

Evolving uses of artificial intelligence in human resource management in emerging economies in the global South: some preliminary evidence

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Abstract:

Purpose: The purpose of this paper is to examine the use of artificial intelligence (AI) in human resource management (HRM) in the Global South. **Design/methodology/approach:** Multiple case studies of AI tools used in HRM in these countries in recruiting and selecting as well as developing, retaining and productively utilizing employees have been used. **Findings:** With AI deployment in HRM, organizations can enhance efficiency in recruitment and selection and gain access to a larger recruitment pool. With AI deployment in HRM, subjective criteria such as nepotism and favoritism are less likely to come into play in recruitment and selection of employees. AI deployment in HRM also has a potentially positive impact on the development, retainment and productive utilization of employees. **Research limitations/implications:** AI is an evolving technology. Most HRM apps have not gained enough machine learning capabilities with real-world experience. Some of them lack a scientific basis. AI in HRM thus currently affects only a tiny proportion of the population in the GS. **Practical implications:** The paper explores the roles of AI in expanding recruitment pools. It also advances our understanding of how AI-based HRM tools can help reduce biases in selecting candidates, which is especially important in the Global South. It also delves into various mechanisms by which AI helps in the development, retainment and productive utilization of employees. **Originality/value:** We provide details of various mechanisms by which AI brings input and output efficiencies in recruitment and selection in these countries.

Keywords: global South | chatbots | artificial intelligence | autonomous AI | augmented intelligence

Article:

Introduction

Artificial intelligence (AI) is a potentially transformative force that is likely to change the role of management and organizational practices. AI is having revolutionary impacts on organizational decision making (Jarrahi, 2018) and redefining management models (Thomas *et al.*, 2016). AI's

visible impacts can be observed in core competency and business processes such as knowledge management, customer outcomes such as perceptions of service quality and customer satisfaction (Brynjolfsson and McAfee, 2017). Such impacts have been observed not only in developed countries, but also in emerging economies (Kshetri, 2020a, 2020b).

Moving to the focus of this paper, AI is being touted as an effective human resource management (HRM) tool (Tambe *et al.*, 2019). AI deployments in HRM issues such as recruitment and selection are becoming increasingly widespread and have drastically reduced the time and cost of performing these functions. Practitioners have noted the need to incorporate AI in HRM in order to be competitive in the global economy (HRPA, 2017). According to a 2019 survey by the online infographic and graphic design software company Venngage, 61% of companies were using AI to improve HRM (Rykun, 2019). Some of the key HRM areas that have already been transformed by AI include time consuming and labor intensive tasks in recruiting such as reading many CVs, sorting them out and identifying the best candidates in a fraction and identifying which employees need what type of training (Rykun, 2019).

AI's potential usefulness as a tool to improve HRM strategy and performance is being increasingly recognized not only in developed countries, but also in the Global South (GS), especially in emerging economies. It is argued that private and public sector enterprises in emerging economies are under pressures to develop unique strategies in order to deal with economic and political change, increased competition from the global market and other factors (Ghosh and Rajan, 2019). Incorporation of AI in HRM could emerge as a key component of their organizational strategy.

Diffusion of AI in HRM practices in these economies has been facilitated via a number of mechanisms. Just like other forms of modern HRM practices that have been reported in prior studies (Baddar Al-Husan *et al.*, 2009), multinational enterprises (MNEs) from the Global North (GN) have brought AI-based HRM tools in the GS. For instance, by March 2019, EY's AI-powered chatbot "Goldie" had been deployed in 138 countries, many of which are emerging GS economies.

These economies are also creating cutting-edge and innovative AI-based HRM applications. Some notable examples include WeChat Recruiting and Malaysian company Supahands' Digital Innovation Assistant for kNowledge Engineering (DIANE).

AI-based tools can bring significant changes in HRM practices. Prior researchers have, however, noted a substantial gap between the promise and reality of AI in HRM (Tambe *et al.*, 2019). The gap is decreasing with the rapid pace of development of AI tools. Research and practice can benefit from an understanding the benefits of AI in HRM, especially political, social and economic contexts facing the GS. This paper attempts to address these research gaps and pragmatic needs. Specifically, the following research questions have been addressed: What are the impacts of AI on HRM in emerging economies in the GS?

Our analysis contributes to the HRM literature, and especially research in HRM in GS economies, in several ways. First, we provide a framework for understanding AI's potential usefulness as a tool to improve HRM performance by enhancing efficiency in recruitment and

selection, enlarging recruitment pools, reducing the influence of subjective criteria such as nepotism and favoritism and facilitating the development, retention and productive utilization of employees. Second, our study highlights how social, cultural, political and economic conditions in the GS economies may lead to a higher value addition in AI's use in HRM activities in these economies.

Before proceeding, we offer some definitions. AI systems can mimic and imitate human cognition to perform tasks that seemed to be possible only with human thinking and logic before. It entails simulating human intelligence by machines. The key processes involved are learning (acquiring information and understanding the rules for using the information), reasoning (applying the rules to reach conclusions), and self-correction. The Global South consists of "Africa, Latin America, and developing Asia including the Middle East" (Müller, 2018). This term is considered to be more favorable than terms such as "Third World" and "Developing World" (Rigg, 2016). Emerging economies are rapidly growing developing economies that use economic liberalization as the key means to achieve growth.

The article is organized as follows. We first provide a literature review. Then we discuss the methods. Next, we analyze AI's potential in bringing changes in HRM practices and develop some propositions. It is followed by a section on discussion and implications. The final section offers conclusions.

