The Impact of E-Recruitment and Artificial Intelligence (AI) Tools on HR Effectiveness: The Case of High Schools

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Abstract

The HRM encompasses a broad variety of topics, including preparation, recruiting, workforce relations and organisational growth. The people in any organisation are a wealth of information and experience. Acquisition of certain workers by recruiting thus plays a major role today. The implementation method for e-recruitment practices is the reason behind the success of organisational performance. The recruiting method used to be longer and entailed a great deal of paperwork for recruiters, but it began evolving steadily as online recruitment became more widespread. In recent years, a study has been carried out on integrating these two essential facets of HRM and technology due to technical developments. Studies are typically carried out about how technologies will render the hiring phase easier and optimised. The research implemented a mixed approach methodology throughout conducting interviews and questionnaires over a defined number of respondents in High Schools. The survey had been distributed using google forms, and the interviews had been conducted through zoom

meeting due to the COVID-19 Pandemic. The results proved a direct relationship between the implementation of e-recruitment in School and employee performance.

Keywords: E-Recruitment; Time Efficiency; Cost Performance; High Schools; Artificial Intelligence.

Introduction

The traditional methods to do business are being questioned in today's globalised environment. There are no longer only small businesses as rivals, but businesses must continuously compete, as emerging technologies limit the globe. This ensures that the introduction of these emerging innovations is crucial for a company to remain up-to-date and retain a competitive edge. Artificial intelligence is one of the most novel fields and has been researched since World War II in architecture and research. In 1956, the term artificial intelligence was tested.

Problem Statement & Research Questions

Currently, recruiting is mostly performed by human recruiters who sit and search for their specific applicants through CVs, online profiles, and other outlets. Recruiters perform all initial contacts, provide rejected staff with input, and carry out applicant interviews. Since people have minimal qualifications, it's not easy to keep up with all the activities involved and typically takes time for each recruiter. The reality is that individual constraints such as prejudices, pre-concept, and time limits will impede the recruiting method's efficacy. The issue is that it is important to accomplish this. This is a concern since a company will sacrifice both the most desirable work applicants and the monetary value. Methods for studying technology-based recruiting have been described as inadequate and lie behind the existing practice. More in-depth scientific studies can also be undertaken in the future to allow for more innovation and clearer access to emerging developments than before. The consequences for the recruiters of emerging technology are also unknown, as these new and effective technologies create obstacles or openings for the recruiter's job. However, the research questions will be addressed as follows:

- RQ1: How are new technology-based solutions utilised in recruitment processes?
- RQ2: What kind of opportunities and risks do new technology solutions generate in recruitment processes?
- RQ3: What are the prospects of technology-based recruiting?

Literature Review

Background Overview about E-recruitment, Artificial Intelligence and HR Effectiveness
Ahmed, E. R., et.al., [1] referred to e-recruiting as cyber-recruiting or e-recruiting. This approach is one of the latest in human resources that determine the qualified and potential candidates.

Online recruitment has substituted the most internal and external recruitment approach. From a legal point of view, recruitment is defined as the total number of persons recruited by a company at a particular place or at varying times controlled by local or national rules and laws for employment. Thus, legal constraints on the recruitment procedure must guarantee collateral and protection for the employee and the company and handle the greatest interest of both sides. According to Huang, Ahmed, E. R., et.al., [2] e-recruitment is when an organisation uses the internet, specifically online websites, for employers to post a vacancy about a specific position and where people looking for employment can post their resume where it matches. E-recruitment websites provide employment details to people seeking a job.

Ahmed, E. R., et. al., [3] claims that e-recruitment is not just about sending emails to candidates, inviting them to interviews, or either accepting or rejecting them. However, e-recruitment is referred to as an approach to apply and execute plans, tactics, and strategies in organisations and institutions to assist and use online channels. In the recruitment area, this web-based segments the market trying to locate the potential candidates and then gathering the essential information that is important and required for the selection development. Ahmed, E. R., et., al., [4] stated that e-recruitment is an online tool used to determine, recognise, and attract possible employees via advertising for that vacant job using the organisations' websites or job portals. Also, online recruitment can be viewed and considered as an umbrella casing HRM and the whole recruitment process specifically. This web-based process can be used in two forms: first, the company's web site for employment, other advertising job portals for posting a job.

Artificial Intelligence

Technology, such as artificial intelligence, is considered, nowadays, to be the crucial factor for organisations to endure, exist, adapt, and alter in an evolving and shifting atmosphere. What makes artificial intelligence effective and powerful than any other technology is that it has the ability and capacity to learn, understand, and make decisions. Despite that, in HRM, there is yet an absence of the whole general use of artificial intelligence and its tools in some organisations. Each day, a new and modern technology emerges into the market, such as AR or augmented reality, AI or artificial intelligence, 3D printing, algorithms, robots, and many others. All these technologies are being created and made to improve, assist, and facilitate individuals' personal and business lives.

