Impact of Artificial Intelligence systems and tools in Human Resources sourcing and selection

To what extent do Artificial Intelligence systems and tools impact the efficiency and effectiveness of sourcing and selection in Human Resources?

Subject / Category:

Information Technology in a Global Society (ITGS)

May 2022

Word Count:

3998

APA citation

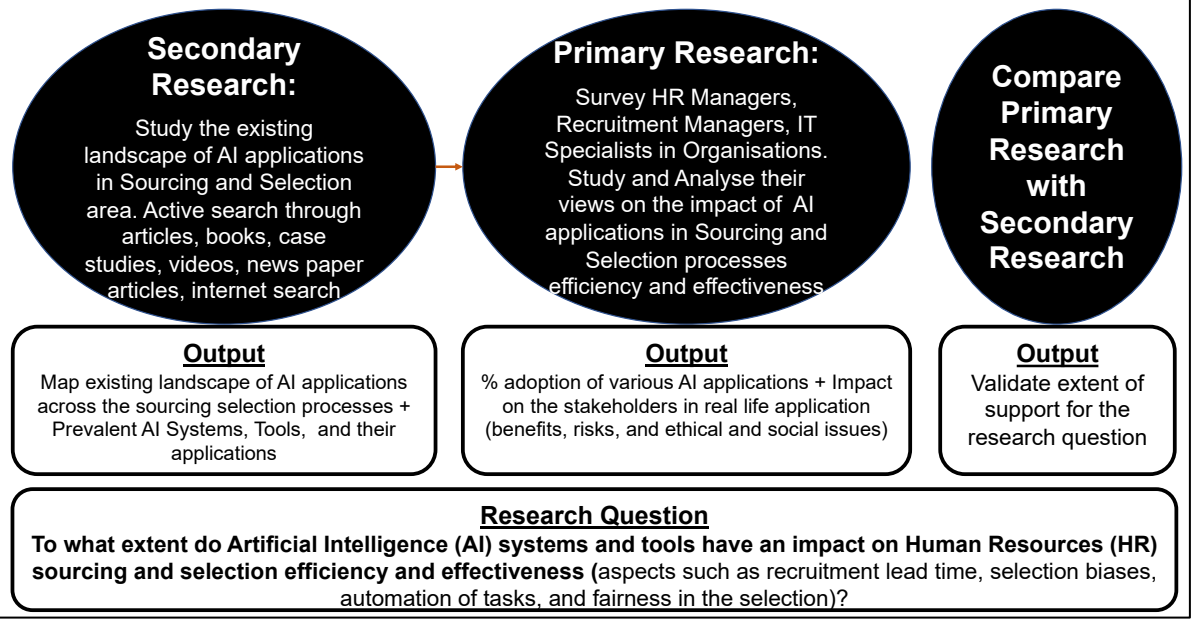
Table of Contents

Introduction

Since childhood, being a graduate of ABACUS at the age of 10, logical, structured and faster means of solving problems has always excited me, and my passion for computers grew steadily. My interest in computer science grew further when I developed a python code to help employees find the correct answers from Human Resources (HR) policies (my internship at Etihad Airways in 2019). Over the past decade, the adoption of Artificial Intelligence technologies accelerated, and the potential value of the market for AI tools was pegged at 1.2 trillion dollars (Albert, 2019, p.1). Moreover, post-pandemic, the war for talent has further intensified: demanding faster, cheaper and effective ways of sourcing candidates (Pillai and Sivathanu, 2020,p.1), making sourcing & selection of talent acquisition more critical for these organisations (Albert, 2019, p.5; Pillai and Sivathanu, 2020, p.5). Therefore, this extended essay will research the impact of Artificial Intelligence systems and tools in HR sourcing and selection.

The research question actively governs the methodology (Lekanides, 2016, p.50). A combination of primary (survey of management practitioners) and secondary sources (the literature review of the field) is needed for studies in ITGS to get the holistic analysis of both scientific and practitioner perspectives (Lekanides, 2016, p.49). Figure-01, given below, summarises the research approach for validating the research question: To what extent do Artificial Intelligence systems and tools impact the efficiency and effectiveness of sourcing and selection in Human Resources? It would include recruitment lead time, selection biases, automation of tasks, and fairness in the selection.

Figure 01: Extended Essay Approach & Research Question Validation



Chapter-02 will summarise the literature review findings from my secondary research, concluding that "adopting AI systems and tools positively impacts sourcing and selection efficiencies (time to hire, cost per hire, and automation of tasks) and effectiveness (potential biases, job-skill-culture match, and benefits to all stakeholders). The literature review stresses that the adoption pace might have gained momentum post-pandemic and highlights some critical success factors (technical competencies of sourcing and selection staff, management support, and adequate investment) for successfully adopting AI in sourcing and selection (eliminating/minimising biases). The chapter also discusses the need to exercise caution while taking the conclusions from the literature review due to the limited research in AI sourcing and selection.

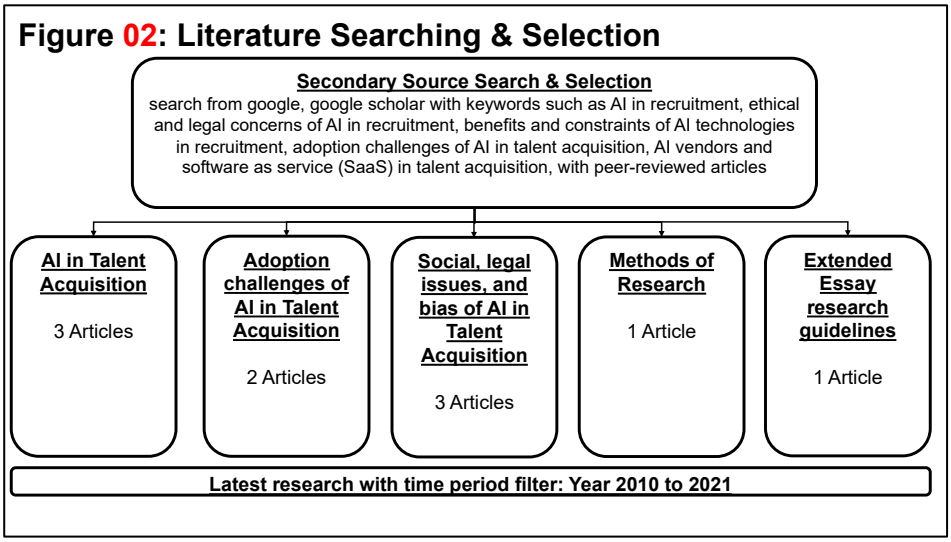
Chapter-03 reinforces the findings of chapter-02 on researchers' views through a web-based survey with ten questions using a Likert scale. The studies and evaluates the views of 87 management practitioners from 42 organisations, collected using snowball sampling. However, the chapter also discusses the limitations of the sample size, sampling method, and any potential concerns of validity and reliability of the survey instrument (ten questions) for the generalisability of findings. The survey findings support the research question's positive aspect with reassurance that the impact of AI is positive on sourcing and selection efficiencies and effectiveness.

The conclusion chapter highlights the support to the research question and the contribution of this extended to the limited literature review available by studying the impact of AI systems and tools in the sourcing and selection process of talent acquisition (Nawaz, 2019, p.1) and empirically validating the literature review findings through the perspective of practising managers through a survey. The future scope of research overcoming some of the limitations faced in this extended essay was also discussed.

Chapter-02: Literature review: Impact of AI systems and tools on HR sourcing and selection

Secondary source search & selection: Ten literature articles were selected using the advanced search in google and google scholar with keywords such as AI in recruitment, ethical and legal concerns of AI in recruitment, benefits and constraints of AI technologies in recruitment, adoption challenges of AI in talent acquisition, AI vendors and software as service (SaaS) in talent acquisition, with peer-reviewed articles from the year 2010 to 2021.