Literature review

Prior researchers have suggested that HRM policies are shaped by interests of stakeholders such as shareholders, management, employees, governments and trade unions and situation-related factors (Macini *et al.*, 2020). Situational factors include law and societal values, labor market conditions, workforce characteristics, business strategies and management philosophy (Wajeeh-ul-Husnain *et al.*, 2020). Additional factors include economic, governance-related factors, and legal systems (Leat and El-Kot, 2007). Prior researchers have also noted that priority has not been given to human capital development in GS economies (Haak-Saheem and Festing, 2020). Regarding societal values, HRM practices in economies such as India (Kshetri, 2007) and Gulf States (Haak-Saheem and Festing, 2020) are affected by factors such as personal relationships and politics.

Prior research has noted that GS economies utilize ineffective HRM practices and systems (Berman, 2015). For instance, studies conducted in African economies such as Ghana (Ayentimi *et al.*, 2018) and Mozambique (Dibben *et al.*, 2017) found lack of regulatory and professional standards related to HRM. Dibben *et al.*'s (2017) comparison of HRM practices in Mozambique and Portugal found that informal work-based training and informal recruitment were more common in the former than in the latter. Likewise, Ayentimi *et al.* (2018) found a low degree of HRM professionalization and underdeveloped regulative institutions related to HRM.

Other challenges include ineffective performance standards and reward programs. A complaint that is often reported is that there is too much emphasis on seniority or patronage. A study conducted in India, an emerging GS economy, found that supervisors engage in abusive behaviors that demoralize employees (Agarwal and Avey, 2020). Prior research conducted in

some GS economies has found that objective criteria are difficult to implement in training and review programs (Haak-Saheem and Festing, 2020). For instance, in the UAE, training line managers on performance management reviews is challenging because team members are viewed as friends and it is considered to be an improper behavior to criticize their performance of Haak-Saheem and Festing (2020).

Because of these various challenges, effective HRM thus would play a key role in the development of these countries (Tessema and Soeters, 2006). Unsurprisingly HRM systems in GS economies are facing pressures for change. For instance, in GS economies such as India (Kshetri, 2007), and Gulf States (Haak-Saheem and Festing, 2020), HRM policies are tightly linked to social traditions. On the other hand, they are facing pressure to adopt modern HRM practices.

HRM practices of firms in GS economies have different propensities to change. Prior researchers have noted that the pressures to introduce modern HRM practices are especially felt by technology industry sectors such as call-centers (Puyod and Charoensukmongkol, 2019). This can be attributed to several factors, inter alia, job pressures, lack of promotions, working time and work–life balance. The tasks' repetitive and boring natures also lead to high labor turnover rates (Guchait and Cho, 2010; Mukherjee and Maheshwari, 2014). Due to their complexity, call centers need diverse skills. They are required to attract and retain employees with skills suitable for their unique requirements. This underscores the importance of effective HR practices.

Methods

We build theory from multiple cases (Eisenhardt and Graebner, 2007). Compared to a single-case study, multiple-case studies provide a stronger base for theory building (Rowley, 2002).

As suggested by Eisenhardt and Graebner (2007) we have made connections with related literatures and established theoretical gaps. We have provided an explicit statement of research questions. Theoretical and practical importance of research on AI's use in HRM has been clearly established.

Selection of cases

In a multiple case study design, the cases need to represent the population and there must be a variation on the dimensions of theoretical interest (Seawright and Gerring, 2008). However, a substantive rather than statistical basis is what distinguishes a multiple case study (Greene and David, 1984).

Logistical and financial considerations are also important in the case selection process (Stvilia *et al.*, 2007). Due to these constraints, we have selected only cases of AI-based HRM tools for which sufficient information could be obtained from secondary resources. Archival data is among a variety of recognized data sources for case studies (Eisenhardt and Graebner, 2007). This study thus relied on archival and secondary data sources.

Following Eisenhardt’s (1989) recommendation, we selected ten cases. The cases involve companies using AI in HRM from emerging GS economies such as Chile, China, Indonesia, Malaysia, Mexico, Peru, South Africa, the Philippines and Vietnam. We have combined two approaches: extreme method, and diverse method (Seawright and Gerring, 2008). Our process started with extreme case method and evolved over time to implement different requirements and recommendations.

In the extreme case method, cases with extreme values on the independent (X = characteristics of AI app developers or companies using AI) or dependent variable (Y= effective use of AI in HRM) of interest are selected (Seawright and Gerring, 2008). In terms of the use of AI in HRM (Y), the cases are extreme in the sense that they are among the earliest AI apps in HRM. The companies that have used AI apps in HRM can be considered to be exemplar. Prior researchers have suggested that best practices models and exemplar companies are good candidates for case research (Eisenhardt, 1989).

If researchers have idea about other factors that affect Y (outcome of interest = effective AI use in HRM), other case selection methods can be pursued (Seawright and Gerring, 2008). We utilize a diverse case method to select specific cases. The cases we have selected cover a wide range of circumstances in which the app was created such as custom developed AI apps for internal use versus packaged AI solutions for retail sale.

As to the deployment of AI apps in HRM, two main themes emerged: a) HRM goals that are intended to be reached with new AI tools (e.g. recruiting, selecting, developing, retaining and productively utilizing employees); b) who developed the apps (developed for internal use versus commercial purpose). In order to achieve diversity, we selected cases with different combinations of these two variables. We illustrate this process with two of the cases in Figure 1: DBS and Deayea’s “brain surveillance devices”.



| HRM goals  | Recruiting and selecting | Developing, retaining and productively utilizing employees |
|---|---|--|
| Internal use versus commercial use of AI apps  | | |
| Internal use | [1] <ul style="list-style-type: none"> • Harambee’s AI tool • DBS’s Jim | [4] <ul style="list-style-type: none"> • EY’s Goldie • SupaAgents’ DIANE |
| External commercial use | [2] <ul style="list-style-type: none"> • Talkpush's recruitment chatbot Stanley • Ajinga’s Talent Experience Management platform • WeChat recruiting • AIRA recruiting | [3] <ul style="list-style-type: none"> • Deayea’s “brain surveillance devices” • Leena AI’s chatbot |

Figure 1. The cases selected and their classification

DBS [cell 1] partnered with Singapore start-up impress.ai to develop Jim. Its availability of 24/7. It saves recruiters about 40 man-hours per month. Jim answered 97% of questions asked by the

candidates (dbs.com, 2018). The project to develop Jim began in April 2017 and it was officially launched in May 2018. In five months, Jim interviewed more than 600 candidates.