Previous Studies about Artificial Intelligence

John McCarthy is the man who created and came up with artificial intelligence. He started his research and studies on this matter in 1955 and supposed that every characteristic of AI can be copied and substituted by a machine. Artificial intelligence is known to be shortened as AI.[1] AI is

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[1] Artificial Intelligence

work operations where knowledge is needed if applied by a human. Alabdullah, et al., [5] defined artificial intelligence that it is "investigating intelligent problem-solving behaviour and creating intelligent computer systems.". The expression AI was recommended and proposed in a conference, for the first time, in the United States of America in the year 1956. It is used to analyse a particular case or circumstance and maximise by selecting the optimum resolution by mimicking human rationality and artificial intelligence. AI is currently used in translation, gaming, robots, speech, and image (face) recognition, printed documents, and texts, etc.

The "A" in Artificial Intelligence refers to Artificial and is accepted worldwide. However, many studies aim to define the "I" since it is the most difficult to identify. As stated in the Oxford Dictionary, artificial is something "made or produced by human beings rather than occurring naturally, especially as a copy of something natural." The difficult, complicated, and sensitive part is in identifying intelligence. Various researchers would determine the word AI as the development and establishment of robots, machines, computers, or software that dwell and imitate human being's behaviours and intelligence. AI can be used in many fields as language interpretation/translation, machine understanding, awareness, and perception, problem-solving, robotics, and finally, gaming.

Another definition for artificial intelligence, as stated by D Datta, et.al., [6] is "machines that respond to stimulation consistent with traditional responses from humans, given the human capacity for contemplation, judgment and intention." Another term used for artificial intelligence is machine intelligence or machine learning. AI is instantaneously reforming and changing a considerable number of organisations at a rapid pace. AI is an "intelligent agent" that senses, observes, and comprehends its surrounding and make a decision that optimises reaching its goals effectively, efficiently, and successfully.

Therefore, AI is implemented when a machine imitates analytical tasks and operations suchlike problem solving and learning. AI is capable of perceiving and grasping human speech, independently running a vehicle, etc.… AI can be divided into three kinds: analytical, human-inspired, in addition to humanised AI [7]. The analytical type is characterised by using intellectual knowledge based on previous experience and events to make later choices and decisions. Artificial intelligence based on human-inspiration is made up of mental and intellectual knowledge and emotional quotient or, in other word EI; these are the factors and aspects human beings rely on to make a particular decision. Finally, humanised artificial intelligence represents all kinds of features: mental, emotional, and cultural knowledge, makingne capable of interacting with others [8].

AI can be categorised into two parts; weak and strong artificial intelligence. The weak artificial intelligence, or in other words limited artificial intelligence, concentrates on restricted tasks such as a self-driving vehicle [9]. The intense artificial intelligence, or in other terms, comprehensive artificial intelligence, is a system with alertness, responsiveness, and consciousness, and this

system or machine has knowledge, understanding, intelligence, and perception in many fields [10]. An additional elaboration regarding these two parts is that the weak AI refers to computers or machines as just a mean or a device for studying rational and intellectual processes, meaning the machine only imitates and mimicked knowledge and intelligence [11]. Strong AI states that the machine's approaches and methods are intelligent, reasonable, logical, and rational. They can comprehend an exact and precise software and therefore enhance and improve their operations based on past experiences. This incorporates spontaneous and intuitive connecting with other computers and machines, which results in an impressive scaling outcome [12].

Levels of Artificial Intelligence

Artificial intelligence is divided into three layers; the necessary support, the platform framework, and the area of technology [13]. The first layer, which is the first support layer, is composed of three main fundamentals: vast data, figuring power, and technology layer. Broad data offers control for artificial intelligence's growth and development through the new algorithm templates with enhanced machine learning competencies [14]. For example, deep learning ensures that all tasks as managed, unmanaged, and concentrated learning are carried out correctly. The second layer, the platform framework, is online websites, like Amazon, Google, Facebook, etc., used by companies and especially universities [15]. Some of them have introduced and implemented their platform, such as the University of California, University of Montreal. Finally, the technology layer that is being used in different sectors and areas [16]. It comprises computer vision, normal speech processing as Siri, face and image recognition, e-payments, smart speakers, translation programs and autocorrect, and many more, shown in figure 1.
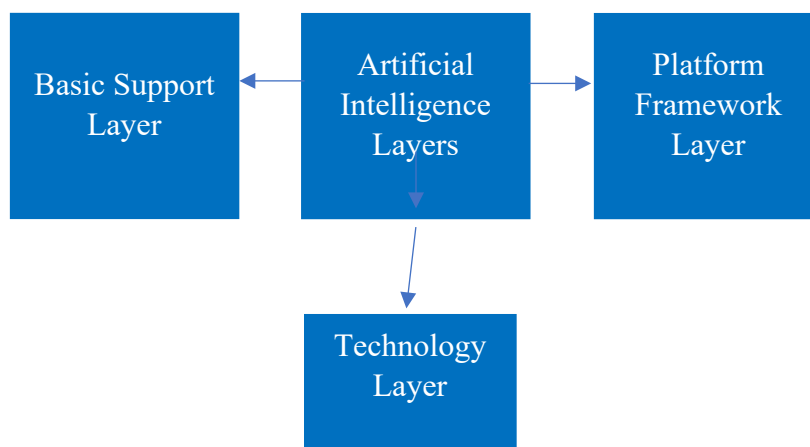

