A FRAMEWORK FOR ASSESSING THE EFFECTIVENESS OF HR METRICS AND ANALYTICS: THE CASE OF AN AMERICAN HEALTHCARE INSTITUTION

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ABSTRACT: *Although some studies have been conducted on human resource (HR) metrics and analytics, little rigorous research focused on practices and challenges of HR (staffing) metrics and analytics in the healthcare sector. This study, therefore, intends to address this research gap by focusing on practices and challenges of staffing metrics and analytics in the healthcare sector using an American Healthcare Institution (AHCI). This study has the following four objectives: (a) review the literature on HR/staffing metrics and analytics, (b) develop a conceptual framework for assessing the effectiveness of staffing metrics and analytics efforts, (c) assess the practices and challenges of staffing metrics and analytics of AHCI, and (d) discuss the study's implications and future research directions.*

KEYWORDS: HR, staffing, recruiting, metrics, analytics, healthcare.

INTRODUCTION

It is generally accepted that human resources (HR) are an organization's most important asset and are sources of sustainable competitive advantage (Barney, 1991; Huselid, 1995). The capacity to effectively manage an organization's manpower is significantly impacted by the type and quality of data available to managers (CIPD, 2017; Kavanagh & Johnson, 2018). Frequently, HR departments are required to calculate the return on investment of HR initiatives provide organizational leadership with actionable information to aid in business decisions (Feffer, 2017; Phillips, 2020; Levenson, 2015). HR departments need to measure their impact as a whole and address how they can leverage the organizational workforce to maximize the bottom line (Sierra-Cedar, 2017). To demonstrate how HR measures can impact the bottom line, HR departments must meld HR metrics with business data (Feffer, 2017). Such a trend has also led to the need for measuring HR programs and activities using HR metrics (Fitz-enz & Davidson, 2002). HR as a business area has aimed to prove its value using metrics (Heneman, Judge, & Kammeyer-Mueller, 2019). As noted by Sullivan (2003), the single difference between a great HR department and an average one is the use of metrics and analytics. As a result, interest in HR metrics and analytics has been rising, and organizations are reaching out to learn more about useful HR metrics and analytics and how they can make use of them to improve organizational effectiveness (CIPD, 2017; Lockwood, 2006). In other words, evidence-based management is the main factor for the rapidly growing interest in HR metrics and analytics and thus HR metrics and analytics have become focus points.

Interest in HR metrics goes back to the pioneering work of Fitz-enz and the early benchmarking work he conducted through the Saratoga Institute in the mid-1980s (Fitz-enz & Davidson, 2002). At first, HR metrics were mainly used to audit different parts of related programs and activities (Casio, 2000). More recently they have been used to measure the effectiveness of HR programs

and activities and support managers in making better-informed business decisions (Adler, 2016; SHRM, 2010; Sullivan, 2003). While the Saratoga Institute was the first systematic effort to develop information on standard HR metrics to inform managers about human capital, the introduction of the balanced scorecard further refined organizations' thinking about HR metrics (Kaplan & Norton, 1996). The work of Becker, Huselid, & Ulrich (2001) had a significant impact on popularizing the HR scorecard, which underscores how the alignment of HR activities with both corporate strategies and activities enhance organizational outcomes.

The use of HR metrics is essential given the current trend of evidenced-based management. Properly implemented HR metrics and analytics can provide a number of benefits such as assessing the efficiency and effectiveness of different aspects of HR programs and activities (Adler, 2016; Maurer, 2016; Sullivan, 2003); making better-informed decisions and backed by facts- rather than hunch and thus make key HR decisions far more sellable to the business (Feffer, 2017); and offering HR departments strong competitive advantages, without which departments could be at an extreme disadvantage (Dulebohn & Johnson, 2013; SHRM, 2010). Thus, one can argue that the use of HR metrics and analytics evolves from casual to compulsory for organizational success. Although this study will highlight HR metrics and analytics-related issues, its focus is on staffing metrics and analytics. Staffing is the foundation for all other HR functions (Lussier & Hendon, 2020). In addition, while "metrics are about getting the numbers right, analytics are about finding answers in the data" (Feffer, 2017: 61). Some studies have been conducted on HR metrics and analytics, however, little rigorous research focused on practices and challenges of staffing metrics and analytics in the healthcare sector. This study, therefore, intends to address the research gap by focusing on practices and challenges of staffing metrics and analytics in the healthcare sector using an AHCI. The reason an AHCI was selected as a case study is because it has been lauded by many scholars for providing the finest healthcare services and having effective HR practices. This study has the following four objectives: (a) review the literature on HR/staffing metrics and analytics, (b) develop a conceptual framework for assessing the effectiveness of staffing metrics and analytics efforts, (c) assess the practices and challenges of staffing metrics and analytics of AHCI, and (d) discuss the study's implications and future research directions.

LITERATURE REVIEW

Effective HR management includes numerous functional areas such as staffing, training and development, employee performance appraisal, and compensation. (Mathis et al., 2017). This study focuses solely on staffing. Staffing activities (recruitment and selection) are increasingly important components of HR systems (Lussier & Hendon, 2020). "Staffing is the process of acquiring, deploying, and retaining a workforce of sufficient quantity and quality to create positive impacts on the organization's effectiveness" (Heneman et al., 2019: 10). If managers are to make better-informed HR/staffing decisions, the role HR/staffing metrics and analytics plays is critical.