Figure 02: Literature Searching & Selection



An extensive review of these articles presented the current state of AI systems and tools used in the HR sourcing and selection, potential biases to be aware of and ways to overcome them, challenges faced in the implementation, and suggestions for successful adoption of AI tools in the field. This chapter will present and discuss some of the significant findings and explore the extent of support for the research question

2.1 Artificial Intelligence (AI)

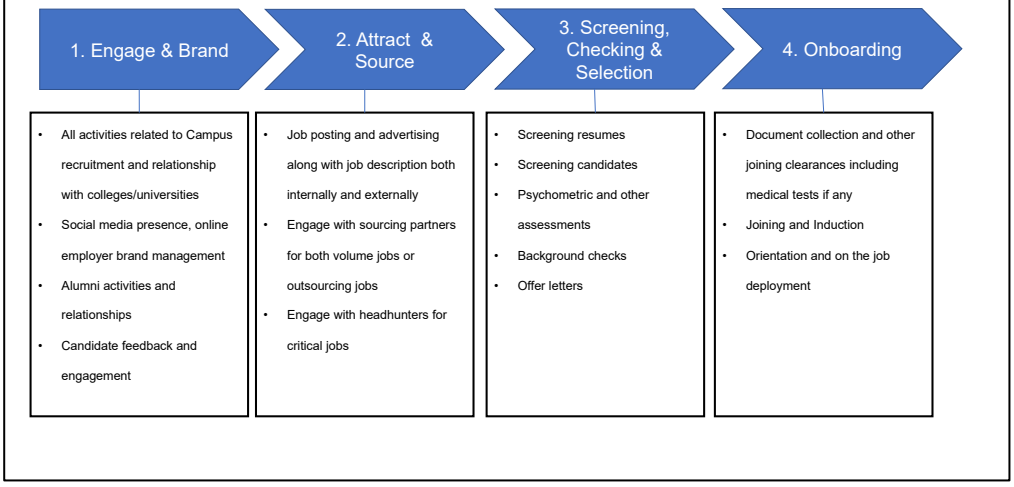
Oxford dictionary defines AI as "the theory and development of computer systems able to perform tasks normally requiring human intelligence, such as visual perception, speech recognition, decision-making, and translation between languages". The last two decades have already seen a seismic change in the landscape of AI tools and adoption by organisations, and it is only a matter of time that AI will invade recruiting and sourcing processes (Albert, 2019, p.4). While the academic literature is cautious, practitioner views are more optimistic, suggesting that organisations' actual adoption of AI tools is minuscule to what is possible technologically (Albert, 2019, p.2).

2.2 Human resources (HR) sourcing and selection

Talent acquisition is defined as a "strategic approach to identifying, attracting, and onboarding top talent to efficiently and effectively meet the dynamic business needs" (Bugg, 2015, p.5 cited in Pillai and Sivathanu, 2020, p.2). Figure-03 below shows the four steps of the talent acquisition process, steps 2 and 3 are focused on sourcing and selection process.

Figure 03: Talent Acquisition process

(adopted from Albert, 2019, p.5; Pillai and Sivathanu, 2020, p.5)



These two steps of sourcing and selection in the talent acquisition process are crucial in reaching out most efficiently to the right candidates and selecting the right fit candidates without any biases (less time, lower cost, and excellent administrative convenience to both candidates and recruiters). Therefore, this extended essay will be studying the AI systems and tools impact on the HR sourcing and selection process of talent acquisition.

2.3 AI systems and tools in Human Resources (HR) sourcing and selection

By studying and analysing the literature, one would conclude that the landscape of AI software and tools is vast. However, organisations have adopted relevant tools suiting their strategic needs, objectives and readiness (Albert, 2019, p.2). HR sourcing and selection are the two popular process areas in talent acquisition where many organisations have adopted AI tools beneficially (Albert, 2019, pp.3-4; Pillai and Sivathanu, 2020, p.5). AI tools appear to have limited penetration where tasks

involve high human touch in the process, such as offer negotiation with a candidate, while tasks with a minimal human touch and high volume tasks such as screening of candidates have a high proliferation of AI tools (Bongard, 2019, p.5).

Attract & Source: Sourcing involves attracting candidates for selection. Table-01 below provides the list of activities for attracting & sourcing, how and where AI could help, names of organisations adopting AI tools in this functional area, and a list of AI tools & software that the organisations mostly use.

Table-01: Landscape of AI tools, application and organisations adopting such tools in attract and source
(modified from Albert, 2019, pp.3-4; Pillai and Sivathanu, 2020, p.5)

What are the typical activities performed in this process step	How does AI tool help in the process?	Organisations adopting AI tools
• Job posting and advertising along with job description both internally and externally • Engage with sourcing partners for both volume jobs or outsourcing jobs • Engage with headhunters for critical jobs	• AI Software help to push jobs to the suitable candidates • AI tools also help scan and match resumes using the keyword search algorithms • Bots guide candidate to build resumes or match jobs	• Intel, eBay, Hilton, Verizon, IBM, Accenture, Warner Bros, Newton, Netflix, YouTube
AI Software tools: 1) ClickIQ; 2) Wade and Wendy (Padologic); 3) Recruitz; 4) Appcast; 5) Hiretual; 6) Ideal; 7) Entelo; 8) Switch App; 9) Google Cloud Job Discovery; 10) Skillate; 11) Tectio; 12) IBM Kenexa; 13) NextIT, 14) Inbenta, 15) Kore, 16) Mya		

The ever increasing landscape of AI vendors with tools targeted towards tailor-made needs of organisations, reducing costs of technology and software licensing, ease of use for end-users are all factors that make practitioners sustain an optimistic view n the future adoption potential of AI systems and tools in the sourcing and selection process of talent acquisition (Albert, 2019, pp.1-2).

Screening, checking & selection: After sourcing, the selection process would involve screening candidates, checking credentials and selecting candidates. Table-02 provides the list of activities for screening, background checks & psychometric testing, assessment and selection, how and where AI could help, names of organisations adopting AI tools in this functional area, and a list of AI tools & software that the organisations mostly use

Table-02: Landscape of AI tools, application and organisations adopting such tools in screen, check, and selection
(modified from Albert, 2019, pp.3-4; Pillai and Sivathanu, 2020, p.5)

What are the typical activities performed in this process step	How does AI tool help in the process?	Organisations adopting AI tools
• Screening resumes • Screening candidates • Psychometric and other assessments • Background checks • Offer letters	• AI Software can help with a video screening of candidates, automated interviews, scheduling assistance • Screening based on fitment by behavioural, cultural, basic skills • Bots check candidate background based on social media posts & public records of government agencies	• IBM, LinkedIn, Hilton, Goldman Sachs, Amazon, Unilever, PwC, Accenture, Tesla, Vodafone, Intel, Urban Outfitters, Uber, Axa Insurance, BT, McAfee, At&T Disney, Coca-Cola, Walmart, General Electric, Survey Monkey
AI Software tools: 1) IBM Kenexa, 2) CVViz; 3) Idea, 4) Zho Recruit, 5) TalentRecruit, 6) Talent Cube, 7) Hire Value, 8) Montage, 9) Wepow, 10) Interview Stream, 11) Koru, 12) Snap.hr, 13) Fama, 14) Belong.co, 15) Siri, Alexa and Sofia, 16) Arctic Shores, 17) Pymetrics, 18) Knack, 19) X.ai, 20) Tact, 21) Troops, 22) Olono, 23) HireRight, 24) Intelligo, 25) GoodHire, 26) Sterling Talent, 27) Onfido;		

AI tools are helping in screening candidates by doing psychometric tests, observing emotions, body language, and gestures which help in the selection of candidates on a preset selection criterion (Pillai and Sivathanu, 2020, p.2). Recently, even interviews are being conducted by chatbots. However, many argue that these technologies might discriminate based on gender and other discriminatory practices and need proper governance checks in the coding, policies, and administration of such tools to avoid biases and improve objectivity (Dastin, 2018 cited in Pillai and Sivathanu, 2020, p.4; Njoto, 2020, p.5).

