for hospitals.

EBMgt refers to gathering evidence from different sources, including experiential, organizational, scientific, and stakeholder evidence, appraising its quality and its relevance to the context, and using it to make better-informed decisions (Barends, Rousseau, Briner, & Center for Evidence-Based Management, 2014). There is no better time than now to reflect on our current knowledge of EBMgt practice in hospital settings, identify the gaps, and outline core areas for future research. Doing so will serve as a means to deepen our understanding of EBMgt in hospital settings and leverage it to face the challenges of the COVID-19 pandemic and prepare for future pandemics. Accordingly, our aim in this study is to identify the gaps in the literature on the EBMgt decision-making process in hospital settings and outline core areas for future research. To do this, we scoped out the literature on EBMgt in hospital settings by conducting a systematic scoping review, and analyzed the results using an existing theoretical framework of the EBMgt process. Scoping reviews are similar to systematic reviews in every aspect except in their aim, which is not to sum up available research to answer specific questions (Campbell Collaboration, 2019), but rather to map the existing literature on a certain topic examining its scope, variety, and nature (Arksey & O'Malley, 2005).

The Literature on EBMgt in Healthcare Management

EBMgt aims to encourage practices with evidence for their effectiveness, and consequently improve decisions and lead to better organizational outcomes (Barends et al., 2014). While it is being widely promoted with the intention of having it change management practice (Kovner & Rundall, 2006; Pfeffer & Sutton, 2007; Rousseau, 2006; Tourish, 2012;

Walshe & Rundall, 2001), the literature on EBMgt has been criticized for being primarily conceptual in nature (Morrell, Learmonth, & Heracleous, 2015). Systematic reviews of the EBMgt literature have found that the majority of articles use opinion and anecdotal information to encourage EBMgt adoption (Currie, 2013; Reay, Berta, & Kohn, 2009), and are not based on empirical evidence (Rynes & Bartunek, 2017).

These systematic reviews have examined the literature on EBMgt generally, and while some others have been done on EBMgt in healthcare management, they have focused on specific aspects of the literature. For example, Jaana, Vartak, and Ward (2014) focused on determining the availability and accessibility of systematic reviews and meta-analyses for healthcare managers to use. They found that most reviews addressed clinical topics relevant to managers (e.g., telemedicine), while purely management-related topics (e.g., pay for performance) were rare. They also found that the limited number of reviews of interest to healthcare managers was challenging to retrieve. Furthermore, Roshanghalb et al. (2018) focused on identifying the different groups of decision-makers the EBMgt literature has focused on, and understanding the evidence they use, how they analyze it, and the types of decisions they make. They concluded that the literature has focused mostly on hospital managers and medical professionals, who rely on expert opinion, organizational data, and scientific literature as sources of evidence. They also concluded that this data is gathered and analyzed through literature reviews and data analysis and is used for performance assessment, change management, organizational knowledge transfer, and strategic planning. These systematic reviews provide insight into the decisions evidence is gathered for, the sources of evidence gathered, and, their availability and accessibility. These reviews do not, however, provide insight into the overall nature (empirical or conceptual) of the literature on EBMgt in hospital settings, the process of decision-making, and the individual and

contextual factors that influence it. In addition, while these reviews make recommendations for future research, they do not identify the gaps in our knowledge of the overall EBMgt process in hospital settings.

As such, the aim of this study is to identify the gaps in the literature on the EBMgt decision-making process in hospital settings and outline core areas for future research. In pursuit of this aim, we explored the following research questions: 1) What aspects of the EBMgt process in hospital settings have been studied in the literature? 2) What is the nature of the literature on the EBMgt process in hospital settings (conceptual or empirical)? 3) What are the main gaps in our knowledge of the EBMgt process in hospital settings? and 4) How generalizable is the literature to different contexts? In the context of the COVID-19 pandemic, taking stock of our current knowledge of EBMgt practice in hospital settings, identifying the gaps in our knowledge, and delineating areas for future research will deepen our understanding of how managers can use data to face the challenges of this and future pandemics.

To fulfill our aims and answer our questions we conducted a systematic scoping review of the literature on EBMgt in hospital settings. We decided to analyze the results from a process perspective (Huff & Reger, 1987; Pettigrew, 1992, 2012) using Sahakian et al.'s (2020) Grounded Model of the EBMgt Process, which we describe in detail below. We decided the process perspective would be suitable for our analysis since EBMgt is an approach to managerial decision-making, and since existing systematic reviews have not provided insight into the EBMgt decision-making process, and the individual and contextual factors that influence it.

Theoretical Framing

The process perspective focuses on examining phenomena and processes as dynamic sequences of events and actions that form, develop, and change over time (Huff & Reger, 1987;

Pettigrew, 1992, 2012). This perspective also focuses on the important role of human actors in the process, who construct and create processes through their actions, whose subjective interpretations can change processes, and who mobilize and use aspects of the context to obtain outcomes important to them (Pettigrew, 1992; Pettigrew, McKee, & Ferlie, 1989; Pettigrew, Woodman, & Cameron, 2001). The perspective also highlights the importance of structures, as the context in which actions occur, and which both shape and are shaped by the actions (Pettigrew, 1992; Pettigrew et al., 2001). To guide our analysis, we juxtaposed three existing frameworks of EBMgt in healthcare settings that take the process perspective, to varying degrees (Table 1; Kovner and Rundall 2006, Baba and HakemZadeh 2012, Sahakian et al. 2020). Kovner and Rundall (2006) took a rational decision-making perspective to EBMgt. They conceptualized EBMgt as a stepwise and linear decision-making process with a series of steps resembling those in rational models. What makes the process EBMgt is that evidence can be incorporated in the steps of analyzing alternatives and selecting an alternative. In line with the rational perspective, Kovner and Rundall's (2006) model assumes that managers are rational, in that they make a complete search of all alternatives and make a decision based on organizational goals (Langley, Mintzberg, Pitcher, Posada, & Saint-Macary, 1995), and that organizational contextual factors do not influence the process (Dean & Bowen, 1994). Baba and HakemZadeh (2012) took a bounded rationality approach to EBMgt. They conceptualized EBMgt as a multi-level phenomenon, executed at the individual level as a dynamic process, and influenced by individual, organizational, and institutional factors. These factors influence the evidence that managers use, the alternatives they generate, and the choice they make between alternatives. While Baba and HakemZadeh (2012) developed this model based on the extant literature, taking into account the

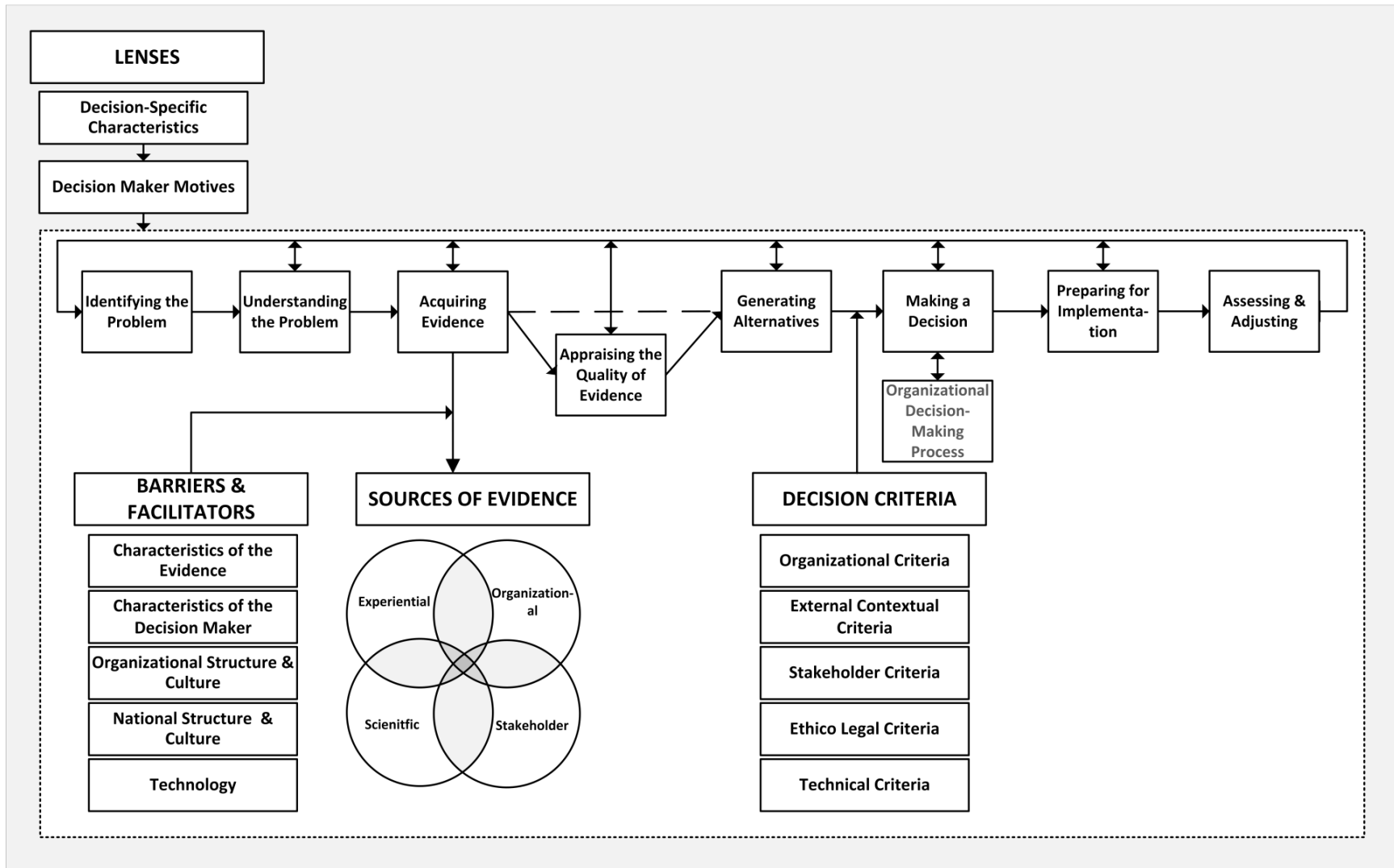
principles of bounded rationality and contextual factors, their model does not explicate the details of the evidence-based decision-making process, and remains conceptual in nature.

Table 1. *Juxtaposing Three Existing Frameworks of EBMgt in Healthcare Setting*

EBMgt Framework	Assumptions	Decision-making Process		Considers Context?	Basis for Development
		Sequential/ Dynamic	Single/ Multi-Level		
Kovner and Rundall (2006)	Rational Decision-making	Sequential process	Single-level	No	Conceptual
Baba and HakemZadeh (2012)	Bounded Rationality	Dynamic process	Multi-level	Yes	Conceptual
Sahakian et al. (2020)	Bounded Rationality	Sequential & Iterative process	Multi-level	Yes	Empirical

Finally, we considered the Grounded Model of the EBMgt Process (Figure 1) proposed by Sahakian et al. (2020), which builds on the model of Baba and HakemZadeh (2012), and integrates some elements of the stepwise process of Kovner and Rundall (2006). It explicates in steps and using empirical data what is suggested conceptually by Baba and HakemZadeh (2012). It is an empirically-driven model of the evidence-based decision-making process and its contextual nuances in hospital settings. It includes five dimensions: I) Process of Evidence-based Decision-Making, II) Sources of Evidence, III) Barriers and Facilitators, IV) Decision Criteria, and V) Lenses. The model depicts the Process of Evidence-based Decision-Making as involving a series of eight structured steps, starting from identifying the problem and ending with assessing and adjusting a decision. Among the process are the steps of acquiring evidence and appraising the quality of the evidence, which are the hallmarks of EBMgt (Barends et al., 2014). At the step of acquiring evidence, four Sources of Evidence are identified in the model, which are experiential, organizational, scientific, and stakeholder evidence, which are further delineated

Figure 1. *The Grounded Model of the Evidence-based Management Process (Sahakian et al., 2020)*



into sub-sources. Progression through the eight steps of the process is led by an individual manager, whose acquisition, assessment, and use of evidence is influenced by different individual, organizational, and national-level factors. Thus, progress through the steps is not strictly sequential and linear; rather it can be iterative and involve back and forth movement, similar to the iterative sequence process of Mintzberg, Raisinghani, and Theoret (1976) (Langley et al., 1995). These individual, organizational, and national-level factors act either as Barriers and Facilitators, Decision Criteria, or Lenses. Barriers and facilitators refer to factors related to the characteristics of the evidence, the characteristics of the decision-maker, organization structure and culture, national structure and cultures, or technology, which either hinder or help evidence acquisition and use. Decision criteria refer to contextual conditions related to the organization, the external context, internal and external stakeholders, ethical and legal considerations, or technical considerations that must be balanced alongside the evidence when deciding between decision alternatives. Finally, lenses color decision makers' perceptions of situations, and influence their decision-making process, the evidence they use, and the criteria they prioritize. Lenses include managers' motives, referring to their reason for using evidence, and they also refer to the decision-specific characteristics, referring to managers' perception of the nature of the problem.

We decided to adopt Sahakian et al.'s, (2020) Grounded Model of the EBMgt Process to guide our analysis and had several reasons for our choice. First, the model depicts the process of evidence-based decision-making and the different individual, organizational, and national-level contextual factors that influence this process. Second, the model pinpoints when these contextual factors come into play in the decision-making process and maps their influence. Third and finally, the model was based on empirical data collected from hospitals in Lebanon. While it

could be argued that the model is not representative of other contexts, it is embedded in the larger EBMgt literature with many of its dimensions and themes overlapping with the literature (Sahakian et al., 2020).

Methods

Procedure

We conducted a scoping review for peer reviewed journal articles on the topic of EBMgt in hospital settings. One of the main challenges of a scoping review on EBMgt is that this literature is spread across several fields and may not be using the EBMgt terminology (Briner, Denyer, & Rousseau, 2009). Existing reviews of the EBMgt literature have searched the literature either only using EBMgt terminology (i.e. EBMgt, evidence-informed management; Jaana et al., 2014; Roshanghalb et al., 2018; Rynes & Bartunek, 2017), or EBMgt terminology and related terms developed based on the expertise of librarians (i.e. research utilization, research to practice etc ; Currie, 2013; Reay et al., 2009). We adapted these two approaches and developed a novel methodology that involved two systematic searches; one using EBMgt terminology, and a second using terminology associated with the EBMgt concept, which we derived from the results of the first search. This resulted in a 4-step process, discussed further below, which we implemented from April 2015 till October 2019. The novelty of this process is in its use of the results of an initial search of EBMgt terminology to derive more relevant keywords related to EBMgt to conduct a second more expanded search of the literature. We applied this process to search four online databases: PubMed, CINAHL, PsycINFO, and Cochrane Library. These databases were selected to be wide in scope, encompassing disciplines related to health and life sciences, social and behavioral sciences, and business, to cover the hospital setting, and to be inclusive of all levels of management.

General Systematic Search

We searched the four databases using the key-terms: ‘evidence’ AND ‘based’ OR ‘driven’ OR ‘informed’ AND ‘healthcare’ AND ‘management’. We specified peer reviewed, English-only journal articles, involving only human subjects with no restrictions on publication year. We exported the results from the databases into Microsoft Excel and merged all the results within and across databases to identify and remove the duplications. We applied four filters to narrow down the articles (Table 2). Two researchers, including one of the authors, applied each of the filters separately and then reconciled their differences after each filter, consulting the rest of the authors when necessary. After applying these four filters to the results of this search, we reviewed the reference lists of the remaining relevant articles to see if they include any relevant articles.

Table 2. *Filtering Criteria Applied to Narrow the Search Results and Identify Relevant Articles*

Filters Applied to Narrow Down Search Results
1: Remove titles that reflect clinical topics (e.g., alginate dressings for venous leg ulcers).
2: Remove titles that are irrelevant to topic (e.g., a comment on World War II repression).
3: Read abstracts and keep those related to non-clinical evidence-based decision-making, non-clinical decision-making in healthcare, non-clinical decision-making by nurse managers or healthcare managers, and practice guideline development.
4: Read full texts and keep those related to evidence-based hospital processes, procedures, and design, non-clinical evidence-based decision-making by hospital/ healthcare organization managers, non-clinical evidence-based decision-making in hospitals.

Focused Keyword Identification

We extracted the keywords of the articles remaining from the first step to determine EBMgt related terminology that might be used by relevant articles. To this end, we developed an expert panel involving the researchers who applied the filters and two of the remaining authors. The panel removed keywords that pertain to specific fields (e.g. community health), practices (e.g. telehomecare) and countries (e.g. Canada), calculated the frequency of the different words,

and reviewed the relevance of the remaining words and based on consensus decided on a list of 21 keywords (Table 3).

Table 3. *Keywords Identified from the Focused Keyword Identification Step*

Focused Keywords	
1. decision makers	11. knowledge process
2. decision making	12. knowledge transfer
3. decision science	13. knowledge based value creation
4. evidence	14. organizational decision making
5. evidence informed improvement	15. research capacity building
6. evidence based design	16. research transfer
7. evidence based management	17. research use
8. evidence based practice	18. research practice gap
9. knowledge flow	19. scientific evidence
10. knowledge management	20. strength of evidence
	21. translation*

* Referring to transfer of knowledge or evidence into practice

Keyword Systematic Search

We searched the same four databases using the 21 focused keywords, in addition to “AND healthcare AND management NOT clinical”. As in the first search, we applied the same specifications, exported and merged the results, removed duplications, and the two researchers applied the same filters in the same way.

Reconciliation

To ensure the uniqueness of the final list of relevant articles from the two searches, we examined the overlap of the articles across the General Systematic Search and the Keyword Systematic Search and removed duplications.

Analysis

We analyzed the articles using a deductive content analysis approach (Elo & Kyngas, 2008). The foundation for the categorization was the Grounded Model of the Evidence-based Management Process (hereafter the Model) with its five dimensions encompassing 30 themes.

Coding

We tabulated key information about each article including their objectives, methodology, results, and limitations on Microsoft Excel. Two of the authors conducted the categorization simultaneously and collaboratively. They familiarized themselves with each of the articles, paying particular attention to the objectives and results of each, and assigned each article a code based on the dimensions and themes of the Model. Articles were assigned to a relevant dimension or set of dimensions, as well as theme or set of themes from the model. When articles did not fit the dimensions and themes provided by the model, we created new themes derived from the data to encompass these articles based on the principles of inductive content analysis (Elo & Kyngas, 2008).

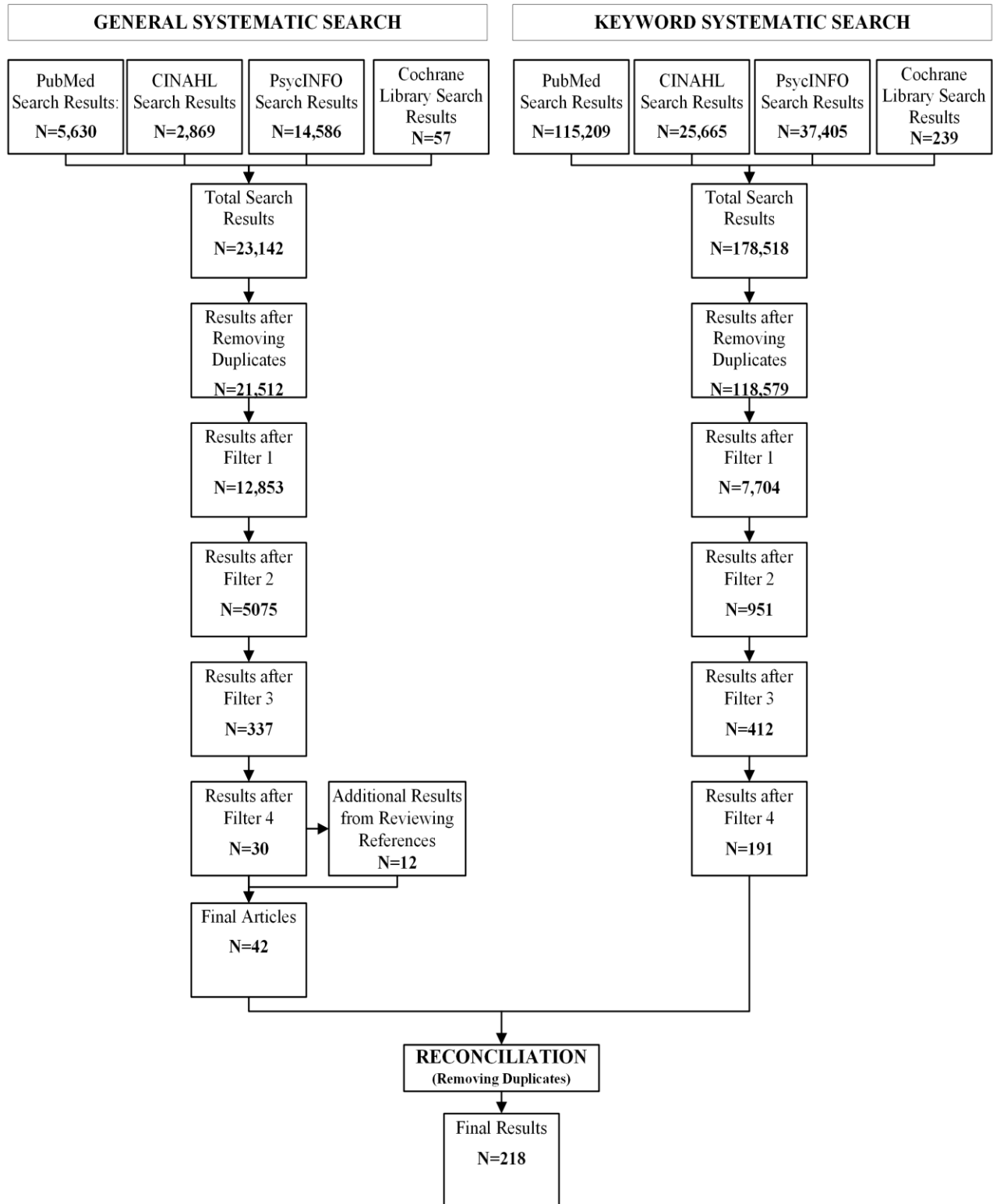
Reliability

To increase reliability of the categorization of articles according to the Model we engaged an independent coder, a PhD candidate in organizational psychology. We provided the coder with definitions of each of the dimensions and, based on Lacy and Riffe's (1996) recommendations, asked them to code a random sample of 70 articles. We assessed inter-coder reliability and found moderate agreement between our categorization and that of the independent coder, Cohen's $\kappa = .59$ (95% CI, 0.44 to 0.75). We revisited the disagreements, made a change to the categorization of one article, and found that most disagreements were due to the coders' lack of familiarity with the concepts.

Results

The General Systematic Search yielded 23,142 articles, which we narrowed down to 45. The Keyword Systematic Search yielded 178,518 articles, which we narrowed down to 191.

Figure 2. Search and Filtering Results of the General Systematic Search, the Keyword Systematic Search, and Reconciliation Steps



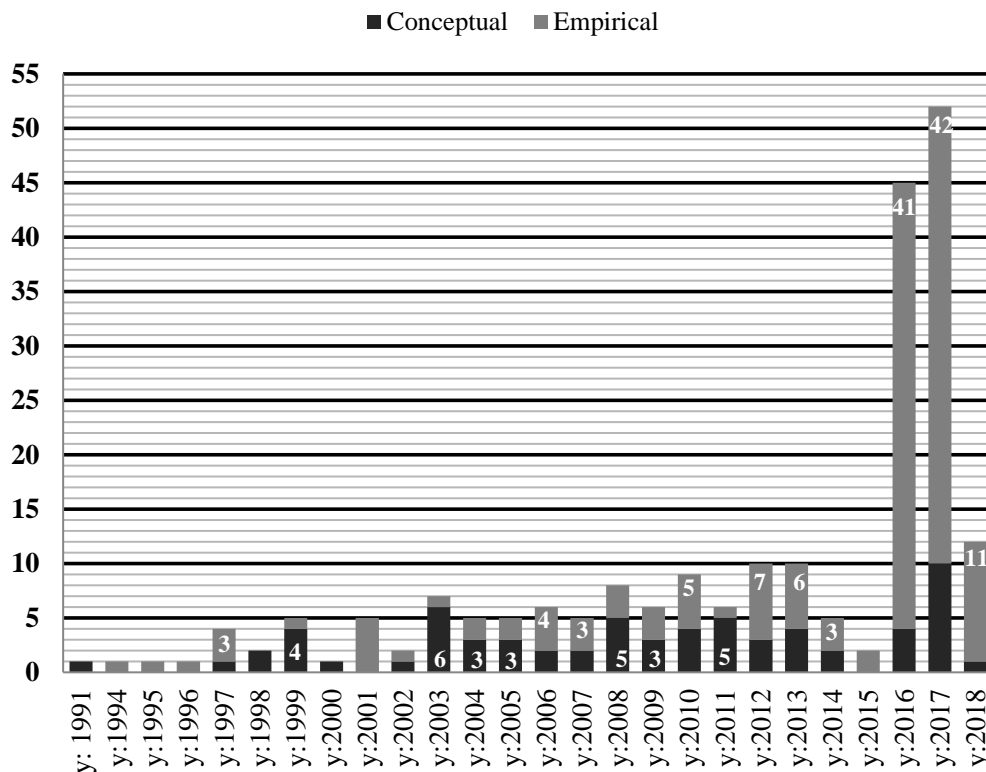
We calculated inter-rater agreement between the researchers applying the filters and found almost perfect agreement in the General Systematic Search Step, Cohen's $\kappa = .85$ (95% CI, 0.79 to 0.91), and moderate agreement in the Keyword Systematic Search Step, Cohen's $\kappa = .57$ (95% CI, 0.48 to 0.66). In the reconciliation step we removed 15 duplications and identified 218 unique articles for analysis (Figure 2).

Descriptive Analysis

The first article was published in the year 1991 (Figure 3), since then the number of publications has increased relatively steadily.

Figure 3

Frequency of Articles over Time and Distribution of Conceptual versus Empirical Articles



In terms of geographic distribution of studies (Table 4), half were conducted in North America (50.00%) and another quarter in Europe (25.69%). Some studies were conducted in Australia (5.96%), Asia (5.50%), and the Middle East (5.50%), and only a few in South America (2.75%)

and Africa (0.92%). Moreover, some studies were cross-cultural involving different countries within and across regions (3.67%). The majority of the studies done in North America, were conducted in the USA (37.61%), and in Europe, the majority were conducted in the UK (7.80%). Notably, the countries of the Global North, including USA, Canada, UK, EU member states, Russia, Israel, Japan, Singapore, South Korea, Australia, and New Zealand, accounted for 86.24% of all studies.

Table 4. *Distribution of Articles Across Geographic Regions*

Region	Frequency	Percent
North America	109	50.00
Europe	56	25.69
Australia	13	5.96
Asia	12	5.50
Middle East	12	5.50
South America	6	2.75
Africa	2	0.92
Cross-cultural	8	3.67

The majority of articles were empirical in nature (150 articles, 68.81%). Looking at the distribution of the conceptual and empirical articles over time (Figure 3), while there has been an overall incidence of empirical articles, the ratio of empirical to conceptual articles has increased over time and especially in recent years. Looking at the methodology of these empirical articles (Table 5), almost half used quantitative methods (50.67%), while the rest used qualitative (36.00%) and mixed methods (13.33%). These empirical articles employed a range of methods for data collection including single case studies (38.67%), interviews (31.33%), and cross-sectional surveys (25.33%), and most articles combined several methods (103 articles, 68.67%). As for the conceptual articles, 12 were systematic reviews (17.65%), while the rest were literature reviews.