A metric is a quantifiable measure that demonstrates the effectiveness (or infectiveness) of a particular practice or procedure (Heneman et al., 2019: 351) or is used as an accountability tool that enables the assessment of a function's results (Dulebohn & Johnson, 2013: 72). HR metrics are operational measures, addressing the efficiency, effectiveness and impact of an organization's

HR practices (Phillips, 2020: 62). Staffing metrics, in this study, refer to data (numbers) that reflect descriptive detail about staffing processes and outcomes. They are measurements used to determine the value and effectiveness of staffing initiatives (Maurer, 2016). HR analytics refers to decision points, guiding HR decisions that impact the workforce and related matters (Feffer, 2017: 62). It is in the use of data and data analysis techniques that we understand, improve, and optimize the people side of business (Dearborn & Swanson, 2017) and to generate insight. HR data and metrics can reveal trends that identify job applicants who will likely succeed at workplace (Kavanagh & Johnson, 2018). HR analytics leverages HR data to help organizations understand or predict how changes in one or more metrics will affect a meaningful business outcome (Phillips, 2020: 62). While HR metrics use data to assess efficiency and effectiveness, HR analytics harness those measures to help organizations understand or predict how changes will affect an outcome (Feffer, 2017; Kuncel et al., 2014). In other words, HR metrics tell organizations what is going on, HR analytics uncover what to do about it. (Feffer, 2017). There is a need for transforming HR metrics into HR analytics and information into insight for it is the insight that produces value, not the metric itself (SHRM, 2016). Managers are more likely to make better decisions, which give an organization a competitive advantage when they use facts in objective ways (Fleck, 2016). HR needs to provide tangible evidence and such evidence can be found in HR metrics and analytics. Thus, HR analytics is necessary and critical to the success of organizations (Bersin, 2017).

HR metrics and analytics help organizations assess the status and progress of their HR practices (SHRM, 2010); assess the efficiency and effectiveness of their HR activities; learn the performance of their HR practices (Sullivan, 2003); compare different data points (CIPD, 2017); know how well HR functions work and identify where improvement could be made (Kavanagh & Johnson, 2018); delivery of HR services more effectively (SHRM, 2016); assess their HR practices and results over time (Johnson, Lukaszewski, & Stone, 2016); benchmark their HR practices against their competitors (Feffer, 2017); measure the value of the time and money spent on HR activities (Dulebohn & Johnson, 2013); expose where effort, resource, and budgets have not produced intended outcomes (Lee, 2016); track and assess the performance of different HR activities that can ultimately predict the future (Adler, 2016); identify and ferret out ineffective or unlawful HR practices and processes (CIPD, 2017); and make data-driven decisions to attract, manage, and retain employees (Fleck, 2016). For instance, Fleck (2016: 134) reports that JetBlue Airways, with the help of HR analytics, was able to improve the quality of hires and received fewer complaints from crew members hired. In addition, attrition has decreased. Fleck (2016) further stated that, with the help of HR analytics, a mattress company, was able to hire salespeople who were eighty percent less likely to leave and sold eleven percent more product than others who were hired but not recommended. Lastly, after analyzing seventeen studies of applicant evaluations, Kuncel et al. (2014) showed that the use of HR analytics outperformed human decisions by at least twenty-five percent.

Taking into account the objectives of the current study and relevant literature (e.g., Adler, 2016; Dulebohn & Johnson, 2013; Kavanagh & Johnson, 2018; Feffer, 2017; Phillips, 2020; Fleck, 2016), we developed a conceptual framework (Figure-1) for assessing the effectiveness of HR metrics and analytics efforts. The conceptual framework is based on the following assumptions:

- Effective HR metrics and analytics require some critical factors to be in place. There are many factors that influence HR metrics and analytics efforts, however, the framework identifies ten 'critical factors' (A) that impact the success of HR metrics and analytics processes (B), which in turn affect managers' decisions (C), which subsequently influence HR outcomes (D).

- Effective HR metrics and analytics requires the following five steps: Identifying an HR problem, collecting relevant and accurate HR data, generating relevant HR metrics, conducting HR analytics, and developing and implementing an HR action plan.

- Effective HR decisions influence the following three HR outcomes: Employee's competence, performance, and retention in that when an organization makes effective HR decisions, it is more likely to hire competent, productive, and employees who are willing to stay (Paauwe, 2004; Tessema & Soeters, 2006).

- The more the proposed 'critical factors' for HR metrics and analytics are in place, the higher the impact of HR metrics and analytics on managers' decisions. We postulate if one or more of the 'critical factors' is/are missing, HR metrics and analytics would have less impact overall.

- As with any checklist, our 'critical factors' might be both incomplete and, in some cases, have overlapping factors. Nevertheless, we found it very useful and helpful for diagnosing and understanding HR metrics and analytics efforts. As remarked by Hiltrop (1996), the checklist should depend on the problems being researched and the kinds of predictability sought.

- The framework might also reveal the missing elements that organizations have to consider if they are to get maximum contribution from their HR metrics and analytics efforts. In other words, the framework can be used to identify an HR problem area on which organizational actions should focus. As remarked by Siggelkow (2007), the framework is a means indicating the direction of the action needed but is not an end in itself.