2.4 Potential Biases, social and ethical concerns adopting AI systems and tools in HR sourcing and selection

Bias in sourcing and selection is a social and economic issue and not just a technology-centric issue. However, the prominence of such biases gets further amplified with complex algorithms used by AI tools that start making decisions resulting in increased discrimination of candidates in the sourcing and selection stage (Sánchez-Monedero et al., 2020, p.1). Women are more likely to be subjected to discrimination by AI tools as the very model of algorithms uses historical data when training algorithms (Njoto, 2020, p.5)

Technology-savy practitioners, large scale technology organisations, and AI Vendors argue that AI systems and tools reduce potential biases in sourcing and selecting candidates, while critics argue that organisations should be cautious of potential biases when using such tools and raise concerns on the transparency of these algorithms and called them black boxes (Albert, 2019, p.4, Bongard, 2019, p.5; Njoto, 2020, p.12). Algorithms use historical data to predict the future hiring fit; therefore, a higher probability of gender bias in the recruitment, as shown below in Figure-04

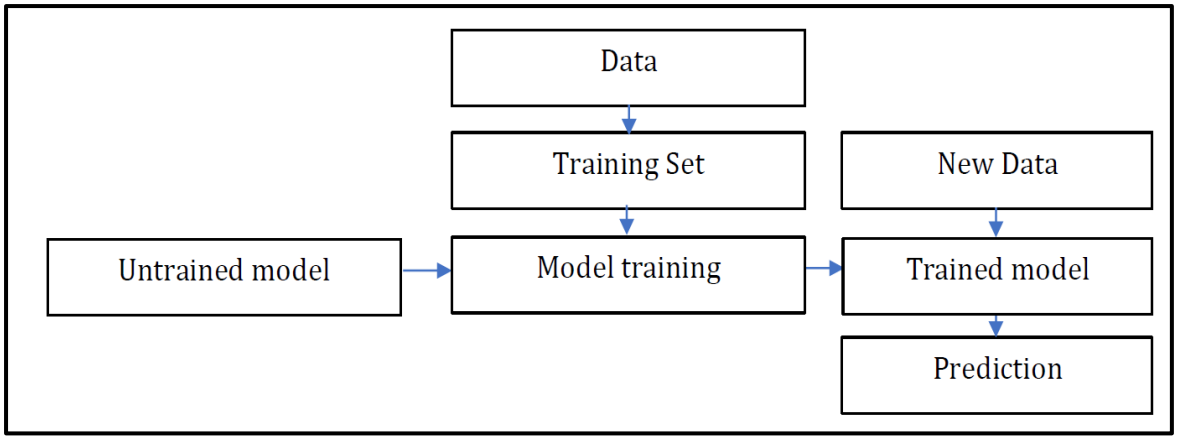


Figure-04: Algorithm working in AI tools (adopted from Njoto, 2020, p.8).

Limiting data sets and correlational errors might aggravate the potential gender bias issue in recruitment (Njoto, 2020, p.33). The extent and nature of bias differ based on the AI tool and vary based on the data sets (Njoto, 2020, p.7). Unlike human biases, algorithmic biases such as the one in the Amazon case on discriminating women in the sourcing and selection are like black boxes, which lack transparency and accountability and are hard to detect (Njoto, 2020, p.22). However, some software used by some vendors such as 'HireVue', 'Pymetrics', and 'Applied' has open and transparent algorithms suggesting less likelihood of bias and better scrutiny of algorithm decisions, and are more like "white-box" than black-box algorithms (Sánchez-Monedero et al., 2020, p.1). Organisations use AI tools in sourcing and selection to reduce human biases is the argument presented by Ochmann and Laumer (2019, p.1).

2.5 Enablers for better adoption of AI systems and tools in Human Resources (HR) sourcing and selection and research question validation

Literature research presents mixed views on the impact of AI adoption in the sourcing and selection process primarily due to the limitations of the data collected, the method used, or the period of study making the findings obsolete due to constant change in the field and technological breakthroughs in AI tools (Albert, 2019, pp.2-4). "Stickiness" and preference to stay with old sourcing and selection methods by the members of sourcing and selection teams would be a significant limiting factor of AI tools adoption (Pillai and Sivathani, 2020, p.20). Figure-05 given below gives Technology-Organisation-Environment (TOE) model affecting AI adoption in sourcing and selection, in which Pillai and Sivathanu (2020, p.8) argued that technological considerations such as cost-effectiveness, reliability, capability, security, quality and compatibility; organisational considerations such as organisation readiness, scope, size, the structure and quality of human resources, top management support; and environmental considerations: competitors, government policies and regulations, industry and vendor support, are all factors that affect the Task-Technology-Fit (TTF).

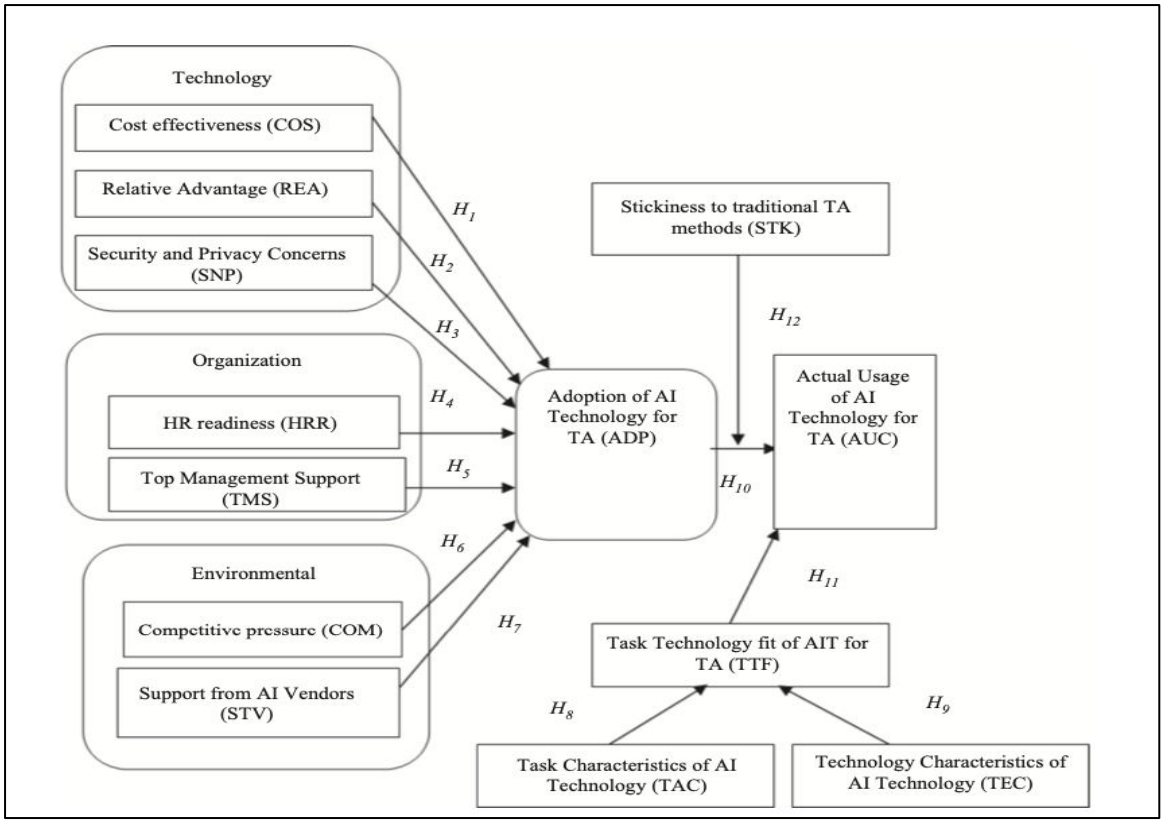


Figure-05: TOE and TTF model (adopted from Pillai and Sivathanu, 2020, p.8)

Further, security concerns and ethical access related to data might slow down the adoption of AI in talent acquisition (Pillai and Sivathanu, 2020, p.20). Due to time constraints and the limited scope of this essay, the literature review will not explore the legal aspects of discrimination/bias arising from using AI systems and tools in the HR sourcing and selection process. Contrary to the unfounded fears of AI making recruiters redundant, recruiters would be able to spend quality time in high human touch tasks such as offer negotiation, minimising human biases, enhanced reach to potential candidates, and automation by implementing AI in sourcing and selection (Hmoud and Laszlo, 2019, p.1).

In conclusion, the literature review answers the research question that the positive impact of adopting AI tools in sourcing and selection outweigh the potential limitations and that with some precautions, the biases and security concerns could also be minimised (Albert, 2019, pp.3-4; Pillai and Sivathanu, 2020, p.20; Bongard, 2019, p.3).

Chapter-03: Impact of AI systems and tools on HR sourcing and selection: practitioner views

The literature review research in chapter-02 concluded ten significant positive impacts and critical success factors of adopting AI systems and tools in HR sourcing and selection, supporting the research question that the benefits outweigh the potential limitations (could be overcome with some caution). One major constraint of the literature review is that the published literature and case studies are scarce, and it is challenging to evaluate the extent of support to the research question purely based on limited literature studies (Albert, 2019, p.1). While it is relevant to see the researchers' view, it is also equally important to explore the views of management practitioners and users of such AI systems and tools to evaluate the support for the research question.