Figure 1. Levels of Artificial Intelligence

The first stage ANI is mostly the basic one in AI. It is limited to only a single functional area. The second stage is AGI, which is the advanced stage [17]. It incorporates reasoning, problem-

solving, abstract intelligent, which is to human beings [18]. The last stage is ASI which exceeds human intelligence in all areas and is considered the highest form, shown in figure 2.
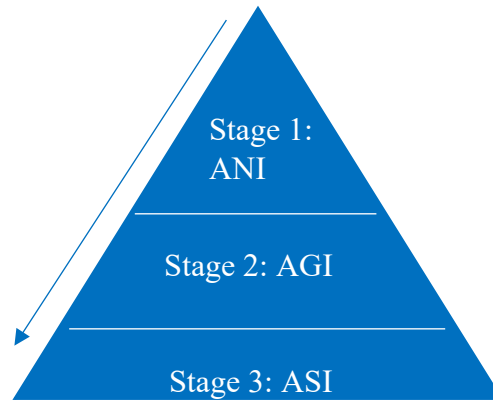

Figure 2. The basic stages of AI

For artificial intelligence to be understandable, it is best to understand and comprehend intellectual digitalisation levels [19]. The first level is assisted intelligence created to improve and enhance what individuals and organisations are doing by automating repetitive and monotonous tasks such as the GPS in vehicles nowadays, which is made to provide directions and road situations [20]. The second is augmented intelligence; that is permitting individuals and machines to take, together, a particular decision [21]. The third and the last is autonomous intelligence which is the supreme and the best form [22]. When machines and computers act solely, as an example of that is self-driving or autonomous vehicles, shown in figure 3.
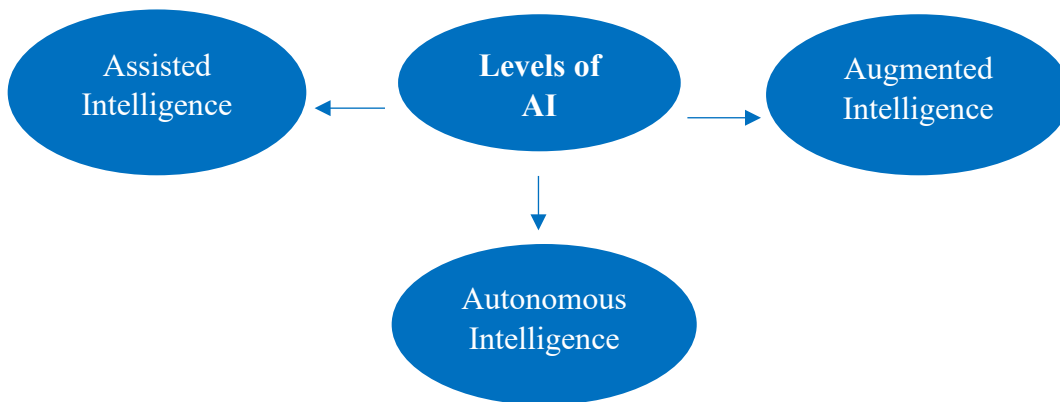

Figure 3. The intellectual digitalisation levels

Artificial Intelligence Tools

In 1993, Intel microprocessor added to a massive number of applications graphics and music capacities [23]. This was the beginning of a new generation that involves robots, intelligent personal assistants, autonomous vehicles, and many other capabilities and competencies that are exclusive and can only be done by human beings [24]. Individuals who are technology savvy claimed that, in no more than twenty-five years, computers are being used in complex and complicated algorithms such as comprehending and speaking of natural languages when it was only used for coding and handling the digits of 0 and 1 [25].

The Impact of E-recruitment on Effectiveness of HR

The prompt, quick, and rapid expansion in innovation and technology has led to many changes in every department in organisations [26]. Managers are accepting and using the latest and advanced ways and methods for recruiting and selecting candidates. Recruitment is a core component of human resources. Human resources activities, and especially recruitment, are not completed in the modern world unless using the internet [27]. Nowadays, companies and organisations are using their websites or job portals to post a vacant position and attract the right person. E-recruitment supports managers in reducing stress, time wasted, decreasing the time needed for the recruitment cycle, money spent and saving their resources [28]. This online recruitment has transformed the staff's life and the organisation by increasing productivity and wealth [29].