Figure 1: A framework for assessing the effectiveness of HR (staffing) metrics and analytics efforts
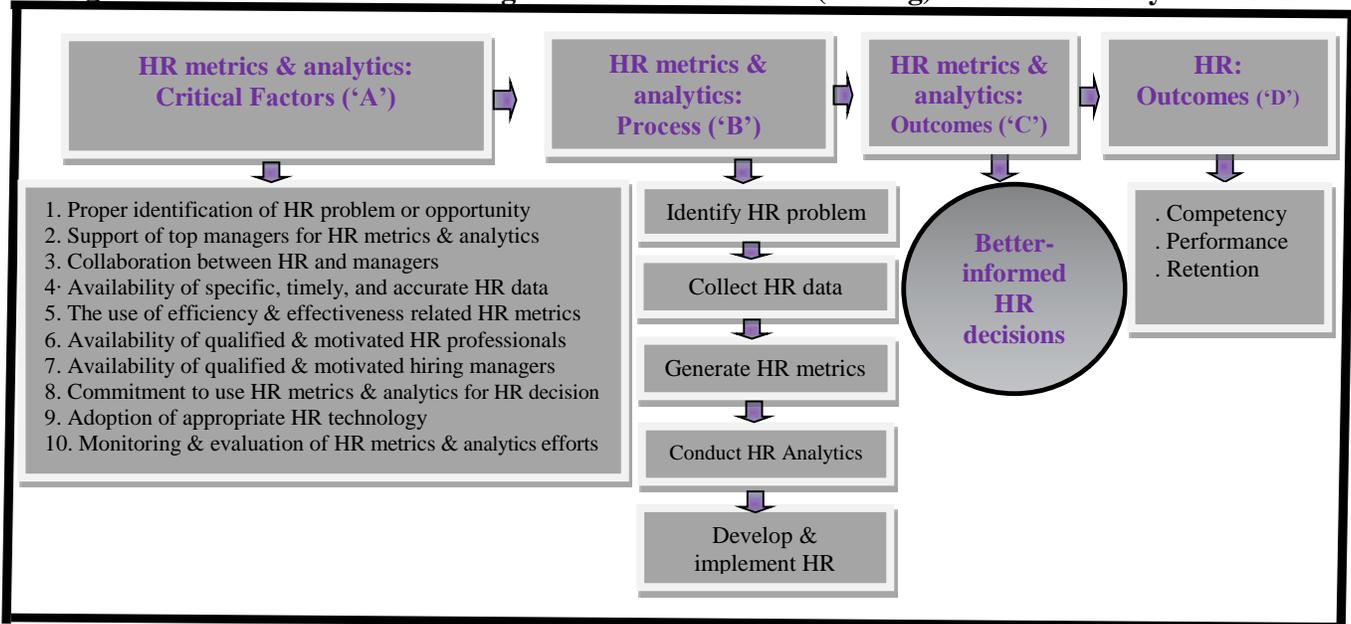
Critical factors for effective HR metrics and analytics Below, we discuss the first aspect of our proposed framework, ten 'critical factors' for effective HR metrics and analytics identified in the framework (Figure-1).

Proper identification of HR problem or opportunity

Proper identification of an HR problem or opportunity is perhaps the most important critical factors for effective HR metrics and analytics. Organizations should first properly identify an HR issue or identify previously unexplored opportunities before they collect HR data (Kavanagh & Johnson, 2018; Heneman et al. 2019). Understanding the prevailing HR problems or unexplored opportunities can allow organizations to determine the kind of HR data and HR metrics. Most organizations tend to pursue a 'data first approach' instead of a 'problem first approach' (Levenson, 2015). As a result, many HR metrics have ultimately little to no impact on business decision making (Kavanagh & Johnson, 2018; Feffer, 2017). Recently, it has been argued that an effective approach is 'problem first' not 'data first'. Meaning, begin with the HR problem an organization is facing and then collect timely and relevant HR data needed to generate appropriate HR metrics that would be useful in supporting managerial decisions. Such approach requires fewer metrics to be collected and reported.

Support of top managers for HR metrics and analytics

The commitment and support of top managers play a significant role in the success of HR metrics and analytics efforts. When they believe in and are committed to HR metrics and analytics efforts, they are more likely to allocate the required resources in terms of time and money (Breaugh & Starke, 2000; Dineen & Noe, 2009). The adequacy and reliability of financial resources is one of the key factors for success. Their support, on one hand, enables the HR department to utilize appropriate HR technology and be staffed with qualified and motivated HR professionals and analysts. Equally, their support encourages and requires line managers to cooperate with the HR department in HR metrics and analytics efforts and base their HR decisions on HR metrics and

analytics results. As argued by Adler (2016), top executives must commit themselves to active, visible, and personal involvement in HR issues.

Collaboration between HR and managers

It is critical for HR to collaborate with other departments to identify HR problems and collect HR-related data to develop meaningful HR metrics. HR metrics that matter are the ones that incorporate the input of stakeholders and contribute to informed decision-making (CIPD, 2017; SHRM, 2010). For example, to determine the quality of a new hire, there is a need for the HR department to collect HR data from the hiring department. As underlined by Feffer (2017: 63), "although cross-functional measurement is harder to do, it connects the dots". Prior studies, however, reported that many managers perceive the increased interest in metrics as simply a mandate to compute and report more HR metrics. HR professionals who generate HR reports (HR metrics) tend to be frustrated with their inability to get managers to tell them what information they need, read, or use the HR metrics data included in reports, or even acknowledge receipt of the HR reports (Kavanagh & Johnson, 2018; Jamrog & Downey, 2009).

Availability of specific, timely, and accurate HR data

If HR metrics and analytics efforts are to have meaningful impact, organizations need to collect specific, timely, and accurate HR data. The effectiveness of HR analytics depends mainly on accurate HR data and metrics (Johnson et al., 2016). Levenson (2015) further underlined that if HR metrics are to be useful and helpful, they should meet the CARE criteria-- consistent, accurate, reliable and efficient. Less is more when it comes to metrics and analytics if they are timely and relevant (SHRM, 2016). However, many HR professionals tend to argue that much of their work is intangible and hard to measure, but there is always a way to quantify HR metrics (CIPD, 2017). It only requires time and effort (Pfeffer, 2017). To improve the quality of a hire, the feedback loops in recruiting, sourcing, and applicant tracking processes need to be real time, not weeks or months after the fact (Adler, 2016). Thus, organizations should devote adequate resources to collect specific, timely, and accurate HR data, which help them to build better predictive models (Dearborn & Swanson, 2017).

The use of efficiency and effectiveness related HR metrics

If organizations are to have impactful HR metrics and analytics, they should focus not only on efficiency but also effectiveness. However, many studies disclosed that although many organizations conduct HR metrics, their focus was on some HR metrics to the exclusion of others. Although they assess their HR programs, processes, and practices, most of them collect efficiency metrics, overlooking effectiveness (Dulebohn & Johnson, 2013; Jamrog & Downey, 2009; Maurer, 2017). This is a crucial point because HR departments that collect effectiveness data are more likely to be strategic partners (Lawler, Levenson, & Boudreau, 2004). As underscored by Maurer (2016), organizations should move to collect and value metrics that reflect effectiveness. Furthermore, Lawler et al. (2004) argued that if HR wants to play a strategic role in organizations, it needs to develop its ability to measure the impact of HR decisions on organizational effectiveness. Thus, it can be argued that although efficiency metrics are necessary, they are not enough in that effectiveness metrics are as important as efficiency metrics.