China’s Deayea [cell 3] has developed “brain surveillance devices”, which had been deployed by over a dozen Chinese factories and businesses. A device costs around US\$15,800 including service fees (Ruohan, 2018). Its devices are used for developing, retaining and productively utilizing employees. In 2015, some high-speed train drives in the Shanghai-Hefei route started wearing the device. The goal is to enhance safety. Deayea has claimed that its device has an accuracy of over 90%. It can assess drivers’ attention span and mood. For instance, if a driver is feeling depressed, sleepy or fatigued, they can be replaced (Ruohan, 2018). A driver’s attention level is measured in the 1 to 100 scale. When the score is below 85, the device vibrates to warn the driver. If the score falls below 65, the driver receives and the backstage operator receive the message. The driver will be woken up or replaced.

The device is used to train new employees by Ningbo Shenyang Logistics. By integrating the sensors in virtual reality headsets, different scenarios are simulated (Chen, 2018). Deayea worked with an air force institute on a pilot selection system. It can detect “unstable emotions” in candidates during the training process (Ruohan, 2018). Brief descriptions of the cases are provided in Table 1.

Table 1. Brief descriptions of the selected cases

| Company | Explanation | Usage status/users |
|---|---|--|
| 1. Harambee’s AI tool | Helps unemployed young people find jobs | By early 2019, 50,000 young people had benefitted. Plans to expand service to over seven million unemployed youths |
| 2. DBS’s Jim | Reviews CVs, asks questions and conducts psychometric assessments | Deployed in in Asia and the Middle East |
| 3. Talkpush's Stanley | Asks interview questions. Hands over to human for final decisions | Had clients in many Asian countries |
| 4. Ajinga’s Talent Experience Management platform | Connects recruiters, hiring managers and candidates <i>r</i> to increase applicant conversion rates and facilitate hiring decisions | Used mainly in China |
| 5. WeChat recruiting | Allows job candidates to review, apply or share jobs | Widely used in China |
| 6. AIRA recruiting | Reads and ranks résumés, uses psychometric tests and conducts video interviews | June 2018: used by 30 Chilean companies. It is also used in Mexico and Peru (Fajardo, 2018) |
| 7. EY’s Goldie | Answers questions for employees | Deployed in 138 countries, many of which are GS economies |
| 8. SupaAgents’ DIANE | Predictive routing system to match agents and projects based on timing and relevance | 5,000 SupaAgents in the Philippines, Indonesia and Malaysia in November 2019 |
| 9. Deayea’s “brain surveillance devices” | Installs sensors in helmets/caps to measure conditions of drivers and assembly-line workers | Used by the Chinese military, State Grid Zhejiang Electric Power and train drivers of the high-speed rail line |
| 10. Leena AI’s chatbot | Handle travel/leave requests and similar tasks | Coca-Cola Vietnam |

Finally, it should be noted that AI is an evolving technology. Most HRM apps have not gained enough machine learning (ML) capabilities with real-world experience and thus lack a scientific

basis (Barrett *et al.*, 2019). Many of the apps can thus be viewed more as a “trial run”. A low degree of readiness has been reported for organizations’ AI deployment in HRM. For instance, according to a survey conducted by Deloitte in 2019 with 10,000 organizations in 119 countries, 22% of the respondents were using AI in their organizations and 81% of them predicted the growth of AI use. However, only 6% were “very ready” to address AI’s impact on their workforces (Deloitte, 2019).

An additional point that should be emphasized is that Natural Language Processing (NLP) has gained more ML capabilities with real-world experience compared to other areas such as emotion recognition (El Adl, 2019). Most apps covered in this study rely on NLP. However, these apps cannot represent the vast and diverse population of GS. This is mainly because ML algorithms for NLP are mainly developed for the English language, which is spoken by a small proportion of users in the GS. For instance, only 10% of the Indian population speaks English (Darshankar, 2018). The Indo-Aryan or Indic languages is a major language family spoken in the South Asian countries. In 2016, Indic language users accounted for 60% of India’s 409 million Internet users. According to KPMG, 93% of the next 326 million new Internet users in India, would be local language-first users (Kolla, 2018). Likewise, In Africa 2,000 languages are spoken on a daily basis (Russon, 2019). AI in HRM thus currently affects only a tiny proportion of the population in the GS.

Sources and characteristics of data

Various dimensions of data quality have been identified. We assessed data’s internal consistency. As suggested by prior researchers, we evaluated different data items for the same point in time. Additionally, the same data items have been analyzed for different points in time to ensure internal consistency. For instance, Supahands (Case 8), we tracked its number of employees (known as: SupaAgents) for early 2017 (200+), mid-2019, (over 3,000) (Pradhan, 2019) and November 2019 (more than 5,000).

The reputation and trustworthiness of the source as well as content of data are important. In order to achieve these goals, we relied on information from reputable third parties as well as from the websites of organizations chosen in the analysis (e.g. DBS’s website: www.dbs.com/innovation/dbs-innovates/creating-jim-seas-first-virtual-bank-recruiter.html).