3.1 Research method, questionnaire design, sampling, data collection, and data preparation

The survey method is employed to collect the views of management practitioners and users of AI systems and tools in the sourcing and selection process of talent acquisition due to the constraints of the time to complete the extended essay and the ability to get consistent and reliable answers across the population of respondents (Bakla et al., 2013, p.3). Also, to overcome the limitations of access to management practitioners, this extended essay relied on the convenience of snowball sampling of

management practitioners drawn from the contacts of my summer internship organisation's managers and their friends (Bakla et al., 2013, p.6). A cautionary approach is adopted before generalising the findings in the conclusion section, though the representativeness of the responses to generalise the findings (from snowball sampling using web-based survey method) to the population has acceptance in research. Ethical issues and privacy issues were overcome by clearly stating the purpose of the survey and codifying the survey participants identity without altering the evaluation of the responses (Bakla et al., 2013, p.8).

Figure-06 would give the ten survey focus areas to explore management practitioners' views based on the outcomes from the literature review.

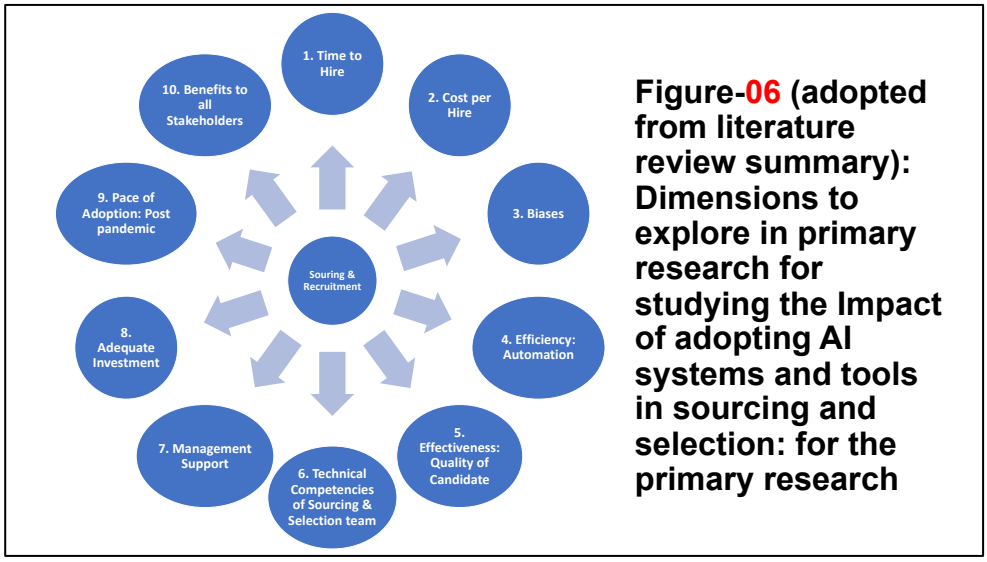
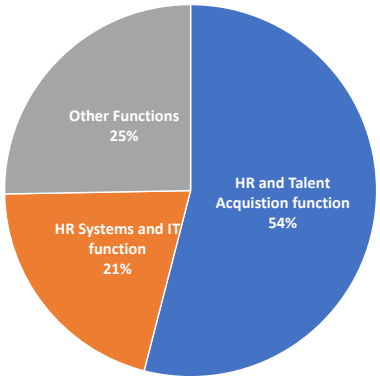


Figure-06 (adopted from literature review summary): Dimensions to explore in primary research for studying the Impact of adopting AI systems and tools in sourcing and selection: for the primary research

Annexure-01 would give the questionnaire, initially piloted and reviewed with the supervisor before being developed into a web-based questionnaire in google docs mailed to participants, and the survey was kept open for two weeks until 31/Jul/2021. The questionnaire adopted a 5 point Likert scale (Bakla et al., 2013, p.6) with the

rating scale descriptions of 5. Strongly agree; 4. Agree; 3. Neither agree nor disagree; 2. Disagree; 1. Strongly disagree. The questionnaire received 87 valid responses (after eliminating missing information and duplicate answers). Annexure-02 attached at the end would give the detailed responses to every question by each respondent, and the master data file is also included. The names of the respondents and organisations are codified to comply with the ethical and privacy concerns. As shown below in Figure-07, 75% of the respondents were from the functional roles in human resources, talent acquisition, HR systems, and Information Technology.

Figure 07: Functional distribution of total respondents to the survey



87 total respondents from 42 organisations across India, UAE and USA

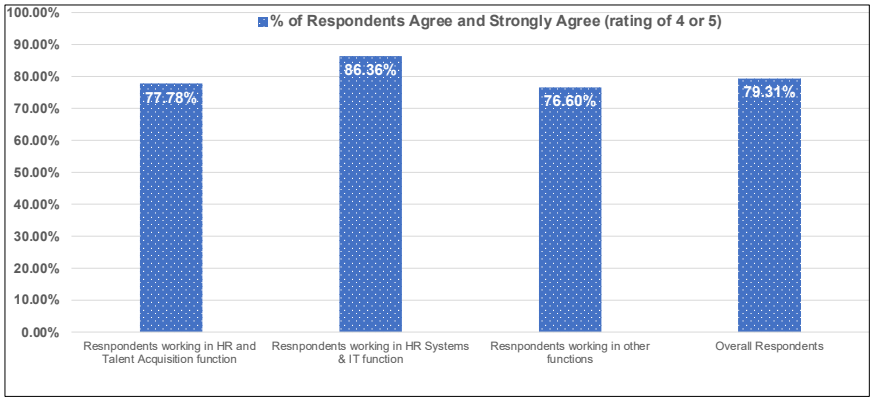
As seen from the above figure-07, not all stakeholders could be surveyed (such as prospective candidates, employees seeking jobs internally within the organisations, vendors of AI systems and tools, legislative representatives) due to the chosen sampling & surveying method, time and access constraints. Surveys results were analysed by the question and functional group of a respondent using Microsoft excel pivot tables and graphs. The analysis of survey questions was grouped under four broad categories to explore the impact of AI systems and tools implementation in the sourcing and selection process of talent acquisition

- **Effectiveness** (bias, job-skill-culture match, and benefits to all stakeholders)
- **Efficiencies** (time to hire, cost per hire, and automation of tasks)
- **Critical success factors** impacting the implementation of AI tools and systems (technical competencies of sourcing and selection staff, management support, and adequate investment)
- **COVID-19 pandemic impact** on the pace of adopting AI tools and systems

3.2 Results and analysis: Effectiveness of AI systems and tools in the sourcing and selection of talent acquisition

There is solid support for the argument that AI systems and tools would reduce the bias in sourcing and selection, with 79.31% of all respondents agreeing or strongly agreeing to question-04, as shown in figure-08 (there is variation among various functional groups of respondents, though).

Figure 08: Survey results for the question Q4: **Adopting AI tools in sourcing and selection processes of talent acquisition would help by reducing biases in sourcing and selection**

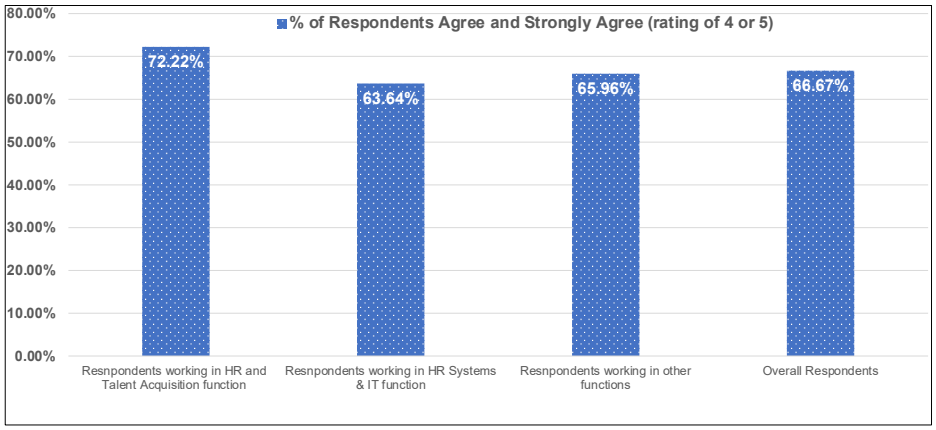


87 total respondents from 42 organisations across India, UAE and USA

The survey found adequate support that Job-skill-culture match improves by implementing AI systems and tools in the sourcing and selection with 66.67% of all

respondents agreeing or strongly agreeing to question-03, as shown in figure-9 (there is variation among various functional groups of respondents, though).