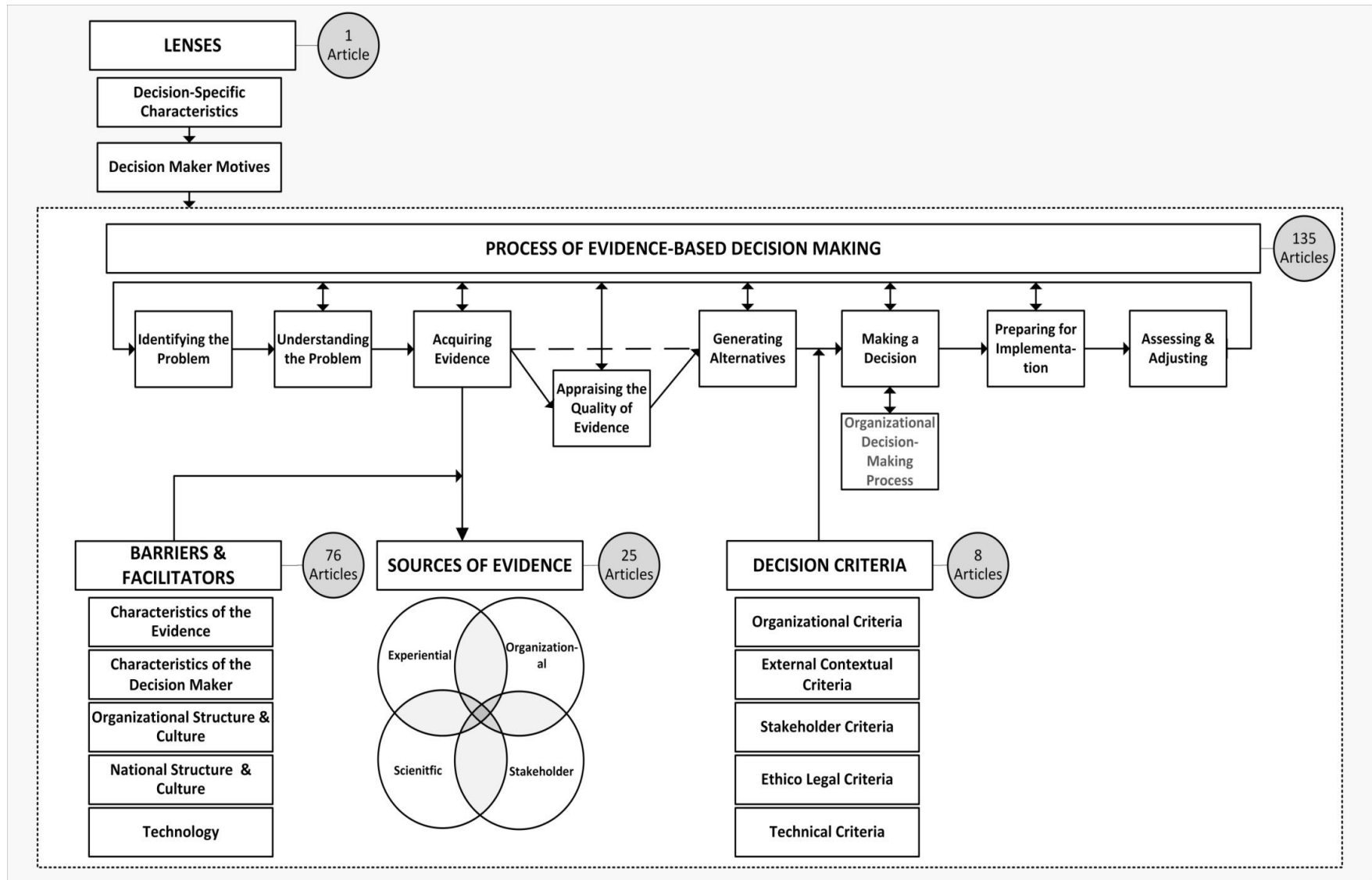
Table 5. Methodology of Empirical Articles

	Frequency	Percent
Methodology		
Quantitative	76	50.67
Qualitative	54	36.00
Mixed Methods	20	13.33
Method of data collection		
Single case study	58	38.67
Interview	47	31.33
Cross-sectional survey	38	25.33
Pretest–post-test design	18	12.00
Secondary data	9	6.00
Multiple case studies	7	4.67
Focus group discussion	4	2.67
Quasi-experimental design	4	1.33
Experimental design	2	1.33
Longitudinal design	2	0.67
Delphi study	1	38.67

Content Analysis: The Grounded Model of the EBMgt Process

In analyzing the articles, we found that most of the articles focus on the application of EBMgt in practice and could fit under the Grounded Model of the EBMgt Process. These articles could be categorized according to the five dimensions of the Model (Figure 4), with many articles fitting under more than one dimension. The Process of Evidence-Based Decision-making dimension encompassed 135 articles, the Sources of Evidence dimension encompassed 25 articles, the Barriers and Facilitators dimension encompassed 76 articles, the Decision Criteria dimension encompassed 8 articles, and the Lenses dimension encompassed one article. The articles under each of these dimensions are discussed below. Given the large number of articles in this review, we did not discuss and cite them all in text, but summarized them all as tables in the Appendix (Tables A1-A5), and denoted them with asterisks in the reference list.

Figure 4. Mapping articles on the Grounded Model of the Evidence-based Management Process (Sahakian et al., 2020)



The Process of Evidence-based Decision-Making

Within the Model, this dimension includes eight steps managers engage in when making evidence-based decisions (Figure 4). In this review, 135 articles (113 empirical, 83.70%) discussed the process of evidence-based decision-making in hospitals (Table A1), either focusing on one of the eight steps or the process in its entirety.

Specific Step of the Process. The steps these articles focused on were acquiring evidence (45 articles), appraising the quality of the evidence (four articles), generating alternatives (one article), making a decision (one article), preparing for implementation (13 articles), and assessing and adjusting (23 articles). Overall, we can see that some steps of the EBMgt process have been studied more extensively than others. This is as expected, given that only two of the steps of the process; acquiring evidence and assessing the quality of the evidence, are the hallmarks of EBMgt and core to its practice, while the rest are common to different decision-making models and not unique to EBMgt.

Among the steps that are the hallmarks of EBMgt, acquiring evidence has been studied extensively. The articles focusing on this step either discussed strategies and tools to support evidence acquisition from different sources (Abidi, 1999; Chan, Morton, & Shekelle, 2004), such as using data mining to derive knowledge from healthcare databases (Abidi, 1999). Or they provided examples of evidence acquisition in specific contexts, underlining the context dependent nature of the best-available evidence in EBMgt, such as acquiring internal hospital evidence on the reasons for overcrowding in the emergency department (Brady et al., 2017; Elamir, 2018). Or they themselves engaged in conducting research to collect evidence for specific problems (Nantsupawat et al., 2017), such as nursing burnout and fatigue (Nantsupawat et al., 2017). In comparison to acquiring evidence, the step of appraising the quality of evidence, which is also a hallmark of EBMgt, has received little attention. The articles focusing on this step

described methods for analyzing data (Delias, Doumpos, Grigoroudis, Manolitzas, & Matsatsinis, 2015), and discussed strategies for appraising the quality of evidence, such as rating the strength of evidence (Davidson, 2017; Kibbe, Smith, LaVallee, Bailey, & Bard, 1997; Lohr, 2004).

Among the steps that are not unique to EBMgt, a couple of studies have focused on the steps of generating alternatives (Elamir, 2018) and making a decision (Testik, Shaygan, Dasedmir, & Soydan, 2017). While the steps of preparing for implementation and assessing and adjusting have received considerable research focus. The articles focusing on preparing for implementation either discussed tools to support implementation of evidence-based solutions, such as using simulations to prepare for facility design changes (Gignon, Amsallem, & Ammirati, 2017; Guzman et al., 2015; Newhouse & White, 2011). Or they examined factors that influence implementation of different evidence-based solutions, such as waiting time management initiatives (Pomey et al., 2013). Or they presented applied cases of implementation (Johnson et al., 2017; Mazur, Johnson, Pooya, Chadwick, & McCreery, 2017).

The articles focusing on the step of assessing and adjusting all presented applied cases evaluating the impact of implementing certain initiatives on different hospital outcomes. They examined a wide range of problems and outcomes, such as assessing the impact of staffing initiatives on patient mortality (Claret et al., 2016) and hospital costs (Maass et al., 2017). They were applied either at the level of one or two hospitals, such as assessing the impact of a medication management system in a hospital intensive care unit (de-Carvalho, Alvim-Borges, & Toscano, 2017). Or they were applied at the level of the healthcare system and involved multiple hospitals, such as examining the efficiency and profitability of hospitals after entering health systems (Büchner, Hinz, & Schreyögg, 2016). These articles focusing on the steps of preparing

for implementation and assessing and adjusting indicate that the success of EBMgt depends not only on the identification of solutions that are evidence-driven but also the implementation of such solutions in the specific context of the organization. They underline the importance of better understanding two factors; how to implement evidence-based solutions and how to incorporate them into different organizational contexts.

The Process Overall. The remaining articles focusing on the process of evidence-based decision-making discussed it in its entirety (Table A2). Some examined this process among managers in hospitals in different settings and accordingly proposed different individual and organizational decision-making models. For example, Brown and Ecoff (2011) proposed an-eight step approach to evidence-based decision-making in the context of healthcare facility design. Some other articles developed tools to support evidence-based decision-making, such as a digital platform to support resource planning (Gartner & Padmanab, 2017). Finally, the remaining articles provided examples of specific problems being faced in a hospital(s) and described the evidence-based decision-making process adopted. These articles were all empirical and used case studies and pretest-posttest designs. They targeted a wide range of problems, including hospital staffing (DeRienzo et al., 2017; Kullberg, Bergenmar, & Sharp, 2016), and patient throughput and flow (Lovett, Illg, & Sweeney, 2016; Tibor et al., 2016; Wiler et al., 2016).

Overall, the steps of the process of evidence-based decision-making described in these articles, overlapped considerably with each other, as well as with the Model. One noteworthy point of difference is the focus on aggregating the evidence, which is present in only one of the articles in the literature (Oetjen, Oetjen, & Rotarius, 2008) and the Model. This lack of focus makes us question whether it is indeed a necessary step in the process. Moreover many of the

articles were applied cases targeting a wide range of problems, many of which are being faced in hospitals worldwide, such as emergency department crowding (Pines & Griffey, 2015). This situates EBMgt at the core of tackling such pervasive problems.

Sources of Evidence

This dimension refers to the sources from which managers acquire evidence when making decisions. Within the Model, there are four sources of evidence: experiential evidence (i.e. experience, knowledge, and judgment of managers), scientific evidence (i.e. research literature), organizational evidence (i.e. internal data), and stakeholder evidence (i.e. data from different stakeholders). In this review, 25 articles (14 empirical, 56%) revolved around the sources of evidence (Table A2). Among these articles, Råholm (2009) focused on the concept of evidence, arguing that its current conceptualization is rigid, and re-conceptualizing it from a multidimensional perspective. Some other articles examined the evidence that managers use during EBMgt practice, either by collecting empirical data, conducting systematic reviews, or presenting applied cases. These articles found that managers combine a variety of sources of evidence, all of which fall under the four sources of evidence identified in the Model. To illustrate, Shoemaker, Kazley, and White (2010) examined the evidence used for a facility design decision in a hospital, and identified that managers used: literature searches (scientific evidence in the Model), consultation with architects (experiential evidence in the Model), financial costs (organizational evidence in the Model), and site visits to examine the practices of other organizations (stakeholder evidence in the Model).

The remaining articles under this dimension argued for using specific types of evidence in EBMgt, which could also be categorized according to the four sources of evidence from the Model. Some argued for using scientific evidence, such as operations and implementation

research (Capan et al., 2017; Peters, Adam, Alonge, Agyepong, & Tran, 2013). Others argued for using organizational evidence, such as performance data (Ginsburg, 2003), effectiveness data (Simonen, Viitanen, & Blom, 2012), patient flow data (Vissers, 1995), and patient experience data in twitter posts (Hawkins et al., 2016). Overall, these studies shed light on the different types of information that might be available to hospital managers, both internally and externally, and how to use these types of information to inform decisions.

Barriers and Facilitators

This dimension refers to factors that either hinder or help managers' acquisition and use of evidence in decision-making. In the Model, barriers and facilitators relate to five aspects: the characteristics of the evidence (i.e., its availability, appropriateness, and the time consuming nature of its acquisition), the characteristics of the decision-maker (i.e., their competencies, and position), the organizational structure and culture that influences accessing, capturing, and using evidence (i.e., scientific database access, health information systems, and employee capacity building), the national structure and culture (i.e., information sharing culture, and national networks), and finally, to the overall advancement of technology. In this review, 76 articles (41 empirical, 53.95%) identified barriers and facilitators to EBMgt. These articles either focused on one specific barrier or facilitator to EBMgt, or attempted to identify all barriers and facilitators (Table A3). In this section, we will discuss the articles according to the barriers and facilitators they identified from the Model.

Characteristics of the Evidence. In terms of the availability of evidence, on the one hand, some articles noted that there is an overall scarcity of evidence that is necessary for EBMgt (Axelsson, 1998; Kontio, Lundgren-Laine, Kontio, Korvenranta, & Salanterä, 2013; Kovner, Elton, & Billings, 2000). On the other hand, some articles discussed information overload as a

threat to EBMgt and suggested strategies to overcome it (Green, 2011; Liang, Howard, Leggat, & Murphy, 2012).

In terms of the appropriateness of evidence, some articles noted that the poor quality of available evidence hinders its usefulness (Gallego, Fowler, & van Gool, 2008; Ginsburg, 2003). Several other articles noted that the available evidence is not applicable to the context in which decisions are made (Ginsburg, 2003). This is due to management research not taking context into account (Finkler & Ward, 2003; Gautam, 2008; Leatherman & Sutherland, 2007) and being dominated by studies from western countries (Jih, Chen, & Chen, 2006; Leatherman & Sutherland, 2007; Liang et al., 2012). A considerable number of articles also discussed and examined how evidence dissemination influences its use. For example, Zwijnenberg et al. (2016) examined how information presentation affects the way it is understood and used for quality improvement. Finally, in terms of the issue of time, several articles noted that the time consuming nature of searching for, collecting, and interpreting evidence limits its use (Ellen et al., 2014; Gagliardi & Dobrow, 2016).

To tackle these issues of evidence scarcity and inappropriateness, several articles noted the necessity of research meeting managers' evidence needs (Clancy & Cronin, 2005; Walshe & Rundall, 2001). Some articles identified the evidence managers need to make decisions, for example, Alexander, Hearld, Jiang, and Fraser (2007) examined the information hospital CEOs need to address cost and quality problems. While others suggested different methods to produce evidence, such as evidence co-creation (Gagliardi & Dobrow, 2016; Gautam, 2008; Marshall, 2013; Zborowsky & Bunker-Hellmich, 2010).

Characteristics of the Decision Maker. A considerable number of articles focused on the competencies of managers, arguing that lack of certain competencies hinder the adoption of

EBMgt (Gagliardi & Dobrow, 2016; Karamitri, Talias, & Bellali, 2017). The competencies important for EBMgt included knowledge of the EBMgt concept (Janati, Hasanpoor, Hajebrahimi, & Sadeghi-Bazargani, 2018), research and data analysis knowledge (R. Adams et al., 2016; Liang et al., 2012; Niedzwiedzka, 2003), certain business knowledge, including financial management (Janati et al., 2018; Kovner et al., 2000), certain technical skills, including technology utilization (Jbilou, Landry, Amara, & El Adlouni, 2009), and certain interpersonal skills, including networking (R. Adams et al., 2016; Kovner et al., 2000; Spiers, Lo, Hofmeyer, & Cummings, 2016). To overcome this barrier of limited competencies, several articles discussed the need to improve management education, (Bigelow & Arndt, 2003; Finkler, 2002), and develop professional training programs (Axelsson, 1998; Liang et al., 2012). For example, Nicklin and Stipich (2005), described the goals of a program aimed to enhance healthcare executives' skills in using research for decision-making. In addition to the competencies, a handful of articles focused on managers' position or role. They argued that healthcare managers are perfectly positioned to promote EBMgt in their organizations (Browman, Snider, & Ellis, 2003; Karamitri et al., 2017; Williams, 2006), and discussed different means by which managers could promote evidence use (Browman et al., 2003; Burgess & Currie, 2013; Fischer et al., 2016; Karamitri et al., 2017).

In the Model, barriers and facilitators related to the characteristics of the decision-maker including their competencies and position. The articles, however, noted two additional barriers and facilitators related to the decision-maker, namely their background and their attitudes, which were not part of the Model. The articles that focused on the background found that some demographic characteristics, such as education level, are associated with a higher likelihood of adopting EBMgt (Jbilou, Amara, & Landry, 2007; Jbilou et al., 2009; Shoemaker et al., 2010).

The articles that focused on attitudes found that negative attitudes towards EBMgt and research are associated with a lower likelihood of adopting EBMgt (Ellen et al., 2014; Guo, Berkshire, Fulton, & Hermanson, 2017; Niedzwiedzka, 2003).

Organizational Structure and Culture. Articles that identified barriers and facilitators related to the organization focused on structural and cultural factors that influence accessing evidence, capturing evidence, and using evidence, similar to the Model. Moreover, the articles, noted three additional barriers and facilitators related to the organization, that were not part of the model, namely these were structural and cultural factors that influence producing evidence, translating evidence, and disseminating evidence.

In terms of accessing evidence, several articles noted the importance of providing managers with the technical infrastructure to support access to evidence. This includes providing access to electronic databases, providing services that facilitate access (e.g. libraries), and implementing hospital information systems (Ellen et al., 2013; Ellen et al., 2014; Niedzwiedzka, 2003; Simonen et al., 2012). Moreover, several articles noted the importance of creating an organizational culture that encourages knowledge sharing (Gagliardi & Dobrow, 2016; Spiers et al., 2016). This includes encouraging managers' engagement in multidisciplinary committees and establishing relationships with research organizations (Innis & Berta, 2016).

In terms of capturing the evidence, the articles noted the importance of having technological infrastructure to capture evidence (Rundall, Martelli, Arroyo, & McCurdy, 2007). This includes electronic medical records and knowledge management programs (Karamitri et al., 2017; Yu-N & Abidi, 1999). The data that is captured in such systems would have to be converted into information; this is where translating evidence comes in. Here, Murphy, Wilson,

and Newhouse (2013) and Wills (2014) discussed data analytics as the tool that organizations can use to extract useful information.

In terms of producing evidence, several articles noted the importance of organizations participating in research production. This includes encouraging employees to conduct research (Finkler & Ward, 2003), investing financial resources into research projects (Ellen et al., 2013; Finkler & Ward, 2003; Kovner & Rundall, 2006), or partnering with research organizations and universities (Finkler & Ward, 2003; Gagliardi & Dobrow, 2016; Jbilou et al., 2007).

Furthermore, for this evidence to be used it has to be properly published, this is where disseminating evidence comes in (Ginsburg, 2003; Kovner, Wagner, & Curtis, 2001; Sarkies et al., 2017). Articles noted that organizations can employ different methods to disseminate evidence, such as having specialized units (Allen, 1997; Ellen et al., 2013; Jayakumar et al., 2016).

In terms of using evidence, a considerable number of articles noted the importance of having an organizational culture where there is a preference for evidence use (Ginsburg, 2003; Jbilou et al., 2007; Walshe & Rundall, 2001). This involves incorporating EBMgt into the mission, vision, and strategy (Ellen et al., 2013; Kovner & Rundall, 2006; Simonen et al., 2012). It also involves having leaders who model and encourage EBMgt behavior (Champagne, Lemieux-Charles, Duranceau, MacKean, & Reay, 2014; Karamitri et al., 2017), and having research activities such as management journal clubs (Ellen et al., 2013; Friedman, 1999). Finally, a considerable number of articles noted the importance of having Human Resource Management practices that promote EBMgt adoption. Articles made varied suggestions about possible practices, based on data they collected or literature they reviewed (Table 6). Finally,

Thornhill, Judd, and Clements (2009) discussed a tool that organizations can use to assess their capacity to engage in EBMgt.

Table 6. *Organizational Human Resource Management Practices Suggested by Some Articles to Support Using Evidence*

Suggested Organizational Human Resource Management practices to Support EBMgt
<ul style="list-style-type: none"> • Offering training programs to build managers' capacity in EBMgt (Canaway, Bismark, Dunt, & Kelaher, 2017; Champagne et al., 2014; Ellen, Lavis, Ouimet, Grimshaw, & Bédard, 2011; Ellen et al., 2013; Ellen et al., 2014; Janati et al., 2018; Karamitri et al., 2017; Kovner & Rundall, 2006; Ouimet et al., 2014; Rundall et al., 2007; Sarkies et al., 2017; Williams, 2006) • Establishing specialized positions or units charged with supporting managers' evidence use (Ellen et al., 2011; Ellen et al., 2013; Ellen et al., 2014; Golenko, Pager, & Holden, 2012; Jayakumar et al., 2016; Kovner & Rundall, 2006; Langaner & Worthington, 2010; Lavoie-Tremblay, Richer, et al., 2012; Marshall, 2013; Ouimet et al., 2014; Rundall et al., 2007; Williams, 2006). • Establishing incentive programs to reward managers who adopt EBMgt (Ellen et al., 2011; Ellen et al., 2013; Jan, 2003; Janati et al., 2018; Jih et al., 2006; Rundall et al., 2007). • Building EBMgt into managers' job roles by giving them the time to acquire, assess, and use evidence (Canaway et al., 2017; Golenko et al., 2012; Jbilou et al., 2007). • Integrating key EBMgt skills into their performance appraisal (Ellen et al., 2011; Ellen et al., 2013; Williams, 2006). • Creating career path opportunities (Golenko et al., 2012).

National Structure and Culture. A handful of articles identified and discussed barriers and facilitators at the level of national health systems. They identified several structural factors, which were different from the Model. These included allocating funding to healthcare management research (Clancy & Cronin, 2005), establishing legal and policy reforms to incentivize organizations and hold them accountable (Leatherman & Sutherland, 2007; Liang et al., 2012), and implementing national information technology infrastructure (Clancy & Cronin, 2005; Ranasinghe, Chan, & Yaralagadda, 2012). Furthermore, as in the Model, they noted the importance of having national research cooperatives for evidence production and dissemination, which bring together healthcare management researchers and practitioners (Walshe & Rundall, 2001; Wilson, Lavis, & Grimshaw, 2012).

Technology. In the model, this theme referred to the overall advancement of technology, such as health information systems and electronic health records, which has enabled information availability. None of the articles in this review commented on the overall facilitating presence of such technological advancement. This might be a matter of the national context; the Model was developed in Lebanon where such electronic health technologies are still novel and not yet widely adopted (Saleh, Khodor, Alameddine, & Baroud, 2016). We will explore the issue of the national context in the discussion.

Overall, we can see that the barriers and facilitators to EBMgt are at the intersection of healthcare management research, education, practice, and government. Therefore, and as noted by several articles (Kovner et al., 2000; Kovner & Rundall, 2006; Liang et al., 2012; Marshall, 2013; Walshe & Rundall, 2001), the responsibility of facilitating the adoption of EBMgt falls on these four groups, who must work independently and collaboratively to make EBMgt practice a reality. Furthermore, while there was much overlap between the barriers and facilitators in these articles and the Model, the articles also include some barriers and facilitators which are not part of the model. These included decision makers' attitudes and background, organizational structural and cultural factors, and national structural factors. Thus, the model could be amended to include these barriers and facilitators to make it more representative of the overall literature.

Decision Criteria

This dimension refers to contextual conditions that are considered alongside the evidence when selecting between alternatives. In the Model, decision criteria are organizational (i.e., strategic plan, resources, culture, and politics), external contextual (i.e., external systems, cultural, and political context), stakeholder (i.e., interest and needs of internal and external stakeholders), ethico-legal (i.e., ethicality and legality), and technical (i.e., specialty-specific

technical requirements). In the current review, 8 articles (6 empirical, 75%) fit under this dimension. They either identified the different decision criteria that come into play in the decision-making process, or pinpointed when these criteria come into play, or both (Table A4).

A handful of articles identified a range of criteria that come into play in the decision-making process. In categorizing these criteria according to the Model, we found that many articles identified organizational criteria; specifically resource considerations (e.g., Shoemaker et al., 2010; Spiers et al., 2016), and cultural considerations (Friedman, 1999; Spiers et al., 2016). Many articles also identified stakeholder criteria; specifically patient care and safety considerations (e.g., Beglinger, 2006; Gallego et al., 2008). A couple of articles identified external contextual criteria, specifically political considerations (Gallego et al., 2008; Spiers et al., 2016), external funding, and marketing initiatives in the industry (Gallego et al., 2008). A couple of articles also identified ethico-legal criteria, including ethics, morality, and equity (Baghbanian, Hughes, Kebriaei, & Khavarpour, 2012; Janati et al., 2018), and technical criteria, including clinical considerations (Baghbanian et al., 2012).

In terms of pinpointing when these criteria come into play in the process, Oetjen et al. (2008) conceptually argued that they are defined once a problem is identified, and are used to choose between decision alternatives. On the other hand, Baghbanian et al. (2012) and Beglinger (2006), collecting data from hospital managers, noted that these criteria are used to evaluate alternatives but are not predetermined early in the process. This is in-line with the Model and decision-making research that has found that consideration of these criteria is done implicitly when choosing between alternatives (Mintzberg et al., 1976).

Interestingly, these studies that identified and pinpointed decision criteria did not specifically aim to do so. Rather, these criteria emerged when examining the EBMgt process in

practice. This is potentially indicative of the value of focusing on the context when empirically examining EBMgt in practice. Furthermore, while there is some overlap between the criteria in these articles and the Model, the articles also include certain criteria which are not part of the Model. These criteria, which were external funding considerations and industry marketing initiatives, could fit under external contextual considerations. This finding suggests that the model could be potentially amended to include these criteria. Furthermore, the Model included criteria not identified in the literature, which suggests a potential gap in our knowledge on decision criteria and room for more research.

Lenses

This dimension refers to factors that influence managers' perception of the situation, and in turn impact how they make decisions, what sources of evidence they use, and what decision criteria they prioritize. In the Model, these factors include managers' motives for utilizing evidence (i.e. instrumental or symbolic) and decision characteristics, referring to managers' perception of the nature of the decision (i.e., important, urgent, familiar, ethical, emergency, controversial). In the current review, the study by Kyratsis, Ahmad, and Holmes (2012), which aimed to examine how healthcare managers rely on and make sense of evidence when making decisions, could fall under this dimension. Kyratsis et al. (2012) proposed to explore managers' motives and determine "why different understandings and meanings emerge for one observation and how this explains different views of scientific evidence" (p. 5). Since only one article could fit under lenses, this indicates a possible gap in the literature on EBMgt in hospital settings, which we will explore in the discussion.

EBMgt Concept

In addition to articles that could be categorized according to the Model, we identified a handful of articles discussing the EBMgt concept in healthcare (Table A5). These articles were conceptual in nature, and involved authors reviewing the literature or presenting their perspectives. Some of these articles introduced EBMgt as a new approach for healthcare management decision-making, discussing its main principles and comparing it to evidence-based medicine (Axelsson, 1998; Clancy & Cronin, 2005; Kovner et al., 2000; Kovner & Rundall, 2006; Ovretveit, 1999; Young, 2002). Some other articles argued for the application of EBMgt to different subfields of healthcare management, such as human resource management and healthcare facility design (Cohen, 2011; Finkler & Ward, 2003; Sadler, DuBose, & Zimring, 2008). Finally, Hewison (2004) critiqued EBMgt, arguing that it is incongruent with current management practice, and that it can inform a more critical approach to management rather than be applied in its pure form.

