Market Analysis of High-Profile Position Recruitment in Hangzhou

An Interactive Qualifying Project

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ABSTRACT

Changing government policies, the wake of the COVID-19 epidemic, and many other recent events undoubtedly affected talent acquisition demands for high-technology industries in Hangzhou, Zhejiang. This study was conducted in collaboration with a Zhejiang-based talent acquisition and consulting firm— Mingju Enterprise Management Consulting— and aims to assess the current hiring needs of six key high-technology sectors. The goal of the study is to provide recommendations for potential market specialization and client needs for the sponsor as they continue to grow their business. This report includes a sector analysis of each relevant high-technology industry conducted via survey, interview, and publication research. The team ultimately concludes that the Integrated Circuits, Digital Communication/Devices, and New Energy sectors show the most potential for talent acquisition services.

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AUTHORSHIP PAGE

Han Chiem, Yuran Xue, Matthew Ford, and Viet Hung Pham all worked diligently to complete this report. While all members contributed to the overall writing for the report, certain sections were written and edited by different individuals. §1 [Introduction] was written and edited as a collaborative effort by the entire team. §2-§2.1.2 [Background, The Talent Acquisition Industry, Job Hunting in China Versus the United States, Leadership and Talent in the Digitalization Era] were written primarily by Matthew and edited by Viet Hung and Han. §2.2-§2.4 [High-Technology Manufacturing in Hangzhou, High-Technology Manufacturing Industrial Sectors, Globalization in Hangzhou] were collaboratively written and revised by Han and Viet Hung. §3-3.1 [Methods, Methods Overview] were written by Matthew and revised by Viet Hung. §3.1.1-3.1.2 [Broad-Based Industry Survey and Sample, Semi-Structured Interviews] were written by Viet Hung and revised by Matthew. §3.1.3-3.2 [Resources and Report, Methods Limitation] were written by Matthew and Han. §4 [Results and Analysis] was written and edited collaboratively by Matthew and Han. §5 [Conclusions and Recommendations] was written by Matthew and revised by Yuran. All appendices, tables, and figure items were constructed by all individuals with Yuran being primarily responsible for translations with the help of HDU team members.

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Project Description

China looks to re-establish and redefine its position in the global high-technology sectors by 2025. However, many intelligent manufacturing, software, and information systems industries face a shortage of high-level senior management and technical personnel despite the oversaturated supply of college graduates. Recent graduates lack industry experience and skill sets required to adequately fill these roles. The projected doubling of the middle class by 2025 also shifts the general consumer base. The expectations for higher-quality goods and services as well as rapid technological developments and innovations further exacerbate a problem that requires highly qualified human resources and managers. This situation provides a unique opportunity and challenge to the talent acquisition and headhunting industry.

Project Goal

To capitalize on the current state of the high-level talent market, Mingju Enterprise Management Consulting, the sponsor of this project, tasks the group with an investigation: How can headhunting companies better service potential clients in Hangzhou's high-technology manufacturing industry and which specific sector of clients should Mingju target?

For this question, the group will seek to understand which sectors show promising long-term (3-5 years) development prospects with a high demand for high-level talent. Additionally, how can the sponsor attract the desired clients proactively? This includes understanding the client's needs for certain talents and skills in each sector. Ultimately, the project goal aims to recommend approaches to expedite the growth process of Mingju by conducting a market analysis of high-profile position recruitment in its customer industries.

Methods

To accomplish these goals, the study employs a mixed-method approach. A combination of secondary research, industry surveys, and semi-structured interviews is utilized. Secondary research uses government issued indexes to analyze sector health and growth. The surveys target

Hangzhou-based high-tech companies, particularly human resource recruitment employees or managers. Semi-structured interviews are conducted with individuals who participated in the survey to gain insight into the rationale behind their survey responses. Furthermore, existing literature research will be incorporated to evaluate the consistency of the study's findings.

Methods to analyze the data from surveys include correlation and linear regression analysis. Data from secondary research is used as a reference for current sector health while interviews aid in providing deeper and more personal insights. The study acknowledges limitations that include canvassing issues, communication barriers, and possible sample inaccuracies due to convenience sampling. The predominant use of Chinese in the described methods contributes to language limitations. Some mitigation strategy used involves broadening the survey scope to increase the response rate and applying multiple rounds of cross-translation.

Findings

Findings of sector growth based on data posted on secondary sources are as follows:

- The studied sectors are growing except for biomedicine and information software sectors.
- The ordering of other sectors from most to least growth: integrated circuits, digital communication/devices, new energy, and smart home devices.
- Many government policies are implemented to support integrated circuits sector growth.
- Biomedicine has shown a sharp decline in the number of newly registered enterprises and patent applications.
- The information software sector was viewed by survey respondents with the greatest growth potential followed by biomedicine.