Also, a larger pool of talented and experienced candidates is being attracted through e-recruitment [30]. The risk concerning the candidate's background, education, experiences, and qualification of the significant field has been reduced using e-recruitment. Besides, a load of work and tasks to be done by human resources managers, recruiters, and recruitment agencies is being limited, leading to increased job satisfaction. It has become quite simple to shortlist the needed candidate. The benefit of online recruitment is that a databank will save, keep, and reserve all the applicants' information. Finally, companies fail by only using e-recruitment; it also needs to have appropriate, adequate, and decent planning and implementation.

Human resources always are the lead of using the latest innovation and technologies in companies. Payroll warning is one of the new procedures that has been automated. For instance, many companies are keeping records of their employees through computers. Administrative efficiency has been increasing after using human resource information systems or, in other words, HRIS. As time is passing, HR professionals are looking more into the possibilities of using the internet and more latest technologies in the human resources field. Nowadays, e-HR incorporate enterprise resource planning (or ERP), voice recognition systems (or VRS), interactive voice response (or IVR), and many others that are artificial intelligence tools. Electronic, human resources are defined as practising human resources activities using electronic platforms. Managers, through e-HR, will be able to have access to relevant and significant data,

carry out an analysis, decide, and communicate with other individuals with the advice of HR professionals unless they decide otherwise. As for the employees, they can monitor, regulate, and update their information. Regarding the HR operations, e-HR will reduce paper-based tasks, minimise the unwanted staff, and enhance accuracy and capabilities for making more effective decisions.

Finally, the time and effort spent on administrative tasks shall be substituted by managerial, strategic, competitiveness issues and focusing more on relationship building, knowledge mediator, and human capital steward. E-HR may influence each area of human resources management that are essential. Starting with HR planning, e-HR gives managers and employees the chance to access data to update their personal information. This will lead to better accuracy and higher quality of data. Regarding acquiring resources or recruitment and selection, e-HR brings significant advantages about the quality of response, time, money, sorting applicants, and applicants' pool. On the other hand, there is always a risk of excess of resumes, a bad reputation for certain websites and databanks, without forgetting its uncertain effectiveness for senior and managerial positions.

Concerning the evaluation process, e-HR permits the performance appraisal to be done through the company's internet interface. This will reduce paperwork, cost, and time. It will allow managers and employees to present their performance information directly to the human resources department electronically. This will also supply managers with the criteria needed to be able to accomplish an effective PA. The positive effects of e-HR regarding communication are significant. It changed and upgraded corporate communication enabling the enhancement of upward communication within an organisation. Training and development of employees through the internet is undoubtedly one of the most profitable aspects of using e-HR. E-learning can be done through a wide range of resources such as links to many websites, streaming video, etc. It is tailor-made learning that is being made to fit the learner specifically. The switch from traditional human resources to modern or e-HR affects HRM in many ways. Other than its effect on cost and time, e-HR is considered an opportunity and a threat since the implementation of Electronic Human resources tend to minimise cost and labour, but at the same time enhances performance. The contribution of employees and human resources managers is increasing gradually to e-HR.

The Impact of Artificial Intelligence on HR

Since two-hundred years ago, alerts and warnings have been raised that machines and modern technologies will replace a considerable number of jobs, mainly middle-class jobs. The main issue is not only about having jobs disappearing, but it is also about the new posts that will not be created in return due to machines and automation. Previously, new organisations employed more individuals than those they fire, which is not considered this case nowadays. The rapid growth in technology can bring economic confusion, breakdown, and turmoil instead of environmental since machines and processors are becoming powerful and effective that companies are relying

on them to do the job instead of relying on the workers and employees. The acceleration in technology will affect and change jobs and what they pay.

Artificial intelligence may be utilised in the extraction of data, scanning, and classifying resume automatically. The human resources department used to manually assess the job applications, whereas nowadays, and with AI, recruiters find it easier to rank applications received through the algorithm, which is a form of artificial intelligence. An interesting aspect of artificial intelligence is collecting personality traits about the candidates that are beneficial when accomplishing and completing job positions. Though these traits can be pointed out during the interview, preliminary figures and information could be attained through searching the web through performing a linguistic evaluation to the candidates' blog post, social media, LinkedIn, etc. there is the possibility to collect and assemble information about the candidates' feelings, affections, and personality traits. Also, an application was made specifically for video interviews called HireVue.

By using this application, artificial intelligence can examine, study, analyse, and understand candidates' facial expressions, tonality, and body language. Then, it compares these characteristics with the talented employees and therefore proposes the best fit candidate to recruiters. Recruitment and selection are some of the major functions of HRM that have been affected by technological development. Recently, the use of artificial intelligence in the recruitment process is frequently increasing. Various scholars examined and suggested models that have integrated AI with recruitment operations.