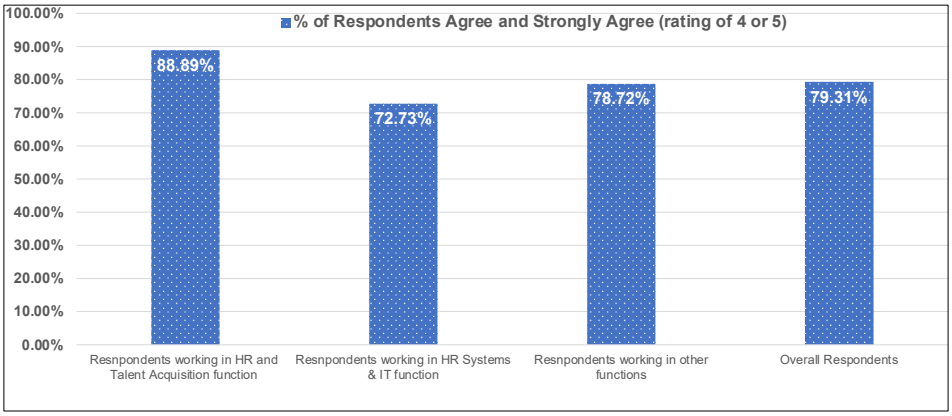
Figure 09: Survey results for the question Q3: **Adopting AI tools in sourcing and selection processes of talent acquisition would increase the effectiveness by enhancing fitment of the job-skill-culture match of the candidates**



87 total respondents from 42 organisations across India, UAE and USA

The survey found strong support to the argument that AI systems and tools implementation in the sourcing and selection helps all stakeholders, with 79.31% of all respondents agreeing or strongly agreeing to question-10, as shown in figure-10 (there is variation among various functional groups of respondents, though).

Figure 10: Survey results for the question Q10: **Adopting AI tools in the sourcing and selection process of talent acquisition is beneficial to all stakeholders (Candidates, Vendors of AI tools, Talent Acquisition team, Organisations, Recruitment & Sourcing firms, and the Society at large)**



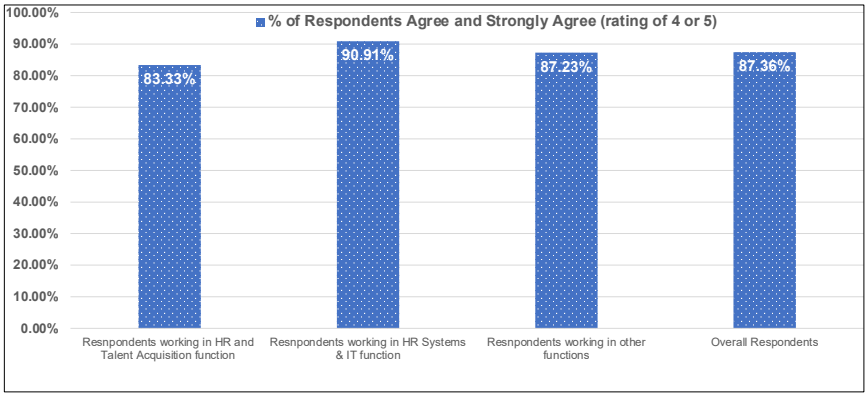
87 total respondents from 42 organisations across India, UAE and USA

Overall, the analysis of the survey results shows that there is adequate support to the positive aspect of the research question that adopting AI systems and tools in the sourcing and selection steps of talent acquisition improves effectiveness.

3.3 Results and analysis: Efficiencies of implementing AI systems and tools in the sourcing and selection of talent acquisition

The survey results strongly supported the argument that the time to hire would be reduced with the adoption of AI systems and tools in the sourcing and selection, with 87.36% of all respondents agreeing or strongly agreeing to question-01, as shown in figure-11 (there is variation among various functional groups of respondents, though).

Figure 11: Survey results for the question Q1: Adopting AI tools in sourcing and selection processes of talent acquisition would reduce the time to hire

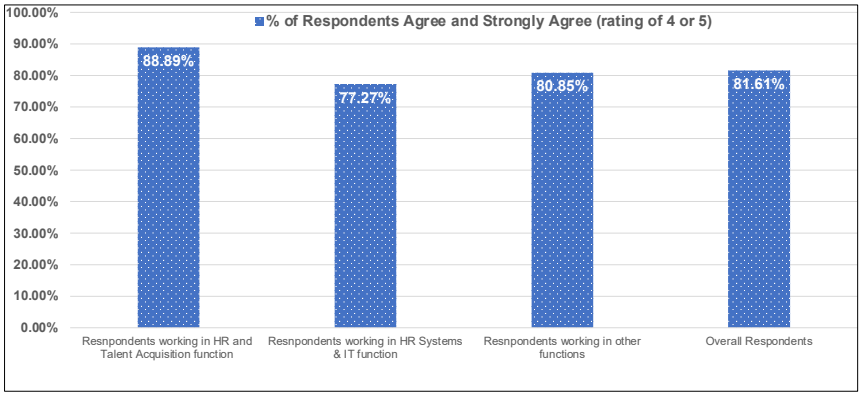


87 total respondents from 42 organisations across India, UAE and USA

Cost per hire would be reduced with the adoption of AI systems and tools in the sourcing and selection was well supported by the survey findings, with 81.61% of all

respondents agreeing or strongly agreeing to question-02, as shown in figure-12 (there is variation among various functional groups of respondents, though).

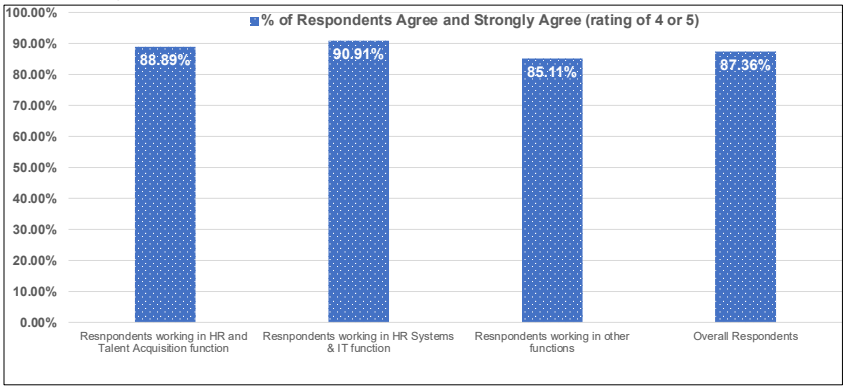
Figure 12: Survey results for the question Q2: **Adopting AI tools in sourcing and selection processes of talent acquisition would reduce the cost per hire**



87 total respondents from 42 organisations across India, UAE and USA

The notion that adoption of AI systems and tools in the sourcing and selection would help automate most of the administrative processes and thereby brings efficiencies is well supported by the survey findings, with 87.36% of all respondents agreeing or strongly agreeing to question-05, as shown in figure-13 (there is variation among various functional groups of respondents, though).

Figure 13: Survey results for the question Q5: **Adopting AI tools in sourcing and selection processes of talent acquisition would help to automate administrative tasks efficiently**



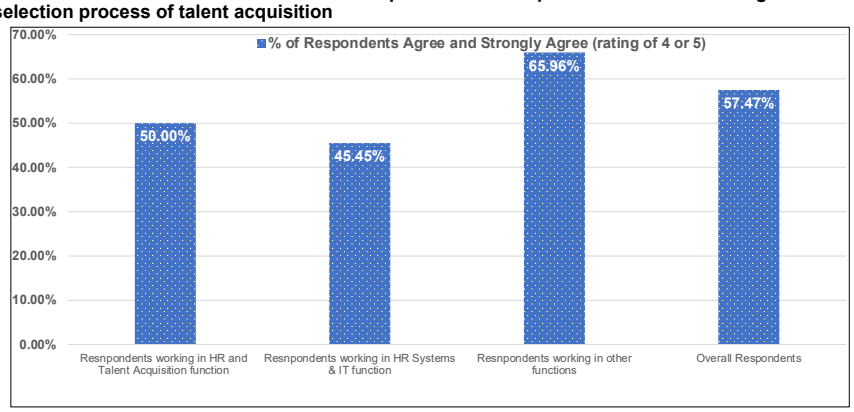
87 total respondents from 42 organisations across India, UAE and USA

Overall, the analysis of the survey results again shows that there is adequate support to the positive aspect of the research question that adopting AI systems and tools in the sourcing and selection steps of talent acquisition improves efficiencies.