Availability of qualified and motivated HR professionals

HR managers/professionals need to be knowledgeable of HR metrics and analytics (Sullivan (2003; Adler, 2016; Dearborn & Swanson, 2017; Fleck, 2016). When they are knowledgeable of HR metrics and analytics, they can play a great role in properly identifying the prevailing HR problems, collecting specific, timely, and accurate HR data, generating and reporting relevant HR metrics and training line managers on HR metrics and analytics related issues. An important skill that HR managers/analysts should develop is being consultative (Mathis et al., 2017). HR managers/analysts should not simply provide HR metrics to managers for it is a waste of resources until managers understand their meaning and use them in their decisions. So, HR managers/analysts should not only report HR metrics but also provide their interpretation for the manager's decision situation (Kavanagh & Johnson, 2018). However, previous studies indicated that HR professionals struggle for relevance because they do not speak the language of business-- numbers (Fleck, 2016). Adler (2016) further argued that, although having a good understanding of HR metrics and analytics is critical, many HR managers/professionals may have limited knowledge of how to collect, analyze, store, and utilize HR metrics.

Availability of qualified and motivated of hiring managers

If an organization is to have impactful HR metrics and analytics, it needs to have qualified and motivated of hiring managers. When hiring managers are qualified and motivated, they are more likely to be actively involved in proper identification of HR problems, collaborate with the HR department in collecting relevant and timely HR data, report data to the HR department, and utilize the results of HR metrics and analytics for managerial decisions (SHRM, 2016; Phillips, 2020).

Commitment to use HR metrics and analytics for HR decisions

Conducting effective HR metrics and analytics are necessary but not sufficient. Prior studies report that many organizations collect HR data, generate and store HR metrics, but do not use them for making business decisions (Adler, 2016; Sierra-Cedar, 2017; Maurer, 2017). It is not simply good enough to *do* metrics and analytics (Kavanagh & Johnson, 2018: 401). Managers make different and better decisions when they *use* information gleaned from HR metrics and analytics. CIPD (2017) contended that HR metrics should be predictive and action oriented and that HR metrics that do not assist organizational decision making are of little value. Hence, if HR metrics and analytics efforts are to have a real impact, managers should believe in, and base their HR decisions on the results of HR metrics and analytics. As previously noted, the main goal of HR metrics and analytics is to support and improve decision making and HR metrics and analytics that do not lead to action are not worth the time and effort to calculate and report them. Kavanagh & Johnson (2018) argued that many HR departments overproduce HR data and information yet provide little to no insight that support and improve decision making. Thus, the success of HR metrics and analytics efforts depends mainly on the extent to which they impact managerial decisions, not by the number generated.

Adoption of appropriate technology for HR metrics and analytics

The presence of appropriate HR technology is a prerequisite for effective HR metrics and analytics. When organizations have an appropriate HR technology, they are more likely to collect specific, timely, and accurate HR data, which help generate appropriate HR metrics, and produce relevant HR analytics results (Bersin, 2017; Johnson et al., 2016; Rastogi, 2018). With the changing world

and constant new HR technology, organizations need to be aware of the appropriate technology that would help generate relevant and timely HR metrics (Maurer, 2017). HR technology can provide real-time HR metrics that allow decision-makers to spot trends and promptly respond to HR problems and opportunities (Bersin, 2017). Vendors have introduced disruptive new technologies which provide fast, valid, and reliable HR metrics (Sierra-Cedar, 2017). However, Rastogi's (2018) study revealed that over 77 percent of HR decision makers were not satisfied with the performance of a software management firm. This implies the need for choosing appropriate HR technology and vendors.

Continuity of monitoring and evaluation of HR metrics and analytics efforts
Organizations must regularly monitor and evaluate their HR metrics and analytics efforts. This is because monitoring and evaluation (ME) are used to assess past trends, evaluate the present situation, and project future events (Lockwood, 2006). Organizations should ask what kind of HR data and metrics have they generated and which of have been effectively utilized (and under-utilized) and why? Unless HR metrics and analytics efforts are monitored and evaluated, organizations may not be able to know their contribution. Once HR problems have been identified, preventive or corrective actions can be initiated as required by the situation (Dessler, 2017). HR metrics and analytics efforts must be monitored and evaluated and be used as signposts to charter the future course of action. As underscored by Mathis et al. (2017), ME mechanisms could help organizations measure future actions.

HR metrics and analytics process
Step two in our proposed framework involves conducting effective HR metrics and analytics. Hypothetical examples that clarify concepts within the five steps are included.

Proper identification of HR problem or unexplored opportunity: First, an organization should properly identify its HR problem(s) or identify previously unexplored opportunities for enhancing organizational effectiveness. Having a good understanding of the prevailing HR problems or unexplored opportunities can allow an organization to determine an appropriate analysis (Kavanagh & Johnson, 2018). Heneman et al. (2019) noted that understanding what opportunities and problems managers face suggest relevant analysis that can support better decisions. Thus, this begs the question: 'What are the HR problems within the organization?' For example, assume managers of X organization have been complaining about the long hiring cycle (the number of days between opening a position and extending a job offer) in that it has become long to hire employees. In this example, managers' complaint of a long hiring cycle is the HR problem facing X organization.

Collecting timely and relevant HR data: Once the HR problem is identified, the organization should collect timely, relevant, and accurate HR data needed for generating relevant HR metrics. Having a good understanding of the problem can help in identifying and collecting relevant and accurate HR data (Fitz-enz & Davidson, 2002; Adler, 2016). According to SHRM (2016), the focus of HR metrics and analytics should be on identifying and responding to HR problems and opportunities. Hence, this begs the question at this stage of the process: 'What kind of HR data do we need and how should it be collected'? In our prior example, the collected HR data revealed that

the average days to hire an employee was fifty (50). With this data alone, we cannot make a value judgment as to a proper solution.