Discussion

The COVID-19 pandemic has made apparent the necessity of using evidence to inform healthcare management decision-making, and thus, has put EBMgt at the forefront of tackling the operational challenges facing hospitals during this pandemic. Within this context, identifying the gaps in our knowledge of EBMgt in hospital settings and delineating areas for future research is critical. It will contribute to deepening our understanding of EBMgt practice and enable its use to face the forthcoming challenges of this and future pandemics. To this end, we conducted a systematic scoping review. Adapting existing approaches used to review the EBMgt literature, we developed a novel four step methodology, which involved searching the literature not only using EBMgt terminology, but also, deriving and using terminology associated with the EBMgt

concept to conduct a second more expanded search. We analyzed the resulting 218 articles using The Grounded Model of the EBMgt Process. We found that EBMgt in hospital settings has been examined for almost 30 years; sparsely at first, but more extensively in recent years. These examinations have been mostly conducted in countries of the Global North, primarily the USA. The articles have been mostly empirical, and have used a variety of quantitative, qualitative, and mixed methods in their analyses. The majority of the articles could be captured by the dimensions of the Grounded Model of the EBMgt Process, except for a handful of articles that discussed the concept of EBMgt and advocated its use. Using this model we identified the scope of the existing literature and the major gaps in our knowledge of EBMgt in hospital settings.

In doing so, the current study makes two major contributions to the literature on EBMgt in hospital settings. First, we identified the gaps in our current knowledge of the EBMgt decision-making process in hospital settings and delineate areas for future research. The major gaps related to the lenses that influence the process of evidence-based decision-making, the outcomes of EBMgt, and the representation of the countries of the Global South among the studies. Second, we employed a new approach of identifying keywords for a scoping review, one that focused not only on the EBMgt terminology but also terminology associated with the EBMgt concept. Using this approach, we widened our search parameters, identified an additional 180 unique articles (see Figure 2) that did not use the EBMgt terminology, and gained a deeper understanding of the current state of the knowledge on EBMgt in hospital settings. We will discuss these contributions in detail below.

EBMgt in Hospital Settings: Gaps in our Knowledge and Future Research

The research on EBMgt in hospital settings has focused on two aspects; the EBMgt concept and EBMgt application. Research focusing on the EBMgt concept included articles

introducing the EBMgt principles and advocating for its use. While the larger EBMgt literature has been criticized for being dominated by such articles (Currie, 2013; Reay et al., 2009; Rynes & Bartunek, 2017), they were not a prominent component in the current review. Rather, our review indicates that unlike the general management setting (Rynes & Bartunek, 2017), the majority of the articles on EBMgt in hospital settings are empirical in nature using quantitative, qualitative, and mixed-method designs to examine some aspect of EBMgt in practice.

Research focusing on EBMgt application in hospitals included primarily empirical and some conceptual articles that focused on some aspect of the EBMgt decision-making process in practice. Mapping this research onto the Grounded Model of the EBMgt Process (Sahakian et al., 2020) indicated that there are several areas of EBMgt that future research can focus on. For example, within the process of evidence-based decision-making, the step of appraising the evidence has not received much research attention with only a handful of studies targeting this step. This scarcity is at odds with the fundamental principle of EBMgt that the quality of decisions is likely to improve the more managers use reliable evidence. Additionally, among the contextual factors influencing EBMgt, the decision criteria have received little research attention. Since the identification of these criteria is starting to build a case that in addition to evidence certain contextual factors are also considered during EBMgt, more research is necessary to delineate these decision criteria and examine their influence on EBMgt. In this discussion, however, we will focus in-depth on three areas, two related to context and one related to outcomes, which we believe pose major gaps in our knowledge of EBMgt in hospital settings and we will suggest avenues for future research.

Lenses: Managers' Subjectivity Shaping EBMgt

Among the contextual factors influencing EBMgt, in addition to the decision criteria,

lenses were also neglected in the literature on EBMgt in hospital settings with only one article dedicated to their study. Lenses represent factor that influence a managers' perception of situations, and that impact how they make decisions, what sources of evidence they use, and what decision criteria they prioritize {Sahakian, 2020 #1048}. The importance of considering the influence of perceptions and interpretations has been highlighted in the strategy process literature (Pettigrew, 1992; Pettigrew et al., 2001). In this literature it has been noted that a process cannot be discussed without discussing human agency, and how the subjective interpretation of actors – perceiving, comprehending, learning, and remembering – within a certain context, can change decision-making processes over time. This aspect has been overlooked in EBMgt, although implementation of EBMgt involves a dynamic process where agents continuously make sense of information and interpret it in the light of their knowledge, aims, and power, which can then influence the process (Baba & HakemZadeh, 2012; Sahakian et al., 2020). Critics of EBMgt have argued that there has to be greater study of how managers perceive and frame situations and how this impacts EBMgt practice, in order to better understand issues such as power, politics, and ethics, which have been neglected in EBMgt (Morrell & Learmonth, 2015).

Moreover, the strategy process literature has also noted that actors mobilize and use aspects of context within the process to obtain outcomes important to them (Pettigrew et al., 1989). Recent research into EBMgt in practice has found preliminary evidence that managers use evidence for different purposes, including to solve problems, to gather support for an action, or to give legitimacy to predetermined actions that serves their interests (Kohn, 2013; Sahakian et al., 2020). Therefore, more research into the impact of managers' perceptions and interpretation of situations and of evidence, and their motives for using evidence is necessary to better understand EBMgt practice. This could possibly be done through using the critical incident

technique to explore managers' motives and perceptions in specific incidents of evidence-based decision-making. It could also be done through using multiple case studies to examine different evidence-based decisions in different contexts and examine managers' differing perceptions and motives.

EBMgt Outcomes: Evidence for Effectiveness

We can view outcomes of EBMgt decision-making from a temporal perspective, in proximal and distal terms. Proximal outcomes refer to the targeted outcomes of a decision that occur immediately after its implementation and that can be attributed to the decision. Distal outcomes on the other hand refer to the long-term outcomes that are affected by many factors. Our review clearly identified many cases that showed that hospitals implementing particular evidence-based solutions to solve certain problems attained positive outcomes, and better outcomes than before. To illustrate, Plantier and colleagues (2017; 2017) evaluated the impact of implementing Electronic Health Records in hospitals throughout France and found a significant positive impact on the performance of surgical units and on overall quality of care. These and many of the studies in this review presenting cases of EBMgt application provide evidence that EBMgt can improve proximal outcomes of a decision.

Our review did not reveal, however, any studies assessing the effectiveness of EBMgt as an overall approach to decision-making. There is no evidence that hospitals that regularly implement EBMgt show better outcomes than before, or in comparison with hospitals that do not. Thus, evidence of distal outcomes of EBMgt is lacking in the literature on hospital settings, as it is lacking in the EBMgt literature overall (Rynes & Bartunek, 2017). Therefore, future research could focus on assessing the distal outcomes of the adoption of EBMgt. This could possibly be done through conducting longitudinal follow up studies with managers who

receiving EBMgt training and assessing the extent of their implementation of EBMgt, as well as, its effect on individual and organizational outcomes such as management and organizational performance (Rynes & Bartunek, 2017). It could also be done by comparing different units within hospitals, which are managed either using EBMgt approach or not, on individual and organizational outcomes, while also considering the impact of organizational culture. Moreover, it could also possibly be done through examining organizational outcomes before and after the implementation of certain organizational-level facilitators, such as management incentive programs and units meant to support adoption of evidence.

The Global South: The Neglected Half of the World

In addition to the contextual factors influencing the EBMgt process (i.e. decision criteria and lenses) that have been neglected in the literature, certain national contexts have also been ignored. The literature on human psychology and behavior has been criticized for neglecting about 90% of the world population. Thalmayer, Toscanelli, and Arnett (2020) examined the samples used in research published in top journals over a five year period, and found that the majority of samples in these studies are from USA (62%), Europe (17%), and other English speaking countries (14%). This is in line with the results in the current review, whereby the countries of the Global North accounted for 86.24% of all studies. Thus, we can also conclude that the literature on EBMgt in hospital settings has neglected about 90% of the World population, with only 15% of the articles representing countries of the Global South.

The countries of the Global North and South starkly differ in critical areas including income, education, and health (Arnett, 2008; Henrich, Heine, & Norenzayan, 2010). The countries of the Global South tend to be poorer developing countries, with less technologic advancement, and higher political instability (Mimiko, 2012). Given that the majority of our

knowledge and understanding of EBMgt in hospital settings is based on the Global North, this could have implications for the conclusion we can draw about EBMgt in national contexts that differ from these countries. While this literature fit well under the Grounded Model of EBMgt Process, which is based on the Lebanese context, there were certain discrepancies. Certain sub-themes under barriers and facilitators (e.g. establishing national reforms) and decision criteria (e.g. impact of marketing initiatives) were unique to the literature, while others (e.g. technological advancement) remained unique to the model. Thus, future research must move beyond studying EBMgt in the Global North contexts and focus on the remaining neglected 90% of the World to better understand the impact of differences in contexts.

This is particularly imperative in the current context of the COVID-19 pandemic, the impacts of which are unequally distributed across the Global North and South. While the impact of the pandemic in the Global North is significant, in the developing countries of the Global South it can be catastrophic due to differences in access to care, access to essential goods and services, and the ability of governments to stimulate the economy (de Moraes, 2020). Thus, better understanding the practice of EBMgt in hospital settings in the Global South is critical to its adoption in countries where the impact of the pandemic could be disastrous.

Methodological Contribution: Systematically Scoping a Fragmented Literature

Responding to Reay et al.'s (2009) conclusion that a large body of research on EBMgt does not exist, Briner et al. (2009) argued that while the principles underlying EBMgt are old, the EBMgt terminology is new and not commonly used. Another issue is that the research on EBMgt, especially in healthcare management, is spread across different disciplines including management, medicine, nursing, and human resource management, to name a few. These make it

challenging to systematically review and draw conclusions about the existing research on EBMgt in hospital settings.

To overcome these challenges, we adapted existing approaches used to review the EBMgt literature and developed a four-step methodology. While step one of our process; systematically searching the literature using the EBMgt terminology and identifying relevant articles, was not novel, the remaining steps were. These involved using an expert panel to derive and identify the relevant keywords used by articles resulting from step one, conducting a second more expanded search using these keywords, and reconciling the results of the two searches. Using this approach along with checking the reference lists of relevant articles, we widened the scope of our search exponentially, identifying an additional 180 unique articles that did not use the EBMgt terminology, and better captured a fragmented literature that is dispersed across disciplines (Papaioannou, Sutton, Carroll, Booth, & Wong, 2010). Using this methodology, our review provided a more holistic view of EBMgt decision-making and a deeper understanding of the current state of the knowledge on EBMgt in hospital settings. Given the complexity of problems facing society today, and the emphasis placed on interdisciplinary research (Pedersen, 2016; Slatin, Galizzi, Melillo, Mawn, & Phase in Healthcare Research Team, 2004), such a methodology can prove necessary for reviewing concepts in interdisciplinary fields (Raasch, Lee, Spaeth, & Herstatt, 2013).

Practical Implications

Scoping the existing literature on EBMgt in hospital settings allowed us to compile the extensive knowledge about EBMgt across different disciplines and accordingly provide some practical insights. For managers, the review provides some resources to enable EBMgt practice, including for example articles that provide tools and strategies to support evidence acquisition,

evaluation, and use (Chan et al., 2004; Kibbe et al., 1997; Lohr, 2004). The review also indicates the different competencies that might be necessary for EBMgt, which managers might choose to develop to facilitate their practice of EBMgt. Organizations could also rely on these competencies to make selection decisions or to develop training programs. Organizations can also measure their internal capacity for EBMgt practice (Thornhill et al., 2009), use the barriers and facilitators identified to identify the role their internal structure, culture, and practices play to enable EBMgt, and to identify potential solutions. Researchers, research organizations, and educational institutions can also use the barriers and facilitators identified in this review and the proposed solutions to partner with practitioners and meet practitioner needs. Government agencies can also use the review to identify the role they can play in EBMgt and facilitate partnerships across groups.

Limitations

The results and implications of this study must be considered in light of some limitations. First, our search strategy did not include the grey literature, referring to literature that is not formally published in commercial publication sources as journal articles. We did not include this literature given our study was the first scoping review of the literature on EBMgt using a new methodology. This may have limited our results because grey literature could be important for identifying studies commissioned by organizations (Briner et al., 2009) and studies with null results (R. J. Adams, Smart, & Huff, 2017). This provides an opportunity for future research. Second, our search strategy included only English language publications, because we lacked the resources (time and financial) that would be necessary for translation. Not limiting the search to English language publications might have provided a better idea of the geographic distribution and scope of the literature on EBMgt in hospital settings and provides an opportunity for future

research. Third, the search method we used, while extremely exhaustive, was also very time consuming, given the large number and wide nature of the keywords. This also accounts for the fact that the latest studies included in this review are already almost two years old. This presents an opportunity to further refine the methodology we adopted for this scoping review.

Conclusion

In the current study, we set out to identify the gaps in the literature on EBMgt in hospital settings and delineate areas for future research. We conducted a systematic scoping review and analyzed the results using an EBMgt framework (Sahakian et al., 2020) based on the process perspective (Pettigrew, 1992). We made two major contributions to the literature on EBMgt in hospital settings. First, we developed a novel review methodology for reviewing phenomena, such as EBMgt, that are not unified by common terminology and are studied across disciplines. Second, we identified the major gaps in the literature on EBMgt in hospital settings, and outlined areas for future research. We found that the literature on EBMgt in hospital settings is dominated by studies from countries of the Global North. We also found that the lenses, which refer to managers' perceptions and motives and, which influence EBMgt, have been neglected. Furthermore, we found that the distal outcomes of EBMgt implementation, which could provide evidence to the effectiveness of EBMgt as an approach have been neglected. Thus, we concluded that future research focusing on the EBMgt process, should pay particular attention to the context of the Global South, the influence of contextual factors in the form of managerial perceptions and motives, as well as, the distal outcome of EBMgt practice.

Appendix

Table A1. Articles Falling Under the Process of Evidence-based Decision-Making Dimension

Process of Evidence-based Decision-Making Dimension				
Theme	Sub-Theme	Articles	Example Research	
Acquiring Evidence	<i>Tools for Acquisition</i>	Abidi (1999)	> Abidi (1999) proposed a software that uses data mining as a tool to derive knowledge for from healthcare databases to use in decision-making.	
		Atack, Gignac, and Anderson (2010)		
		Chan et al. (2004)		
		Davidson (2017)		
		Devine, Ealey, and O'Clock (2008)		
		Doods (2005)		> Chan et al. (2004) proposed strategies to help managers' retrieve systematic reviews.
		Kibbe et al. (1997)		> Kibbe et al. (1997) proposed a multi-step process and search strategy to guide management researchers, students, and practitioners searching for best practice information on the internet
		Marshall (2013)		
		Mathew (2011)		
		Ozyapici and Tanis (2016)		
Player (1998)				
Testik et al. (2017)				
	<i>Applied Cases</i>	Aguado-Correa, Herrera-Carranza, and Padilla-Garrido (2016)	> Brady et al. (2017) described acquiring evidence about the nature of out-of-hours communication between nurses and doctors in a hospital in Ireland.	
	<i>Patient flow</i>	Elamir (2018)	> Elamir (2018) described acquiring organizational evidence about the cause of overcrowding and increased patient length of stay in an Emergency Department in a hospital in Kuwait.	
	<i>Facility design</i>	Zafar, Suri, Nguyen, Petrash, and Fazal (2016)		
	<i>Medication management</i>	Mazur et al. (2017)		
	<i>Patient experience</i>	Debono et al. (2017)		
	<i>Policy</i>	Xie and Or (2017)		
	<i>Team communication</i>	Mahmoudian-Dehkordi and Sadat (2017)		
		Brady et al. (2017)		
	<i>Acquiring Evidence about a Problem</i>	Furnham, Moutafi, and Crump (2003)	> Attree (2001) conducted a qualitative	

<i>Nursing burnout & fatigue</i>	Myers et al. (2016) Nantsupawat et al. (2017) Steege and Dykstra (2016) Steege, Pinekenstein, Arsenault Knudsen, and Rainbow (2017)	<p>study to acquire evidence about how nurses, doctors, managers, patients and relatives describe quality of care and what criteria they use to evaluate it.</p> <p>> Bucci et al. (2016) conducted a systematic review to acquired evidence about how Lean Management methods and tools can be applied to address the problem of overcrowding in Emergency Departments.</p> <p>> Jiang and Verderber (2017) conducted a systematic review to acquired evidence about the relationship between the design of hospital circulation zone (i.e. corridors, lobbies, elevators) and health-related outcomes (i.e. stress, satisfaction, patient falls).</p> <p>> Myers et al. (2016) conducted a qualitative study to acquire evidence about nurses' experiences of horizontal violence (i.e. hostile behavior by nurses towards nurses) in different types of hospitals.</p>
<i>Quality & safety</i>	Attree (2001) DeWulf, Otchi, and Soghoian (2017) Finkelstein, Silvers, and Rosenthal (1997) Steuten and Buxton (2010) Willems and Ingerfurth (2018)	
<i>Wait Time and Crowding</i>	Bucci et al. (2016) Khalifa and Zabani (2016a) Kreindler (2008) Pomey et al. (2013)	
<i>Facility design</i>	Ibrahim, Dimick, and Joseph (2017) Jiang and Verderber (2017) Ward Casscells et al. (2009)	
<i>EBMgt</i>	Guo et al. (2017)	
<i>Freestanding emergency department</i>	Patidar, Weech-Maldonado, O'Connor, Sen, and Camargo Jr (2017).	
<i>Knowledge translation</i>	Gagliardi and Dobrow (2016)	
<i>Lean implementation</i>	Al-Hyari, Abu Hammour, Abu Zaid, and Haffar (2016)	
<i>Medication management</i>	Härkänen, Saano, and Vehviläinen-Julkunen (2017)	
<i>Patient experience</i>	Bendesky, Hunter, Kirchhoff, and Jones (2016)	
<i>Performance assessment</i>	Fanelli and Zangrandi (2017)	
<i>Resource deployment</i>	Chow, Ganulin, Haddad, and Harrison (1999)	
<i>Value-based healthcare</i>	Nilsson, Bååthe, Andersson, Wikström, and Sandoff (2017)	
Appraising the Quality of the Evidence	Analyzing Data	

			to support decision making.
	Strategies & Tools for Appraisal	Davidson (2017) Kibbe et al. (1997) Lohr (2004)	Lohr (2004) classified and evaluated existing systems for grading the quality of research articles and bodies of evidence.
	Generating Alternatives	Elamir (2018)	Elamir (2018) described how several evidence-based alternatives were generated using organizational data and scientific literature to solve overcrowding in a hospital Emergency Department in Kuwait.
	Making a decision	Testik et al. (2017)	Testik et al. (2017) developed and tested a tool for objectively choosing between different alternatives.
	Preparing for Implementation	Factors Impacting Implementation Gallego et al. (2008) Korlén, Essén, Lindgren, Amer-Wahlin, and von Thiele Schwarz (2017) Pomey et al. (2013) Robbins and McAlearney (2016) Soomro et al. (2018) Stelson, Hille, Eseonu, and Doolen (2017) Walston, Kimberly, and Burns (2001)	> Pomey et al. (2013) conducted a systematic review on frameworks that can be used to analyze factors that influence the success of waiting time management strategies. > Soomro, Ahmed, Muhammad, Hayes, and Shah (2018) examined the factors that contribute to successful implementation of an e-roistering system in a hospital.
	Strategies & Tools for Implementation	Gignon et al. (2017) Guzman et al. (2015) Newhouse and White (2011)	Gignon et al. (2017) discuss how simulation can be used to design, plan, and assess a new hospital building before opening it for patient care.
	Applied Cases	Chiarini and Bacarani (2016)	Mazur et al. (2017)

	<i>Facility Design</i>	Johnson et al. (2017) Mazur et al. (2017)	described how they applied lean management principles and strategies during the design phase of a new surgery building.
Assessing & Adjusting	<i>Applied Cases Admission</i>	Jessup et al. (2016) Karliner et al. (2017)	> Büchner et al. (2016) assessed the impact of entering a health system on hospital efficiency and profitability in hospitals in Germany.
	<i>Electronic health records</i>	Plantier, Havet, Durand, Caquot, Amaz, Biron, et al. (2017) Plantier, Havet, Durand, Caquot, Amaz, Philip, et al. (2017)	> de-Carvalho et al. (2017) assessed the implementation of an automated drug-dispensing system on errors in drug administration in a hospital in Brazil.
	<i>Facility Design</i>	Donetto, Penfold, Anderson, Robert, and Maben (2017) M. Krugman, Sanders, and Kinney (2015)	> Karliner, Pérez-Stable, and Gregorich (2017) assessed the impact of having easy access to professional interpreters at each hospital bedside on readmission rates, length of stay, and hospital expenditures in USA.
	<i>Patient experience</i>	Kowalski, Yeaton, Kuhr, and Pfaff (2017) Replinger et al. (2017)	> Plantier and colleagues (2017; 2017) assessed the implementation of Electronic Health Record on the performance of surgical units and overall quality of care in hospitals throughout France.
	<i>Patient flow</i>	Naidoo and Mahomed (2016) Richardson, Brockman, Abigail, and Hollis (2017)	> Replinger et al. (2017) assessed the impact of redesigning the emergency department front-end
	<i>Staffing</i>	Claret et al. (2016) Maass et al. (2017)	
	<i>Accreditation</i>	Chen, Chien, Hsu, and Yu (2016)	
	<i>Bed Allocation</i>	Doorduijn, van Gameren, Vasse, and de Roos (2016).	
	<i>Discharge</i>	Luo, Luo, Zhang, and He (2017)	
	<i>Foodservices</i>	Büchner et al. (2016)	
	<i>Forecasting</i>	Schachner, González, Cano, Luna, and Benítez (2017)	
	<i>Health systems</i>	de-Carvalho et al. (2017)	
	<i>Medical Equipment</i>	Chiarini and Bacarani (2016)	
	<i>Medication Management</i>	Buttigieg, Gauci, and Dey (2016)	
	<i>Performance Improvement</i>	Foglia et al. (2017)	
	<i>Quality Improvement</i>	Chen et al. (2016)	
<i>Technology Assessment</i>	Doorduijn et al. (2016).		

			on patient satisfaction scores in a hospital in USA.
Overall Process	<i>Mapping the Process</i>	<u>Baghbanian et al. (2012)</u> <u>Brown and Ecoff (2011)</u> <u>Gallego et al. (2008)</u> <u>Janati et al. (2018)</u> <u>Oetjen et al. (2008)</u>	Brown and Ecoff (2011), through a conceptual study, proposed an eight-step approach to evidence-based decision making in the context of healthcare facility design.
	<i>Support Tools</i>	<u>Fernandez, Schrogie, Wilson, and Nash (1997)</u> <u>Gartnera and Padmanb (2017)</u>	Gartnera and Padmanb (2017) developed a digital workbench for hospital resource planning decisions.
	<i>Applied Cases Forecasting</i>	<u>Afilal et al. (2016)</u> <u>Barak-Corren, Israelit, and Reis (2017)</u> <u>Calegari et al. (2016)</u> <u>Lucini et al. (2017)</u> <u>Parente, Salvatore, Gallo, and Cipollini (2018)</u>	> Fulbrook, Jessup, and Kinnear (2017) proposed and assessed having nurse navigators to facilitate patient movement through the Emergency Department on throughput in a hospital in Australia.
	<i>Patient flow</i>	<u>Fulbrook et al. (2017)</u> <u>Lovett et al. (2016)</u> <u>Tibor et al. (2016)</u> <u>Venugopal, Rafi, Innah, and Puthayath (2017)</u> <u>Wiler et al. (2016)</u>	> Hicks et al. (2017) designed and tested a quality improvement initiative to reduce unnecessary blood transfusions in the Department of Surgery of a hospital in USA.
	<i>Information system</i>	<u>Krugman and Sanders (2016)</u> <u>Nippak, Veracion, Muia, Ikeda-Douglas, and Isaac (2016)</u> <u>Qin et al. (2017)</u> <u>Ruland (2001)</u>	> Khalifa (2017) conducted a root cause analysis to identify reasons for delays in discharging inpatients. They then designed and launched a performance improvement project, which involved collecting data, applying several interventions, and
	<i>Patient experience</i>	<u>Bellamkonda et al. (2016)</u> <u>Gillespie and Reader (2016)</u> <u>Nelson and Staffileno (2017)</u> <u>Pottenger et al. (2016)</u>	
	<i>Process improvement</i>	<u>Bell, Bohannon, Porthouse, Thompson, and Vago (2016)</u> <u>Bowen, Prater, Safdar, Dehkharghani, and Fountain (2016)</u> <u>Hicks et al. (2017)</u> <u>Khalifa and Zabani (2016b)</u>	
	<i>Staffing</i>	<u>Butler, Clinton, Sagi, Kenney, and Barsoum (2012)</u>	

	DeRienzo et al. (2017)	
	Kullberg et al. (2016)	
	Respicio, Moz, Pato, Somensi, and Flores (2018)	
<i>Emergency department crowding</i>	Eiset, Erlandsen, Møllekær, Mackenhauer, and Kirkegaard (2016)	> assessing their impact on discharge and average length of stay in a hospital in the Kingdom of Saudi Arabia.
	Siddharthan, Jones, and Johnson (1996)	> Lucini et al. (2017) proposed and tested a Text Mining approach to analyze free-text medical records from Emergency Department patients soon after they make first contact with Emergency Department physicians to better predict admission in a hospital in Brazil.
	Wallingford Jr et al. (2018)	
<i>Bed allocation</i>	da Silveira Grübler, da Costa, da Rosa Righi, Rigo, and Chiwiacowsky (2018)	
	Vissers (1995)	
<i>Quality improvement</i>	Gold et al. (2016)	
	Nates, Pereira, Neto, and Silva (2017)	
<i>Test turnaround time</i>	Inal et al. (2018)	
	White et al. (2017)	
<i>Employee Satisfaction</i>	Yurumezoglu and Kocaman (2012)	> Qin et al. (2017) actively involved nurses in the design, development, and implementation of an intensive care information system and examined the impact on nursing care processes and nurse satisfaction in a hospital in China.
<i>Hospital design</i>	Yoder (2008)	
<i>Patient discharge</i>	Khalifa (2017)	
<i>Policy selection</i>	Carnero and Gómez (2016)	
<i>Priority setting</i>	Astley and Wake-Dyster (2001)	> White, Yun, Lev, and Raja (2017) applied and tested a series of process improvement interventions based on lean methodologies to address delays in radiology test turnaround time in an Emergency department of a hospital in USA.