Timeliness and currency of the data are of equal importance. In order to ensure the appropriateness of the age of the data, we followed the latest news items related to the cases chosen. In addition, we visited the websites of the relevant companies for up-to-date data and information. We also followed interviews published in newspapers and other sources developers and users of the AI-based HRM tools. In Table 2, we have presented representative views of the developers and users of the AI-based HRM tools.

Patternmatching theory and data

Prior researchers have suggested that theory and data need to be “patternmatched” and propositions need to be consistent with the selected cases (Eisenhardt and Graebner, 2007). To

this end, Table 3 explains how the framework developed can be applied to understand the roles of AI in realizing various HRM goals in GS economies.

Table 2. The perceived and real benefits or AI-based HRM systems: Views of the creators and users of AI-based HRM tools

| <i>Recruiting and selecting</i> | |
|---|--|
| Harambee's youth employment accelerator CEO Tamera Campbell | "We have secured 2600 jobs for young people since our inception in 2011" (Nhlabathi, 2013) |
| Zhang Xiuwen, Talent Acquisition Group, DBS | "Candidates used to have a 15% drop off rate but with Jim it's 3%" (dbs.com, 2018) |
| Max Armbruster, CEO of Talkpush | "We enable recruiters to easily receive valuable input by listening to candidates via recorded audio, video or via a live conversation. It provides a more accurate, human and emotional connection with the applicant." (NEXMO, 2018) |
| CEO & Co-Founder of AIRA, Gonzalo Sanzana | "We asked ourselves how we could reduce recruiting time from 30 days to 3, with two hours [human time per candidate] instead of 20" (Fajardo, 2018) |
| Eric Fiedler, Chairman and CEO at Ajinga.com | "Our innovative technology allows companies to promote and track their jobs across social media networks. Our system then uses AI to help companies focus on applicants that are a best fit for the company and the job" |
| <i>Developing, retaining and productively utilizing employees</i> | |
| Zhao Binjian, a manger of Ningbo Shenyang Logistics | "It [Deayea] has significantly reduced the number of mistakes made by our workers" (Durden, 2018) |
| Cloda O'Dea, Human Resources Executive at EY | "We set it up in 2 months and fed in Q and A. We were blown away over the course of a month. In the first month, it had answered 1 million questions. They would have gone to the contact centre otherwise." (Brooks, 2019) |
| Mark Koh, a co-founder and CEO of Supahands | "Our technology also helps us match the right job with the right agent. We have historical data on all our agents, so we know who is good at doing which particular type of work" (Kim, 2018) |
| Ge Jia, an influential Chinese technology blogger | "This [emotion recognition] technology is still a bit of a gimmick and is unlikely to be rolled out on a large scale in the next 3–5 years" (Wong and Liu, 2019) |

Table 3. Patternmatching theory and data

| Proposition | Examples [Case No.] |
|--|---|
| Enhancing efficiency in recruitment and selection (P1) | Talkpush: speeds up the recruitment process/makes it real-time [3]. DBS's Jim: eight minutes to assess a candidate, one-third of the candidates who passed Jim's vetting were offered a job [2]. AIRA reads and ranks the résumés and uses psychometric tests [6]. Ajinga increases applicant conversion rates [4] |
| Expanding recruitment pool (P2) | AIRA publishes vacancy announcements in recruitment websites [4]. WeChat recruiting helps reach large number of candidates [5]. Harambee helps organizations hire from backward townships and villages [1] |
| Reducing the effects of values, biases, and subjective preferences (P3) | AIRA is that it reduces the possibility of nepotism [6]. DBS reported that Jim's recruitment process is free from biases in selecting candidates based on criteria such as age, gender or education [2] |
| Impact on the development, retainment and productive utilization of employees (P4) | Leena AI's chatbot handles 50% of all travel requests and 60% of all leave requests Coca-Cola Vietnam [10]. Supahands' DIANE pairs a project with the most appropriate team of SupaAgents [8]. EY's "Goldie" answered more than 2.2 million questions for employees across 138 countries by March 2019 [7]. Deayea's Emotional surveillance technology has been used by organizations to enhance productivity[9] |

Findings and some propositions

Enhancing efficiency in recruitment and selection

Prior research has suggested that organizational and institutional factors in the GS are associated with various types of inefficiencies in HRM (Wood and Bischoff, 2019). A key objective for MNCs operating in the GS is thus to formulate effective and efficient HRM policies and practices. Instead of viewing the GS context as unsuitable for modern HRM, some researchers have suggested that these economies may be more conducive to some types of HRM practices (Cunha *et al.*, 2020). AI tools perform well in terms of input efficiency such as time and costs for recruitment and selection as well as in terms of output efficiency such as the drop off rates during the application process. GS economies may benefit even more from such tools than their Northern counterparts.

First, AI tools are efficient in terms of cost. According to Glassdoor, on the average, an employer spends about US\$3,900 to hire a new worker and the process takes 27.5 days (www.glassdoor.co.uk/employers/blog/calculate-cost-per-hire/). With AI deployment in HRM, organizations can reduce recruiting costs. Talkpush charges a minimum of US\$300 per month, which allows 100 interviews (US\$3 per interview). High-volume packages reduce the cost per interview to US\$0.50. AI deployment can thus address the cost-efficiency challenges observed in GS economies.

With AI deployment in HRM, organizations can reduce time-to-hire candidates. By automating recruitment processes, organizations typically can reduce time-to-hire a candidate from 10 weeks to 2 weeks. The time to shortlist candidates can be cut from 2–3 weeks to almost instantaneous (Strusani and Hounghonon, 2019). Talkpush uses AI to speed up the recruitment process and make it more real-time and conversational. Its conversational assistant Stanley processes over a million candidates every year. Talkpush's CRM hands over the process from bot to human in minutes. Talkpush had clients in Singapore, Malaysia, Philippines, Macao, Indonesia and China.