Generating HR metrics: Once relevant and accurate HR data are collected; the organization should generate HR metrics. HR metrics help compare different data points, which can be useful and helpful for decision makers to attach meaning(Adler, 2016; Dulebohn & Johnson, 2013). There are two ways through which HR metrics, given the context, provides meaning, which in turn create useful information: trend identification and benchmarking. (Kavanagh & Johnson, 2018). Pertinent questions at this stage are: 'What, when, to whom and how should HR metrics be reported'? In our example, in order to know whether the hiring cycle is actually lagging, the organization should compare the hiring cycle data with a second data point (such as the past hiring cycle trend or the average days to hire in the industry). A comparison of the HR data collected shows that while the average days to hire an employee was forty last year, it is now fifty days, whereas the industry average is thirty-five days. The comparison of those data shows that hiring cycle has increased by 10 days. The former are HR data points, the latter is the HR metric. The HR metric clearly shows that the hiring cycle has extended when compared to its past practices and the industry average. However, HR metrics do not reveal the cause of the problem, they just measure the difference between numbers.

Conducting HR analytics: Once HR data is gathered, HR analysts feed the data into sophisticated data models, algorithms, and tools to obtain actionable insights (Levenson, 2015). The results of HR analytics provide insights in the form of dashboards, visualizations, and reports (Dearborn & Swanson, 2017). HR analytics tracks the effects of HR metrics on HR and business outcomes and helps identify the causes of the problem. HR analytics measures why something is happening and the potential impact. While HR metrics use data to assess the extent to which specific HR practices are efficient, HR analytics utilize those measures to help an organization predict the impact of HR interventions (Feffer, 2017). The questions that need to be asked are: 'Why the HR problem has occurred and what would be the effect of change in HR practice?' In our example, the organization should figure out why it is taking ten days longer to hire an employee (as compared to last year) and fifteen days longer than the industry average (35 days). Among the possible reasons for a long hiring cycle are tight labor market, inefficient recruitment and selection processes and procedures, and ineffective recruiters (Dineen & Noe, 2009; Tessema et al., 2017).

Developing and implementing the HR action plan: Once the causes of the HR problems are identified, the organization should develop and implement an HR plan of action to alleviate the prevailing problems or exploit previously unexplored opportunities (Kavanagh & Johnson, 2018; Maurer, 2017). The question that needs to be asked is: 'What HR actions should be implemented to improve the effectiveness of the HR practice in question?' In our example, the organization must create an action plan to reduce the number of average days to hire. Options for the action plan are: (a) increase the number of potential job applicants by using several recruiting sources; (b) streamline the recruitment and selection processes and procedures by introducing recent HR technology (e.g. recruiting software, ATS); and (c) increase the effectiveness of recruiters/HR professionals by providing continuous training programs.

Types of staffing metrics

HR metrics range from broad, overall organizational measures to those that focus narrowly on specific HRM functions and activities (Dessler, 2017). Staffing metrics are grouped differently by various scholars: staffing process, staffing process results, staffing costs, and customer satisfaction (Heneman et al. 2019), cost, quantity, quality, and timeliness (Mathis et al., 2017), effectiveness, efficiency, and impact related metrics (Jamrog & Downey, 2009; Kavanagh & Johnson, 2018; Phillips, 2020), and strategic, operational, and transactional (CIPD, 2017). After reviewing relevant literature, we identified seventeen staffing-related metrics, and then provided their descriptions, formula, and objectives (Appendix- 1). While most of the staffing metrics are related to efficiency (e.g., cost-per-hire & time-to-hire), some others are related to effectiveness (e.g., retention rate and absenteeism rate). While many of the staffing metrics are expressed as percentages (e.g., absence rate) or ratios (e.g., yield ratios), some others are absolute values (e.g., time to hire & turnover rate) that organizations can compare to industry or company standards. While collecting HR data needed to generate HR metrics is relatively easy, it is more difficult to conduct the statistical analyses that demonstrate the strategic value of staffing decisions and link staffing metrics with business outcomes (Adler, 2016; Fitz-enz & Davidson, 2002).

RESEARCH METHODOLOGY

This study uses a case study design, which allows researchers to study processes in their social context (Siggelkow, 2007). A case study design was an appropriate choice for the current study. HR metrics and analysis are used as the unit of analysis. Qualitative data was more suitable, since it can provide insights into complex social processes (Creswell, 2011). The data that would be used in this study were collected from multiple sources available to the researchers and were predominantly qualitative. The following two data collection techniques were used: interviews with HR managers and hiring managers and analysis of relevant documents of the institution. Specifically, in this study, four in-depth interviews (two HR managers and two hiring managers) were conducted. The American healthcare institution under study has two primary recruitment groups: the physician scientist group and the allied health group. One HR manager and hiring manager were from the physician scientist group and one HR manager and hiring manager were from allied health group. Four in-depth interviews were found to be enough to reach a good degree of saturation. Saturation, as the criterion, has been often used to justify the number of interviews needed. Glaser and Strauss (1967) propose the concept of saturation for achieving an appropriate sample size in qualitative studies. Saturation occurs when adding more participants to the study does not result in additional perspectives or information. To ensure confidentiality of the collaborating American healthcare institution and the respondents (interviewed managers), the institution in this study has been given a fictitious name: American Healthcare Institution (hereafter refers to "AHCI"). AHCI is one of the world's most known hospitals with over 60,000 employees, of which approximately 5,000 are physicians. Drawing on the literature review and guided by the research framework, first, the variables/concepts considered relevant to the study were identified, defined conceptually and operationalised. The second step was the preparation of two sets of interview questions and the execution of a pilot study by requesting two HR professionals from AHCI provide their suggestions on the topic under study. Thus, all questions in the interviews were discussed in advance. After making necessary adjustments, the interview

questions were sent to the interviewees. Hence, as suggested by Creswell (2011), member-checking procedures were used to seek an objective opinion as to how questions could be made easier to understand, avoid bias or leading questions, and/or avoid any potential ambiguity. Once the four managers were identified and interview dates were set, the interview questions were emailed. The interview questions did not limit the responses of the managers. They expressed and provided additional insight beyond the questions. Other essential issues were raised during the interviews. We took notes from their responses during the interviews as much as possible. The interviews were carried out in Fall 2019. Additionally, a thorough review of relevant documents of the AHCI was conducted to enrich the interview data.