3.4 Results and analysis: Critical success factors for implementing AI systems and tools in the sourcing and selection of talent acquisition

The survey findings supported the idea that fully developed and trained technical competencies of the staff in sourcing and selection would account for better adoption of AI systems and tools in the sourcing and selection with 57.47% of all respondents agreeing or strongly agreeing to question-06, as shown in figure-14 (there is variation among various functional groups of respondents, though).

Figure 14: Survey results for the question Q6: **The sourcing and selection team members have technical competencies to adopt AI tools in the sourcing and selection process of talent acquisition**

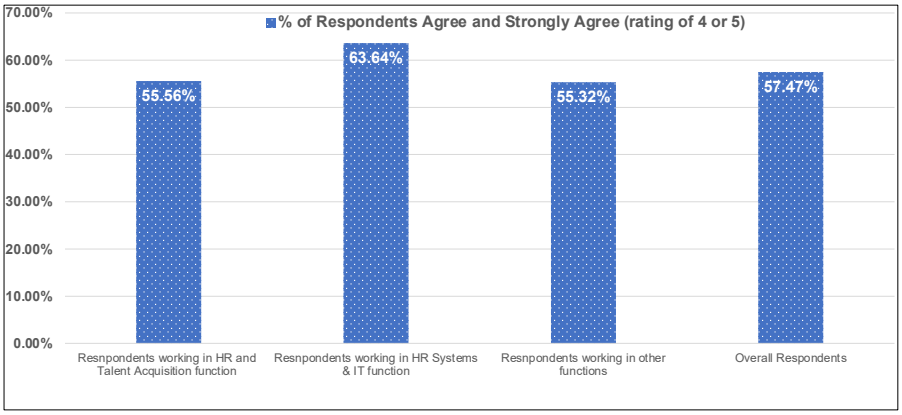


87 total respondents from 42 organisations across India, UAE and USA

The survey findings supported the argument that adopting AI systems and tools in the sourcing and selection would need management support, with 57.47% of all

respondents agreeing or strongly agreeing to question-07, as shown in figure-15 (there is variation among various functional groups of respondents, though).

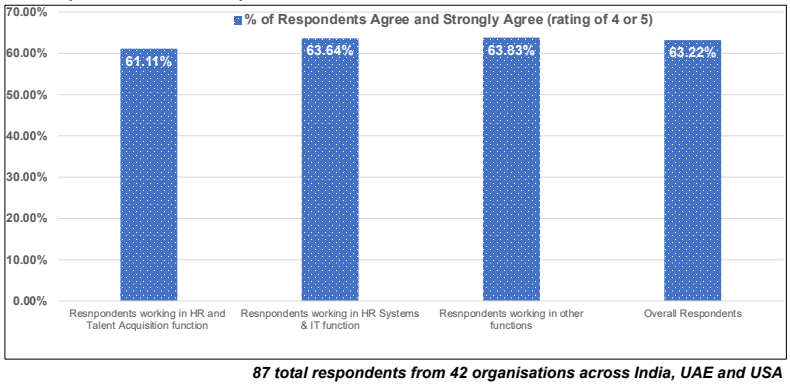
Figure 15: Survey results for the question Q7: There is strong support of management to adopt AI tools in the sourcing and selection process of talent acquisition



87 total respondents from 42 organisations across India, UAE and USA

The idea that adequate investment in AI systems and tools in the sourcing and selection process of talent acquisition improves adoption was also supported by the survey findings, with 63.22% of all respondents agreeing or strongly agreeing to question-08, as shown in figure-16 (there is variation among various functional groups of respondents, though).

Figure 16: Survey results for the question Q8: There is strong support from the organisation with the adequate investment to adopt AI tools in the sourcing and selection process of talent acquisition



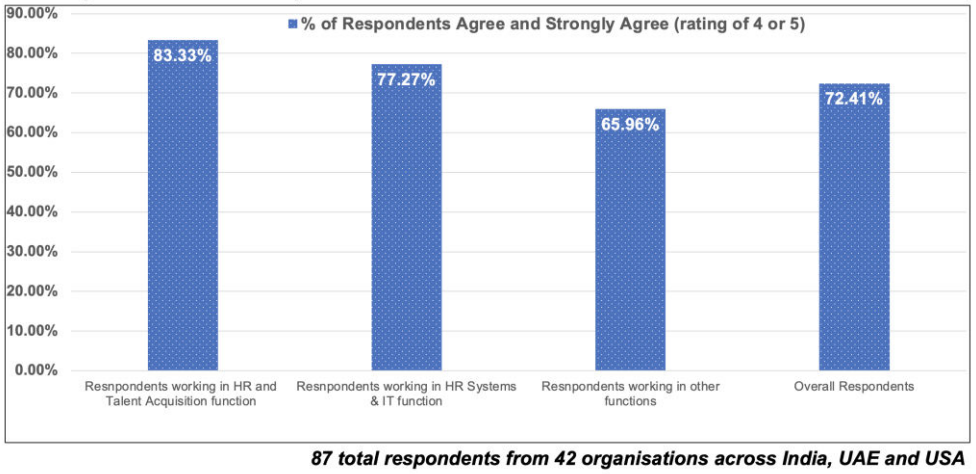
87 total respondents from 42 organisations across India, UAE and USA

Overall it can be concluded from the analysis of the survey results that the technical competencies of the staff in sourcing and selection, management support, and adequate investment would be critical success factors for adopting AI tools and systems in the sourcing and selection of talent acquisition.

3.5 Results and analysis: COVID-19 pandemic impact on adopting AI systems and tools in sourcing and selection

COVID-19 accelerated the adoption of AI tools and systems in the sourcing and selection process of talent acquisition was well supported by the survey findings, with 72.41% of all respondents agreeing or strongly agreeing to question-09, as shown in figure-17 (there is variation among various functional groups of respondents, though).

Figure 17: Survey results for the question Q9: **Post pandemic COVID-19, in general, the pace of adopting AI tools by organisations accelerated the sourcing and selection process of talent acquisition**



87 total respondents from 42 organisations across India, UAE and USA

Conclusion: support to the research question, the contribution and utility of the research, and future scope of research

AI systems and tools help sourcing and selection in various tasks as below (Albert, 2019, pp.3-4; Pillai and Sivathanu, 2020, p.5):

- Pushing jobs to the suitable candidates
- Scanning and matching resumes using the keyword search algorithms
- Guiding candidates to build resumes
- Video screening of candidates in interviews based on fitment by behavioural-cultural-skills
- Automated interviews and scheduling assistance
- Checking candidate credentials based on social media posts & public records of government agencies

The literature review also supported that the task-technology-fit and reduced 'stickiness' of sourcing staff to the traditional methods would enhance effectiveness (Pillai and Sivathani, 2020, p.20). Research question got adequate support from the literature review that the AI systems and tools implementation has net positive impact enhancing efficiencies and effectiveness of sourcing and selection; however, generalisability of these claims might still face challenges as the researchers argued the literature is scarcely studying the impact of AI in sourcing and selection (Albert, 2019, p.1). "Humans hiring humans using AI" will not affect recruiters' jobs. Recruiters would benefit from automation (by implementing AI in sourcing and

selection). They can then redeploy their time in high human touch tasks such as offer negotiation, enhanced reach to potential candidates, and minimising human biases in sourcing and selection (Hmoud and Laszlo, 2019, p.1).

The survey results confirmed that the adoption of AI tools in sourcing and selection benefits all stakeholders, enhancing effectiveness by reducing biases and enhancing job-skill-culture matches. Efficiencies will improve by adopting AI tools and systems in the sourcing and selection by automating most administrative tasks, reducing lead time for recruitment, and reducing cost per hire are all well supported by the survey findings. Management teams can support by providing adequate investment and technical skills by training the sourcing and selection staff and fostering AI tools adoption in the sourcing and selection. However, generalising support to the research question through the survey findings needs caution as the survey sample does not cover all stakeholders.

The extended essay adds value to research by synthesising the literature on AI impact in sourcing and selection. The extended essay would be beneficial for decision-makers in the organisation, regulators and governance teams in the government to understand and support through adequate investments, technical skills training, policy framework, and governance for implementing AI systems and tools. Governance teams both in organisations and governments could ensure that AI systems and tools do not bring undesirable discrimination or biases in the sourcing and selection of candidates. Vendors could benefit by making their coding

of algorithms transparent and auditable to avoid social and ethical concerns of implementing a 'black-box' software.