AI tools are also efficient in terms of defect reduction. A key benefit of AI tools is to detect fraudulent activities by candidates. For instance, the AIRA system detects a false CV (Fajardo, 2018). One estimate suggested that approximately 20% of CVs submitted for positions in the Indian IT industry are fake (Rai, 2012).

Detecting fraudulent practices is difficult in most GS economies because they lack standard identifier such as the U.S. social security number, which makes it difficult to check potential employees' background. In some countries (Kshetri, 2007), catching fraudulent practices is difficult. It costs up to US\$1000 per employee for a detailed background check. In India, companies such as Authbridge, the U.S.-based ReZource, and Supersoft Consultants send their officers to meet the references given by candidates. They check the existence of companies at which applicants claim to have worked in the past. In India, even if the fraudsters are caught, the legal penalty is not severe (Kshetri, 2015). AI system's capability to detect frauds thus have a higher value addition in the GS.

Prior researchers have emphasized the importance of law and legal systems in HRM practices (Wajeeh-ul-Husnain *et al.*, 2020). AI-based HRM can address challenges of weak legal and law enforcement systems facing GS economies. Whereas weak legal systems in GS economies encourage fraudulent practices such as providing false information in CV, AI systems can stop such practices.

AI tools have shown a high level of efficiency in terms of productivity. For instance, Ajinga connects recruiters, hiring managers and candidates in order to increase applicant conversion rates and better facilitate hiring decisions. The Phenom Talent Experience Management platform is built on AI. It aims to increase personalization, automation and accuracy for candidates, recruiters, employees and management. Phenom People and Ajinga extract and feed insights from career sites and WeChat into the applicant tracking system (ATS). With Ajinga, companies can create a dedicated account that can be used for recruiting and branding. Ajinga uses geolocation data.

AI tools are also expected to perform well in terms of output efficiency. This is important because the application process is reported to have an average drop off rate of 80% (Avature, 2019). Talkpush users can change their interface from English to Mandarin Chinese, Traditional Chinese, French, Spanish and Hebrew. The recruitment chatbot Stanley is available on Wechat and Facebook Messenger. It welcomes candidates, allows them to choose job positions and asks them job-specific questions. Recruiters can access the candidate data and answers to view, evaluate and process the candidates. The answers are in text, audio or video. After the candidates complete their interview on Stanley over WeChat, recruiters can interact with them via the Talkpush interface. Candidates can be interviewed via WeChat.

AI tools are more efficient in terms of resource utilization. For instance, human beings can participate only when they are really important. The Chilean company Artificial Intelligence Recruitment Assistant's (AIRA) system publishes vacancy announcements in recruitment websites. It reads and ranks the résumés and uses psychometric tests. It also conducts video interviews with applicants. An applicant's performance is measured with indicators related to emotion analytics. Factors such as attention levels and facial expressions are converted into numbers. After all these processes are completed, human recruiters conduct in-depth interviews with the highest-ranked candidates (Ovanessoff and Plastino, 2017).

Likewise, Singapore-based multinational bank DBS, which operates in many GS countries in Asia and the Middle East, has developed a chatbot Jim (Job Intelligence Maestro). Jim reviews CVs, asks screening questions and collects answers to them, conducts psychometric assessments. It also answers basic questions on topics such as hiring response times and career progression. Jim takes eight minutes to assess a candidate, compared with about 30 minutes taken by human-led systems. About one-third of the candidates who passed Jim's vetting were offered a job by DBS, compared with only one-seventh under the previous human-led system (Harper, 2019). The above discussion leads to the following proposition:

PI. With AI deployment in HRM, organizations can enhance efficiency in recruitment and selection in emerging economies in the GS.

Expanding recruitment pool

GS economies face a large deficit of human capital. Observers have, for instance, suggested that a key reason why aid to Africa has not worked concerns the lack of human, social and institutional capital (Asongu and Tchamyou, 2020). The issue here is a surplus of unskilled labor but at the same time significant shortage on highly skilled human capital (Giannetti *et al.*, 2015).

A related problem is the lack of information on human resources. For instance, health workers are in severe short supply in India. This problem is further compounded by the lack of complete and reliable information on human resources. A key step to address this challenge is to ensure the availability of reliable and comprehensive workforce information (Rao *et al.*, 2012).

AI tools can tackle these problems. One example is the South African social enterprise Harambee's AI tool to help young people find jobs. Harambee uses Google's open sourced AI TensorFlow to interact with more than 1 million young people. It uses precise geographical attributes and preferential behavioral metrics to achieve its goals. Harambee uses machine learning (ML) to more effectively use the data it has collected (Paul *et al.*, 2019). Harambee's youth employment accelerator CEO Tamera Campbell noted that 2600 jobs for young people were found in the first two years after the organization was established in 2011 (Table 2). By early 2019, 50,000 young people had benefitted (Kennedy, 2019).

Harambee's young recruiters, referred to as "feet on the streets" visit backward townships and villages to collect contacts of unemployed people. Some are invited into its offices to assess interests and skills and test analytical capabilities. Harambee helps them create email accounts and CVs and facilitates the interview process. It provides advice and information on ways to prepare for the interviews such as how to dress and the kinds of questions that might be asked. Potential candidates are also offered clothes for free for the interview. It also provides work readiness interventions, which address the risks that employers have identified (Paul *et al.*, 2019). Promising candidates can also get additional assessment and vocational trainings in call-center or similar facilities (Goering, 2018).