RESULTS

In this section, the responses of the interviewed managers to the ten critical factors for effective HR metrics and analytics and the seventeen-staffing metrics are presented in two separate tables. As shown in Table-1, the interviewed managers of AHCI believed that the vast majority of the ten critical factors for effective HR metrics and analytics are in place. Table-2 reveals that the interviewed managers believed that AHCI generates and reports most of the seventeen-staffing metrics. A closer look at the responses of the respondents also discloses that there is a good interrater agreement, which is the degree of agreement among raters. According to Heneman et al. (2019: 333), the minimum level of interrater agreement should be 75 percent.

Table 1: Responses to the 10 critical factors for effective HR metrics and analytics

No.	Do you think these 10 critical factors for effective HR metrics and analytics are present at AHCI?	HR managers				Hiring managers			
		#1		#2		#1		#2	
		Yes	No	Yes	No	Yes	No	Yes	No
1	Proper identification of HR problem or opportunity	✔		✔		✔			✔
2	Support of top managers to HR metrics & analytics	✔		✔		✔		✔	
3	Good collaboration between HR and hiring managers	✔		✔		✔		✔	
4	Availability of specific, timely, and accurate HR data	✔		✔			✔		
5	The use of efficiency & effectiveness related HR metrics	✔		✔		✔		✔	
6	Availability of qualified & motivated HR professionals	✔		✔		✔		✔	
7	Availability of qualified & motivated hiring managers	✔		✔		✔		✔	
8	Commitment to use HR metrics and analytics for HR decision	✔		✔		✔		✔	
9	Adoption of appropriate HR technology	✔		✔		✔		✔	
10	Continuity of monitoring & evaluation of HR metrics & analytics efforts		✔	✔			✔		✔

Table 2: Responses of the interviewed managers to staffing metrics used by AHCI

No.	Do you think these staffing metrics are used by AHCI?	HR managers				Hiring managers			
		#1		#2		#1		#2	
		Yes	No	Yes	No	Yes	No	Yes	No
1	Job application completion rate	✓			✓		✓		✓
2	Recruiting source	✓		✓		✓		✓	
3	Quantity of applicants	✓		✓		✓		✓	
4	Quality of applicants		✓	✓			✓	✓	
5	Recruiting time	✓		✓		✓		✓	
6	Recruiting cost		✓		✓	✓			✓
7	Selection rate	✓		✓		✓		✓	
8	Job offer acceptance rate	✓		✓		✓		✓	
9	Ghost rate		✓	✓		✓		✓	
10	Time to hire	✓		✓		✓		✓	
11	Cost per hire		✓	✓		✓			✓
12	Time to productivity		✓		✓	✓		✓	
13	Quality of new hire		✓	✓			✓	✓	
14	New hire fail rate	✓		✓		✓		✓	
15	Turnover rate of new hire	✓		✓		✓		✓	
16	Retention rate of new hires	✓		✓		✓		✓	
17	Absence rate of new hires		✓	✓		✓		✓	

DISCUSSION

One of the main goals of this study is to assess the practices and challenges of HR (staffing) metrics and analytics in AHCI. To that end, we conducted in-depth interviews with HR managers and hiring managers and analyzed published and unpublished documents of the AHCI. All of the interviewed managers strongly believed that the AHCI has been able to put in place most of the proposed critical factors for effective HR metrics and analytics (Table-1). Respondents agreed that the AHCI has tried its best to have effective HR programs and practices, which also require effective HR metrics and analytics practices. While an interviewed hiring manager stated that senior managers of AHCI are very supportive of any effort that may enhance the success of the institution including HR metrics and analytics, another HR manager noted that senior managers were very committed and show strong support for HR metrics and analytics efforts. The commitment and support of senior managers were instrumental in facilitating the presence of the majority of critical factors for effective HR metrics and analytics (Table 1). Hence, like in any program and project, the success of HR metrics and analytics is contingent on the active support of managers at all levels.

The AHCI has introduced several HR technologies since the late 1990s. For instance, currently, it uses the following three technologies for HR metrics and analytics: IBM *Kenexa Brassring*, SAP SuccessFactors, and Tableau. IBM *Kenexa Brassring* was founded in 1987 and acquired by IBM in 2012. It is a leader in applicant tracking systems and is used to attract, hire, and engage talent. *SAP SuccessFactors* was founded in 2001 and acquired by SAP in 2011. It has features like recruiting, training and development, performance management, and compensation management as well as HR planning and HR analytics. The third HR technologies being used by the AHCI is *Tableau*, which was founded in 2003, and was acquired by Salesforce.com in 2019. It includes features such as analytical processing cubes, spreadsheets to generate graph-type data visualizations, and cloud databases. According to an AHCI HR manger, *Tableau* has more capabilities than *SAP SuccessFactors* and AHCI is planning on making *Tableau* the primary HR analytics tool. All respondents believed that the top three HR technologies have the capability to generate and report HR metrics. They also believed that overall, the AHCI has decent HR technology, which are conducive to utilizing HR metrics and analytics efforts. As an HR manager stated, the AHCI has a helpful applicant tracking system (ATS) and a well-developed HR information system (HRIS) and that it has been trying to improve its HR metrics and analytics practices using specialized dashboards. While the HR Analytics Group at the AHCI conducts HR analytics, the HR Technology Group creates reports.