One of the AI methods used in recruitment is called a knowledge-based browser. It is created for finding a suitable candidate based on a certain semantic annotation. In return, recruiters must state a keyword or, in other terms, "reasoner" that points out the qualifications that the vacant job requires. Hence, this knowledge-based engine will extract though the system the candidates that match the position. This will save time and money as well as reducing human errors, favouritism, and biases. Another method of artificial intelligence that is frequently used in recruitment in data mining. D Datta, et. al., [6] refers to data mining as extracting effective yet unknown, understandable, and actionable data from huge records through an automatic or semi-automatic device to take important and essential business-wise decisions. Data mining is an effective method for extracting data that might be beneficial and used for resume attainment in the screening process.

Also, intelligent text processing used for opinion analysis. This technique extracts sentiments inside a random text and arranges them under two categories; positive and negative sentiments. With the help of this technique, recruiters will assess the candidates based on their opinions and thoughts. An additional technique of artificial intelligence is called Artificial Neural Network or ANN. This technique is used to examine the learning capabilities of each applicant and assess

their managerial capacities. Finally, ANN may be used to predict employees' forthcoming performance.

Furthermore, "Chatbots" are artificial intelligence software used to communicate and interact with applicants and are an example of intuitive AI. After the applicant is done applying for the position, the chatbot will start interview screening, multiple evaluation tests and responding to the candidates' questions. Also, studies have shown that most of the applicants will be disappointed if the recruiters did not provide them with feedback; thus, the chatbot provides prompt and immediate feedback and updates during the recruitment and selection process, which abolishes the gap between the recruiters and candidates.

An example of chatbots is Mya and Olivia. Mya is an automated recruitment associate that utilises intellectual neural language to offer candidates immediate feedback; it computerises 75% of the recruitment process. It has become crystal clear that artificial intelligence helps in optimising the recruitment process. Artificial intelligence tools minimise monotonous tasks that are costly and time-consuming such as sourcing and screening candidates. These tools will result in more transparency to the recruitment process, reduce human biases, discrimination, and improve organisations' brand name and images. Employees nowadays, with all the innovation, expect to have more personalised interactive and technological surroundings. Approximately 8% of companies have already started using and implementing artificial intelligence, and 21% are examining and assessing the use of technology in the coming years.

The primary cause for organisations to use artificial intelligence is the responsiveness offered by chatbots. Artificial intelligence helps organisations retain their employees, monitor development, and progress, and make better decisions based on the system's facts and data. The exactness of artificial intelligence is likely to be 95%. Even though artificial intelligence offers many benefits to the company; however, it cannot consider the cultural traits, non-technical aspects, and other intangible behaviours that a candidate could bring to the company. Also, since artificial intelligence is replacing many jobs used by humans, it is feared that a huge number of jobs will disappear and the unemployment rate will gradually increase. It must be noted that machines cannot be left alone to do the work because a single mistake can cost a lot, considering the speed that a computer works and deliver results.

One of the biggest challenges regarding implementing artificial intelligence is personal information privacy and the unaware discrimination during the recruitment process. Although artificial intelligence is growing and becoming powerful, humans can never be replaced by machines or computers because of a simple reason: "Emotional Intelligence" or EI[2]. Machines can never have the complexity of human brains. In addition to EI, machines lack reasoning that is present in human beings. Regardless of how intelligence these computers and machines are,

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[2] The capacity to be aware of, control, and express one's emotions, and to handle interpersonal relationships judiciously and empathetically.

they will never be able to cope with and react to human emotions, reactions, and sentiments in a dependable way.

Research Design

This part of the research will address the research philosophy, hypotheses, research approach, research strategy, research choice and time horizon.

Hypotheses

The following hypotheses will be tested throughout the research:

- H1: Employees skills is affected by e-recruitment in SCHOOL
- H2: Advanced technology affects e-recruitment in SCHOOL
- H3: Time management affects e-recruitment in SCHOOL

Sources of Data

Both primary and secondary source of data was used in conducting the research.

Primary Data

Several methods of data processing are accessible, as primary data is obtained. The researcher called the Human Resources Department in High Schools to gather accurate and relevant details. The way the primary data was gathered is through implementing the questionnaires and interviews.

Questionnaires

The questionnaire was structured to define and assess the effectiveness of School recruitment and selection activities using Online Platforms. A collection of questionnaires of accessible and closed questions is planned.

Interviews

The interviews were conducted with four employees from the human resources department. Questions asked were semi-structured. One interview was done with a senior talent acquisition manager, one with junior talent acquisition, one with a recruiter, and the last one with a regional HR specialist; this was to ensure a variety of answers and different point of views.

The research even used secondary data for data analysis. Secondary data points include books, online resources, posts and journals, etc. This led to understanding how others identified and evaluated core principles, the origins of evidence utilised by some, and how this study project is connected to other projects.