Future research could address validity, reliability, and generalisability concerns of this extended essay findings by the following:

- **Sample size:** Improve the number of responses to the survey questions
- **Stakeholders:** studies all stakeholders to increase the representativeness of findings from the survey sample.
- **Sampling method:** better sampling than snowballing
- **Depth of exploration:** expand the number of questions probing effectiveness and efficiency
- **Narrow the scope of research:** could probe specific process step of sourcing and selection or a particular software tool effectiveness and efficiency
- **Pre and Post impact:** could explore the longitudinal study of one or a group of organisations over time by observing improvement in effectiveness and efficiency in talent acquisition's sourcing and selection process before and after implementing AI tools and systems.
- **Enhanced method of research:** future researchers could use a more reliable method than comparing survey results with the findings from the literature review analysis

In conclusion, the literature review and survey results both validated the research question that there is a positive net impact of adopting AI tools in sourcing selection

outweigh the potential limitations, and with some precautions, the biases and security concerns could also be minimised (Albert, 2019, pp.3-4; Pillai and Sivathanu, 2020, p.20; Bongard, 2019, p.3).

Bibliography

- Albert, E. T. (2019). AI in talent acquisition: a review of AI-applications used in recruitment and selection. *Strategic HR Review*.
- Bakla, A., Çekiç, A., & Köksal, O. (2013). Web-based surveys in educational research. *International Journal of Academic Research*, *5*(1), 5-13.
- Bongard, A. (2019). Automating Talent Acquisition: Smart Recruitment, Predictive Hiring Algorithms, and the Data-driven Nature of Artificial Intelligence. *Psychosociological Issues in Human Resource Management*, *7*(1), 36-41.
- Hmoud, B., & Laszlo, V. (2019). Will artificial intelligence take over humanresources recruitment and selection?. *Network Intelligence Studies*, *7*(13), 21-30.
- Lekanides, K. (2016). *Oxford IB Diploma Programme: Extended Essay Course Companion*. Oxford University Press-Children.
- Nawaz, N. (2019). How far have we come with the study of artificial intelligence for recruitment process. *Int. J. Sci. Technol. Res*, *8*(07), 488-493.
- Njoto, S. (2020). Research Paper Gendered Bots? Bias in the use of Artificial Intelligence in Recruitment.
- Ochmann, J., & Laumer, S. Fairness as a Determinant of AI Adoption in Recruiting: An Interview-based Study. *Technology*, *12*, 15-2019.
- Pillai, R., & Sivathanu, B. (2020). Adoption of artificial intelligence (AI) for talent acquisition in IT/ITeS organisations. *Benchmarking: An International Journal*.

- Sánchez-Monedero, J., Dencik, L., & Edwards, L. (2020, January). What does it mean to'solve'the problem of discrimination in hiring? Social, technical and legal perspectives from the UK on automated hiring systems. In *Proceedings of the 2020 conference on fairness, accountability, and transparency* (pp. 458-468).

Annexure-01

Questionnaire for the surveying practitioner managers

Q1. Adopting AI tools in sourcing and selection processes of talent acquisition would reduce the **time to hire**

5. Strongly agree

4. Agree

3. Neither agree nor disagree

2. Disagree

1. Strongly disagree

Q2. Adopting AI tools in sourcing and selection processes of talent acquisition would reduce the **cost per hire**

5. Strongly agree

4. Agree

3. Neither agree nor disagree

2. Disagree

1. Strongly disagree

Q3. Adopting AI tools in sourcing and selection processes of talent acquisition would increase the effectiveness by **enhancing fitment** of the **job-skill-culture match** of the candidates

5. Strongly agree

4. Agree

3. Neither agree nor disagree

2. Disagree

1. Strongly disagree

Q4. Adopting AI tools in sourcing and selection processes of talent acquisition would help by **reducing biases** in sourcing and selection

5. Strongly agree

4. Agree

3. Neither agree nor disagree

2. Disagree

1. Strongly disagree

Q5. Adopting AI tools in sourcing and selection processes of talent acquisition would help to **automate administrative tasks efficiently**

5. Strongly agree

4. Agree

3. Neither agree nor disagree

2. Disagree

1. Strongly disagree

Q6. The sourcing and selection team members have **technical competencies** to adopt AI tools in the sourcing and selection process of talent acquisition

5. Strongly agree

4. Agree

3. Neither agree nor disagree

2. Disagree

1. Strongly disagree

Q7. There is strong **support of management** to adopt AI tools in the sourcing and selection process of talent acquisition

5. Strongly agree

4. Agree

3. Neither agree nor disagree

2. Disagree

1. Strongly disagree

Q8. There is strong support from the organisation with the **adequate investment** to adopt AI tools in the sourcing and selection process of talent acquisition

5. Strongly agree

4. Agree

3. Neither agree nor disagree

2. Disagree

1. Strongly disagree

Q9. **Post pandemic** COVID-19, in general, the **pace of adopting AI tools** by organisations accelerated the sourcing and selection process of talent acquisition

5. Strongly agree

4. Agree

3. Neither agree nor disagree

2. Disagree

1. Strongly disagree

Q10. Adopting AI tools in the sourcing and selection process of talent acquisition is **beneficial to all stakeholders** (Candidates, Vendors of AI tools, Talent Acquisition team, Organisations, Recruitment & Sourcing firms, and the Society at large)

5. Strongly agree

4. Agree

3. Neither agree nor disagree

2. Disagree

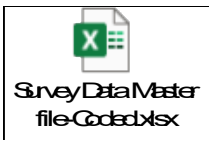
1. Strongly disagree

Annexure-02

Annexure - 02

Data Table: Survey Results from 87 Respondents from 42 Organisations by questions