An interesting finding of the current study is that through the help of the aforementioned HR technologies, AHCI generates and reports most of the seventeen-staffing metrics, which are also both efficiency and effectiveness related metrics (Table 2). Hence, the findings of this study are in line with the suggestions of prior studies (Adler, 2016; CIPD, 2017; Feffer, 2017). How often does the AHCI report HR metrics? Although the AHCI generates and reports HR data and metrics monthly, for some staffing metrics, it generates and reports at any point in time--as needed/requested. According to a respondent, in the past, HR metrics were generated and reported sporadically and on request. In addition, the AHCI is developing recruitment analytics dashboards to collect more consistent data, regularly send metrics to top level managers, and make data more accessible to all employees. While an interviewed hiring manager stated that there is ample collaboration and a very high level of trust among HR and hiring managers, one respondent noted that managers tend to be very helpful and cooperative in collecting HR data. However, another HR manager provided further evidence that although there is good collaboration between HR and hiring managers, occasionally, HR struggles with collecting information from managers who do not share updates and regularly track information.

To what extent are HR metrics and analytics information utilized effectively? All the interviewed managers believed that although majority of the generated and reported HR metrics have been utilized for different purposes, some of them have not been utilized for any purposes or had little or no impact on decision making. An interviewed hiring manager remarked that the higher level the position, the more likely individuals are to use the results of HR metrics and analytics for decision making. Another hiring manager underlined that even though they receive reports on HR metrics and analytics, many of them were hard to understand. Hence, one can argue that HR managers and analysts should provide interpretation of HR metrics and analytics, which in turn requires HR managers and analysts to be knowledgeable in HR metrics and analytics and

consultancy (Mathis et al., 2017; Maurer, 2017). This study further argues that organizations may generate and report HR metrics and analytics, but it may be difficult to make them impactful as the latter seems to be a challenge to organizations due to their inability to put in place the proposed critical factors for effective HR metrics and analytics practices.

According to an interviewed HR manager, upper level HR leaders, senior level business advisors, HR business partners, and 25-35 percent of recruiters have a deep understanding of HR metrics and analytics. The level of familiarity with HR metrics and analytics varies for mid and lower level managers. The difference in knowledge among different levels of managers is due to the necessity of management to use metrics and analytics to make and justify decisions. All the interviewed managers were of the opinion that although hiring managers know how to effectively hire employees, the AHCI should make a larger effort to enhance their understanding of HR metrics and analytics.

All the interviewed managers strongly believed that staffing metrics (Table-2) provided the AHCI with important information to increase the efficiency and effectiveness of staffing process, outcomes, and practices. Specifically, how many potential applicants were attracted to make a hire, which recruiting source was effective, how quickly were applicants moved from one stage to the other stage of selection process, which selection stages were most effective, what percent of the candidates accept job offer, how long does it take to hire an employee, what percentage of new hires are still with the AHCI after one, two and five years, and what percentage of new hires stay away from work without good reason. While one manager stated that staffing metrics and analytics have helped the AHCI monitor and track the status and outcomes of staffing process, another manager noted that staffing metrics such as absence rate and turnover rate of new hire have helped the AHCI pinpoint staffing related problems and intervene before they get worse. While one manager noted that HR(staffing) metrics and analytics have been advantageous in helping the AHCI determine where to recruit applicants and where to advertise, another manager provided further evidence that recently staffing metrics and analytics tools have started to assist the AHCI in identifying job applicants who are more likely to be productive at workplace and less likely to leave. Most interviewed managers also disclosed that the AHCI has used HR (staffing) metrics to compare its staffing process, outcomes, and practices across time (trend) and with other organizations in the healthcare sector (benchmarking). Thus, this study provides further evidence that effective HR metrics and analytics are necessary and vital.

An interesting finding of this study is that about three-quarters of the interviewed managers believed that the AHCI does not generate and report job application completion rate (Table-2) even though it is an important staffing metric. For instance, while Zielinski's (2016) study revealed that industry sources indicate about sixty percent of job seekers quit in the middle of filling out online job applications because of their length or complexity, Lee's (2016) study also found that organizations can lose money from abandoned job applications if they are operating under cost-per-click recruiting models. Organizations can increase job application completion rates by more than three hundred percent by reducing the length of the process to a mere five minutes (Lee, 2016). Hence, technology has both improved and complicated the job application process. One half of the interviewed managers believed that the AHCI did not assess both the cost of recruiting

and the cost of hiring (Table-2) although both metrics are crucial for assessing the efficiency of staffing processes and practices (Casio, 2000; SHRM, 2010). Moreover, half of the interviewed managers believed that the AHCI did not assess time to productivity (Table-2) although it is a vital metric that helps to identify the best recruiting sources, selection process, and onboarding for future hiring efforts (Adler, 2016; Fitz-enz & Davidson, 2002). Williams's (2003) study disclosed that it can take eight to twenty-six weeks for an employee to achieve full productivity. Moreover , a respondent remarked that although the AHCI has monitored and evaluated its staffing processes, outcomes, and practices, monitoring and evaluation were not conducted regularly (Table-1).Nevertheless , all interviewed managers suggested that the AHCI needs to constantly monitor and evaluate its staffing practices and outcomes using staffing metrics and analytics.

Contrary to our framework and recommendations of many experts, the AHCI still uses a "data first" approach in generating and reporting metrics in that it does not identify HR problems until analyzing data and is very reactive to the problems. This finding is in line with the conclusions of prior studies (Adler, 2016; Kavanagh & Johnson, 2018; Levenson, 2015; Maurer, 2017). Like vast majority of organizations, the AHCI begins with collecting HR data and then uses the HR data to create HR metrics, which are combined in several analyses that can then be reported to concerned managers who utilize the information for different purposes. However, most of the interviewed managers believe the AHCI is trying to adjust to a more proactive approach that utilizes a "problem first" approach.

The study's implications, conclusions, and directions for future research
This study argues that the prospects of having effective HR metrics and analytics would be contingent mainly upon an organization's ability and willingness to put in place the proposed ten critical factors (Figure-1). The case of the AHCI indicates that it has been able to put in place the vast majority of the critical factors, which in turn has enabled it to have somewhat effective HR metrics and analytics practices, although some areas need improvement. In that respect, this study suggests that the main challenges facing organizations is their inability to put in place the proposed critical factors for effective HR metrics and analytics. Hence, an important finding of this study is that the more organizations are willing and able to put the critical factors in place, the more likely they are to have effective HR (staffing) metrics and analytics. We conclude that the effectiveness of HR metrics and analytics depends, to a large degree, on how they are managed, which in turn are significantly influenced by the ten critical factors. The ten critical factors were instrumental in enhancing the effectiveness of the AHCI's HR metrics and analytics efforts. We know wide variations exist as to how organizations conduct HR metrics and analytics. That is, variations in contextual factors act as constraints on or enhancement in the effectiveness of HR metrics and analytics efforts. Nevertheless, the presence (or absence) of the ten critical factors greatly impact the effectiveness of HR metrics and analytics.