Harambee plans to expand its service to over seven million unemployed in South African youths. It has also expanded into Rwanda.

Harambee has developed strong partnerships with companies. It first learns the skills needed by employers. It then works to identify candidates that are likely to be a good match. Harambee's corporate partners provide information about the number of candidates they need and the target hiring date. This process provides them with larger pools of potential candidates by including demographic groups that were overlooked (Paul *et al.*, 2019).

Harambee has reduced the cost barriers for employers to hire unemployed youth. These disadvantaged demographic groups now have access to opportunities that were unavailable but unthinkable before.

Another example is the Chinese social media company WeChat (known as Weixin in China), which had 1.1 billion monthly users as of October 2019 (Grant, 2019). WeChat recruiting has

expanded the recruiting pool for companies. WeChat recruiting allows job candidates to review, apply or share jobs in the platform. Some companies' WeChat account have a button, which links to a list of jobs. About 50% of companies use WeChat as a recruiting platform (Fiedler, 2019).

In China, 70% of people trust recommendations from friends. In contrast, only 10% trust advertising. WeChat integrates with HR platforms to facilitate employee referral programs. Organizations encourage employees to share WeChat posts in their networks to expand the pool of candidates. Recruiting platforms such as Ajinga and Talkpush provide chatbot functionality using WeChat. Recruitment features in social media platforms works well in China's relationship-centric culture. The above discussion suggests the following:

P2. With AI deployment in HRM, organizations can gain access to a larger recruitment pool in emerging economies in the GS.

Reducing the effects of values, biases, and subjective preferences

As prior researchers have suggested, recruitment, selection and promotion practices in many GS countries are based on favoritism, nepotism and political loyalty (Hotho *et al.*, 2020; Wated and Sanchez, 2015). While it is a legal requirement for listed Indian companies to appoint independent directors, a large proportion of such companies fail to comply thanks to the culture of nepotism and favoritism. The new Companies Act of 2013 requires at least one-third a listed company's total number of directors on the board to be independent. About 17% of S&P Bombay Stock Exchange (S&P BSE) 500 companies were reported to violate the regulation (Walia, 2015).

Likewise, a study conducted across hotels in Northern Cyprus found nepotism's significant negative effect on HRM, job satisfaction and retention (Arasli *et al.*, 2006). Moreover, some people associated with political and economic elites exhibit a sense of entitlement and feel that they should get certain high paying jobs (Yeganeh and Su, 2008).

AI-based HRM solutions attempt to address these problems. DBS reported that Jim's recruitment process is free from biases based on criteria such as age, gender or education in selecting candidates (Chanjaroen, 2019).

Likewise, one of the stated benefits of AIRA is that it reduces the possibility of nepotism, which a problem in the state and in the private sectors in Chile. In the mining sector, for instance, the recruiting process in Chile is biased towards men due to "self-discrimination" of workers, and male dominance (Salinas and Romani, 2014). Overall, the recruiter's own values, biases, and subjective preferences have no place in AI-based recruitments. By replacing human being with machines in key decision-making process, unfavorable effects of factors such as emotions, feelings, wants and needs can be removed. The preceding discussion can be summarized as:

P3. With AI deployment in HRM, subjective criteria such as nepotism and favoritism are less likely to come into play in recruitment, selection and promotion of employees in emerging economies in the GS.

Impact on the development, retainment and productive utilization of employees

In most GS economies, employee productivity-related criteria get less importance. Tessema and Soeters (2006) found that a large proportion of civil servants in Eritrea believed that there was no link between performance and reward. Employee performance evaluation is based more on subjective and behavioral criteria and compliance rather than on productivity (Yeganeh and Su, 2008).

In Iran, there is a social expectation that every employee should comply with Islamic and revolutionary criteria (Yeganeh and Su, 2008). HRM practices that have been reported and observed in GS economies such as seniority-based reward and pay structures that are overly hierarchical (Yeganeh and Su, 2008) are incompatible with AI-enabled HRM systems.

These challenges can be overcome using AI tools. We consider the Malaysian-outsourcing company Supahands to illustrate this point. Supahands' DIANE is a predictive routing system to match agents and projects based on timing and relevance (Moe, 2018). The company has SupaAgents in the Philippines, Indonesia and Malaysia (Pradhan, 2019).

SupaAgents handle over 1 million units of data each month. The company collects and aggregates data about each SupaAgent. The collected data include skills, availability, and past performance. DIANE utilizes the information to pair a project with the most appropriate team of SupaAgents.

Projects are broken down into small units—micro-tasks. The task is divided between humans and machine so that multiple people can work on a project to improve speed, efficiency and accuracy. They can also be aggregated into larger projects which require multiple workers. The goal is to ensure that SupaAgents complete the project at high levels of accuracy and that the right sets of skills are assigned to each project (Moe, 2018).

By automating repetitive administrative activities such as personnel reporting and record keeping, HRM professionals can focus more on interpreting information. More benefits can be realized if organizations can go beyond simple automation. For instance, Coca-Cola Vietnam uses Leena AI's chatbot. It cut 60% of the time of the CEO and the Director. The bots can be integrated with workplace chat apps Slack or Facebook's Workplace. They are trained to use information in policy documents. They pull data from back-end systems such as Oracle and SAP.

As another example, EY in 2017 launched an AI-powered chatbot named "Goldie". It is powered by IBM Watson. It answered more than 2.2 million questions by March 2019.

In China, businesses and the military use AI tools to monitor employees' brain activity and emotions (Chan, 2018). They place wireless sensors in employees' caps or hats. The data are combined with AI algorithms in order to assess various emotion conditions such as happiness, anxiety, sadness, and emotion-neutral state. Employers can identify workers' mood shifts, which can help them to take interventions such as changing break times, the nature of the task, or even asking them to take off time from work in order to increase productivity and profits.