Table A2. Articles Falling Under the Sources of Evidence Dimension

Sources of Evidence Dimension			
Theme	Sources Mapped onto Model	Articles	Example Research
Concept of evidence		Råholm (2009)	Råholm (2009) argued that the concept of evidence in EBMgt is rigid, portrayed it from a multidimensional perspective, and argued for rethinking it.
Evidence used in Practice	Experiential, Scientific, Organizational, Stakeholder	Guo et al. (2017) Janati et al. (2018) Liang et al. (2012) Spiers et al. (2016)	> Guo et al. (2017) examined the types of evidence hospital managers across the USA used in their decision-making. > Shoemaker et al. (2010) described the different types of evidence used for a facility design decision in a hospital in USA.
<i>Applied Cases</i>	Experiential, Scientific, Organizational, Stakeholder	Shoemaker et al. (2010)	
	Scientific, Organizational, Stakeholder	Richer, Dawes, and Marchionni (2013)	
	Organizational, Stakeholder	Beglinger (2006)	
Encouraging the use of a specific type of evidence	Organizational	Ginsburg (2003) Jan (2003) Murphy et al. (2013) Mykkänen, Miettinen, and Saranto (2016) Schaeffer et al. (2017) Simonen et al. (2012)	> Capan et al. (2017) argued for the use of operations research to inform healthcare delivery decision-making and highlighted potential opportunities for its use. > Hawkins et al. (2016) demonstrated their use of Twitter as a supplementary data source to measure patient-perceived quality of care in US hospitals.
	Scientific	Capan et al. (2017) Peters et al. (2013)	> Patrick and Puterman (2008) discussed the benefit of using operations research in healthcare management and demonstrated its benefits for optimizing scheduling and reducing reduce wait times.
<i>Applied Cases</i>	Organizational	Fagerström (2009) Gignon et al. (2017) Hawkins et al. (2016) Margrif (1991) Seifan and Shemer (2005) Vissers (1995)	> Schaeffer, Booton, Halleck, Studeny, and Coustasse (2017) argued for the use of big data
	Scientific	AbuKhousa, Al-	

	Jaroodi, Lazarova-Molnar, and Mohamed (2014)	and discussed its potential benefits to hospitals.
	Bai, Fügener, Schoenfelder, and Brunner (2018)	
	Patrick and Puterman (2008)	

Table A3. *Articles Falling Under the Barriers & Facilitators Dimension*

Barriers & Facilitators Dimension			
Theme	Barriers Mapped onto Model	Article	Example Research
Examining one Barrier/ Facilitator	Characteristics of the Evidence	Aldrich, Bonevski, and Wilson (2006) Alexander et al. (2007) Atack et al. (2010) Bai et al. (2018) Barton (1994) Fergie and Wood (2003) Finkler and Ward (2003) Gautam (2008) Green (2011) Kontio et al. (2013) Lomas (2005) Matchar et al. (2005) Poot et al. (2018) Pope, Mays, and Popay (2006) Treweek et al. (2013) Tricco, Zarin, Rios, Straus, and Langlois (2016) Ulrich, Berry, Quan, and Parish (2010) Zborowsky and Bunker-Hellmich (2010) Zwijnenberg et al. (2016)	> Alexander et al. (2007) examined the types of information hospital chief executive officers need to address cost and quality problems and the extent to which health services research is meeting those needs. > Zborowsky and Bunker-Hellmich (2010) discuss evidence-based design decision-making and the challenges and opportunities that exist related to the existing research evidence. > Zwijnenberg et al. (2016) examined how information presentation effects the way it is understood and used for quality improvement.
	Characteristics of the Decision Maker	Adams et al. (2016) Bigelow and Arndt (2003) Browman et al. (2003) Burgess and Currie (2013) Finkler (2002) Fischer et al. (2016) Fletcher and Thornhill (2009) Jbilou et al. (2009)	> Finkler (2002) discuss the necessity of providing research oriented education as a way to overcome barriers to evidence-based management. > Nicklin and Stipich (2005), described the goals of a

	Lavoie-Tremblay, Anderson, Bonneville-Roussy, Drevniok, and Lavigne (2012)	program aimed to enhance healthcare executives' skills in using research for decision making.
	Nicklin and Stipich (2005)	
Organizational Structure & Culture	Allen (1997)	> Ellen et al. (2013) examine the different programs, interventions, instruments, and tools that healthcare organizations in Canada have to support evidence-informed decision-making and which are perceived to actually facilitate evidence-based decision-making.
	Ellen, Lavis, Ouimet, Grimshaw, and Bédard (2011)	
	Ellen et al. (2013)	
	Finkler (2004)	
	Friedman (1999)	
	Innis and Berta (2016)	
	Jan (2003)	
	Jayakumar et al. (2016)	
	Kovner, Wagner, and Curtis (2001)	> Thornhill, Judd, and Clements (2009) discussed a self-assessment tool that can be used by healthcare organizational to examine their capacity to acquire, interpret, and rely on research evidence to make decisions and deliver healthcare services.
	Lavoie-Tremblay, Richer, et al. (2012)	
	Murphy, Wilson, and Newhouse (2013)	
	Ouimet et al. (2014)	
	Rundall, Martelli, Arroyo, and McCurdy (2007)	
	Sarkies et al. (2017)	
	Thornhill et al. (2009)	
	Wills (2014)	
	Yu-N and Abidi (1999)	
National Structure & Culture	Mykkänen, Miettinen, and Saranto (2016)	Wilson, Lavis, and Grimshaw (2012) documented five Canadian contributions to facilitate the acquisition and use of research evidence.
	Ranasinghe, Chan, and Yaralagadda (2012)	
	Wilson et al. (2012)	
Examining overall	• Characteristics of Axelsson (1998)	> Ellen et al. (2014)

Barriers & Facilitators

the Evidence	Gallego, Fowler, and van Gool (2008)	identified the barriers and facilitators to implementing programs, interventions, instruments, and tools to support evidence-informed decision-making in Canadian healthcare organizations.
• Characteristics of the Decision Maker	Kovner, Elton, and Billings (2000)	
	Sheng, Chang, Teo, and Lin (2013)	
• Characteristics of the Evidence	Gagliardi and Dobrow (2016)	
• Organizational Structure & Culture	Ginsburg (2003)	
	Golenko et al. (2012)	
	Jih, Chen, and Chen (2006)	
	Marshall (2013)	
• Characteristics of the Evidence	Clancy and Cronin (2005)	
• National Structure & Culture	Leatherman and Sutherland (2007)	
• Characteristics of the Evidence	Ellen et al. (2014)	> Golenko, Pager, and Holden (2012) assessed the barriers and facilitators to research capacity building from the perspective of senior healthcare managers in allied health.
• Characteristics of the Decision Maker	Jbilou, Amara, and Landry (2007)	
• Organizational Structure & Culture	Karamitri et al. (2017)	
	Langaner and Worthington (2010)	
	Niedzwiedzka (2003)	
	Simonen, Viitanen, and Blom (2012)	
• Characteristics of the Evidence	Liang et al. (2012)	
• Characteristics of the Decision Maker		
• National Structure & Culture		
• Characteristics of the Decision Maker	Guo et al. (2017)	
• Organizational Structure & Culture	Champagne, Lemieux-Charles, Duranceau, MacKean, and Reay (2014)	
	Janati, Hasanpoor, Hajebrahimi, and Sadeghi-Bazargani (2018)	
	Shoemaker, Kazley, and White (2010)	
	Spiers, Lo, Hofmeyer, and Cummings (2016)	

	Williams (2006)	
<ul style="list-style-type: none"> • Organizational Structure & Culture • National Structure & Culture 	<p>Canaway, Bismark, Dunt, and Kelaher (2017)</p>	<p>barriers to implementation of knowledge management.</p>
<ul style="list-style-type: none"> • Characteristics of the Evidence • Characteristics of the Decision Maker • Organizational Structure & Culture • National Structure & Culture 	<p>Kovner and Rundall (2006)</p> <hr/> <p>Walshe and Rundall (2001)</p>	<p>> Kovner and Rundall (2006) suggest practical strategies that healthcare organizations in USA can adopt to strengthen the implementation of evidence-based management.</p> <p>> Liang, Howard, Leggat, and Murphy (2012) conducted a systematic review on evidence- informed decision-making, including the barriers to its practice among health service managers.</p> <p>> Niedzwiedzka (2003) examined the individual and environmental factors that influence healthcare managers' information use in hospitals in Poland.</p>

Table A4. *Articles Falling Under the Decision Criteria Dimension*

Decision Criteria Dimension			
Theme	Decision Criteria Mapped onto Model	Articles	Example Research
Identifying Criteria	Organizational	Friedman (1999)	Spiers et al. (2016) examined nurse leaders' evidence-based decision-making process in a context of continuous restructuring, and found that political and fiscal criteria inherent in system restructuring took precedent over patient needs.
	Organizational, External	Spiers et al. (2016)	
	Organizational, Stakeholder	Shoemaker et al. (2010)	
	Organizational, Stakeholder, External	Gallego et al. (2008)	
	Ethico-Legal	Janati et al. (2018)	
Pinpointing Criteria in the Process	-	Oetjen et al. (2008)	Oetjen et al. (2008) offered a conceptually developed evidence-based managerial decision-making modal, which included developing and ranking criteria once a problem is identified and then using the criteria to choose between alternatives.
Pinpointing & identifying Criteria in the Process	Organizational, Ethico-Legal, Technical	Baghbanian et al. (2012)	Baghbanian et al. (2012) empirically developed a decision-making model for resource allocation, which depicted different decision criteria that are used to evaluate possible positions and create contextual fit.
	Organizational, Stakeholder	Beglinger (2006)	

Table A5. Articles Falling Under the EBMgt Concept Label

EBMgt Concept			
Dimension	Theme	Example Research	
EBMgt Introduction & Promotion	<i>Healthcare Management</i>	Axelsson (1998)	> Walshe and Rundall (2001) introduced the core principles of evidence-based management in healthcare, compared it to evidence-based medicine, described its increasing acceptance, and explored the reasons behind it.
		Clancy and Cronin (2005)	
		Kovner and Rundall (2006)	
		Kovner et al. (2000)	
		Ovretveit (1999)	
		Walshe and Rundall (2001)	
		Young (2002)	
EBMgt Promotion	<i>Facility Design</i>	Berry et al. (2004)	> Finkler (2004) argued that healthcare financial management can benefit from the evidence-based management approach and discussed a framework for its application. > Cohen (2011) discussed the financial benefits of using the evidence-based management approach for managing the healthcare workforce.
		Sadler et al. (2008)	
		Ulrich et al. (2010)	
		Zborowsky and Bunker-Hellmich (2010)	
		Finkler (2004)	
	<i>Financial Management</i>	Finkler and Ward (2003)	
	<i>Nursing Management</i>	Shingler-Nace and Gonzalez (2017)	
		Williams (2006)	
	<i>Health Technology Assessment</i>	Juzwishin (2010)	
	<i>Human Resource Management</i>	Cohen (2011)	
<i>Risk Management</i>	Card, Ward, and Clarkson (2012)		
EBMgt Criticism		Hewison (2004) argued that EBMgt is incongruent with current management practice.	

References

*Results of the systematic scoping review are marked with astericks.

- *Abidi, S. S. R. (1999). Applying Data Mining in Healthcare: An Info-Structure for Delivering "Data-Driven" Strategic Services. *Studies in health technology and informatics*, 453-456.
- *AbuKhoua, E., Al-Jaroodi, J., Lazarova-Molnar, S., & Mohamed, N. H. (2014). Simulation and modeling efforts to support decision making in healthcare supply chain management. *The Scientific World Journal*, 2014, 1-16.
- Adams, J. G., & Walls, R. M. (2020). Supporting the Health Care Workforce During the COVID-19 Global Epidemic. *Jama*, 323(15), 1439-1440. doi:10.1001/jama.2020.3972
- *Adams, R., Rush, K., Leddy, C., Cook, T. L., Leach, T. K., Bollinger, B. I., & Hoyle, L. (2016). Increased consumer communication and knowledge leads to higher quality in health care. *Radiologic technology*, 88(1), 80-83.
- Adams, R. J., Smart, P., & Huff, A. S. (2017). Shades of grey: guidelines for working with the grey literature in systematic reviews for management and organizational studies. *International Journal of Management Reviews*, 19(7), 432-454.
- *Afilal, M., Yalaoui, F., Dugardin, F., Amodeo, L., Laplanche, D., & Blua, P. (2016). Forecasting the emergency department patients flow. *Journal of medical systems*, 40(7), 175.
- *Aguado-Correa, F., Herrera-Carranza, M., & Padilla-Garrido, N. (2016). Variability and Overcrowding Management: Ongoing Challenge for Spanish Hospital Emergency Departments. *Journal of Health Management*, 18(2), 218-230.
- *Al-Hyari, K., Abu Hammour, S., Abu Zaid, M. K. S., & Haffar, M. (2016). The impact of Lean bundles on hospital performance: does size matter? *International Journal of Health Care Quality Assurance*, 29(8), 877-894.
- *Aldrich, R., Bonevski, B., & Wilson, A. (2006). A case study on determining and responding to health managers' priorities for research to assist health service decision making. *Australian Health Review*, 30(4), 435-441.
- *Alexander, J. A., Hearld, L. R., Jiang, H. J., & Fraser, I. (2007). Increasing the relevance of research to health care managers: Hospital CEO imperatives for improving quality and lowering costs. *Health Care Management Review*, 32(2), 150-159.

- *Allen, J. (1997). Overcome info overload to improve decision-making. . *Data Strategy & Benchmarking*, 1(6), 81-96.
- Anell, A., & Willis, M. (2000). International comparison of health care systems using resource profiles. *Bulletin of the World Health Organization*, 78, 770-778.
- Arksey, H., & O'Malley, L. (2005). Scoping studies: towards a methodological framework. *International Journal of Social Research Methodology*, 8(1), 19-32.
- Arnett, J. J. (2008). The neglected 95%: why American psychology needs to become less American. *American Psychologist*, 63(7), 602-614. doi:10.1037/0003-066X.63.7.602
- *Astley, J., & Wake-Dyster, W. (2001). Evidence-based priority setting. *Australian Health Review*, 24(2), 32-39.
- *Atack, L., Gignac, P., & Anderson, M. (2010). Getting the right information to the table: using technology to support evidence-based decision making. *Healthcare Management Forum*, 23(4), 164-168.
- *Attree, M. (2001). A study of the criteria used by healthcare professionals, managers and patients to represent and evaluate quality care. *Journal Nursing Management*, 9(2), 67-78.
- *Axelsson, R. (1998). Towards an evidence based health care management. *The International Journal of Health Planning and Management*, 13(4), 307-317.
- Baba, V. V., & HakemZadeh, F. (2012). Toward a theory of evidence based decision making. *Management Decision*, 50(5), 832-867. doi:10.1108/00251741211227546
- *Baghbanian, A., Hughes, I., Kebriaei, A., & Khavarpour, F. A. (2012). Adaptive decision-making: how Australian healthcare managers decide. *Australian Health Review*, 36(1), 49-56. doi:10.1071/AH10971
- *Bai, J., Fügenger, A., Schoenfelder, J., & Brunner, J. O. (2018). Operations research in intensive care unit management: a literature review. *Health care management science*, 21(1), 1-24.
- *Barak-Corren, Y., Israelit, S. H., & Reis, B. Y. (2017). Progressive prediction of hospitalisation in the emergency department: uncovering hidden patterns to improve patient flow. *Emerg Med J*, 34(5), 308-314.
- Barends, E., Rousseau, D. M., Briner, R. B., & Center for Evidence-Based Management, A. (2014). *Evidence-Based Management, The Basic Principles*. Amsterdam: Center for Evidence-based Management.

- *Barton, A. J. (1994). Data needs for decision support of chief nurse executives. *The Journal of nursing administration*, 24(4 Suppl), 19-25.
- *Beglinger, J. E. (2006). Quantifying patient care intensity: an evidence-based approach to determining staffing requirements. *Nursing Administration Quarterly*, 30(3), 193-202.
- *Bell, A. M., Bohannon, J., Porthouse, L., Thompson, H., & Vago, T. (2016). Process improvement to enhance quality in a large volume labor and birth unit. *MCN: The American Journal of Maternal/Child Nursing*, 41(6), 340-348.
- *Bellamkonda, V. R., Kumar, R., Scanlan-Hanson, L. N., Hess, J. J., Hellmich, T. R., Bellamkonda, E., . . . Nestler, D. M. (2016). Pilot study of Kano “Attractive Quality” techniques to identify change in emergency department patient experience. *Annals of emergency medicine*, 68(5), 553-561.
- *Bendesky, B. S., Hunter, K., Kirchhoff, M. A., & Jones, C. W. (2016). Same physician, different location, different patient satisfaction scores. *Annals of emergency medicine*, 68(5), 531-535.
- *Berry, L. L., Parker, D., Coile, R. C., Hamilton, D. K., O'Neill, D. D., & Sadler, B. L. (2004). The business case for better buildings. *Frontiers of Health Services Management*, 21, 3-24.
- *Bigelow, B., & Arndt, M. (2003). Teaching evidence-based management: where do we go from here? *The Journal of health administration education*, 20(4), 305-312.
- *Bowen, M., Prater, A., Safdar, N. M., Dehkharghani, S., & Fountain, J. A. (2016). Utilization of workflow process maps to analyze gaps in critical event notification at a large, urban hospital. *Journal of digital imaging*, 29(4), 420-424.
- *Brady, A.-M., Byrne, G., Quirke, M. B., Lynch, A., Ennis, S., Bhangu, J., & Prendergast, M. (2017). Barriers to effective, safe communication and workflow between nurses and non-consultant hospital doctors during out-of-hours. *International Journal for Quality in Health Care*, 29(7), 929-934.
- Briner, R. B., Denyer, D., & Rousseau, D. M. (2009). Evidence-Based Management: Concept Cleanup Time? *Academy of Management Perspectives*, 23(4), 19-32.
- *Browman, G. P., Snider, A., & Ellis, P. (2003). Negotiating for change. The healthcare manager as catalyst for evidence-based practice: changing the healthcare environment and sharing experience. *HealthcarePapers*, 3(3), 10-22.

- *Brown, C. E., & Ecoff, L. (2011). A systematic approach to the inclusion of evidence in healthcare design. *HERD: Health Environments Research & Design Journal*, 4(2), 7-16.
- *Bucci, S., De Belvis, A., Marventano, S., De Leva, A., Tanzariello, M., Specchia, M. L., . . . Franceschi, F. (2016). Emergency Department crowding and hospital bed shortage: is Lean a smart answer? A systematic review. *Eur Rev Med Pharmacol Sci*, 20(20), 4209-4219.
- *Büchner, V. A., Hinz, V., & Schreyögg, J. (2016). Health systems: changes in hospital efficiency and profitability. *Health care management science*, 19(2), 130-143.
- *Burgess, N., & Currie, G. (2013). The knowledge brokering role of the hybrid middle level manager: The case of healthcare. *British Journal of Management*, 24, S132-S142.
- *Butler, V., Clinton, C., Sagi, H. K., Kenney, R., & Barsoum, W. K. (2012). Applying science and strategy to operating room workforce management. *Nursing Economics*, 30(5), 275.
- *Buttigieg, S. C., Gauci, D., & Dey, P. (2016). Continuous quality improvement in a Maltese hospital using logical framework analysis. *Journal of Health Organization Management*, 30(7), 1026-1046.
- *Calegari, R., Fogliatto, F. S., Lucini, F. R., Neyeloff, J., Kuchenbecker, R. S., & Schaan, B. D. (2016). Forecasting daily volume and acuity of patients in the emergency department. *Computational and mathematical methods in medicine*, 2016, 1-8.
- Campbell Collaboration. (2019). *Campbell systematic reviews: Policies and guidelines*. . Retrieved from <https://onlinelibrary.wiley.com/pb-assets/assets/18911803/Campbell%20Policies%20and%20Guidelines%20v4-1559660867160.pdf>
- *Canaway, R., Bismark, M., Dunt, D., & Kelaher, M. (2017). Medical directors' perspectives on strengthening hospital quality and safety. *Journal of Health Organization Management*, 31(7/8), 696-712.
- *Capan, M., Khojandi, A., Denton, B. T., Williams, K. D., Ayer, T., Chhatwal, J., . . . Zaric, G. (2017). From data to improved decisions: Operations Research in healthcare delivery. *Medical Decision Making*, 37(8), 849-859.
- *Card, A. J., Ward, J. R., & Clarkson, P. J. (2012). Getting to Zero: Evidence-based healthcare risk management is key. *Journal of Healthcare Risk Management*, 32(2), 20-27.

- *Carnero, M. C., & Gómez, A. (2016). A multicriteria decision making approach applied to improving maintenance policies in healthcare organizations. *BMC medical informatics and decision making*, 16(1), 47.
- Cavallo, J. J., Donoho, D. A., & Forman, H. P. (2020) Hospital Capacity and Operations in the Coronavirus Disease 2019 (COVID-19) Pandemic—Planning for the Nth Patient. In: *Vol. 1. JAMA Health Forum* (pp. e200345-e200345): American Medical Association.
- Center for Systems Science and Engineering. (2020). COVID-19 Dashboard by the Center for Systems Science and Engineering (CSSE) at Johns Hopkins University (JHU). *Coronavirus Resource Center*. Retrieved from <https://coronavirus.jhu.edu/map.html>
- *Champagne, F., Lemieux-Charles, L., Duranceau, M.-F., MacKean, G., & Reay, T. (2014). Organizational impact of evidence-informed decision making training initiatives: a case study comparison of two approaches. *Implementation Science*, 9(1), 53.
- *Chan, K. S., Morton, S. C., & Shekelle, P. G. (2004). Systematic reviews for evidence-based management: how to find them and what to do with them. *American Journal of Managed Care*, 10(11 Pt 1), 806-812.
- *Chen, K.-C., Chien, L.-N., Hsu, Y.-H., & Yu, M.-M. (2016). Metafrontier frameworks for studying hospital productivity growth and quality changes. *International Journal for Quality in Health Care*, 28(6), 650-656.
- *Chiarini, A., & Bacarani, C. (2016). TQM and lean strategy deployment in Italian hospitals: Benefits related to patient satisfaction and encountered pitfalls. *Leadership in Health Services*, 29(4), 377-391.
- *Chow, C. W., Ganulin, D., Haddad, K., & Harrison, P. D. (1999). Increasing the effectiveness of resource deployment in healthcare organizations. *Journal of Healthcare Management*, 44(6), 513-528.
- *Clancy, C. M., & Cronin, K. (2005). Evidence-based decision making: global evidence, local decisions. *Health Affairs*, 24(1), 151-162.
- *Claret, P. G., Bobbia, X., Olive, S., Demattei, C., Yan, J., Cohendy, R., . . . de La Coussaye, J. E. (2016). The impact of emergency department segmentation and nursing staffing increase on inpatient mortality and management times. *BMC Health Serv Res*, 16(1), 279.
- *Cohen, K. R. (2011). The case for evidence-based human capital management. *Healthcare Financial Management*, 65(8), 102-108.

- Currie, K. M. (2013). *Updating Reay, Berta & Kohn EBMgt systematic review*. (Unpublished Thesis), University of Prince Edward Island, Canada,
- *da Silveira Grübler, M., da Costa, C. A., da Rosa Righi, R., Rigo, S. J., & Chiwiacowsky, L. D. (2018). A Hospital bed allocation hybrid model based on situation awareness. *CIN: Computers, Informatics, Nursing*, 36(5), 249-255.
- *Davidson, J. E. (2017). Organizing the evidence for healthcare design projects. *HERD: Health Environments Research & Design Journal*, 10(2), 13-22.
- *de-Carvalho, D., Alvim-Borges, J. L., & Toscano, C. M. (2017). Impact assessment of an automated drug-dispensing system in a tertiary hospital. *Clinics*, 72(10), 629-636.
- de Moraes, R. F. (2020). Not a First-World Problem: COVID-19 in the Global South. *Journal Of International Affairs*, 73.
- Dean, J. W. J., & Bowen, D. E. (1994). Management theory and total quality: improving research and practice through theory development. *Academy of Management Review*, 19(3), 392-418.
- *Debono, D., Taylor, N., Lipworth, W., Greenfield, D., Travaglia, J., Black, D., & Braithwaite, J. (2017). Applying the theoretical domains framework to identify barriers and targeted interventions to enhance nurses' use of electronic medication management systems in two Australian hospitals. *Implementation Science*, 12(1), 42.
- del Rio, C., & Malani, P. N. (2020). COVID-19—New Insights on a Rapidly Changing Epidemic. *Jama*, 323(14), 1339-1340. doi:10.1001/jama.2020.3072
- *Delias, P., Doumpos, M., Grigoroudis, E., Manolitzas, P., & Matsatsinis, N. (2015). Supporting healthcare management decisions via robust clustering of event logs. *Knowledge-Based Systems*, 84, 203-213.
- *DeRienzo, C. M., Shaw, R. J., Meanor, P., Lada, E., Ferranti, J., & Tanaka, D. (2017). A discrete event simulation tool to support and predict hospital and clinic staffing. *Health informatics journal*, 23(2), 124-133.
- *Devine, K., Ealey, T., & O'Clock, P. (2008). A framework for cost management and decision support across health care organizations of varying size and scope. *Journal of health care finance*, 35(2), 63-75.
- *DeWulf, A., Otchi, E. H., & Soghoian, S. (2017). Identifying priorities for quality improvement at an emergency Department in Ghana. *BMC emergency medicine*, 17(1), 28.

- *Donetto, S., Penfold, C., Anderson, J., Robert, G., & Maben, J. (2017). Nursing work and sensory experiences of hospital design: A before and after qualitative study following a move to all-single room inpatient accommodation. *Health & place, 46*, 121-129.
- *Doods, S. (2005). Designing improved health care processes using discrete event stimulation. *Br J Healthcare Comput Inf Manag, 22*, 14-16.
- *Doorduijn, A. S., van Gameren, Y., Vasse, E., & de Roos, N. M. (2016). At Your Request® room service dining improves patient satisfaction, maintains nutritional status, and offers opportunities to improve intake. *Clinical nutrition, 35*(5), 1174-1180.
- *Eiset, A. H., Erlandsen, M., Møllekær, A. B., Mackenhauer, J., & Kirkegaard, H. (2016). A generic method for evaluating crowding in the emergency department. *BMC emergency medicine, 16*(1), 21.
- *Elamir, H. (2018). Improving patient flow through applying lean concepts to emergency department. *Leadership in Health Services, 31*(3), 293-309.
- *Ellen, M. E., Lavis, J. N., Ouimet, M., Grimshaw, J. M., & Bédard, P. O. (2011). Determining research knowledge infrastructure for healthcare systems: a qualitative study. *Implementation Science, 6*(1), 60.
- *Ellen, M. E., Léon, G., Bouchard, G., Lavis, J. N., Ouimet, M., & Grimshaw, J. M. (2013). What supports do health system organizations have in place to facilitate evidence-informed decision-making? A qualitative study. *Implementation Science, 8*(1), 1-19.
- *Ellen, M. E., Léon, G., Bouchard, G., Ouimet, M., Grimshaw, J. M., & Lavis, J. N. (2014). Barriers, facilitators and views about next steps to implementing supports for evidence-informed decision-making in health systems: a qualitative study. *Implementation Science, 9*(1), 179.
- Elo, S., & Kyngas, H. (2008). The qualitative content analysis process. . *Journal of Advanced Nursing, 62*(1), 107-115. doi:10.1111/j.1365-2648.2007.04569.x
- *Fagerström, L. (2009). Evidence-based human resource management: a study of nurse leaders' resource allocation. *Journal Nursing Management, 17*(4), 415-425.
- *Fanelli, S., & Zangrandi, A. (2017). Assessment for improving the performance of NICUs: The Italian experience. *Health Services Management Research, 30*(3), 168-178.