Descriptive Statistics

Table 1. Descriptive Statistics

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
My company always invests in up-to-date technology and software	54%	43%	1%	1%	1%
My company is leader in its region	49%	46%	4%	0%	1%
My company tends to always inform its employees about new investments made and share them with them through the Newsletter	3%	51%	9%	1%	0%
I am familiar with artificial intelligence and e-recruitment in the hiring practices	14%	63%	17%	6%	0%
To what extend do you agree that AI-based software and e-recruitment are helping to find the best talent for the job	14%	62%	17%	6%	0%
AI-based software and e-recruitment are the future for hiring practices	18%	63%	15%	1%	1%
Artificial Intelligence and e-recruitment is easing human resource operations	28%	56%	13%	2%	1%
In your opinion, the implementation of artificial intelligence and e-recruitment reduce time wasted	32%	51%	10%	6%	0%
In your opinion, the implementation of artificial intelligence tends to map talents	25%	56%	13%	4.39%	2%
In your opinion, the implementation of artificial intelligence and e-recruitment help management save costs	26%	55%	2%	2%	1%
In your opinion, the implementation of e-recruitment and artificial intelligence in recruitment tend to eliminate bias in screening CVs	29%	50%	18%	3%	1%
I have been recruited based on the traditional method	29%	45%	7%	17%	2%
Artificial intelligence helps to identify candidates' skills, competency and trait that match the job applied for	24%	54%	19%	1%	1%

In table 1, Reference to the mentioned results, 97% agree and strongly agree that the company invests in up-to-date technology and software, while 1% were neutral, and 2% disagree and strongly disagree. This means that the company is willing to invest in technology, such as e-recruitment which depends on high and advanced technology, to retain talents and enhance employees' performance in the workplace. 95% agree and strongly agree that their company is the leader in its region, 4% neutral, and 1% strongly disagree. School is a well-known and reputable school in the region. It is known for providing high-quality education to its clients and is also reputable in recruiting and retaining talented employees. 89% agree and strongly agree that their company always informs its employees about new investments and shares them with them through the newsletter. In comparison, 9% were neutral, and 1% of the respondent disagrees. This means that School is transparent with its shareholders and tends to inform its employees about all the changes taking place in the organisation by involving them in all the processes taking place and that employees tend to feel that they belong to this company.

This survey results showed that 77% of the respondents agree and strongly agree that they are familiar with the usage of artificial intelligence and e-recruitment in the hiring practices in School, 17% are neutral, and 6% of them disagree and strongly disagree. Responding to whether artificial intelligence and e-recruitment software help finds the best talent for the job, 76% agree and strongly agree, 17% were neutral, where 6% of the respondents disagree and strongly disagree. It is known that the implementation of e-recruitment practices and artificial intelligence in the workplace tend to increase the productivity of the human resources employees and by that will be able to address more tasks and by that become more productive.

Reference to the mentioned results, 81% agree and strongly agree that AI-based software and e-recruitment are the future for hiring practices, 15% were neutral, where 2% of the respondents disagree and strongly disagree. The surveyed employees agreed that artificial intelligence and e-recruitment practices tend to be the future of hiring practices, especially in the COVID 19 pandemic since everything is implemented online nowadays. This requires heavy investments in technology advancement and requires highly skilled employees in the workplace, which can effectively and efficiently use artificial intelligence and e-recruitment. Moreover, 84% agree and strongly agree that both artificial intelligence and the e-recruitment software are easing human resources operations, 13% were neutral, 3% of the respondent disagree and strongly disagree. The surveyed employees explained that the implementation of artificial intelligence and e-recruitment practices could make human resources operations easier and enhance the HR operations' effectiveness and efficiency, leading to higher performance in the workplace.

Reference to the mentioned results, 86% agree and strongly agree that they are familiar with artificial intelligence and e-recruitment in the hiring practices, 10% were neutral, and 3% of the respondents disagree. Employees in School are aware of the importance of artificial intelligence.

They are familiar with e-recruitment practices in the workplace and the effect that e-recruitment tends to have on its performance. This will give the employees an advantage and for the school to easily implement e-recruitment practices and achieve higher performance. Suppose the implementation of artificial intelligence and e-recruitment reduces time wasted. In that case, 83% agree and strongly agree that 10% were neutral, and 6% of the respondent disagree and strongly disagree that implementation of artificial intelligence and e-recruitment reduce time wasted. Effective implementation of artificial intelligence and e-recruitment practices tend to minimise and reduce the workplace's time wasted. The time can be invested in achieving different tasks that help the employees accomplish the company's vision and mission.