A notable provider of emotional surveillance technology is Deayea, which installs sensors in helmets and uniform caps to measure conditions of drivers, assembly-line workers or people in similar occupation. The manufacturer's "brain surveillance devices" are special types of "emotional surveillance technology". Deayea claims that the measures have an accuracy of over 90% (Schmidkonz, 2019).

State Grid Zhejiang Electric Power in Hangzhou introduced Deayea's technology in 2014. Manufacturing company Hangzhou Zhongheng Electric uses it to track production line workers (Houser, 2018). Train drivers of high-speed rail lines also use them. The sensor can trigger an alarm if a driver falls asleep (Chan, 2018). Based on above discussion, the following is presented:

P4. AI deployment in HRM has a potentially positive impact on the development, retainment and productive utilization of employees in emerging economies in the GS.

Discussion and implications

Since GS economies utilize outdated and ineffective HRM systems (Berman, 2015), effective HRM plays a key role in the development of these countries (Tessema and Soeters, 2006). In this way, the adoption of AI-based tools by GS-based firms is one way to leapfrog their counterparts in developed countries. We argue that in many ways, due to the social, cultural, political and economic conditions facing GS economies AI use in HRM is likely to lead to higher value addition in these economies than in their GN counterparts.

The present findings can be generalized to developed economies. AI tools offer many benefits. Organizations increase effectiveness and efficiency in recruiting talent. They are efficient in terms of time to hire a candidate and speed. For instance, AI-based apps developed by Talkpush, AIRA and others can process large numbers of candidates almost instantaneously. They also perform well in terms of other efficiency indicators such as resource use and costs. AI tools are also more efficient in terms of reducing errors. Investments in AI may increase the productivity of employees.

We noted earlier that powerful contradictory forces have shaped the HRM policies in GS economies. In this regard, AI is likely to shape the mechanisms and dynamics of these factors. Specifically, we expect a decreasing influence of informal institutions such as social traditions. AI tools can also overcome the biases associated with demographic characteristics of candidates as well as those related to nepotism and favoritism. On the other hand, AI is likely to lead to a higher degree of professionalism and formalization of HRM systems and practices.

Having said that, it should also be mentioned that the long-term success of AI hinges on the ability to create required culture and organizational shifts in order to make them compatible with such intelligent systems and solutions. In organizations characterized by the prevalence of nepotism, cronyism and favoritism in practices such as hiring and promotion, AI-based systems are bound to fail. Such cultures can contribute to employees' overt and covert resistance to AI systems.

It is also worth noting that while some biases can be prevented using AI systems, other biases cannot be ruled out using such systems. AI may also introduce new types of biases. For instance, AI algorithms used in HRM and other purposes in the GS as well as GN are reported to lead to gender bias. It has been shown that AI algorithms used by recruiters are not necessarily neutral. Ironically many algorithms tend to reproduce the human errors that they are supposed to correct. To take an example, it was reported that the algorithm employed by Amazon to screen job applicants between 2014 and 2017 penalized terms such as “women” as well as the names of women’s colleges on job applicants’ CVs (Schulte, 2019). In South Africa, banks use AI to make loan decisions. It is argued that AI algorithms used for such purpose tend to discriminate against women of color. While race- and gender-related information is not explicitly be captured, it is suspected that information related to location and habits of applicants that is used to train AI may lead to such discrimination (Moosajee, 2019).

In order to understand the AI-led changes in HRM practices in GS economies, following the typology of PwC (2017), this technology’s deployments in HRM are plotted onto a 2 x 2 matrix (Table 4) that illustrates humans in the AI loop (present vs absent) on the horizontal axis against the ability to make adaptation to changing circumstances on the vertical axis. AI systems used in HRM in each cell in Table 4 have unique features that can help achieve different HRM objectives.

Table 4. A typology of AI systems used in HRM

| | | Roles of humans in the AI loop | |
|---|-----|--|---|
| | | Present | Absent |
| <i>Ability to make adaptation to changing circumstances</i> | No | [I] <i>Assisted Intelligence</i> Assists employers or recruiters to make decisions or take actions. They do not learn from their interactions with humans (e.g., Harambee’s AI tool) | [II] <i>Automation</i> Automate routine or non-routine tasks (manual as well as cognitive). The focus is on automation of existing HRM tasks rather than finding new ways of doing them (e.g., EY’s Goldie, Leena AI’s chatbot) |
| | Yes | [IV] <i>Augmented Intelligence</i> Augment HRM decisions made by humans. They also continuously learn by interacting with humans and the HRM environment. (e.g., detecting and flagging falsified CVs by AIRA) | [III] <i>Autonomous Intelligence</i> Can make adaptation to different HRM situations and act in an autonomous manner without human assistance (e.g., Deayea’s “brain surveillance”) |

Many of the benefits discussed above can be realized because computers are better than human beings in performing repetitive mathematical tasks. Their judgement and intelligence are not affected by factors such as emotions, feelings, wants and needs. They have better memories and are capable of processing a large amount of information. Such benefits are especially pronounced in assisted intelligence (cell I) and automation (cell II) of HRM (Table 4).

AI tools used in HRM such as Deayea’s brain surveillance (cell III) can be considered to an autonomous AI, which is arguably the fourth wave in AI and is the “most monumental” and “most difficult (Lee, 2018). It combines the previous three waves of AI, namely- Internet AI,

business AI and perception AI. Machines get the ability to sense the environment around them and respond. They can move intuitively and manipulate objects with the same ease and in just the same way as humans. Outside HRM, autonomous vehicles are perhaps the best example of autonomous AI.