- *Ferlie, E., & Wood, M. (2003). Novel mode of knowledge production? Producers and consumers in health services research. *Journal of Health Services Research & Policy*, 8(2_suppl), 51-57.
- *Fernandez, A., Schrogie, J., Wilson, W., & Nash, D. (1997). Technology assessment in healthcare: a review and description of a "best practice" technology assessment process. *Best Practices and Benchmarking in Healthcare*, 2(6), 240-253.
- *Finkelstein, B. S., Silvers, J., & Rosenthal, G. E. (1997). The importance of outcomes data in health care decision making and purchasing. *Marketing health services*, 17(2), 52.
- *Finkler, S. A. (2002). Teaching future healthcare financial managers to use evidence. *The Journal of health administration education*, 20(4), 243-261.
- *Finkler, S. A. (2004). Evidence-Based Financial Management - What are We Waiting for? *Research in Healthcare Financial Management*, 9(1), 1.
- *Finkler, S. A., & Ward, D. M. (2003). The case for the use of evidence-based management research for the control of hospital costs. *Health Care Management Review*, 28(4), 348-365.
- *Fischer, M. D., Dopson, S., Fitzgerald, L., Bennett, C., Ferlie, E., Ledger, J., & McGivern, G. (2016). Knowledge leadership: Mobilizing management research by becoming the knowledge object. *Human Relations*, 69(7), 1563-1585.
- *Fletcher, L., & Thornhill, J. (2009). Organizational value in enhancing individual research use capacity: a joint evaluation project led by EXTRA and SEARCH Canada. *Healthcare Quarterly*, 12(2), 18-20.
- *Foglia, E., Lettieri, E., Ferrario, L., Porazzi, E., Garagiola, E., Pagani, R., . . . Masella, C. (2017). Technology assessment in hospitals: lessons learned from an empirical experiment. *International Journal of Technology Assessment in Health Care*, 33(2), 288-296.
- Fong, Z. V., Qadan, M., McKinney, R. J., Griggs, C. L., Shah, P., Buyske, J., . . . Altieri, M. S. (2020). Practical Implications of Novel Coronavirus COVID-19 on Hospital Operations, Board Certification, and Medical Education in Surgery in the USA. *J Gastrointest Surg*, 1-5. doi:10.1007/s11605-020-04596-5
- *Friedman, C. P. (1999). Information technology leadership in academic medical centers: a tale of four cultures. *Academic Medicine*, 74(7), 795-799.

- *Fulbrook, P., Jessup, M., & Kinnear, F. (2017). Implementation and evaluation of a 'Navigator' role to improve emergency department throughput. *Australasian Emergency Nursing Journal*, 20(3), 114-121.
- Furnham, A., Moutafi, J., & Crump, J. (2003). The Relationship between the Revised Neo-Personality Inventory and the Myers-Briggs Type Indicator. *Social Behavior and Personality: an international journal*, 31(6), 577-584. doi:10.2224/sbp.2003.31.6.577
- *Gagliardi, A. R., & Dobrow, M. J. (2016). Identifying the conditions needed for integrated knowledge translation (IKT) in health care organizations: qualitative interviews with researchers and research users. *BMC Health Serv Res*, 16(1), 256.
- *Gallego, G., Fowler, S., & van Gool, K. (2008). Decision makers' perceptions of health technology decision making and priority setting at the institutional level. *Australian Health Review*, 32(3), 520-527.
- *Gartner, D., & Padmanab, R. (2017). E-HOSPITAL—a digital workbench for hospital operations and services planning using information technology and algebraic languages. *Studies in health technology and informatics*, 245, 84-88.
- *Gautam, K. (2008). Addressing the research-practice gap in healthcare management. *Journal of Public Health Management and Practice*, 14(2), 155-159.
- *Gignon, M., Amsellem, C., & Ammirati, C. (2017). Moving a hospital: simulation—a way to co-produce safety healthcare facilities. *International Journal of Occupational Safety and Ergonomics*, 23(4), 589-591.
- *Gillespie, A., & Reader, T. W. (2016). The Healthcare Complaints Analysis Tool: development and reliability testing of a method for service monitoring and organisational learning. *BMJ Qual Saf*, 25(12), 937-946.
- *Ginsburg, L. S. (2003). Factors that influence line managers' perceptions of hospital performance data. *Health Services Research*, 38(1p1), 261-286.
- *Gold, B., England, D., Riley, W., Jacobs-Halsey, G., Webb, C., & Daniels, B. (2016). Integrating quality improvement and continuing professional development at an academic medical center: a partnership between practice plan, hospital, and medical school. *Journal of Continuing Education in the Health Professions*, 36(4), 307-315.

- *Golenko, X., Pager, S., & Holden, L. (2012). A thematic analysis of the role of the organisation in building allied health research capacity: a senior managers' perspective. *BMC Health Serv Res*, 12(1), 276.
- *Green, A. (2011). Information overload in healthcare management: How the READ Portal is helping healthcare managers. *Journal of the Canadian Health Libraries Association/Journal de l'Association des bibliothèques de la santé du Canada*, 32(3), 173-176.
- *Guo, R., Berkshire, S. D., Fulton, L. V., & Hermanson, P. M. (2017). Use of evidence-based management in healthcare administration decision-making. *Leadership in Health Services*, 30(3), 330-342.
- *Guzman, G., Fitzgerald, J. A., Fulop, L., Hayes, K., Poropat, A., Avery, M., . . . Herington, C. (2015). How best practices are copied, transferred, or translated between health care facilities: a conceptual framework. *Health Care Management Review*, 40(3), 193-202.
- *Härkänen, M., Saano, S., & Vehviläinen-Julkunen, K. (2017). Using incident reports to inform the prevention of medication administration errors. *Journal of Clinical Nursing*, 26(21-22), 3486-3499.
- *Hawkins, J. B., Brownstein, J. S., Tuli, G., Runels, T., Broecker, K., Nsoesie, E. O., . . . Bourgeois, F. T. (2016). Measuring patient-perceived quality of care in US hospitals using Twitter. *BMJ Qual Saf*, 25(6), 404-413.
- Henrich, J., Heine, S. J., & Norenzayan, A. (2010). The weirdest people in the world? *Behavioral and brain sciences*, 33(2-3), 61-83.
- *Hewison, A. (2004). Evidence-based management in the NHS: is it possible? *Journal of Health Organization Management*, 18(5), 336-348.
- *Hicks, C. W., Liu, J., Yang, W. W., DiBrito, S. R., Johnson, D. J., Brito, A., . . . Wick, E. C. (2017). A comprehensive Choosing Wisely quality improvement initiative reduces unnecessary transfusions in an Academic Department of Surgery. *The American Journal of Surgery*, 214(4), 571-576.
- Huff, A. S., & Reger, R. K. (1987). A review of strategic process research. *Journal of management*, 13(2), 211-236.
- *Ibrahim, A. M., Dimick, J. B., & Joseph, A. (2017). Building a better operating room: views from surgery and architecture. *Annals of surgery*, 265(1), 34-36.

- *Inal, T. C., Goruroglu Ozturk, O., Kibar, F., Cetiner, S., Matyar, S., Daglioglu, G., & Yaman, A. (2018). Lean six sigma methodologies improve clinical laboratory efficiency and reduce turnaround times. *Journal of clinical laboratory analysis*, 32(1), e22180.
- *Innis, J., & Berta, W. (2016). Routines for change: how managers can use absorptive capacity to adopt and implement evidence-based practice. *Journal Nursing Management*, 24(6), 718-724.
- Jaana, M., Vartak, S., & Ward, M. M. (2014). Evidence-based health care management: what is the research evidence available for health care managers? *Evaluation & the health professions*, 37(3), 314-334. doi:10.1177/0163278713511325
- *Jan, S. (2003). Why does economic analysis in health care not get implemented more? Towards a greater understanding of the rules of the game and the costs of decision making. *Applied Health Economics and Health Policy*, 2(1), 17-24.
- *Janati, A., Hasanpoor, E., Hajebrahimi, S., & Sadeghi-Bazargani, H. (2018). Evidence-based management–healthcare manager viewpoints. *International Journal of Health Care Quality Assurance*, 31(5), 436-448.
- *Jayakumar, K. L., Lavenberg, J. A., Mitchell, M. D., Doshi, J. A., Leas, B., Goldmann, D. R., . . . Umscheid, C. A. (2016). Evidence synthesis activities of a hospital evidence-based practice center and impact on hospital decision making. *Journal of hospital medicine*, 11(3), 185-192.
- *Jbilou, J., Amara, N., & Landry, R. (2007). Research based-decision-making in Canadian health organizations: a behavioural approach. *Journal of medical systems*, 31(3), 185-196.
- *Jbilou, J., Landry, R., Amara, N., & El Adlouni, S. (2009). Combining communication technology utilization and organizational innovation: evidence from Canadian healthcare decision makers. *Journal of medical systems*, 33(4), 275-286.
- *Jessup, M., Crilly, J., Boyle, J., Wallis, M., Lind, J., Green, D., & Fitzgerald, G. (2016). Users' experiences of an emergency department patient admission predictive tool: A qualitative evaluation. *Health informatics journal*, 22(3), 618-632.
- *Jiang, S., & Verderber, S. (2017). On the planning and design of hospital circulation zones: a review of the evidence-based literature. *HERD: Health Environments Research & Design Journal*, 10(2), 124-146.

- *Jih, W.-J., Chen, C.-H., & Chen, Y.-H. (2006). Effects of knowledge management implementation in hospitals: An exploratory study in Taiwan. *International Journal of Knowledge Management (IJKM)*, 2(3), 1-20.
- *Johnson, K., M. Mazur, L., Chadwick, J., Pooya, P., Amos, A., & McCreery, J. (2017). Integrating lean exploration loops into healthcare facility design: Schematic phase. *HERD: Health Environments Research & Design Journal*, 10(3), 131-141.
- *Juzwishin, D. (2010). Evidence informed decision-making in healthcare: the case for health technology assessment. *World hospitals and health services: the official journal of the International Hospital Federation*, 46(1), 10-12.
- *Karamitri, I., Talias, M. A., & Bellali, T. (2017). Knowledge management practices in healthcare settings: a systematic review. *The International Journal of Health Planning and Management*, 32(1), 4-18.
- *Karlner, L. S., Pérez-Stable, E. J., & Gregorich, S. E. (2017). Convenient access to professional interpreters in the hospital decreases readmission rates and estimated hospital expenditures for patients with limited English proficiency. *Medical care*, 55(3), 199.
- *Khalifa, M. (2017). Reducing Length of Stay by Enhancing Patients' Discharge: A Practical Approach to Improve Hospital Efficiency. *Studies in health technology and informatics*, 238, 157-160.
- *Khalifa, M., & Zabani, I. (2016a). Reducing Emergency Department Crowding: Evidence Based Strategies. *Studies in health technology and informatics*, 226, 67-70.
- Khalifa, M., & Zabani, I. (2016b). Utilizing health analytics in improving the performance of healthcare services: A case study on a tertiary care hospital. *Journal of Infection and Public Health*, 9(6), 757-765.
- *Kibbe, D. C., Smith, P. P., LaVallee, R., Bailey, D., & Bard, M. (1997). A guide to finding and evaluating best practices health care information on the Internet: the truth is out there? *The Joint Commission Journal on Quality and Patient Safety*, 23(12), 678-689.
- Kohn, M. K. (2013). *Evidence Based Strategic Decision Making in Ontario Public Hospitals*. (Unpublished PhD Dissertation), University of Toronto, Canada,

- *Kontio, E., Lundgren-Laine, H., Kontio, J., Korvenranta, H., & Salanterä, S. (2013). Information utilization in tactical decision making of middle management health managers. *Comput Inform Nurs*, 31(1), 9-16. doi:10.1097/NXN.0b013e318261f192
- *Korlén, S., Essén, A., Lindgren, P., Amer-Wahlin, I., & von Thiele Schwarz, U. (2017). Managerial strategies to make incentives meaningful and motivating. *Journal of Health Organization Management*, 31(2), 126-141.
- *Kovner, A. R., Elton, J. J., & Billings, J. (2000). Evidence-based management / Commentaries / Reply. *Frontiers of Health Services Management*, 16(4), 3-46.
- *Kovner, A. R., & Rundall, T. G. (2006). Evidence-Based Management Reconsidered. *Frontiers of Health Services Management*, 22(3), 3-22.
- *Kovner, A. R., Wagner, R. F., & Curtis, R. S. (2001). Better information for the board/Practitioner application. *Journal of Healthcare Management*, 46(1), 53.
- *Kowalski, C., Yeaton, W. H., Kuhr, K., & Pfaff, H. (2017). Helping hospitals improve patient centeredness: Assessing the impact of feedback following a best practices workshop. *Evaluation & the health professions*, 40(2), 180-202.
- *Kreindler, S. A. (2008). Watching your wait: evidence-informed strategies for reducing health care wait times. *Quality Management in Healthcare*, 17(2), 128-135.
- *Krugman, M., Sanders, C., & Kinney, L. J. (2015). Part 2: Evaluation and outcomes of an evidence-based facility design project. *JONA: The Journal of Nursing Administration*, 45(2), 84-92.
- *Krugman, M. E., & Sanders, C. L. (2016). Implementing a nurse manager profile to improve unit performance. *JONA: The Journal of Nursing Administration*, 46(6), 345-351.
- *Kullberg, A., Bergenmar, M., & Sharp, L. (2016). Changed nursing scheduling for improved safety culture and working conditions—patients' and nurses' perspectives. *Journal Nursing Management*, 24(4), 524-532.
- *Kyratsis, Y., Ahmad, R., & Holmes, A. (2012). Making sense of evidence in management decisions: the role of research-based knowledge on innovation adoption and implementation in healthcare. Study protocol. 1. *Implementation Science*, 7(1), 1-7.
- Lacy, S., & Riffe, D. (1996). Sampling error and selecting intercoder reliability samples for nominal content categories. *Journalism & Mass Communication Quarterly*, 73(4), 963-973.

- *Langaneer, J. R. I., & Worthington, D. (2010). Operations research diffusion in health care management. *Journal of health care finance*, 36(3), 73-87.
- Langley, A., Mintzberg, H., Pitcher, P., Posada, E., & Saint-Macary, J. (1995). Opening up decision making: The view from the black stool. *Organization Science*, 6(3), 260-279.
- *Lavoie-Tremblay, M., Anderson, M., Bonneville-Roussy, A., Drevniok, U., & Lavigne, G. L. (2012). Nurse executives' perceptions of the executive training for research application (extra) program. *Worldviews on Evidence-Based Nursing*, 9(3), 186-192.
- *Lavoie-Tremblay, M., Richer, M. C., Marchionni, C., Cyr, G., Biron, A. D., Aubry, M., . . . Vézina, M. (2012). Implementation of evidence-based practices in the context of a redevelopment project in a Canadian healthcare organization. *Journal of Nursing Scholarship*, 44(4), 418-427.
- *Leatherman, S., & Sutherland, K. (2007). Designing national quality reforms: a framework for action. *International Journal for Quality in Health Care*, 19(6), 334-340.
- *Liang, Z., Howard, P. F., Leggat, S. G., & Murphy, G. (2012). A framework to improve evidence-informed decision-making in health service management. *Australian Health Review*, 36(3), 284-289.
- *Lohr, K. N. (2004). Rating the strength of scientific evidence: relevance for quality improvement programs. *International Journal for Quality in Health Care*, 16(1), 9-18.
- *Lomas, J. (2005). Using research to inform healthcare managers' and policy makers' questions: from summative to interpretive synthesis. *Healthcare Policy*, 1(1), 55.
- *Lovett, P. B., Illg, M. L., & Sweeney, B. E. (2016). A successful model for a comprehensive patient flow management center at an academic health system. *American Journal of Medical Quality*, 31(3), 246-255.
- *Lucini, F. R., Fogliatto, F. S., da Silveira, G. J., Neyeloff, J. L., Anzanello, M. J., Kuchenbecker, R. d. S., & Schaan, B. D. (2017). Text mining approach to predict hospital admissions using early medical records from the emergency department. *International journal of medical informatics*, 100, 1-8.
- *Luo, L., Luo, L., Zhang, X., & He, X. (2017). Hospital daily outpatient visits forecasting using a combinatorial model based on ARIMA and SES models. *BMC Health Serv Res*, 17(1), 469.

- *Maass, K. L., Liu, B., Daskin, M. S., Duck, M., Wang, Z., Mwenesi, R., & Schapiro, H. (2017). Incorporating nurse absenteeism into staffing with demand uncertainty. *Health care management science*, 20(1), 141-155.
- *Mahmoudian-Dehkordi, A., & Sadat, S. (2017). Sustaining critical care: using evidence-based simulation to evaluate ICU management policies. *Health care management science*, 20(4), 532-547.
- *Margrif, F. D. (1991). The role of health information managers in hospital financial management. *Journal of AHIMA*, 62(11), 59-61.
- *Marshall, M. N. (2013). Bridging the ivory towers and the swampy lowlands; increasing the impact of health services research on quality improvement. *International Journal for Quality in Health Care*, 26(1), 1-5.
- *Matchar, D. B., Westermann-Clark, E. V., McCrory, D. C., Patwardhan, M., Samsa, G., Kulasingam, S., . . . Gray, R. (2005). Dissemination of evidence-based practice center reports. *Annals of internal medicine*, 142(12_Part_2), 1120-1125.
- *Mathew, J. L. (2011). KNOW ESSENTIALS: a tool for informed decisions in the absence of formal HTA systems. *International Journal of Technology Assessment in Health Care*, 27(2), 139-150.
- *Mazur, L. M., Johnson, K., Pooya, P., Chadwick, J., & McCreery, J. (2017). Integrating Lean Exploration Loops Into Healthcare Facility Design: Programming Phase. *HERD: Health Environments Research & Design Journal*, 10(3), 116-130.
- Mills, A. (2014). Health care systems in low-and middle-income countries. *New England Journal of Medicine*, 370(6), 552-557.
- Mimiko, O. (2012). *Globalization: The Politics of Global Economic Relations and International Business*. Durham, N.C.: Carolina Academic.
- Mintzberg, H., Raisinghani, D., & Theoret, A. (1976). The structure of "unstructured" decision processes. *Administrative Science Quarterly*, 21, 246-275.
- Morrell, K., & Learmonth, M. (2015). Against evidence-based management, for management learning. *Academy of Management Learning & Education*, 14(4), 520-533.
doi:10.5465/amle.2014.0346

- Morrell, K., Learmonth, M., & Heracleous, L. (2015). An archaeological critique of 'Evidence-based Management': One digression after another. *Journal of Management Studies*, 26(3), 529-543.
- *Murphy, L. S., Wilson, M. L., & Newhouse, R. P. (2013). Data analytics: making the most of input with strategic output. *JONA: The Journal of Nursing Administration*, 43(7/8), 367-370.
- *Myers, G., Côté-Arsenault, D., Worrall, P., Rolland, R., Deppoliti, D., Duxbury, E., . . . Sellers, K. (2016). A cross-hospital exploration of nurses' experiences with horizontal violence. *Journal Nursing Management*, 24(5), 624-633.
- *Mykkänen, M., Miettinen, M., & Saranto, K. (2016). Standardized Nursing Documentation Supports Evidence-Based Nursing Management. *Studies in health technology and informatics*, 225, 466-470.
- *Naidoo, L., & Mahomed, O. H. (2016). Impact of Lean on patient cycle and waiting times at a rural district hospital in KwaZulu-Natal. *African journal of primary health care & family medicine*, 8(1), 1084-1092.
- *Nantsupawat, A., Kunaviktikul, W., Nantsupawat, R., Wichaikhum, O. A., Thienthong, H., & Poghosyan, L. (2017). Effects of nurse work environment on job dissatisfaction, burnout, intention to leave. *International nursing review*, 64(1), 91-98.
- *Nates, L. K. C., Pereira, A. J., Neto, A. C., & Silva, E. (2017). A Quality Initiative to Implement a Managed Sepsis Protocol in a Public Hospital Based on the IHI Quality Improvement Model: Experience Report. *Quality in Primary Care*, 25(5), 326-334.
- *Nelson, J. J., & Staffileno, B. A. (2017). Improving the patient experience: Call light intervention bundle. *Journal of pediatric nursing*, 36, 37-43.
- *Newhouse, R. P., & White, K. M. (2011). Guiding implementation: frameworks and resources for evidence translation. *JONA: The Journal of Nursing Administration*, 41(12), 513-516.
- *Nicklin, W., & Stipich, N. (2005). Enhancing skills for evidence-based healthcare leadership: the Executive Training for Research Application (EXTRA) program. *Nursing Leadership*, 18(3), 35-44.
- *Niedzwiedzka, B. M. (2003). Barriers to evidence-based decision making among Polish healthcare managers. *Health Services Management Research*, 16(2), 106-115.

- *Nilsson, K., Bååthe, F., Andersson, A. E., Wikström, E., & Sandoff, M. (2017). Experiences from implementing value-based healthcare at a Swedish University Hospital—a longitudinal interview study. *BMC Health Serv Res*, *17*(1), 169.
- *Nippak, P. M., Veracion, J. I., Muia, M., Ikeda-Douglas, C. J., & Isaac, W. W. (2016). Designing and evaluating a balanced scorecard for a health information management department in a Canadian urban non-teaching hospital. *Health informatics journal*, *22*(2), 120-139.
- *Oetjen, R. M., Oetjen, D. M., & Rotarius, T. (2008). Administrative decision making: a stepwise method. *The health care manager*, *27*(1), 4-12.
- *Ouimet, M., Lavis, J. N., Léon, G., Ellen, M. E., Bédard, P. O., Grimshaw, J. M., & Gagnon, M. P. (2014). A cross-sectional survey of supports for evidence-informed decision-making in healthcare organisations: a research protocol. *Implementation Science*, *9*(1), 146.
- *Ovretveit, J. (1999). Evaluation informed management and clinical governance. *British Journal of Clinical Governance*, *4*(3), 103-109.
- *Ozyapici, H., & Tanis, V. N. (2016). Improving health care costing with resource consumption accounting. *International Journal of Health Care Quality Assurance*, *29*(6), 646-663.
- Papaioannou, D., Sutton, A., Carroll, C., Booth, A., & Wong, R. (2010). Literature searching for social science systematic reviews: consideration of a range of search techniques. *Health Information & Libraries Journal*, *27*(2), 114-122.
- *Parente, C. A., Salvatore, D., Gallo, G. M., & Cipollini, F. (2018). Using overbooking to manage no-shows in an Italian healthcare center. *BMC Health Serv Res*, *18*(1), 185.
- *Patidar, N., Weech-Maldonado, R., O'Connor, S. J., Sen, B., & Camargo Jr, C. A. (2017). Contextual factors associated with hospitals' decision to operate freestanding emergency departments. *Health Care Management Review*, *42*(3), 269-279.
- Patrick, J., & Puterman, M. L. (2008). Reducing wait times through operations research: optimizing the use of surge capacity. *Healthcare Policy*, *3*(3), 75.
- Pedersen, D. B. (2016). Integrating social sciences and humanities in interdisciplinary research. *Palgrave Communications*, *2*(1), 1-7.
- *Peters, D. H., Adam, T., Alonge, O., Agyepong, I. A., & Tran, N. (2013). Implementation research: what it is and how to do it. *Bmj*, *347*, f6753.

- Pettigrew, A. M. (1992). The character and significance of strategy process research. *Strategic Management Journal*, 13, 5-16.
- Pettigrew, A. M. (2012). Context and action in the transformation of the firm: A reprise. . *Journal of Management Studies*, 49(7), 1304-1328.
- Pettigrew, A. M., McKee, L., & Ferlie, E. (1989). Strategic Change in the NHS: The Role of Context and Action. *Health Service Journal*, 12, 200-203.
- Pettigrew, A. M., Woodman, R. W., & Cameron, K. S. (2001). Studying organizational change and development: Challenges for future research. *Academy of Management journal*, 44(4), 697-713.
- Pfeffer, J., & Sutton, R. I. (2007). Suppose We Took Evidence-Based Management Seriously: Implications for Reading and Writing Management. *Academy of Management Learning & Education*, 6(1), 153-155.
- Pines, J. M., & Griffey, R. T. (2015). What we have learned from a decade of ED crowding research? *Academic Emergency Medicine*, 22(8), 985–987.
- *Plantier, M., Havet, N., Durand, T., Caquot, N., Amaz, C., Biron, P., . . . Perrier, L. (2017). Does adoption of electronic health records improve the quality of care management in France? Results from the French e-SI (PREPS-SIPS) study. *International journal of medical informatics*, 102, 156-165.
- *Plantier, M., Havet, N., Durand, T., Caquot, N., Amaz, C., Philip, I., . . . Perrier, L. (2017). Does adoption of electronic health records improve organizational performances of hospital surgical units? Results from the French e-SI (PREPS-SIPS) study. *International journal of medical informatics*, 98, 47-55.
- *Player, S. (1998). Activity-based analyses lead to better decision making. *Healthcare Financial Management*, 52(8), 66-71.
- *Pomey, M.-P., Forest, P.-G., Sanmartin, C., DeCoster, C., Clavel, N., Warren, E., . . . Noseworthy, T. (2013). Toward systematic reviews to understand the determinants of wait time management success to help decision-makers and managers better manage wait times. *Implementation Science*, 8(1), 61.
- *Poot, C. C., van der Kleij, R. M., Brakema, E. A., Vermond, D., Williams, S., Cragg, L., . . . Chavannes, N. H. (2018). From research to evidence-informed decision making: a systematic approach. *Journal of Public Health*, 40(suppl_1), i3-i12.

- *Pope, C., Mays, N., & Popay, J. (2006). How can we synthesize qualitative and quantitative evidence for healthcare policy-makers and managers? *Healthcare Management Forum*, 19(1), 27-31.
- *Pottenger, B. C., Davis, R. O., Miller, J., Allen, L., Sawyer, M., & Pronovost, P. J. (2016). Comprehensive unit-based safety program (CUSP) to improve patient experience: How a hospital enhanced care transitions and discharge processes. *Quality Management in Healthcare*, 25(4), 197-202.
- *Qin, Y., Zhou, R., Wu, Q., Huang, X., Chen, X., Wang, W., . . . Qian, S. (2017). The effect of nursing participation in the design of a critical care information system: a case study in a Chinese hospital. *BMC medical informatics and decision making*, 17(1), 165.
- Raasch, C., Lee, V., Spaeth, S., & Herstatt, C. (2013). The rise and fall of interdisciplinary research: The case of open source innovation. *Research policy*, 42(5), 138-1151.
- *Råholm, M.-B. (2009). Evidence and leadership. *Nursing Administration Quarterly*, 33(2), 168-173.
- *Ranasinghe, K. I., Chan, T., & Yaralagadda, P. (2012). Information support for health management in regional Sri Lanka: Health managers' perspectives. *Health Information Management Journal*, 41(3), 20-26.
- Reay, T., Berta, W., & Kohn, M. K. (2009). What's the evidence on evidence-based management? *The Academy of Management Perspectives*, 23(4), 5-18.
- Reeves, J. J., Hollandsworth, H. M., Torriani, F. J., Taplitz, R., Abeles, S., Tai-Seale, M., . . . Longhurst, C. A. (2020). Rapid response to COVID-19: health informatics support for outbreak management in an academic health system. *Journal of the American Medical Informatics Association*, 27(6), 853-859.
- Reid, T. R. (2009). *The Healing of America: A Global Quest for Better, Cheaper and Fairer Health Care*. New York: NY: The Penguin Press.
- *Replinger, M. D., Ravi, S., Lee, A. W., Svenson, J. E., Sharp, B., Bauer, M., & Hamedani, A. G. (2017). The impact of an emergency department front-end redesign on patient-reported satisfaction survey results. *Western Journal of Emergency Medicine*, 18(6), 1068.