Organization	Individual respondent	Functional group	Q1. Adopting AI tools in sourcing and selection processes of talent acquisition would reduce the time to hire	Q2. Adopting AI tools in sourcing and selection processes of talent acquisition would reduce the cost per hire	Q3. Adopting AI tools in sourcing and selection processes of talent acquisition would increase the effectiveness by enhancing fitment of the job-skill-culture match of the candidates	Q4. Adopting AI tools in sourcing and selection processes of talent acquisition would help by reducing biases in sourcing and selection	Q5. Adopting AI tools in sourcing and selection processes of talent acquisition would help to automate administrative tasks efficiently	Q6. The sourcing and selection team members have technical competencies to adopt AI tools in the sourcing and selection process of talent acquisition	Q7. There is strong support of management to adopt AI tools in the sourcing and selection process of talent acquisition	Q8. There is strong support from the organisation with the adequate investment to adopt AI tools in the sourcing and selection process of talent acquisition	Q9. Post pandemic COVID-19, in general, the pace of adopting AI tools by organisations accelerated the sourcing and selection process of talent acquisition	Q10. Adopting AI tools in the sourcing and selection process of talent acquisition is beneficial to all stakeholders (Candidates, Vendors of AI tools, Talent Acquisition team, Organisations, Recruitment & Sourcing firms, and the Society at large)
Organization 1	Individual 1	1. HR and Talent Acquisition	5	5	5	5	5	4	3	5	3	4
Organization 2	Individual 2	2. Systems people(HR and IT)	5	5	4	4	5	4	4	4	4	4
Orhanization 3	Individual 3	2. Systems people(HR and IT)	3	5	3	5	4	2	3	3	4	4
Organization 4	Individual 4	1. HR and Talent Acquisition	5	5	4	4	5	5	5	5	4	4
Organization 4	Individual 5	1. HR and Talent Acquisition	4	2	5	3	4	4	4	4	3	4
Organization 4	Individual 6	1. HR and Talent Acquisition	5	5	5	5	5	5	5	5	5	5
Organization 4	Individual 7	1. HR and Talent Acquisition	5	5	4	4	5	4	4	4	5	5
Organization 5	Individual 8	2. Systems people(HR and IT)	5	5	5	5	4	4	4	4	4	5
Organization 5	Individual 9	2. Systems people(HR and IT)	5	5	5	4	4	3	3	5	4	4
Organization 5	Individual 10	2. Systems people(HR and IT)	4	4	4	4	4	3	3	3	4	4
Organization 5	Individual 11	1. HR and Talent Acquisition	2	4	4	5	5	5	2	4	5	4
Organization 5	Individual 12	2. Systems people(HR and IT)	5	5	4	4	5	4	5	5	4	5
Organization 6	Individual 13	1. HR and Talent Acquisition	5	5	5	5	5	3	3	4	3	5
Organization 6	Individual 14	1. HR and Talent Acquisition	5	5	4	5	5	5	3	3	4	4
Organization 7	Individual 15	3. Other Functions	5	4	5	5	5	2	4	4	5	3
Organization 8	Individual 16	3. Other Functions	5	5	4	4	5	2	4	3	5	1
Organization 9	Individual 17	1. HR and Talent Acquisition	5	3	4	2	5	5	5	5	5	5
Organization 10	Individual 18	1. HR and Talent Acquisition	4	4	3	4	5	4	2	2	3	4
Organization 11	Individual 19	1. HR and Talent Acquisition	3	4	3	5	4	3	2	4	3	3
Organization 12	Individual 20	3. Other Functions	5	5	3	2	5	2	3	2	3	4
Organization 13	Individual 21	3. Other Functions	4	4	5	5	5	5	3	4	4	4
Organization 14	Individual 22	2. Systems people(HR and IT)	5	4	5	3	5	3	4	4	4	4
Organization 15	Individual 23	3. Other Functions	5	3	4	3	3	5	5	5	5	4
Organization 16	Individual 24	1. HR and Talent Acquisition	5	3	4	5	4	3	3	3	4	4
Organization 16	Individual 25	1. HR and Talent Acquisition	4	5	4	5	5	3	5	5	3	5
Organization 16	Individual 26	1. HR and Talent Acquisition	5	5	5	1	5	4	5	4	5	5
Organization 16	Individual 27	1. HR and Talent Acquisition	5	4	5	5	4	4	3	3	4	5
Organization 16	Individual 28	2. Systems people(HR and IT)	4	3	4	5	3	2	3	3	5	4
Organization 16	Individual 29	1. HR and Talent Acquisition	4	4	2	4	5	3	2	2	4	4
Organization 17	Individual 30	1. HR and Talent Acquisition	4	4	3	4	4	3	2	2	3	4
Organization 18	Individual 31	1. HR and Talent Acquisition	5	5	5	5	5	5	4	4	4	5
Organization 18	Individual 32	1. HR and Talent Acquisition	4	5	3	5	5	5	3	2	2	3
Organization 18	Individual 33	1. HR and Talent Acquisition	5	3	4	5	4	4	3	3	4	4
Organization 18	Individual 34	1. HR and Talent Acquisition	5	5	5	5	5	5	5	5	5	5
Organization 18	Individual 35	1. HR and Talent Acquisition	5	5	5	2	1	5	2	1	1	2
Organization 18	Individual 36	1. HR and Talent Acquisition	5	5	3	5	5	4	4	4	4	4
Organization 18	Individual 37	2. Systems people(HR and IT)	5	5	5	4	5	1	5	5	3	5
Organization 18	Individual 38	1. HR and Talent Acquisition	5	4	4	4	5	5	4	4	4	4
Organization 18	Individual 39	1. HR and Talent Acquisition	3	4	4	3	3	4	3	4	4	4
Organization 18	Individual 40	2. Systems people(HR and IT)	4	5	5	4	5	4	3	3	4	5
Organization 18	Individual 41	1. HR and Talent Acquisition	5	4	3	4	5	4	3	3	4	5
Organization 18	Individual 42	1. HR and Talent Acquisition	4	5	4	2	5	1	5	5	3	4
Organization 18	Individual 43	1. HR and Talent Acquisition	5	5	3	5	5	5	5	5	4	5
Organization 18	Individual 44	1. HR and Talent Acquisition	4	4	3	4	4	3	4	4	4	4
Organization 18	Individual 45	1. HR and Talent Acquisition	4	4	3	3	3	4	3	3	2	3
Organization 18	Individual 46	1. HR and Talent Acquisition	5	4	4	5	5	2	3	3	4	4
Organization 18	Individual 47	1. HR and Talent Acquisition	1	2	2	2	1	4	3	3	3	2
Organization 18	Individual 48	1. HR and Talent Acquisition	3	4	3	5	3	4	3	3	3	4
Organization 18	Individual 49	1. HR and Talent Acquisition	5	5	5	5	5	4	4	3	4	4
Organization 18	Individual 50	1. HR and Talent Acquisition	5	5	5	5	5	5	5	5	5	5
Organization 18	Individual 51	1. HR and Talent Acquisition	3	3	3	4	4	3	5	4	3	3
Organization 18	Individual 52	1. HR and Talent Acquisition	4	5	4	3	5	3	4	4	5	5
Organization 18	Individual 53	1. HR and Talent Acquisition	4	4	4	4	4	4	4	4	4	4
Organization 18	Individual 54	1. HR and Talent Acquisition	5	5	5	5	5	2	4	4	4	5
Organization 18	Individual 55	1. HR and Talent Acquisition	5	5	5	4	5	5	4	4	5	4
Organization 18	Individual 56	1. HR and Talent Acquisition	4	5	4	3	5	4	4	3	5	4
Organization 19	Individual 57	1. HR and Talent Acquisition	4	3	2	1	4	1	3	4	3	1
Organization 20	Individual 58	3. Other Functions	5	3	3	5	4	2	2	2	3	3
Organization 21	Individual 59	3. Other Functions	5	4	4	5	4	4	5	4	5	4
Organization 22	Individual 60	3. Other Functions	4	5	4	5	5	3	5	4	5	5
Organization 23	Individual 61	2. Systems people(HR and IT)	3	4	2	2	3	1	2	2	3	3
Organization 24	Individual 62	1. HR and Talent Acquisition	4	3	3	4	3	3	3	4	2	3
Organization 24	Individual 63	1. HR and Talent Acquisition	4	4	3	4	5	4	4	3	4	3
Organization 24	Individual 64	2. Systems people(HR and IT)	5	4	4	5	5	4	5	5	5	4
Organization 24	Individual 65	3. Other Functions	5	5	4	4	5	5	3	5	5	4
Organization 24	Individual 66	1. HR and Talent Acquisition	5	5	4	4	5	4	4	4	4	4
Organization 25	Individual 67	3. Other Functions	3	4	4	4	4	4	4	4	4	4
Organization 26	Individual 68	3. Other Functions	5	5	4	5	4	4	5	5	4	5
Organization 27	Individual 69	3. Other Functions	4	4	4	4	4	3	4	4	4	4
Organization 28	Individual 70	3. Other Functions	5	5	5	5	5	3	4	3	3	5
Organization 29	Individual 71	1. HR and Talent Acquisition	4	3	4	5	4	2	4	4	4	3
Organization 30	Individual 72	3. Other Functions	4	4	3	4	5	3	4	4	5	3
Organization 31	Individual 73	2. Systems people(HR and IT)	5	5	2	3	5	5	3	1	3	3
Organization 32	Individual 74	2. Systems people(HR and IT)	5	5	3	5	5	5	3	3	4	4
Organization 32	Individual 75	3. Other Functions	5	5	4	4	5	5	5	5	5	5
Organization 33	Individual 76	2. Systems people(HR and IT)	3	4	3	3	4	3	4	4	4	4
Organization 34	Individual 77	2. Systems people(HR and IT)	4	5	5	4	5	4	4	4	5	5
Organization 35	Individual 78	3. Other Functions	4	5	3	5	5	3	3	3	3	4
Organization 36	Individual 79	3. Other Functions	2	2	2	2	3	5	5	5	5	2
Organization 37	Individual 80	3. Other Functions	4	4	4	4	4	3	5	5	5	4
Organization 38	Individual 81	3. Other Functions	5	5	5	5	5	4	5	5	5	5
Organization 38	Individual 82	2. Systems people(HR and IT)	5	4	5	4	5	3	5	5	5	5
Organization 38	Individual 83	2. Systems people(HR and IT)	4	2	5	5	5	5	4	5	5	5
Organization 39	Individual 84	3. Other Functions	5	3	3	5	5	2	1	2	2	5
Organization 40	Individual 85	1. HR and Talent Acquisition	5	4	5	4	3	3	4	4	4	4
Organization 41	Individual 86	3. Other Functions	5	5	3	5	4	4	3	3	4	4
Organization 42	Individual 87	3. Other Functions	4	3	3	4	4	3	3	3	4	3



Survey Data Master file-Coded.xlsx