This study concludes that a large number and variety of HR (staffing) metrics are generated and reported (Table-2), which in turn illustrate the visible symbols of their importance. However, despite their increasing interest, many organizations are still unable to see significant visible contribution of their HR (staffing) metrics and analytics efforts. It also concludes that it is no longer a question of whether an organization should use HR metrics and analytics, but how they are

deployed and utilized that matters. That is, the most important question is not how many HR metrics are generated and reported, but how they are generated, reported, and utilized that matters and how they are conducted and utilized also depend upon several critical factors. Thus, this study contends that effective HR metrics and analytics practices are not the matter of choice but are requirements for the success of any organizations

This study further argues that although effective HR (staffing) metrics and analytics cannot guarantee higher HR outcomes, their absence (ineffective HR metrics and analytics) can adversely impact many HR outcomes. This further may suggest that although effective HR metrics and analytics play a particularly important role in positively affecting managers' decisions (HR outcomes), they should not be perceived as panacea for all HR problems. Rather, HR metrics and analytics are only two factors that influence managers' decisions (HR outcomes). Hence, they can be an answer to organizational improvement.

This study joins a growing body of research that attempts to contribute to theory and practice of HR metrics and analytics by explaining how and when HR metrics and analytics affect managers' decisions, which subsequently influence HR outcomes. The present study can be seen as adding to this literature in that, unlike most prior research, we developed a framework (Figure-1) for assessing the effectiveness of HR (staffing) metrics and analytics efforts and then assessed the effectiveness of HR metrics and analytics efforts of the AHCI under study. Hence, our study has important theoretical and practical implications. The findings of this study can also be viewed in the context of the increasing interest of HR metrics and analytics (e.g. SHRM, 2016; Feffer, 2017; Kavanagh & Johnson, 2018; Levenson, 2015), and the role of the proposed critical factors for effective HR metrics and analytics in that respect.

While this study is an important step forward in understanding how and when HR metrics and analytics affect managers' decisions, it also leaves some questions open for future research. First, this study used only mid-level managers and was conducted in only one U.S. healthcare institution (AHCI). And thus, future research should be directed at assessing the effectiveness of HR (staffing) metrics and analytics using information collected from managers at all levels (low, mid, and top) as well as comparing and contrasting the effectiveness of HR (staffing) metrics and analytics efforts of organizations using the proposed framework.

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Appendix 1: 17 metrics in staffing analytics: Types, description, formula, and objectives

Staffing metrics	Description	Formula	Objective
Job app. completion rate	Assess the percentage of job applications submitted compared to the number completed.	Completed applications/submitted applications	To improve the percentage of completed job applications.
Quantity of applicants	Assess the number of applicants being attracted per position.	Applicants/vacancy	To identify the best recruiting sources for future hiring efforts.
Quality of applicants	Assess applicants' skills, knowledge, and ability (SKA) required by an organization.	Applicants' SKA	To identify the best recruiting sources for future hiring efforts.
Yield or selection rate	Assess the percentage of people who moved on to one or more steps in the selection process.	Percentage of applicants moving to next stage of selection process/number of persons at prior stage.	Improve the efficiency of selection process.
Recruiting time	Assess average number of days it took to complete recruiting process.	Total days elapsed from the date a position is posted to the date a job application is assessed.	Identify the best recruiting sources for future hiring efforts.
Recruiting cost	Assess the costs associated with the sourcing and attracting potential applicants to fill an open position in the organization.	Recruiting costs/hire	Identify the best recruiting sources for future hiring efforts.
Time to hire	Assess average number of days it took to fill a position.	Total days elapsed from the date each filled position was available to the date each new person started in the position/number of positions filled	Improve staffing process: Time to approval, time to 1st interview, time to offer, and time-to-fill.
Cost per hire	Assess costs associated with filling a position.	Total hiring cost/hire	Identify the best staffing sources, processes and practices for future hiring efforts.
Job offer acceptance rate	Assess the percentage of job offers accepted.	Number of job offers accepted/total job offers extended	Improve the content of job offers.
Ghost rate	Assess the percentage of candidates who accept a job offer but do not show up the first day for work.	Number of candidates who fail to show up on the first day/total hires	Improve the content of job offers.
Quality of new hire	Assess the quality of the individuals being hired.	Cultural-fit, hiring manager's survey, engagement, and employee productivity	Identify the best staffing sources, processes and practices for future hiring efforts.
Recruiting source	Assess where applicants and new hires originated.	Applicants/recruiting source New hire/recruiting source	Identify the best recruiting sources and practices for future hiring efforts.
Time to productivity	Average number of days to satisfactory productivity.	Number of days or months that new hires took to reach a level of proficiency	Identify the best recruiting sources, selection process, and onboarding for future hiring efforts.
New hire fail rate	Assess the percentage of new hires who voluntarily quit or are fired after starting.	Number of new hires who quit or are fired/total new hires in that time frame	Identify the best recruiting sources, selection process, and onboarding for future hiring efforts.
Turnover rate of new hire	Assess the percentage of new hires who left the organization in a given time period.	Number of new hires who left/total new hires in that time frame	Identify, attract, and select individuals who are less likely to leave the org.
Retention rate of new hires	Assess the percentage of new hires who are still with the organization after various periods of time.	Number of new hires who remain/total new hires in that time frame	Improve retention rate of new hires in the future
Absence rate of new hires	Assess the percentage of new hires who stay away from work without good reason	New hires' workdays missed/total workdays scheduled	Improve the effectiveness of attendance policy and its implementation