- *Respicio, A., Moz, M., Pato, M. V., Somensi, R., & Flores, C. D. (2018). A computational application for multi-skill nurse staffing in hospital units. *BMC medical informatics and decision making*, 18(1), 53.
- *Richardson, D. B., Brockman, K., Abigail, A., & Hollis, G. J. (2017). Effects of a hospital-wide intervention on emergency department crowding and quality: A prospective study. *Emergency Medicine Australasia*, 29(4), 415-420.
- *Richer, M.-C., Dawes, M., & Marchionni, C. (2013). Bringing Knowledge to Action in the Context of a Major Organizational Transition. *The health care manager*, 32(1), 4-12.
- *Robbins, J., & McAlearney, A. S. (2016). Encouraging employees to speak up to prevent infections: opportunities to leverage quality improvement and care management processes. *American journal of infection control*, 44(11), 1224-1230.
- Roshanghalb, A., Lettieri, E., Aloini, D., Cannavacciuolo, L., Gitto, S., & Visintin, F. (2018). What evidence on evidence-based management in healthcare? *Management Decision*, 56(10), 2069.
- Rousseau, D. M. (2006). Is there such a thing as “evidence-based management”? *Academy of Management Review*, 31(2), 256-269.
- *Ruland, C. (2001). Developing a decision support system to meet nurse managers' information needs for effective resource management. *Computers in nursing*, 19(5), 187-193.
- *Rundall, T. G., Martelli, P. F., Arroyo, L., & McCurdy, R. (2007). The Informed Decisions Toolbox: Tools for Knowledge Transfer and Performance Improvement/Practitioner Application. *Journal of Healthcare Management*, 52(5), 325-342.
- Rynes, S. L., & Bartunek, J. M. (2017). Evidence-Based Management: Foundations, Development, Controversies and Future. *Annual Review of Organizational Psychology and Organizational Behavior*, 4, 235-261.
- *Sadler, B. L., DuBose, J., & Zimring, C. (2008). The business case for building better hospitals through evidence-based design. *HERD: Health Environments Research & Design Journal*, 1(3), 22-39.
- Sahakian, T., Daouk-Öyry, L., Karam, C. M., Kooij, D. T. A. M., Kroon, B., & van de Vijver, F. J. R. (2020). *The Fine Line between Decisions and Evidence-based Decisions: Contextualizing and Unraveling the Evidence-based Decision Making Process in Hospital Settings*. Manuscript submitted for publication.

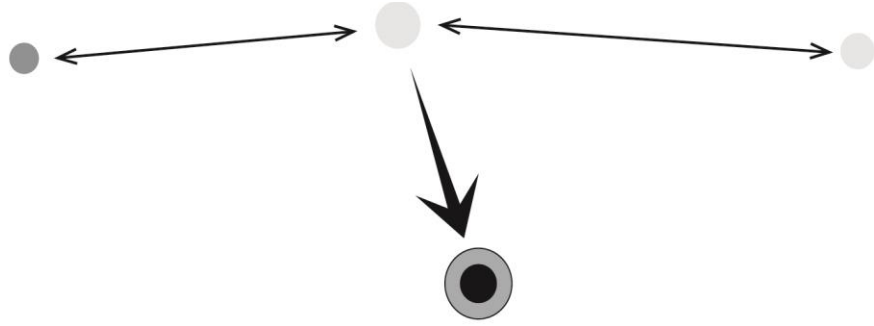
- Saleh, S., Khodor, R., Alameddine, M., & Baroud, M. (2016). Readiness of healthcare providers for eHealth: the case from primary healthcare centers in Lebanon. *BMC Health Serv Res*, *16*, 644-.
- *Sarkies, M. N., Bowles, K.-A., Skinner, E. H., Haas, R., Lane, H., & Haines, T. P. (2017). The effectiveness of research implementation strategies for promoting evidence-informed policy and management decisions in healthcare: a systematic review. *Implementation Science*, *12*(1), 132.
- *Schachner, B., González, Z., Cano, R., Luna, D., & Benítez, S. (2017). Looking for the Best WOW: Understanding the Nurses' Needs. *MEDINFO 2017: Precision Healthcare through Informatics*, 212-215.
- *Schaeffer, C., Booton, L., Halleck, J., Studeny, J., & Coustasse, A. (2017). Big data management in US hospitals: benefits and barriers. *The health care manager*, *36*(1), 87-95.
- *Seifan, A., & Shemer, J. (2005). Economic evaluation of medical technologies. *IMAJ*, *7*(2), 67-70.
- *Sheng, M. L., Chang, S.-Y., Teo, T., & Lin, Y.-F. (2013). Knowledge barriers, knowledge transfer, and innovation competitive advantage in healthcare settings. *Management Decision*, *51*(3), 461-478.
- *Shingler-Nace, A., & Gonzalez, J. Z. (2017). EBM: A pathway to evidence-based nursing management. *Nursing2019*, *47*(2), 43-46.
- *Shoemaker, L. K., Kazley, A. S., & White, A. (2010). Making the case for evidence-based design in healthcare: A descriptive case study of organizational decision making. *HERD: Health Environments Research & Design Journal*, *4*(1), 56-88.
- *Siddharthan, K., Jones, W. J., & Johnson, J. A. (1996). A priority queuing model to reduce waiting times in emergency care. *International Journal of Health Care Quality Assurance*, *9*(5), 10-16.
- *Simonen, O., Viitanen, E., & Blom, M. (2012). Factors relating to effectiveness data use in healthcare management. *International Journal of Productivity and Performance Management*, *61*(7), 752-764.

- Slatin, C., Galizzi, M., Melillo, K. D., Mawn, B., & Phase in Healthcare Research Team. (2004). Conducting interdisciplinary research to promote healthy and safe employment in health care: promises and pitfalls. *Public health reports*, 119(4), 60-72.
- Smith, N., & Fraser, M. (2020). Straining the system: novel coronavirus (COVID-19) and preparedness for concomitant disasters. *American Journal of Public Health*, 110(5), 648-649. doi:10.2105/AJPH.2020.305618
- *Soomro, Z. A., Ahmed, J., Muhammad, R., Hayes, D., & Shah, M. H. (2018). Critical success factors in implementing an e-rostering system in a healthcare organisation. *Health Services Management Research*, 31(3), 130-137.
- *Spiers, J. A., Lo, E., Hofmeyer, A., & Cummings, G. G. (2016). Nurse leaders' perceptions of influence of organizational restructuring on evidence-informed decision-making. *Nursing Leadership*, 29(2), 64-81.
- *Steege, L. M., & Dykstra, J. G. (2016). A macroergonomic perspective on fatigue and coping in the hospital nurse work system. *Applied ergonomics*, 54, 19-26.
- *Steege, L. M., Pinekenstein, B. J., Arsenault Knudsen, É., & Rainbow, J. G. (2017). Exploring nurse leader fatigue: a mixed methods study. *Journal Nursing Management*, 25(4), 276-286.
- *Stelson, P., Hille, J., Eseonu, C., & Doolen, T. (2017). What drives continuous improvement project success in healthcare? *International Journal of Health Care Quality Assurance*, 30(1), 43-57.
- *Steuten, L., & Buxton, M. (2010). Economic evaluation of healthcare safety: which attributes of safety do healthcare professionals consider most important in resource allocation decisions? *Qual Saf Health Care*, 19(5), e6-e6.
- Tanne, J. H., Hayasaki, E., Zastrow, M., Pulla, P., Smith, P., & Rada, A. G. (2020). Covid-19: how doctors and healthcare systems are tackling coronavirus worldwide. *BJM*, 368(1090), 1-5. doi:10.1136/bmj.m1090
- *Testik, Ö. M., Shaygan, A., Dasedemir, E., & Soydan, G. (2017). Selecting health care improvement projects: A methodology integrating cause-and-effect diagram and analytical hierarchy process. *Quality Management in Healthcare*, 26(1), 40-48.
- Thalmayer, A. G., Toscanelli, C., & Arnett, J. J. (2020). The Neglected 95% Revisited: Is American Psychology Becoming Less American? *American Psychologist*, 1-36.

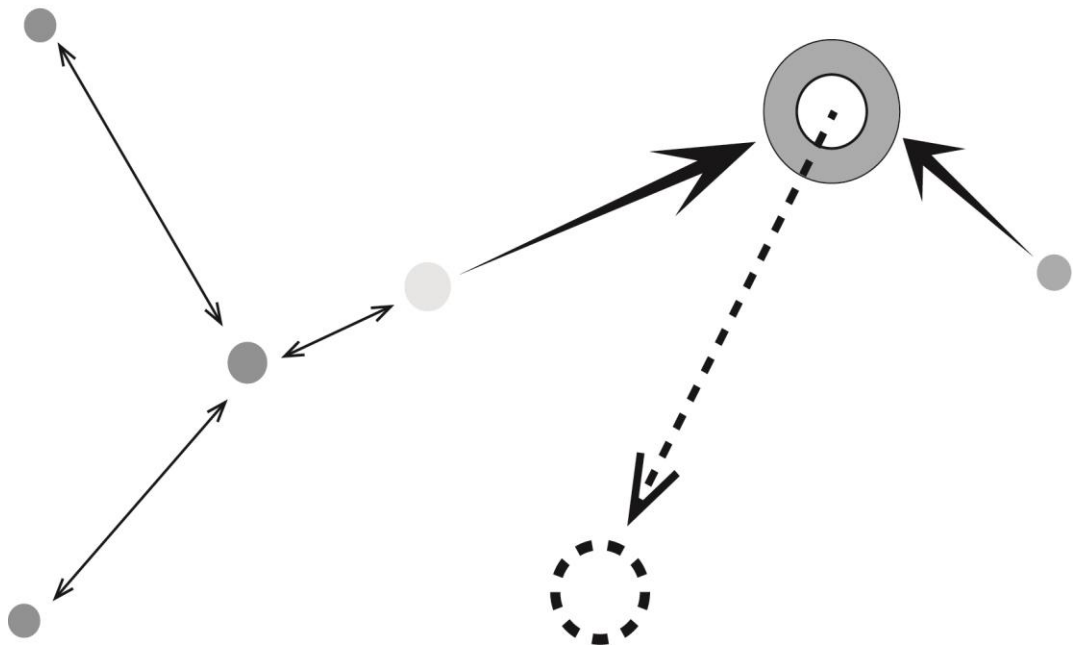
- *Thornhill, J., Judd, M., & Clements, D. (2009). CHSRF knowledge transfer:(re) introducing the self-assessment tool that is helping decision-makers assess their organization's capacity to use research. *Healthcare Quarterly*, 12(1), 22.
- *Tibor, L. C., Schultz, S. R., Cravath, J. L., Rein, R. R., Krecke, K. N., Baron, M., . . . Pocta, B. (2016). Improving Patient Flow Utilizing a Collaborative Learning Model. *Radiology management*, 38(3), 19-28.
- Toner, E., & Waldhorn, R. (2020). *What US hospitals should do now to prepare for a COVID-19 pandemic*. Retrieved from Baltimore:
<https://www.centerforhealthsecurity.org/cbn/2020/cbnreport-02272020.html>
- Tourish, D. (2012). Evidence Based Management', or 'Evidence Oriented Organizing'? A critical realist perspective. *Organization*, 20(2), 173-192.
- *Trewick, S., Oxman, A. D., Alderson, P., Bossuyt, P. M., Brandt, L., Brożek, J., . . . Hill, S. (2013). Developing and evaluating communication strategies to support informed decisions and practice based on evidence (DECIDE): protocol and preliminary results. *Implementation Science*, 8(1), 6.
- *Tricco, A. C., Zarin, W., Rios, P., Straus, S. E., & Langlois, E. V. (2016). Barriers, facilitators, strategies and outcomes to engaging policymakers, healthcare managers and policy analysts in knowledge synthesis: a scoping review protocol. *BMJ Open*, 6(12), e013929.
- *Ulrich, R. S., Berry, L. L., Quan, X., & Parish, J. T. (2010). A conceptual framework for the domain of evidence-based design. *HERD: Health Environments Research & Design Journal*, 4(1), 95-114.
- *Venugopal, D., Rafi, A. M., Innah, S. J., & Puthayath, B. T. (2017). Evaluation of process excellence tools in improving donor flow management in a tertiary care hospital in South India. *Asian journal of transfusion science*, 11(2), 135.
- *Vissers, J. M. (1995). Patient flow based allocation of hospital resources. *Mathematical Medicine and Biology: A Journal of the IMA*, 12(3-4), 259-274.
- *Wallingford Jr, G., Joshi, N., Callagy, P., Stone, J., Brown, I., & Shen, S. (2018). Introduction of a Horizontal and Vertical Split Flow Model of Emergency Department Patients as a Response to Overcrowding. *Journal of Emergency Nursing*, 44(4), 345-352.
- *Walshe, K., & Rundall, T. G. (2001). Evidence-based management: from theory to practice in health care. *Milbank quarterly*, 79(3), 429-457.

- *Walston, S. L., Kimberly, J. R., & Burns, L. R. (2001). Institutional and economic influences on the adoption and extensiveness of managerial innovation in hospitals: The case of reengineering. *Medical Care Research and Review*, 58(2), 194-228.
- *Ward Casscells, S., Granger, E., Williams, T. V., Kurmel, T., May, L., Babeau, L., . . . Thomas, N. (2009). TRICARE management activity healthcare facility evidence-based design survey. *Military medicine*, 174(3), 236-240.
- *White, B. A., Yun, B. J., Lev, M. H., & Raja, A. S. (2017). Applying systems engineering reduces radiology transport cycle times in the emergency department. *Western Journal of Emergency Medicine*, 18(3), 410.
- *Wiler, J. L., Ozkaynak, M., Bookman, K., Koehler, A., Leeret, R., Chua-Tuan, J., . . . Zane, R. (2016). Implementation of a front-end split-flow model to promote performance in an urban academic emergency department. *The Joint Commission Journal on Quality and Patient Safety*, 42(6), 271-AP274.
- *Willems, J., & Ingerfurth, S. (2018). The quality perception gap between employees and patients in hospitals. *Health Care Management Review*, 43(2), 157-167.
- *Williams, L. L. (2006). What Goes Around Comes Around: Evidence-based Management. *Nursing Administration Quarterly*, 30(3), 243-251.
- *Wills, M. J. (2014). Decisions through data: Analytics in healthcare. *Journal of Healthcare Management*, 59(4), 254-262.
- *Wilson, M., Lavis, J., & Grimshaw, J. (2012). Supporting the use of research evidence in the Canadian health sector. *Healthcare Q*, 15, 58-62.
- *Xie, Z., & Or, C. (2017). Associations between waiting times, service times, and patient satisfaction in an endocrinology outpatient department: A time study and questionnaire survey. *INQUIRY: The Journal of Health Care Organization, Provision, and Financing*, 54, 0046958017739527.
- *Yoder, L. (2008). Evidence-based design. *Nursing management*, 39(12), 26-29.
- *Young, S. K. (2002). Evidence-based management: a literature review. *Journal Nursing Management*, 10(3), 145-151.
- *Yu-N, C., & Abidi, S. S. R. (1999). Healthcare knowledge management through building and operationalising healthcare enterprise memory. *Studies in health technology and informatics*, 68, 726-730.

- *Yurumezoglu, H. A., & Kocaman, G. (2012). Pilot study for evidence-based nursing management: Improving the levels of job satisfaction, organizational commitment, and intent to leave among nurses in Turkey. *Nursing & health sciences, 14*(2), 221-228.
- *Zafar, A. M., Suri, R., Nguyen, T. K., Petrash, C. C., & Fazal, Z. (2016). Understanding Preprocedure Patient Flow in IR. *Journal of Vascular and Interventional Radiology, 27*(8), 1189-1194.
- *Zborowsky, T., & Bunker-Hellmich, L. (2010). Integrating healthcare design research into practice: Setting a new standard of practice. *HERD: Health Environments Research & Design Journal, 4*(1), 115-130.
- *Zwijnenberg, N. C., Hendriks, M., Delnoij, D. M., de Veer, A. J., Spreeuwenberg, P., & Wagner, C. (2016). Understanding and using quality information for quality improvement: The effect of information presentation. *International Journal for Quality in Health Care, 28*(6), 689-697.



CHAPTER 5 | General Conclusion



General Conclusion

Triggered by the critiques of EBMgt in the literature, in this dissertation, I conducted three studies to investigate the practice of EBMgt decision-making in hospital settings. In this concluding chapter, I will present a synopsis of the main aims of this dissertation, the studies, and their main findings. I will then reiterate the three main critiques of EBMgt that triggered this dissertation, and for each critique, I will present the key contributions of this dissertation, and their implications for EBMgt conceptualization. Finally, I will discuss the practical implications of this dissertation and reflect on directions for future research.

The Dissertation: A Synopsis

Healthcare organizations today are overflowing with extraordinary amounts and types of data. This data can provide insight into many managerial processes and outcomes related to healthcare delivery (Groves, Kayyali, Knott, & Van Kuiken, 2013). Managers' use of this and other traditional sources of data is particularly important since, with the increase in healthcare expenditure and decrease in funding, healthcare organizations are becoming more complex and their management is becoming increasingly challenging (Baker, 2001; Begun & Thygeson, 2015; Kaplan & Porter, 2011). Managers' use of data has also become critical in the context of the COVID-19 pandemic, which has broken down entire healthcare systems, overburdened hospitals, and created exceptional challenges for healthcare managers (Cavallo, Donoho, & Forman, 2020; Fong et al., 2020; Ming, Huang, & Zhang, 2020). All these factors have put EBMgt, the use of high quality data from different sources to inform decisions, at the forefront of management practice and have made its adoption imperative (Kovner & Rundall, 2006; Walshe & Rundall, 2001). However, the literature on the EBMgt approach has been critiqued for; (1) offering limited empirical insight into the EBMgt decision process by managers in different contexts, (2) neglecting contextual contingencies like issues of ethics, power relations, personal

interest, and politics, and **(3)** taking a narrow view of evidence that privileges scientific evidence and values quantification (Currie, 2013; Morrell, 2008; Morrell & Learmonth, 2015; Reay, Berta, & Kohn, 2009; Rynes & Bartunek, 2017; Rynes, Colbert, & O'Boyle, 2018). Given the current healthcare context, this is an opportune time to tackle these critiques and answer the call in the literature for more empirical in-depth examination of how different managers apply EBMgt in different real-world contexts (Currie, 2013; Reay et al., 2009; Walshe & Rundall, 2001; Wright et al., 2016). As such, the overarching aim of this dissertation was to empirically develop an in-depth understanding of the practice of EBMgt in hospital settings, by unraveling the process of EBMgt decision-making, how evidence is conceptualized in this process, and the role of the decision-maker and the context in this process. To fulfill this aim, I conducted three studies.

To gain insight into the decision-makers who apply the EBMgt decision-making process and their role in the process, I conducted a qualitative study (Chapter 2) aimed at identifying the foundational and functional competencies necessary for practicing EBMgt in hospital settings and developing a competency model for evidence-driven managers. I collected data through interviews and the critical incident technique from executive managers working in hospitals in Lebanon, and analyzed the data using an inductive approach. Accordingly, I identified 13 competencies, which I grouped under four dimensions; technical, cognitive, interpersonal, and intrapersonal that represent popular approaches to classifying managerial skills (Hogan & Warrenfeltz, 2003; Katz, 1955). Furthermore, I used Rousseau and Gunia (2016)'s proposed conceptualization to develop the EBMgt Competency Model by classifying the competencies across the dimensions into foundational competencies necessary for practicing EBMgt overall, and functional competencies necessary for engaging in specific EBMgt activities. I identified 11

foundational competencies and sub-competencies that are necessary to engage in all aspects of EBMgt practice. These included the competencies of general business knowledge, industry knowledge, systems thinking, team leadership, self-initiated improvement, and adaptability, and the sub-competencies of ethicality in management, analytical and systems thinking, innovativeness, and emotional intelligence and conflict management skills. I also identified seven functional competencies and sub-competencies, including research knowledge and skills, ethicality in research, inquisitiveness, resourcefulness, building relationships, management style, and open mindedness, that are critical for the practice of the core EBMgt activities of acquiring evidence and assessing its quality. Finally, I argued that the competency model could be considered dynamic whereby the foundational competencies can be pre-requisites to the development of functional competencies.

To gain insight into the EBMgt decision-making process, how evidence is conceptualized in this process, and the contextual factors in this process, I conducted a qualitative study (Chapter 3) aimed at building an empirically driven theoretical model of the evidence-based decision-making process and its contextual nuances within hospital settings. I collected data through interviews and the critical incident technique from executive managers working in hospitals in Lebanon and analyzed the data using Gioia, Corley, and Hamilton's (2013) proposed method. Accordingly, I developed the Grounded Model of the EBMgt Process, an empirically-driven theoretical model dynamically depicting how managers in hospital settings make evidence-based decisions. The model indicated that EBMgt is a multi-level phenomenon, applied at the individual-level and influenced by factors at individual, organizational, and national levels. As previously found in the literature, these factors act as barriers and facilitators to EBMgt, hindering or helping the acquisition and use of evidence. In addition to that, these factors act as

decision criteria, referring to contextual conditions that must be considered alongside the evidence when weighing the decision alternatives. Moreover, they also act as lenses, referring to managers' motives and perceptions that influence the decision-making process and direct managers' attention to certain sources of evidence and certain decision criteria over others.

Finally, to uncover what insight the literature provides about the practice of EBMgt in hospital settings, I conducted a systematic scoping review (Chapter 4), aimed at identifying the gaps in the literature on the EBMgt process in hospital settings, and outlining areas for future research. Since the EBMgt literature is not unified under the EBMgt terminology, I used a novel methodology to scope out the EBMgt literature, which I developed by adapting existing approaches used in previous EBMgt reviews. The methodology involved first searching the literature using EBMgt terminology, similar to previous reviews. It then involved deriving terminology associated with the EBMgt concept from the results of the first search and using this terminology to conduct a second more expanded search. I analyzed the 218 resulting articles using the Grounded Model of the EBMgt Process from Chapter 3 as the guiding framework. Accordingly, I identified three major gaps in the literature on EBMgt relating to the context and outcomes. In terms of context, the literature has neglected the impact of lenses, referring to managers' perceptions and motives, on the process of evidence-based decision-making. Moreover, the literature has concentrated on the countries of the Global North and neglected to study the context of countries of the Global South, which make up most of the world population. Finally, in terms of outcomes, the literature has neglected the outcomes of implementing EBMgt as an approach to decision-making, thus providing limited evidence for EBMgt effectiveness.

This Dissertation: Contributions to the Three Critiques of EBMgt

The findings of these three studies make several contributions to the critiques of EBMgt that triggered this dissertation and the literature on EBMgt in hospital settings, which I discuss below.

Critique 1: Conceptual Literature Providing Limited Empirical Understanding of Evidence-Based Decision-Making Process

The EBMgt literature has been critiqued for being dominated by conceptual articles (Arndt & Bigelow, 2009; Swan et al., 2012), and thus offering limited insight into how the EBMgt decision process is implemented by different decision-makers in different contexts (Arndt & Bigelow, 2009; Reay et al., 2009; Swan et al., 2012; Walshe & Rundall, 2001). With limited empirical insight into the process, existing conceptualizations of EBMgt have been rooted in rational theories of decision-making (Arndt & Bigelow, 2009), despite organizational decision-making research showing that human rationality is bounded by the decision maker's mental skills, habits, and reflexes (Simon, 1997). The three studies of the dissertation contribute to this critique by providing insight into different aspects of the EBMgt process and have implications for our conceptualization of EBMgt.

First, the competency model for evidence-driven managers in Chapter 2 provides insight into the decision-makers who implement the EBMgt process in hospital settings. It indicates that decision-makers who implement the EBMgt process must possess a range of technical, cognitive, interpersonal, and intrapersonal competencies. Notably, some of these competencies, such as general business knowledge and systems thinking, are not unique to EBMgt but overlap with existing healthcare management competencies, while others are uniquely necessary for the practice of EBMgt. These EBMgt competencies can be further classified using Rousseau and

Gunia's (2016) conceptualization into foundational and functional, with the functional competencies referring to those necessary for practicing the fundamental EBMgt activities of acquiring and appraising evidence. This classification indicates that in the absence of some functional competencies, such as research knowledge and skills and open mindedness, managers cannot practice cores steps of the EBMgt process. Moreover, this classification indicates that foundational competencies might serve as a basis for the development of functional competencies (Rodolfa et al., 2005). Thus, certain foundational competencies such as general business knowledge and analytical thinking might be prerequisites to managers' attainment of the functional skills necessary to practice cores steps of the EBMgt process. This competency model was the first empirically-based competency model for evidence-driven managers in hospital settings. Classifying the competencies in the model under the four higher-order dimensions, which represent popular methods of classifying competencies in the management literature, positioned the model within the larger literature on management competencies. Furthermore, classifying the competencies in the literature into functional and foundational lent evidence to the potential suitability of the Rousseau and Gunia's (2016) conceptualization of EBMgt competencies.

Second, the Grounded Model of the EBMgt Process in Chapter 3 provides insight into the process of EBMgt in hospital settings. It also contributes to the conceptualization of the EBMgt phenomenon in the healthcare context. There has been scant theorizing about the EBMgt decision-making process in healthcare contexts. The few existing conceptualizations of the EBMgt process, such as the models by Kovner and Rundall (2006) and Baba and HakemZadeh (2012), are limited because they are conceptually rather than empirically driven. As such, the Grounded Model of the EBMgt Process, as a theoretical model of the evidence-based decision-

making process grounded in data collected from hospital settings, contributes to this scant research and limited theorizing. These few conceptualizations have also had other limitations. Kovner and Rundall's (2006) model assumes that managers are rational, in that they make a complete search of all alternatives and make a decision based on organizational goals (Langley, Mintzberg, Pitcher, Posada, & Saint-Macary, 1995), and that organizational contextual factors do not influence the process (Dean & Bowen, 1994). While Baba and HakemZadeh (2012) overcame these limitations by taking into account the principles of bounded rationality and contextual factors, their model does not explicate the details of the evidence-based decision-making process. The Grounded Model of the EBMgt Process builds on the model of Baba and HakemZadeh (2012), and integrates some elements of the stepwise process of Kovner and Rundall (2006). It depicts EBMgt as a multi-level phenomenon, executed at the individual level. The execution of EBMgt involves a decision-making process, whereby a manager progresses through a series of structured steps. Progress through these steps is not strictly sequential. Rather, decision-making could involve back and forth movement between the different steps, as a result of influence from different factors at individual, organizational, and national levels. Thus, similar to Mintzberg, Raisinghani, and Theoret's (1976) model of decision-making, EBMgt decision-making is subject to interference from individual, organizational, and national factors, which could knock the decision-making "off the linear track". This supports the critiques that rational assumptions might not best capture EBMgt practice (Arndt & Bigelow, 2009). Rather assumptions of bounded rationality (Simon, 1997) and non-linearity and iterations (Langley et al., 1995; Mintzberg et al., 1976) might be a better way to conceptualize the EBMgt process.