On the other side, 81% agree and strongly agree that artificial intelligence's implementation tends to map talents. 13% were neutral, where 6% of the respondent disagree and strongly disagree. The implementation of artificial intelligence tends to map talents by filtering their CVs based on the system's defined criteria and keywords. This would decrease the time used for recruitment and selection, decrease bias in the selection process, and increase the tendency to map and recruit talents. Furthermore, 81% agree and strongly agree that the implementation of artificial intelligence and e-recruitment helps management save costs, 2% were neutral, where 3% of the respondents disagree and strongly disagree. This means that lower employees will be required for recruitment, and these employees can be used to achieve other tasks and duties in the workplace.

Concerning the statement that the implementation of artificial intelligence and e-recruitment tends to eliminate bias in screening CVs, 79% of the respondents agree and strongly agree 18% were neutral, where 4% of the respondent disagree and strongly disagree. The e-recruitment and artificial intelligence algorithms tend to minimise the bias while screening the CVs. As mentioned before, the CVs will be filtered based on the needed keywords and competencies; therefore, human bias will not interfere with screening. Reference to the mentioned results, 74% strongly agree and agree that they have been recruited based on the traditional method, 7% were neutral, where 19% of the respondent disagree and strongly disagree. Most of the respondents have high years of experience, meaning that they had been recruited using the traditional method, face-to-face interviews and based on recruitment and selection criteria, meaning that the e-recruitment had not been implemented throughout their recruitment process.

About the mentioned results, 78% strongly agree that artificial intelligence helps identify candidates' skills, competency, and traits that match the job applied for, where 19% were neutral, 2% of the respondents disagree and strongly disagree. The implementation of artificial intelligence can help top management and HR identify the employees' skills and competency throughout filtering the data based on keywords in the e-recruitment system. This will help HR to manage many CVs.

Cross-Tabulations

Cross tabulation is a technique used to analyse and compare multiple quantitative variables. Also, this technique is applied to study the correlation between these variables, shown in table 2.

Table 2. Gender * Years of Experience Cross-tabulation

Count

		Years of Experience				Total
		1 year to 5 years	10 years to 15 years	15 years and above	5 years to 10 years	
Gender	Female	27	13	4	30	74
	Male	16	9	4	11	40
Total		43	22	8	41	114

The above cross-tabulation tends to study the demographics, and the sample addressed in the research. It showed that 27 respondents are females and have experienced between 1 to 5 years, 13 respondents have experienced between 10 to 15 years, 4 respondents have experience around 15 years and above, and at last 30 respondents have between 5 to 10 years of experience. On the other hand, 16 male respondents have between 1 year to 5 years of experience, 9 respondents have between 10 to 15 years of experience, 4 respondents have around 15 years, and above and 11 respondents have between 5 to 10 years of experience. As the result shows, most of the employees have a different range of experiences, which means that the implementation of artificial intelligence practices and e-recruitment services will face some challenges, especially with the employees who have high years of experience since some of them are not familiar with using technology and are afraid of change in the workplace, shown in table 3.

Table 3. Work Position * Years of Experience Crosstabulation

Count

		Years of Experience				Total
		1 year to 5 years	10 years to 15 years	15 years and above	5 years to 10 years	
Work Position	Academic Development Department	14	4	0	18	36
	Book Publishing Department	11	8	3	9	31
	Human Resources Department	9	1	0	2	12
	Infrastructure Department	3	3	0	2	8
	Others	6	6	5	10	27
	Total	43	22	8	41	114

The results revealed that 9 respondents who work in the human resources departments have between 1 to 5 years of experience; only one respondent has more than 15 years. In contrast, 2 have 5 to 10 years of experience. The human resources department is the concerned department in implementing recruitment practices in the workplace. Most of them have experienced between one and five years, meaning that they are familiar with technology advancement and ready to implement change in the workplace, shown in table 4.

Table 4. E-recruitment reduce time wasted *E-recruitment help management save costs Crosstabulation

Count

		E-recruitment help management save costs					Total
		Agree	Disagree	Neutral	Strongly Agree	Strongly Disagree	
E-recruitment reduce time wasted	Agree	45	1	6	6	1	59
	Disagree	4	0	3	0	0	7
	Neutral	5	0	6	0	0	11
	Strongly Agree	9	1	3	24	0	37
Total		63	2	18	30	1	114

The above cross-tabulation tends to study the relationship between e-recruitment and minimising time and costs in School. The results revealed that 45 respondents agreed that the implementation of e-recruitment Practices in School tend to minimise workplace costs and manage time effectively and efficiently in School. Thus, the higher the e-recruitment practices are implemented in the workplace, the higher the costs are saved and that enhancing the school's operations leads to better productivity. It can be concluded that the implementation of e-recruitment practices tends to minimise the paperwork and filter the CVs automatically based on defined keywords and defined algorithms to achieve the desired goals, shown in table 5.

Table 5. My company always invests in up-to-date technology and software * In your opinion, the implementation of artificial intelligence and e-recruitment help management save costs Crosstabulation.