In many cases, better results could be achieved with AI augmentation or augmented intelligence (cell IV), which according to Gartner is “a human-centered partnership model of people and AI working together to enhance cognitive performance” (gartner.com, 2019). For instance, researchers found that breast cancer detection rate significantly improved when AI was combined with analysis from human radiologists (Wu *et al.*, 2019). Financial institutions use AI augmentation in fraud detection. ML algorithms can be trained to identify and flag fraudulent financial activities (Masih, 2019). In HRM such algorithms can help detect fraudulent practices by job candidates. The idea here is that AI plays an “assistive role” in order to advance and improve human capabilities. To put things in context, by interacting with humans, AI can reduce errors (e.g. hiring candidates that have falsified CVs) and the amount of routine work in hiring.

At the same time, it can lead to more positive interactions and services. Augmented intelligence-led automation thus increases efficiency and has the potential to produce complementary and synergistic effect with a human touch, feeling, relatedness, warmth and common sense to reduce the risks associated with automation of decisions.

Prior researchers have argued that while the business rhetoric portrays AI, big data and ML as effective HRM tools, there is a significant mismatch between the rhetoric and reality (Tambe *et al.*, 2019). Over time AI tools are likely to get closer to the reality. Development in AI is likely to bring forward new and even more useful tools in the future.

AI-based tools can be applied in HRM in several ways. Apps such as those related to facial and emotion recognition arguably lack a scientific basis (Barrett *et al.*, 2019). A Chinese company claimed that its revenue increased by US\$315 million during 2014–2017 (Houser, 2018). However, it is difficult to determine if these effects can be attributable to the technology. Many critics have pointed out that emotion recognition systems lack scientific foundation (Table 2).

Tambe *et al.* (2019) identified four challenges in using data science techniques such as AI for HR tasks: (a) complexity of HR phenomena, (b) constraints associated with small data sets, (c) accountability questions related to fairness as well as ethical and legal constraints, (d) possible adverse employee reactions to organizational decisions based on AI and other data-based algorithms. Regarding (a), most AI tools are currently used to automate routine operations. With further development in AI, more complex HR tasks are likely to be automated.

Constraints associated with small data sets is a challenge facing many GS economies because ML algorithms need to be trained with big and diverse datasets. That is, algorithms can learn more and AI offerings become smarter if a huge amount of data are available. Among GS economies, China is an exception. The country is estimated to generate more data than all other nations combined (Economist, 2017), which can be attributed the country’s emergence as a global AI powerhouse.

Regarding (c), it can be argued that accountability questions ethical and legal constraints may be less of a concern in GS economies. For instance, Chinese consumers' willingness to share relevant data with companies has facilitated Chinese firms' access to data.

Regarding (d), possible adverse employee reactions would be of concern regarding the use of AI in the development, retainment and productive utilization of employees. No adverse reactions have been reported so far. Such concerns are irrelevant in the use of AI in recruitment and selection.

Future research implications

Before concluding, we suggest several fruitful avenues for future research related to AI use in HRM. First, when new HRM practices are initiated, different groups of employees tend to respond differently. Baddar Al-Husan *et al.* (2009) found that when a French multinational introduced HR reforms in a Jordanian company, the impact overall had a positive effect on worker experiences, attitudes and behavior. However, differential impacts on different types of employees were noted. For instance, more positive attitudinal and behavioral outcomes were found with more senior staff and those with higher educational. We believe it is reasonable to expect AI deployment in HRM will have different effects on attitudes and behavior of different groups of employees. An intriguing avenue for future research is thus to examine the nature of the various effects of AI on different groups of employees when this technology is deployed in HRM.

Second, prior researchers have noted that the adoption of new HRM practices was a key factor behind Japanese firms' ability to introduce innovations. The newly introduced practices provided more incentives for employees to develop and share new knowledge within their firms (Santangelo and Pini, 2011). Future researchers should thus explore the effects AI use in HRM on organizational capabilities such as organizational learning, knowledge management and innovative performance.

Third, prior researchers have found that HR practices that are developed in the West cannot be successful in GS economies unless they are adapted to the context of these economies (Stumpf *et al.*, 2010). Future researchers may wish to test whether this observation holds also for AI apps developed in the West.

Fourth, some of the apps discussed above show evidence of some degree of adaptation at various cultures. For instance, HRM AI providers such as Talkpush have developed multilingual apps. In future research scholars can address this question: What are the measures taken by the developers of AI solutions to accelerate the diffusion of such solutions in GS economies?

Fifth, some AI tools such as Deayea's "brain surveillance devices" are being used to assess person-job fit levels. In this regard, an avenue for future research would be to compare the suitability of such devices with instruments currently being applied such as Job Compatibility Questionnaire (Villanova *et al.*, 1994).

Concluding comments

We have developed propositions that might serve as a guide to future research on the use of AI in HRM in the context of GS economies. AI-based HRM tools are efficient in terms of a number of objectives such as reducing the time to hire a candidate, costs and utilization of other resources. The number and variety of metrics used in recruitment can be increased using AI. AI is likely to emerge as an important force for achieving HRM goals such as attracting top talents, improving their retention and developing leadership capabilities.

AI-based HRM tools have a higher value addition in GS economies due to formal (e.g. high level of corruption and the underdeveloped rule of law) and informal institutions (e.g. prevalence of nepotism) and economic factors (e.g. inadequate record keeping practices) in these economies. The conditions promoting supervisors' behaviors that demoralize employees can facilitate other forms of abuse in AI. AI also will be an effective tool to fight against the acts of corruption, such as nepotism, cronyism and favoritism.

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