Third and finally, the results of the scoping review of the literature on the EBMgt process in hospital settings in Chapter 4 provide insight into the development of the EBMgt literature,

specifically in hospital settings. It indicates that unlike the larger EBMgt literature which is dominated by conceptual and prescriptive articles (Rynes & Bartunek, 2017), the EBMgt literature in hospitals is dominated by empirical articles. This identification of empirical articles may have been a result of the novel methodological approach I used to scope the literature, which involved not only using the EBMgt terminology, but also systematically deriving and using terminology associated with the EBMgt concept. Using this approach widened the search parameters and allowed the identification of an additional 180 unique articles that did not use the EBMgt terminology. Mapping the resulting relevant articles onto the Grounded Model, I found that while considerable research has focused on some aspect of the EBMgt process in the hospital setting, there are still gaps in our knowledge. The majority of articles have focused on some step of the process of EBMgt decision-making and have identified steps that overlap with the steps of the process in the Grounded Model. Nonetheless, the step of appraising the evidence has not received much research attention with only a handful of studies targeting this step. This scarcity is at odds with the fundamental principle of EBMgt that the quality of decisions is likely to improve the more managers use reliable evidence. Moreover, the step of aggregating evidence from the different sources has also received very little attention. While aggregating the evidence was part of the Center for Evidence-based Management's definition of EBMgt (Barends, Rousseau, Briner, & Center for Evidence-Based Management, 2014), and part of the Grounded Model (Sahakian et al., 2020), it was almost neglected in the articles in this review. In addition to gaps in the process of EBMgt decision-making, there are gaps in the outcomes of EBMgt. The review indicates that there is evidence that application of EBMgt process can lead to positive outcomes when applied to solve specific problem. The literature has neglected, however, to focus on the distal or long-term outcomes of the application of EBMgt as an approach to decision-

making. Thus, similar to the larger EBMgt literature, evidence is lacking in the EBMgt literature in hospital settings on the effectiveness of EBMgt as an overall approach.

Overall, this dissertation contributes to Critique 1 of the EBMgt literature via the Grounded Model of the EBMgt Process. The model provides empirical insight into the process of evidence-based decision-making in hospital settings. It also contributes to the conceptualization of the EBMgt phenomenon, and indicates that assumptions of bounded rationality (Simon, 1997) and non-linearity and iterations (Langley et al., 1995; Mintzberg et al., 1976) might be a better way to conceptualize the EBMgt process in hospital settings. This dissertation also contributes to Critique 1 via the EBMgt Competency Model, which provides insight about the decision-maker in EBMgt. Specifically, the competency model provides empirical insight into the competencies necessary for practicing the EBMgt overall as well as the core EBMgt activities of acquiring and appraising evidence. Finally, the dissertation contributes to Critique 1 via the results of the systematic scoping review, which provide insight into the literature on EBMgt in hospital settings. It indicates that the literature is predominantly empirical, dominated by articles on the process of EBMgt decision-making but still neglecting some steps of the process, and lacking evidence on the effectiveness of EBMgt.

Critique 2: Neglect of Contextual Contingencies in EBMgt Decision Process

The EBMgt literature has also been critiqued for neglecting the impact of contextual complexities, like issues of ethics, power relations, and politics (Morrell, Learmonth, & Heracleous, 2015) and for assuming that managers are impartial technical experts with no personal interests in the issues being researched and the evidence being gathered (Rynes et al., 2018; Tourish, 2012). The three studies of the dissertation contribute to this critique and have implications for the conceptualization of EBMgt.

The emergence of some of the competencies in the competency model in Chapter 2 indicates the importance of considering contextual contingencies. One such competency is ethicality, referring to using judgments in line with ethical standards and guided by the benefit of patients, employees, the organization, and society, both in management and in research. Ethicality as a competency is not unique to EBMgt. However, its emergence as a competency necessary for EBMgt practice is important particularly because ethics have been neglected in the literature. Its emergence indicates that ethical considerations are part of EBMgt practice and that ethicality in managing organizational activities and in conducting research are an integral to EBMgt practice. Another noteworthy competency is open-mindedness referring to being open to changing one's mind even after having made a decision, in case the evidence proves otherwise. This competency was unique to EBMgt and its emergence is important particularly because the EBMgt literature has tended to associate poor decision-making, or non evidence-based decision-making, with an absence of knowledge (Rynes et al., 2018). The emergence of this competency indicates that managers' lack of reliance on evidence might be a choice to ignore evidence that contradicts one's beliefs, knowledge, and self-interest, and thus pinpointing the necessity of managers being receptive to evidence (Rynes et al., 2018).

Furthermore, the Grounded Model of the EBMgt Process in Chapter 3 indicated that the EBMgt decision-making process is influenced by different contextual factors at individual, organizational, and national levels. These contextual factors can take the form of barriers and facilitators, decision criteria, and lenses. The identification of these conceptual factors is noteworthy for several reasons. First, while barriers and facilitators have been consistently demonstrated in the literature as impacting EBMgt, decision criteria and lenses have not been, with only one previous study (Kohn, 2013) finding evidence for them. Decision criteria refer to

contextual conditions that are considered alongside the evidence when selecting between alternatives. Decision criteria are organizational (i.e., strategic plan, resources, culture, and politics), external contextual (i.e., external systems, cultural, and political context), stakeholder (i.e., interest and needs of internal and external stakeholders), ethico-legal (i.e., ethicality and legality), and technical (i.e., specialty-specific technical requirements). In identifying these criteria, this dissertation not only support Kohn et al.'s (2013) findings but also further build on them by reporting a wider range of these criteria, categorizing them, and pinpointing the step of evidence-based decision-making at which they come into play. Lenses refer to factors that influence managers' perception of the situation, and in turn impact how they make decisions, what sources of evidence they use, and what decision criteria they prioritize. Lenses include decision-makers' motives for utilizing evidence (i.e. instrumental or symbolic) and their perception of the nature of the decision, or decision characteristics (i.e., important, urgent, familiar, ethical, emergency, controversial). In identifying these Lenses, particularly the decision-maker motives, this dissertation also support Kohn et al.'s (2013) findings. However, our identification of the decision characteristics among the Lenses is unique, providing the first indication of the relevance and influence of such characteristics in EBMgt. Therefore, the Grounded Model of the EBMgt Process expands our understanding of the different contextual factors that can impact EBMgt decision-making in hospital settings and maps their influence. This is further supported by the results of the scoping review in Chapter 4, which indicated that few studies in the literature on EBMgt in hospital settings have identified and examined the impact of decision criteria and lenses.

Second, these contextual factors of barriers and facilitators, decision criteria, and lenses indicate that issues of ethics, power relations, and politics are pervasive in the EBMgt process at

the individual, organizational, and national levels. At the individual level they manifest, as managers' position and power within the organization influencing their access to evidence, as managers' motives and perceptions influencing the decision-making process, and as managers' considerations of ethics influencing their choice between alternatives. At the organizational level they manifest as organizational political considerations influencing choice between alternatives. At the national level they manifest as national political considerations influencing choice between alternatives. Through the Grounded Model of the EBMgt Process, they are made explicit, and their influence on the EBMgt process is mapped out.

Third and finally, these contextual factors, and specifically the lenses among them, have implications for the foundational principles of EBMgt and thus the boundaries of its practice. The lenses, which refer to managers' perceptions and motives, could potentially influence the extent to which a manager practices the core principles of EBMgt, collecting evidence from multiple sources and assessing the quality of the evidence. For example, perceiving that a certain decision is an emergency, and prioritizing patient life and welfare, a manager might choose to rely on one type of evidence without critical appraisal. This brings into question whether this is the best available evidence in such cases, whether such decisions are not evidence-based, and if so, whether they are 'bad' decisions. It can be argued that there are certain contextual constraints to the adoption of EBMgt, in the presence of which, the decision ceases to be evidence-based. These constraints might knock the decision off the 'evidence-based' track. Thus, we could conceptualize evidence-based decision-making on a continuum, ranging from least evidence-based (or not evidence-based) to most evidence-based. Among other things, these lenses could influence the placement of a specific decision on this continuum by influencing different

elements of EBMgt, most importantly whether the available evidence from several different sources is gathered and whether its quality is appraised.

Overall, this dissertation contributes to Critique 2 of the EBMgt literature by providing evidence for the existence and the impact of a host of individual, organizational, and national-level factors on the EBMgt decision process in hospital settings. These factors include barriers and facilitators that relate to the evidence, decision-maker, organization, nation, and technology. They include decision criteria that relate to organizational, external contextual, stakeholders, ethico-legal, and technical consideration. They also include lenses that relate to the motives of the decision-maker for using evidence, and their perceptions of the characteristics of the decision. These factors impact the evidence that managers can acquire, the evidence that managers do acquire, whether they appraise the evidence quality, and what evidence they use in their decision. These factors indicate the pervasiveness of the impact of contextual contingencies including ethics, power relation, and politics. These factors, along with some of the competencies, also indicate the pervasive role of the decision-maker in the process. Finally, these contextual factors indicate that there might be certain boundary conditions for the practice of EBMgt.

Critique 3: Narrow Conceptualization of Evidence

The EBMgt literature has also been critiqued for taking a selective and narrow view of evidence (Morrell & Learmonth, 2015). It has privileged scientific evidence as the foundation of decision-making at the expense of the situated expertise and judgment of the decision-maker (Morrell, 2008), and has held quantitative positivist research as the best available evidence at the expense of qualitative and narrative approaches (Morrell & Learmonth, 2015). Two studies of

the dissertation contribute to this critique and have implications for our conceptualization of the evidence in EBMgt.

In the Grounded Model of the EBMgt Process, I identified the sources of evidence used during the decision-making process. The sources of evidence fit under the four overarching sources of evidence identified in the literature; scientific, experiential, organizational, and stakeholder (Barends et al., 2014; Briner, Denyer, & Rousseau, 2009). Thus, the model provided support for the existing conceptualization of the sources of evidence into four overarching sources. Moreover, the sub-source under each source could be delineated, thus expanding upon this conceptualization of the sources of evidence to include 4 sources and 12 sub-sources. Furthermore, the model and the results of the systematic scoping review in Chapter 4 indicated that managers rely on a combination of different types of evidence from different sources for EBMgt decision-making. Thus, the best available evidence in EBMgt, can be different types and can come from different sources, and defining it narrowly as scientific evidence is not sufficient (Tranfield, Denyer, & Smart, 2003).

The Grounded Model of the EBMgt Process also indicates that in addition to the best available evidence, decision criteria, which refer to stakeholder, organizational, national, ethico-legal, and technical factors, are also being considered when choosing between alternatives. This finding is line with a few empirical studies scoped out from the literature (Janati, Hasanpoor, Hajebrahimi, & Sadeghi-Bazargani, 2018; Kohn, 2013; Spiers, Lo, Hofmeyer, & Cummings, 2016). This indicates that contextual factors, other than the best-available evidence, are being used in EBMgt decision-making. Thus, the best available evidence is not the only consideration in EBMgt. Therefore, we could argue that the best-available evidence could be reconsidered, not only as the evidence that is available to the manager from different sources, and that is judged to

be reliable, but also as the evidence that best fits with the contextual considerations. This has implications for the critique regarding the selective and narrow view of evidence (Morrell & Learmonth, 2015). It aligns with arguments that the best available evidence depends on the context of the decision and the organization, and thus, that the conceptualization of evidence in EBMgt must be contextualized (Baba & HakemZadeh, 2012; Kohn, 2013).

Overall, this dissertation contributes to Critique 3 of the EBMgt literature by providing both empirical and systematic review evidence that managers rely on a combination of different types of evidence from different sources. Thus, it expands the conceptualization of evidence as coming from four overarching sources and a wide range of sub-sources. This dissertation also contributes to the conceptualization of the ‘best available’ evidence not only as the evidence that is available to the manager from different sources, and that is judged to be reliable, but also as the evidence that best fits with the contextual considerations.

Practical Implications

This dissertation provides practical insight into the EBMgt competencies and the EBMgt process, which can inform EBMgt practice for individual managers, organizations, research and educational institutions, and healthcare systems.

Managers must develop their competencies to meet the demands of today’s data-driven world and the EBMgt competency model can help them do so. Using the competency model and the foundational-functional competencies distinction, management practitioners could identify and develop their competencies and thus gain the tools necessary to practice EBMgt. Moreover, a workforce capable of leveraging data is key to creating competitive advantage (Provost & Fawcett, 2013), and selecting and retaining individuals who combine technical expertise and industry experience with data savvy is a challenge for organizations (Henke et al., 2016). This is

where the EBMgt competency model can aid organizations. It provides a foundation for refining managerial selection processes whereby organizations can move beyond the job and more towards the managerial competencies that are needed in today's data driven world. It can also provide a blueprint for management assessment and training. Managers' competencies can be assessed based on the model and accordingly training initiatives can be developed to prepare them to face the challenges of the current healthcare environment. In addition to the organizational level, training and development initiatives can be developed at the level of educational institutions. The model can help design or redesign management education programs to develop future healthcare managers who possess the necessary EBMgt skills. Such training and education programs can also be developed at the level of national healthcare systems. The model can be used by different stakeholder groups at this level, such as ministries of public health, hospital associations, and syndicates, to design training programs and offer it to the healthcare management workforce in a country. EBMgt training and education programs can be a point of intersection between research, education, practice, and government, whereby researchers can validate the competencies identified in the model and, in collaboration with educational institutions and with the support of government, offer training programs for practitioners. This was the case with the ADILLA program, an EBMgt managerial mentorship program for hospital middle-managers that was designed based on the EBMgt competency model in this dissertation. It was developed by researchers and practitioners within an educational institution and academic medical center (American University of Beirut and American University of Beirut Medical Center) and supported and endorsed by different healthcare system stakeholders (e.g. Ministry of Public Health and Syndicate of Hospitals in

Lebanon) and offered freely to managers in private and public hospitals (Evidence-based Healthcare Management Unit, 2019).

Existing conceptualizations of EBMgt indicate that the adoption of EBMgt is executed at the individual level as a decision process (Kovner & Rundall, 2006) and influenced by different factors (Baba & HakemZadeh, 2012). The Grounded Model of the EBMgt Process explicates in steps and using empirical data the process of EBMgt decision-making and the different factors that influence this process. Management practitioners can use this model as a stepwise guide for practicing EBMgt decision-making. They can also use the results of the scoping review to gain insight into how the different steps of the process can be undertaken in different contexts and to identify existing resources to facilitate their practice of certain steps, such as tools and strategies for evidence acquisition and appraisal (Chan, Morton, & Shekelle, 2004; Kibbe, Smith, LaVallee, Bailey, & Bard, 1997; Lohr, 2004). Furthermore, the Grounded Model of the EBMgt Process indicates that the responsibility of practicing EBMgt is not only on individual managers but also on organizations, research and educational institutes, and national healthcare systems. For organizations, incorporating insights derived from data into day-to-day operations and processes is a challenge (Henke et al., 2016). The Grounded Model can help organizations reflect on their managers' decision-making process, identify the steps their managers' struggle with most, and accordingly target training programs. The Grounded Model can also help organizations identify the evidence their managers are knowledgeable of and introduce them to novel sources of evidence. Moreover, the Grounded Model can help organizations identify the influence of different factors on their managers' adoption of EBMgt. Organizations can pinpoint internal structural and cultural barriers to EBMgt. They could use existing tools from the literature (Thornhill, Judd, & Clements, 2009) to evaluate their internal capacity to practice

EBMgt, and gain insight into the possible roadblocks to EBMgt at the organizational level. Finally, referring to the extant literature on EBMgt in hospital settings identified in the scoping review, organizations can identify among a host of potential suggested solutions to ensure managers are supported in their pursuit of EBMgt. Organizations can adopt different practices, such as incorporating EBMgt in the organizational mission and vision, offering EBMgt capacity building programs on where to acquire evidence and how to assess it, providing managers' access to evidence, and publishing reports of the use of EBMgt in different contexts to demonstrate its benefits. Research and educational institutions can also refer to the Grounded Model and the scoping review to identify the role they play in hindering or enabling EBMgt. They can identify different solutions to partner with practitioners and meet their needs. For example, to overcome issues of lack of availability and appropriateness of evidence, organizations, research institutions, and universities can create partnerships to co-create evidence suitable to practitioner needs. Government agencies can also use the Grounded Model and the scoping review to identify the role they play in facilitating EBMgt and potential solutions they can apply. For example, they can also be involved in evidence co-creation whereby they can establish and support collaborative action and partnerships across groups (Rycroft-Malone et al., 2016).

Future Research Recommendations

Given the current healthcare context, characterized by healthcare organizations brimming with data and facing the challenges of the COVID-19 pandemic, it is an opportune time to conduct rigorous empirical research on the EBMgt approach to decision-making. One avenue for future research is to focus on the evidence-driven managers. Research can focus on the competencies of evidence-driven managers, particularly on validating the EBMgt competency

model developed in this dissertation, examining the different competencies or levels of competence required across different management levels, and developing assessment methods to evaluate managerial EBMgt competencies. Research on evidence-driven managers can also move beyond competencies and focus on identifying other characteristics of such managers that are associated with EBMgt implementation, including for example demographic characteristics, as well as personality. There is some preliminary indication for the impact of personality on EBMgt (McBeath, Jolles, Carnochan, & Austin, 2015; Wright et al., 2016), making it an interesting area for future research. For example, building on the competency model in this dissertation, I am conducting a quantitative study to develop and test a tool to measure the EBMgt competencies. I first developed a pool of items based on the qualitative competency model in English and Arabic languages, and then began administering the items as a self-report tool among hospital managers in Lebanon, along with demographic questions, convergent and divergent measures, and a personality tool.

Another avenue for future research could be to focus on the EBMgt process and the contextual factors that influence the EBMgt process. Research could involve conducting in depth examinations of EBMgt practice by different decision makers in different decisional, organizational, and national contexts, with a particular focus on identifying the contextual factors and mapping their impact on the EBMgt decision process. Such research could focus on particularly examining the impact of such factors on the core activities of EBMgt, and thus contribute to better understanding the boundary conditions of EBMgt practice. Here, research focusing on the barriers and facilitators could shift away from identifying these barriers and moving towards testing the efficacy of possible solutions to overcome these barriers. This could involve for example, better understanding the potential advantages and disadvantages of co-

creation and the types of problems for which it is most useful and the roles different parties should play in co-creation (Bartunek & Rynes, 2014; Rycroft-Malone et al., 2016). It could also involve, for example, assessing the impact of EBMgt training programs, whether at the level of organizations or healthcare systems, on managers' EBMgt competencies and EBMgt implementation. Future research could also focus on the decision criteria and the lenses.

Research on the decision-criteria could focus on validating the handful of criteria identified in the Grounded Model and in the scoping review in different contexts. In addition to delineating these decision criteria, future research could focus on better examining the effects of these criteria on the process of evidence-based decision-making to understand their effects. These criteria are important to consider because they include aspects of ethics, power, and politics that have been neglected in the literature and their study might be one way to better incorporate these aspects into EBMgt. Furthermore, the lenses, which refer to managers' motives and perceptions, are a ripe area for future research given that they have been neglected. One aspect of the lenses, the decision-specific characteristics, which are unique to the Grounded Model overlap with the strategic management literature. Thus, future research can borrow from this literature to identify methods to better identify them and understand their impact. Future research focusing on the EBMgt process and its contextual nuances can also use multiple-case studies design. Case studies typically provide a rich empirical description of phenomena in particular contexts through their reliance on a variety of data sources (Yin, 1994). Multiple-case studies serve as a series of related laboratory experiments, replicating one another, contrasting against each other, and building on each other, while simultaneously focusing on studying the phenomenon in the rich real-world context where it occurs. Consequently multi-case research can be particularly

important for better understanding the contextual nuances of EBMgt and for building theory (Eisenhardt & Melissa, 2007).

Finally, another avenue for future research could be to focus on the outcomes of EBMgt practice. Research could focus on identifying the distal outcomes of the application of EBMgt as an overall approach to decision-making. For example, future research could attempt to compare different units within hospitals, which are managed either using EBMgt approach or not, on individual and organizational outcomes. It could also be incorporated with research examining the impact of EBMgt training programs to identify the impact of such training programs on managers' EBMgt implementation, and subsequently the impact of such implementation on individual and team performance outcomes. The study of EBMgt outcomes can also be conducted in the context of advances in big data and artificial intelligence. This could particularly involve studying specific types of evidence-based decision-making, namely data-driven decision-making and algorithmic decision-making, which rely on the use of big data and autonomous computational formulae respectively (Lee, 2018; McAfee, Brynjolfsson, Davenport, Patil, & Barton, 2012). These types of decision-making methods are expected to become a core part of the future of organizational management, including employee management (Lee, 2018; Lee, Kusbit, Metsky, & Dabbish, 2015), and thus the study of their impact is crucial. To this end, I intend to examine the impact of algorithmic human resource decision-making on employees, particularly examining employee reactions to such decisions, as well as, the underlying explanatory mechanisms, and boundary conditions of this impact. Given that evidence relating to the effectiveness of EBMgt is still lacking in the literature, both in the healthcare settings and in management generally, the study of EBMgt outcomes in different contexts and in light of advancements in organizational decision-making is a critical area for future research.

Conclusion

Healthcare organizations today are overflowing with unprecedented amounts and types of data. EBMgt holds the potential of allowing managers to use this data to gain insight into managerial practices related to health service provision, to make better-informed decisions, and face the current and future challenges of the COVID-19 pandemic. To realize this potential, however, we must develop a deep empirically-driven theoretical understanding of EBMgt practice by decision-makers in different contexts; identifying its potential benefits and remaining cognizant of its potential boundaries. This dissertation examined the practice of the EBMgt process in hospital settings; providing insight into the process of EBMgt decision-making, how evidence is conceptualized in this process, and the role of the decision-maker and the context in this process. The results of this dissertation have implications for our conceptualization of the process of EBMgt decision-making, the best available evidence in EBMgt, and the contextual boundary conditions for EBMgt practice.

References

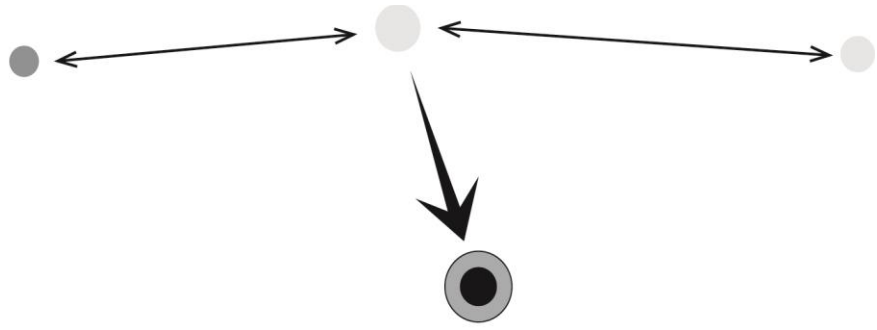
- Arndt, M., & Bigelow, B. (2009). Evidence-based management in health care organizations: A cautionary note. *Health Care Management Review, 34*(3), 206-213.
- Baba, V. V., & HakemZadeh, F. (2012). Toward a theory of evidence based decision making. *Management Decision, 50*(5), 832-867. doi:10.1108/00251741211227546
- Baker, G. R. (2001). Healthcare managers in the complex world of healthcare. *Frontiers of Health Services Management, 18*(2), 23-32.
- Barends, E., Rousseau, D. M., Briner, R. B., & Center for Evidence-Based Management, A. (2014). *Evidence-Based Management, The Basic Principles*. Amsterdam: Center for Evidence-based Management.
- Bartunek, J. M., & Rynes, S. L. (2014). Academics and practitioners are alike and unlike: the paradoxes of academic–practitioner relationships. *Journal of management, 40*(5), 118-1201.
- Begun, J. W., & Thygeson, M. (2015). Chapter 1: Managing complex healthcare organizations. In M. D. Fottler, D. Malvey, & D. J. Slovensky (Eds.), *Handbook of Healthcare Management* (pp. 1-17). Northampton, MA: USA: Edward Elgar Publishing.
- Briner, R. B., Denyer, D., & Rousseau, D. M. (2009). Evidence-Based Management: Concept Cleanup Time? *Academy of Management Perspectives, 23*(4), 19-32.
- Cavallo, J. J., Donoho, D. A., & Forman, H. P. (2020) Hospital Capacity and Operations in the Coronavirus Disease 2019 (COVID-19) Pandemic—Planning for the Nth Patient. In: *Vol. 1. JAMA Health Forum* (pp. e200345-e200345): American Medical Association.
- Chan, K. S., Morton, S. C., & Shekelle, P. G. (2004). Systematic reviews for evidence-based management: how to find them and what to do with them. *American Journal of Managed Care, 10*(11 Pt 1), 806-812.
- Currie, K. M. (2013). *Updating Reay, Berta & Kohn EBMgt systematic review*. (Unpublished Thesis), University of Prince Edward Island, Canada,
- Dean, J. W. J., & Bowen, D. E. (1994). Management theory and total quality: improving research and practice through theory development. *Academy of Management Review, 19*(3), 392-418.
- Eisenhardt, K. M., & Melissa, E. G. (2007). Theory building from cases: Opportunities and challenges. *Academy of Management journal, 50*(1), 25-32.

- Evidence-based Healthcare Management Unit. (2019). ADILLA: Evidence-based Management (EBMgt) Mentorship Program. The Hub for Evidence-driven Hospital Managers. Retrieved from <https://www.aub.edu.lb/ehmu/news/Pages/default.aspx>
- Fong, Z. V., Qadan, M., McKinney, R. J., Griggs, C. L., Shah, P., Buyske, J., . . . Altieri, M. S. (2020). Practical Implications of Novel Coronavirus COVID-19 on Hospital Operations, Board Certification, and Medical Education in Surgery in the USA. *J Gastrointest Surg*, 1-5. doi:10.1007/s11605-020-04596-5
- Gioia, D. A., Corley, K. G., & Hamilton, A. L. (2013). Seeking qualitative rigor in inductive research: Notes on the Gioia methodology. *Organizational Research Methods*, 16(1), 15-31.
- Groves, P., Kayyali, B., Knott, D., & Van Kuiken, S. (2013). *The 'big data' revolution in healthcare*. Center for US Health System Reform; Business Technology Office. Retrieved from https://www.ghdonline.org/uploads/Big_Data_Revolution_in_health_care_2013_McKinsey_Report.pdf.
- Henke, N., Bughin, J., Chui, M., Manyika, J., Saleh, T., Wiseman, B., & Sethupathy, G. (2016). *The Age of Analytics: Competing In a Data-Driven World*. Retrieved from McKinsey Global Institute <https://www.mckinsey.com/business-functions/mckinsey-analytics/our-insights/the-age-of-analytics-competing-in-a-data-driven-world>
- Hogan, R., & Warrenfeltz, R. (2003). Educating the modern manager. *Academy of Management Learning & Education*, 2(1), 74-84.
- Janati, A., Hasanpoor, E., Hajebrahimi, S., & Sadeghi-Bazargani, H. (2018). Evidence-based management–healthcare manager viewpoints. *International Journal of Health Care Quality Assurance*, 31(5), 436-448.
- Kaplan, R. S., & Porter, M. E. (2011). How to solve the cost crisis in health care. *Harvard Business Review*, 89(9), 46-52.
- Katz, R. L. (1955). Skills of an effective administrator. *Harvard Business Review*, 33, 33-42.
- Kibbe, D. C., Smith, P. P., LaVallee, R., Bailey, D., & Bard, M. (1997). A guide to finding and evaluating best practices health care information on the Internet: the truth is out there? *The Joint Commission Journal on Quality and Patient Safety*, 23(12), 678-689.