Count

		E-recruitment help management save costs					Total
		Agree	Disagree	Neutral	Strongly Agree	Strongly Disagree	
My company always invests in up-to-date technology and software	Agree	32	1	9	6	1	49
	Disagree	0	0	1	0	0	1
	Neutral	2	0	1	0	0	3
	Strongly Agree	29	1	7	24	0	61
Total		63	2	18	30	1	114

The above cross-tabulation aims to study the relationship between technology and its impact on School costs. 32 respondents agreed that the implementation and investment in advanced technology software in School tend to save costs in the hiring process in High Schools, however; 9 respondents said that it is neutral to have a relationship between both technology advancement and saving costs, and at last only one respondent disagreed with this. It can be noted that investing and implementing advanced technology, such as e-recruitment in School, tends to enhance the hiring process, make it more efficient and effective, and improve School operations inside the human resources department, shown in table 6.

Table 6. Artificial intelligence helps to identify employee's competency and a trait that match the job applied for * E-recruitment help management save costs Crosstabulation

Count

		E-recruitment help management save costs					Total
		Agree	Disagree	Neutral	Strongly Agree	Strongly Disagree	
Artificial intelligence helps to identify employee's	Agree	38	2	8	13	1	62
	Disagree	1	0	1	0	0	2
	Neutral	15	0	6	0	0	21
	Strongly Agree	9	0	2	17	0	28

competency and a trait that match the job applied for	Strongly Disagree	0	0	1	0	0	1
Total		63	2	18	30	1	114

The above cross-tabulation highlights the relationship between employees' skills and the implementation of e-recruitment practices in School. The results showed that 38 respondents agree that the employee's skills are considered one of the most important factors to implement e-recruitment in School and to save time and costs; however, 8 respondents stated that the relationship between the employees skills and e-recruitment is neutral, and only 1 respondent disagrees and stated that there is no relationship between employees skills and e-recruitment practices in School. This means that most of the employees are aware of the e-recruitment practices and the importance of implementing artificial intelligence activities in the workplace.

Relationship among Variables

Table 7. Correlations

		Technology	Saving Costs	Skills	Saving Time
Technology	Pearson Correlation	1	.438**	.342**	.493**
	Sig. (2-tailed)		.000	.000	.000
	N	114	114	114	114
Saving Costs	Pearson Correlation	.438**	1	.398**	.623**
	Sig. (2-tailed)	.000		.000	.000
	N	114	114	114	114
Skills	Pearson Correlation	.342**	.398**	1	.520**
	Sig. (2-tailed)	.000	.000		.000
	N	114	114	114	114
Saving Time	Pearson Correlation	.493**	.623**	.520**	1
	Sig. (2-tailed)	.000	.000	.000	
	N	114	114	114	114

In table 7, Pearson Correlations is a test that aims to test whether there is a proportional relationship or an inverse relationship between the dependent and independent variable. The dependent variable is the HR effectiveness, whereas the independent are technology, saving costs, skills, and saving time. However, the results revealed that there is a proportional relationship between implementing technology in School and saving costs since it showed a correlation of 0.438, which is considered a positive coefficient, meaning that if the technology is implemented in School, it tends to save around 43.8% of the costs in the human resources

department of School. However, the results showed a proportional relationship between saving costs and employees skills, since the Pearson Coefficient showed 0.398, which means that the more the employees are qualified, the better the implementation of e-recruitment practices will take place, which will save 39.8% of the costs in the HR department of School. Finally, the relationship between time management and the implementation of e-recruitment practices showed a Pearson Coefficient of 0.493, which means that the implementation of e-recruitment practices in School tend to save 49.3% of the time in the human resources department.

Suggestions for further research

Knowing that new technology-based recruitment is still new and very recent, getting deeper into this study is highly required and essential. Like every other study, the shortcomings of this thesis provide important possibilities for potential analysis. Overall, the phenomenon in Lebanon, regionally, and globally could be studied much further. The only focus of this thesis was one country, Lebanon. Further studies involving other countries and cultures may provide valuable insights into this topic. This analysis was conducted using a mixed-method of research because a better understanding of the phenomena was necessary. It would have been difficult to collect quantitative data as utilising new technical recruitment methods in Lebanon is still relatively low and not common yet. It would have been difficult to implement more comprehensive and advanced materials in this research because the topic is new and limited in Lebanon. The study provides an understanding of modern recruitment methods based on technology and relies on a deeper understanding of artificial intelligence and e-recruitment. The complexity of the phenomenon mentioned earlier is so broad that the analysis into some smaller elements will offer more detailed knowledge and test findings. Further studies could discuss the experience of job seekers to extend knowledge in artificial intelligence and e-recruitment. More study into emerging technology-based recruiting approaches would be important. Because technology would undoubtedly improve the potential of recruiting, work on the trend is necessary to start.

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