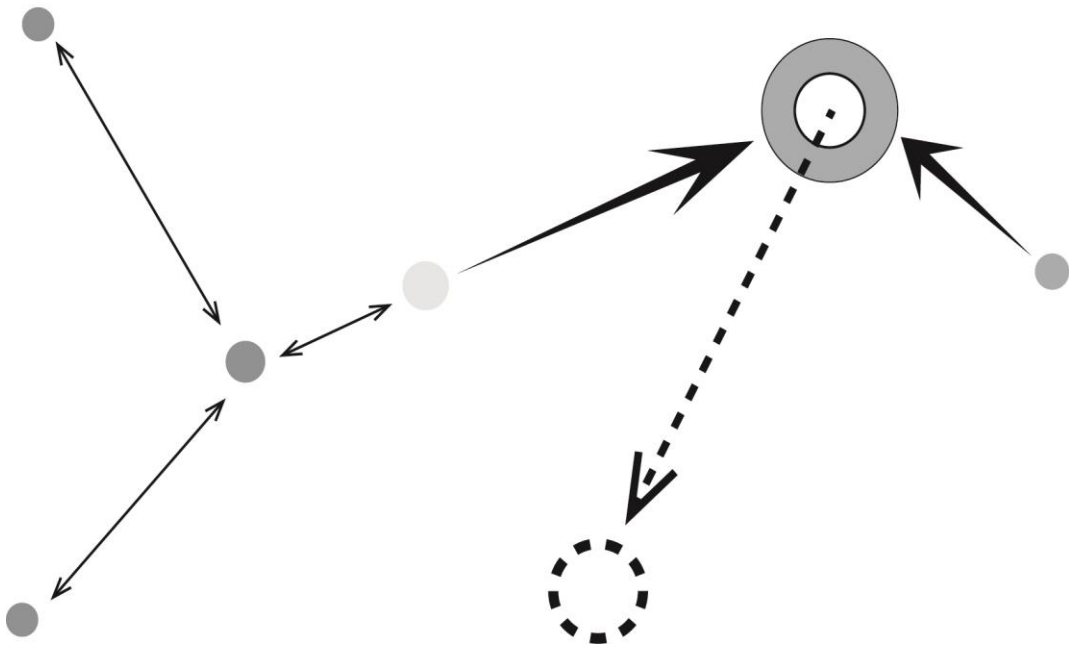
- Kohn, M. K. (2013). *Evidence Based Strategic Decision Making in Ontario Public Hospitals*. (Unpublished PhD Dissertation), University of Toronto, Canada,
- Kovner, A. R., & Rundall, T. G. (2006). Evidence-Based Management Reconsidered. *Frontiers of Health Services Management*, 22(3), 3-22.
- Langley, A., Mintzberg, H., Pitcher, P., Posada, E., & Saint-Macary, J. (1995). Opening up decision making: The view from the black stool. *Organization Science*, 6(3), 260-279.
- Lee, M. K. (2018). Understanding perception of algorithmic decisions: Fairness, trust, and emotion in response to algorithmic management. *Big Data & Society*, 5(1), 1-16.
- Lee, M. K., Kusbit, D., Metsky, E., & Dabbish, L. (2015). *Working with machines: The impact of algorithmic and data-driven management on human workers*. Paper presented at the Proceedings of the 33rd annual ACM conference on human factors in computing systems.
- Lohr, K. N. (2004). Rating the strength of scientific evidence: relevance for quality improvement programs. *International Journal for Quality in Health Care*, 16(1), 9-18.
- McAfee, A., Brynjolfsson, E., Davenport, T. H., Patil, D. J., & Barton, D. (2012). Big data: the management revolution. Harvard business review. *Harvard Business Review*, 90(10), 60-98.
- McBeath, B., Jolles, M. P., Carnochan, S., & Austin, M. J. (2015). Organizational and individual determinants of evidence use by managers in public human service organizations. *Human Service Organizations: Management, Leadership & Governance*, 39(4), 267-289. doi:10.1080/23303131.2015.1044588
- Ming, W. K., Huang, J., & Zhang, C. J. (2020). Breaking down of healthcare system: Mathematical modelling for controlling the novel coronavirus (2019-nCoV) outbreak in Wuhan, China. *bioRxiv*.
- Mintzberg, H., Raisinghani, D., & Theoret, A. (1976). The structure of "unstructured" decision processes. *Administrative Science Quarterly*, 21, 246-275.
- Morrell, K. (2008). The narrative of 'Evidence Based' management: A polemic. *Journal of Management Studies*, 45(3), 613-635. doi:10.1111/j.1467-6486.2007.00755.x
- Morrell, K., & Learmonth, M. (2015). Against evidence-based management, for management learning. *Academy of Management Learning & Education*, 14(4), 520-533. doi:10.5465/amle.2014.0346

- Morrell, K., Learmonth, M., & Heracleous, L. (2015). An archaeological critique of 'Evidence-based Management': One digression after another. *Journal of Management Studies*, 26(3), 529-543.
- Provost, F., & Fawcett, T. (2013). *Data Science for Business: What you need to know about data mining and data-analytic thinking*: " O'Reilly Media, Inc."
- Reay, T., Berta, W., & Kohn, M. K. (2009). What's the evidence on evidence-based management? *The Academy of Management Perspectives*, 23(4), 5-18.
- Rodolfa, E., Bent, R., Eisman, E., Nelson, P., Rehm, L., & Ritchie, P. (2005). A cube model for competency development: Implications for psychology educators and regulators. *Professional Psychology: Research and Practice*, 36(4), 347.
- Rousseau, D. M., & Gunia, B. C. (2016). Evidence-based practice: The psychology of EBP implementation. *Annual Review of Psychology*, 67, 667-692. doi:10.1146/annurev-psych-122414-033336
- Rycroft-Malone, J., Burton, C. R., Bucknall, T., Graham, I. D., Hutchinson, A. M., & Stacey, D. (2016). Collaboration and co-production of knowledge in healthcare: opportunities and challenges. *Int J Health Policy Manag.*, 5(4), 221-223. doi:10.15171/ijhpm.2016.08
- Rynes, S. L., & Bartunek, J. M. (2017). Evidence-Based Management: Foundations, Development, Controversies and Future. *Annual Review of Organizational Psychology and Organizational Behavior*, 4, 235-261.
- Rynes, S. L., Colbert, A. E., & O'Boyle, E. H. (2018). When the "best available evidence" doesn't win: How doubts about science and scientists threaten the future of evidence-based management. *Journal of management*, 44(8), 2995–3010.
- Sahakian, T., Daouk-Öyry, L., Karam, C. M., Kooij, D. T. A. M., Kroon, B., & van de Vijver, F. J. R. (2020). *The Fine Line between Decisions and Evidence-based Decisions: Contextualizing and Unraveling the Evidence-based Decision Making Process in Hospital Settings*. Manuscript submitted for publication.
- Simon, H. A. (1997). *Models of bounded rationality: Empirically grounded economic reason* (Vol. 3): MIT press.
- Spiers, J. A., Lo, E., Hofmeyer, A., & Cummings, G. G. (2016). Nurse leaders' perceptions of influence of organizational restructuring on evidence-informed decision-making. *Nursing Leadership*, 29(2), 64-81.

- Swan, J., Clarke, A., Nicolini, D., Powell, J., Scarbrough, H., Roginski, C., . . . Taylor-Phillips, S. (2012). *Evidence in Management Decisions (EMD): Advancing knowledge utilization in healthcare management: Final report*: NIHR Health Services and Delivery Research Programme.
- Thornhill, J., Judd, M., & Clements, D. (2009). CHSRF knowledge transfer:(re) introducing the self-assessment tool that is helping decision-makers assess their organization's capacity to use research. *Healthcare Quarterly*, 12(1), 22.
- Tourish, D. (2012). Evidence Based Management', or 'Evidence Oriented Organizing'? A critical realist perspective. *Organization*, 20(2), 173-192.
- Tranfield, D., Denyer, D., & Smart, P. (2003). Towards a methodology for developing evidence-informed management knowledge by means of systematic review. *British Journal of Management*, 14(3), 207-222.
- Walshe, K., & Rundall, T. G. (2001). Evidence-based management: from theory to practice in health care. *Milbank quarterly*, 79(3), 429-457.
- Wright, A. L., Zammuto, R. F., Liesch, P. W., Middleton, S., Hibbert, P., Burke, J., & Brazil, V. (2016). Evidence-based Management in Practice: Opening up the Decision Process, Decision-maker and Context. *British Journal of Management*, 27(1), 161-178.
doi:10.1111/1467-8551.12123



Scientific Summary



Scientific Summary

Healthcare organizations today are overflowing with extraordinary amounts and types of data. This data has wide potential for providing insight into processes and outcomes related to the management of healthcare organizations and consequently for optimizing the quality and efficiency of healthcare service delivery. Evidence-based Management (EBMgt) is one approach that could encourage managers to leverage this and other more traditional data, such as managers' experience, scientific research, and stakeholders' input, to inform decision-making. Leveraging data is important in the current healthcare context, where the increase in healthcare expenditure and decrease in funding is making the management of healthcare organizations increasingly challenging. Leveraging data is also critical in the context of the COVID-19 pandemic, which has overburdened hospitals and created exceptional challenges for hospital managers. All these factors have put EBMgt at the forefront of management practice and have made the adoption of EBMgt imperative (see Chapter 1). As such, the overarching aim of this dissertation is to empirically develop an in-depth understanding of the practice of EBMgt in hospital settings.

EBMgt: Concept and Critiques

EBMgt refers to gathering data from multiple sources, including managers' experience, the organization, scientific literature, and stakeholders' input, appraising its quality, and using it as evidence to inform decisions. By focusing on the quality of the evidence, EBMgt encourages the use of more effective practices, consequently improving decision-making. While the adoption of the EBMgt approach is being widely promoted in healthcare management research and practice, some scholars have presented several critiques of the EBMgt literature.

Critique 1: Conceptual Literature Providing Limited Empirical Understanding of Evidence-Based Decision-Making Process

The EBMgt literature has been critiqued for the scarcity of empirical research on EBMgt. The existing literature has been dominated by conceptual articles offering limited insight into how the EBMgt decision process is implemented by different decision-makers in different contexts and providing limited evidence for the effectiveness of EBMgt. With limited empirical insight, existing conceptualizations of the EBMgt process have been rooted in rational decision-making theories, despite organizational decision-making research showing that human rationality is bounded by the decision maker's mental skills, habits, and reflexes.

Critique 2: Neglect of Contextual Contingencies in EBMgt Decision Process

The EBMgt literature has also been critiqued for neglecting the impact of contextual contingencies, like issues of ethics, power relations, politics, and individual personal interests. Ignoring such issues, EBMgt can end up serving power and organizational interests by equating managers' problems and insight with the concerns and interests of employees and ignoring employees' views. Moreover, EBMgt tends to associate non evidence-based decision-making, with decision-makers' absence of knowledge, while in reality decision-makers might choose to ignore evidence that contradicts their beliefs, knowledge, and self-interest. This focus on the role of decision-makers and their perceptions and motives is lacking in the EBMgt literature.

Critique 3: Narrow Conceptualization of Evidence

The EBMgt literature has also been critiqued for taking a selective and narrow view of evidence. It has privileged scientific evidence as the foundation of decision-making at the expense of the situated expertise and judgment of the decision-maker. Furthermore, when it comes to judging the relevance and trustworthiness of the evidence, EBMgt literature has held

quantitative positivist research as the best available evidence at the expense of qualitative and narrative approaches. The devaluing of sources and types of contextualized evidence is particularly problematic considering Critique 2 and the need to consider and incorporate contextual contingencies throughout the process.

Aims and Studies

In light of these critiques of the EBMgt literature, the overarching aim of this dissertation is to empirically develop an in-depth understanding of the practice of EBMgt in hospital settings, by unraveling the process of EBMgt decision-making, how evidence is conceptualized in this process, and the role of the decision-maker and the context in this process. In pursuit of this aim I conducted three studies, each tackling one or more of the critiques. In **Chapter 2**, I intended to gain empirical insight into the characteristics of the decision-makers who apply the EBMgt decision-making process. Specifically, my aim was to identify the foundational and functional competencies necessary for the practice of EBMgt in hospital settings and propose an empirically-based competency model for evidence-driven managers. In **Chapter 3**, I intended to gain empirically insight into the EBMgt decision-making process, the different contextual contingencies, and their impact on the process, and how evidence is conceptualized. Specifically, my aim was to build an empirically driven theoretical model of the evidence-based decision-making process and its contextual nuances within hospital settings. Finally, in **Chapter 4**, I intended to uncover what insight the literature on EBMgt in hospital settings specifically provides about EBMgt and its three critiques. Specifically, my aim was to scope out the existing literature on EBMgt in hospital settings, identify the gaps in the literature on the EBMgt decision-making process in hospital settings, and outline core areas for future research.

Study Results

Chapter 2

The aim of this chapter was to identify the foundational and functional competencies necessary for practicing EBMgt in hospital settings and developing a competency model for evidence-driven managers. I collected data through interviews and the critical incident technique from executive managers working in hospitals in Lebanon, and analyzed the data using an inductive approach. Accordingly, I identified 13 competencies, which I grouped under four dimensions; technical, cognitive, interpersonal, and intrapersonal that represents popular approaches to classifying managerial skills. Furthermore, I used Rousseau and Gunia (2016)'s proposed conceptualization to develop the EBMgt Competency Model by classifying the competencies across the dimensions into foundational competencies necessary for practicing EBMgt overall, and functional competencies necessary for engaging in specific EBMgt activities. I identified 11 foundational competencies and sub-competencies that are necessary to engage in all aspects of EBMgt practice. These included the competencies of general business knowledge, industry knowledge, systems thinking, team leadership, self-initiated improvement, and adaptability, and the sub-competencies of ethicality in management, analytical and systems thinking, innovativeness, and emotional intelligence and conflict management skills. I also identified seven functional competencies and sub-competencies, including research knowledge and skills, ethicality in research, inquisitiveness, resourcefulness, building relationships, management style, and open mindedness, that are critical for the practice of the core EBMgt activities of acquiring evidence and assessing its quality. Finally, I argued that the competency model could be considered dynamic whereby the foundational competencies can be prerequisites to the development of functional competencies.

Chapter 3

The aim of this chapter was to build an empirically driven theoretical model of the evidence-based decision-making process and its contextual nuances within hospital settings. I collected data through interviews and the critical incident technique from executive managers working in hospitals in Lebanon and analyzed the data using Gioia, Corley, and Hamilton's (2013) proposed method. Accordingly, I developed the Grounded Model of the EBMgt Process, an empirically-driven theoretical model dynamically depicting how managers in hospital settings make evidence-based decisions. The model indicated that EBMgt is a multi-level phenomenon, applied at the individual-level as a process of decision-making. This process involves a series of eight structured steps: identifying the problem, understanding the problem, acquiring evidence, appraising the quality of evidence, generating alternatives, making a decision, preparing for implementation, and assessing and adjusting. The steps of acquiring evidence and appraising the quality of the evidence are the hallmarks of EBMgt. At the step of acquiring evidence, four sources of evidence are used: experiential, organizational, scientific, and stakeholder evidence, which are further delineated into sub-sources. The managers' progress through the steps is influenced by different individual, organizational, and national-level factors. These factors act as barriers and facilitators to EBMgt, hindering or helping the acquisition and use of evidence, as previously found in the literature. In addition to that, these factors act as decision criteria, which include contextual conditions related to the organization, the external context, internal and external stakeholders, ethical and legal considerations, or technical considerations. The decision criteria must be balanced alongside the evidence when deciding between decision alternatives. Moreover, the factors act as lenses, which include managers' motives for using evidence and managers' perception of the nature of the decision. Lenses color decision makers' perceptions of

situations, and influence their decision-making process, the evidence they use, and the criteria they prioritize. Due to the impact of the barriers and facilitators, decision criteria, and lenses, the EBMgt process is not strictly sequential and linear; rather it can be iterative and can involve back and forth movement.

Chapter 4

The aim of this chapter was to identify the gaps in the literature on the EBMgt process in hospital settings and outlining areas for future research. Since the EBMgt literature is not unified under the EBMgt terminology, I used a novel methodology to scope out the EBMgt literature, which I developed by adapting existing approaches used in previous EBMgt reviews. The methodology involved first searching the literature using EBMgt terminology, similar to previous reviews. It then involved deriving terminology associated with the EBMgt concept from the results of the first search and using this terminology to conduct a second more expanded search. I analyzed the 218 resulting articles using the Grounded Model of the EBMgt Process from Chapter 3 as the guiding framework. Accordingly, I identified three major gaps in the literature on EBMgt relating to the context and outcomes. In terms of context, the literature has neglected the impact of lenses, referring to managers' perceptions and motives, on the process of evidence-based decision-making. Moreover, the literature has concentrated on the countries of the Global North and neglected to study the context of countries of the Global South, which make up most of the world population. Finally, in terms of outcomes, the literature has neglected the outcomes of implementing EBMgt as an approach to decision-making, thus providing limited evidence for EBMgt effectiveness.

Discussion

The findings of the three studies of this dissertation make several contributions to the critiques of EBMgt and the literature on EBMgt in hospital settings (see Chapter 5).

Critique 1: Conceptual Literature Providing Limited Empirical Understanding of Evidence-Based Decision-Making Process

This dissertation contributes to the first critique of EBMgt by providing empirical insight into the decision-maker who engages in the EBMgt process, the process of EBMgt in hospital settings, and the overall literature on EBMgt in hospital settings. The EBMgt Competency Model (Chapter 2) indicates that decision-makers who implement the EBMgt process must possess a range of technical, cognitive, interpersonal, and intrapersonal competencies. It also indicates that some of these competencies are necessary for practicing EBMgt overall, while others are necessary for practicing core EBMgt activities of acquiring and appraising evidence, without which managers cannot practice core steps of the process. Furthermore, the Grounded Model of the EBMgt Process (Chapter 3) indicates that EBMgt is a multi-level phenomenon, executed at the individual level as a decision-making process. This process is not strictly linear, rather it is subject to interference from individual, organizational, and national factors, which could knock the decision-making “off the linear track”. This indicates that assumptions of bounded rationality and non-linearity might be a better way to conceptualize the EBMgt process in hospital settings. Finally, the systematic scoping review (Chapter 4) also contributes to this critique by providing insight into the literature on EBMgt in hospital settings specifically. The results of the review indicate that the literature is predominantly empirical, dominated by articles on the process of EBMgt decision-making but still neglecting some steps of the process, and lacking evidence on the effectiveness of EBMgt.

Critique 2: Neglect of Contextual Contingencies in EBMgt Decision Process

This dissertation contributes to the second critique of EBMgt by providing evidence for the existence and the impact of a host of individual, organizational, and national-level factors on the EBMgt decision process in hospital settings. The competencies identified in the Competency Model (Chapter 2) indicate that the characteristics of the decision-maker play an important role in the EBMgt process. Additionally, some of the competencies identified highlight the role of certain contextual contingencies, such as ethics and personal interests. For example, the emergence of the competency open-mindedness, which refers to being open to changing one's mind in light of new evidence even after having made a decision, is important particularly because the EBMgt literature has tended to associate poor decision-making, or non evidence-based decision-making, with an absence of knowledge. The emergence of this competency indicates that managers' lack of reliance on evidence might be a choice to ignore evidence that contradicts one's beliefs, knowledge, and self-interest, and thus pinpointing the necessity of managers being receptive to evidence.

Moreover, the Grounded Model of the EBMgt Process (Chapter 3) indicates that different factors, which act as barriers and facilitators, decision criteria, and lenses, impact the evidence that managers can acquire, the evidence they do acquire, whether they appraise the evidence quality of the evidence, and what evidence they use in their decision. While barriers and facilitators have been consistently demonstrated in the literature as impacting EBMgt, decision criteria and lenses have not been, with only one previous study finding evidence for them. Therefore, the Grounded Model of the EBMgt Process expands our understanding of the different contextual factors that can impact EBMgt decision-making in hospital settings and maps their influence. This is further supported by the results of the scoping review (Chapter 4), which indicated that few studies in the literature on EBMgt in hospital settings have identified

and examined the impact of decision criteria and lenses. Furthermore, these barriers and facilitators, decision criteria, and lenses show that issues of ethics, power relations, and politics are pervasive in the EBMgt process. For example, they manifest as managers' position and power within the organization influencing their access to evidence, as organizational political considerations influencing choice between alternatives, and as national political considerations influencing choice between alternatives. Through the Grounded Model of the EBMgt Process, they are made explicit, and their influence on the EBMgt process is mapped out. Finally, these contextual factors and specifically the lenses among them, have implications for the foundational principles of EBMgt and thus the boundaries of its practice. The lenses, which refer to managers' perceptions and motives, could potentially influence the extent to which a manager practices the core principles of EBMgt, collecting evidence from multiple sources and assessing the quality of the evidence. It can be argued that there are certain contextual constraints to the adoption of EBMgt, in the presence of which, the decision ceases to be evidence-based.

Critique 3: Narrow Conceptualization of Evidence

This dissertation contributes to the third critique of EBMgt by providing both empirical and systematic review evidence that managers in fact rely on different types of evidence from different sources. The Grounded Model of the EBMgt Process (Chapter 3) indicates that the sources of evidence fit under the four overarching sources of evidence identified in the literature: scientific, experiential, organizational, and stakeholder. It also indicates that the sub-sources under each source could be delineated, thus expanding upon this conceptualization of the sources of evidence to four overarching sources and a wide range of sub-sources. Moreover, the model and the results of the systematic scoping review (Chapter 4) indicated that managers rely on a combination of different types of evidence from different sources for EBMgt decision-making.

Finally, the model also indicates that in addition to the evidence, decision criteria, which refer to stakeholder, organizational, national, ethico-legal, and technical factors, are also being considered when choosing between alternatives. This contributes to the conceptualization of the best available evidence in EBMgt, indicating that it is not only evidence that is available to the manager from different sources and that is judged to be reliable, but also as the evidence that best fits with the contextual considerations.

Practical Implications

This dissertation provides practical insight that can inform EBMgt practice for individual managers, organizations, research and educational institutions, and healthcare systems. The EBMgt competency model can help management practitioners identify and develop their competencies and thus gain the tools necessary to practice EBMgt. It can aid organizations by providing a foundation for refining managerial selection processes and by serving as blueprint for management training initiatives. Such training initiatives can be developed at the level of educational institutions, whereby the competency model can help (re)design management education programs to develop future healthcare managers. Such training and education programs can also be developed at the level of national healthcare systems whereby the model can be used by different stakeholder groups, such as ministries of public health, to design training programs for the healthcare management workforce in a country. EBMgt training programs can be a point of collaboration between research, education, practice, and government.

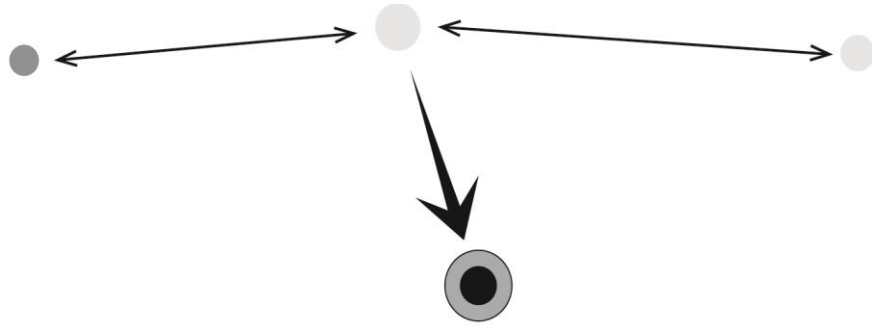
The Grounded Model of the EBMgt Process can be used by management practitioners as a stepwise guide for practicing EBMgt decision-making. Additionally, the results of the systematic review can provide insight into how the different steps of the process can be undertaken in different contexts and can direct management practitioners towards resources to

facilitate their practice of certain steps. Furthermore, the Grounded Model of the EBMgt Process can help organizations reflect on their managers' decision-making process, identify the steps their managers' struggle with most, and accordingly target training programs. It can also help organizations pinpoint internal structural and cultural factors that act as barriers to their managers' practice of EBMgt. Referring to the extant literature on EBMgt in hospital settings identified in the scoping review, organizations can identify among a host of potential suggested solutions to overcome these barriers. Similarly, research and educational institutions as well as government agencies can refer to the Grounded Model of the EBMgt Process and the scoping review to identify the role they play in hindering or enabling EBMgt.

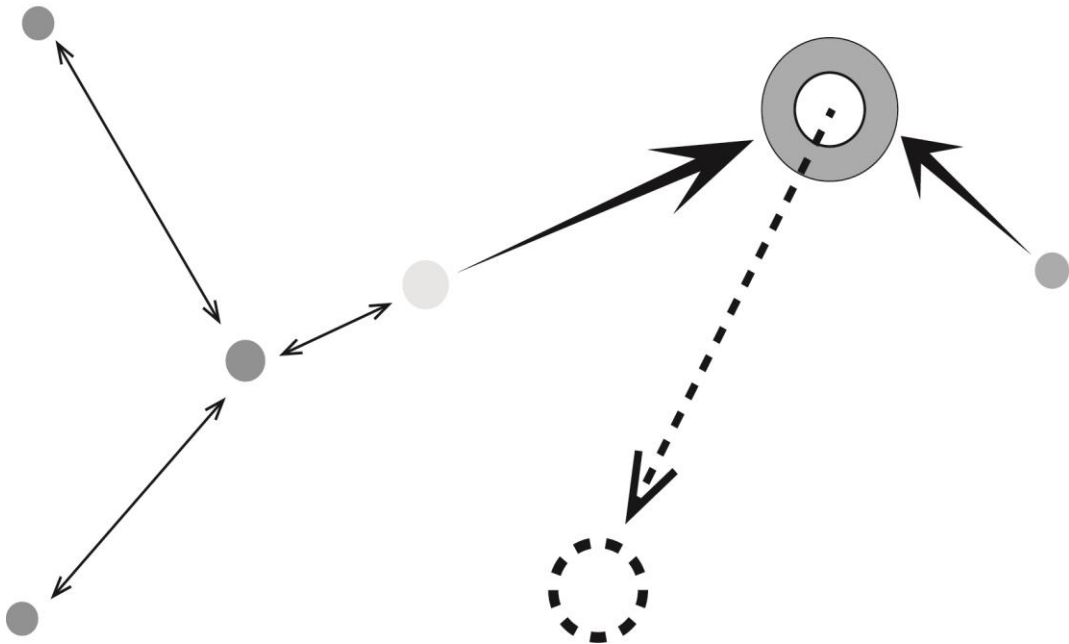
Future Research Recommendations

The results of this dissertation also open up avenues for future research. One avenue is to focus on the evidence-driven managers. Research can focus on the competencies of evidence-driven managers, particularly on validating the EBMgt Competency Model and developing assessment methods to evaluate EBMgt competencies. Research can also focus on identifying other characteristics of evidence-driven managers that are associated with EBMgt implementation, including for example demographic characteristics, as well as personality. Another avenue for future research is to focus on the EBMgt process and the contextual factors that influence the EBMgt process. Research could involve conducting in depth examinations of EBMgt practice by different decision makers in different decisional, organizational, and national contexts, with a particular focus on identifying the contextual factors and mapping their impact on the EBMgt decision process. Such research could focus on particularly examining the impact of such factors on the core activities of EBMgt and could use multiple-case study design to better understand the contextual nuances of EBMgt, the boundary conditions of EBMgt practice, and to

contribute to EBMgt theory building. A third, and final avenue for future research is to focus on the outcomes of EBMgt practice. Research could focus on identifying the outcomes of applying EBMgt as an overall approach to decision-making. Such research can also be conducted in the context of advances in big data and artificial intelligence. This could involve studying specific types of evidence-based decision-making, such as data-driven decision-making that relies on the use of big data specifically. Given that evidence relating to the effectiveness of EBMgt is still lacking in the literature the study of EBMgt outcomes in different contexts and in light of advancements in organizational decision-making is a critical area for future research.



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LEGEND

PERSON



IMPACT



DATA



ASSOCIATION



SOLUTION



PROCESS