Findings of client need based on surveys and interviews include:

- New energy, biomedicine, and integrated circuits respondents have the greatest percentage of future willingness to utilize external executive search services. Biomedicine has a particularly high demand for technical talent— a challenge for headhunters.
- Across all sectors managerial positions have relatively higher demand when compared to director and executive positions.

- Chief Technology Officer and Chief Operating Officer show the highest overall demand from C-suite positions.
- Research and Development and Operations positions are in high demand across all sectors for director and managerial roles. Customer Service Managers are ranked second in demand for managerial roles.
- Perceived benefits of executive search firms include faster recruitment of candidates with wider social networks.
- In general, interpersonal and organizational skills are regarded as more essential than technical and analytical skills but both are important.
- Over 90% of survey respondents use online recruitment services such as LinkedIn and Liepin while executive search services are ranked the third most used method.

Recommendations

Based on the analysis of our findings, we recommend that the sponsor focus mostly on the integrated circuits sector and then the digital communication/ devices and new energy sectors. We also recommend that the sponsor recruit more manager-level roles and focus on candidates' interpersonal/organizational skills that stand out more than technical/analytical skills. Since clients look for time efficiency and extensive networks, we recommend that the sponsor advertises these factors on their website and other promotional materials. Finally, potential topics for further study include going into more depth with the surveyed topics and exploring the effects of governmental policies and globalization on executive search firms.

1. Introduction

China has been at the forefront of the manufacturing world since 2012. This explosive growth, which began from economic reform efforts in 1978, is initially reflective of China's comparative advantage as a massive and low-cost manufacturing hub (Li, 2013). When China joined the World Trade Organization in 2001, the opportunities for open international trade and foreign direct investments boosted the nation's economic growth. In 2015, China announced a 10-year national plan aptly titled "Made-in-China 2025". This plan suggested that the country was preparing to reconsider and redesign its manufacturing strategy on a national scale. A more sustainable approach was needed to tackle new challenges such as rising labor and material costs as well as increasing environmental responsibilities (Li, 2017). This development immediately gained traction as Western publishers headlined and echoed the same core premise: Chinese manufacturing was entering a new era.

The main objective of "Made-in-China 2025" is to transform the country's manufacturing industry from labor-intensive to knowledge-intensive productions. This master plan pushes to improve the quality of made-in-China products, create Chinese brands that can rival global counterparts, accelerate high-technology manufacturing, and research new materials to produce key parts and components of major products (Li, 2017). For the purpose of this paper, high-technology manufacturing will be defined as the manufacture of products that incorporate "the practical use of advanced scientific research and knowledge, especially concerning electronics and computers, and the development of new advanced machines and equipment" (Collins Dictionary, 2023). With the objectives of the "Made-in-China 2025" program outlined and the definition of high-technology manufacturing clarified, it is pertinent to exemplify these concepts at the Chinese regional level.

The Zhejiang coastal province is one of the high-technology centers of China. Hangzhou— the city of focus for the project— is the capital of Zhejiang province. In 2021, the Zhejiang Provincial Government published an urban planning project guideline called the "Implementation Plan for the Zhejiang High-Quality Development and Establishment of a Demonstration Zone for Common Prosperity (2021-2025)" (Zhejiang Provincial Department of Natural Resources, 2021). This 14th Five-Year Plan focuses on establishing balanced

high-technology development across the province. The plan emphasized its support for the construction of innovation centers, in particular, Hangzhou. The governmental report used a metaphor stating that the “construction of a modern industrial system with advanced manufacturing [is] the backbone, digital economy [is] the core, modern transportation and logistics system [is] the artery, and modern infrastructure [is] the support” towards the regions’ modern development (Zhejiang, 2023). Zhejiang holds a key role in constructing a demonstration zone to promote China’s inclusive, sustainable, and high-quality development in the new era of "Made-in-China 2025" (Ma, 2022). These aspirations heavily rely on a constant and robust source of well-educated and experienced talents (Zhao et. al., 2021).

One of the main issues faced by China, and also by Zhejiang, is the talent shortage of skilled professionals in technology fields. This problem pertains to industrial upgrading, specifically the installation and operation of smart manufacturing machines. As the market for cross-industry technology grows, so will the demand for experts in automation, engineering, and software. In the years leading up to 2020, there was a shortage of new university graduates, but the past three years have seen a drastic increase to the point of an oversaturation of new talent in China (Wübbeke, Meissner, Ives & Conrad, 2016). Emergent high-tech industry employees are almost all recent college graduates, resulting in a general lack of industry experience. This situation makes it difficult for new talent to fill high-profile roles as they have not had time to develop the proper skill sets required for these positions. This situation calls for the necessary expertise offered by external agencies and the need to outsource parts of human resource management and recruiting to companies that specialize in identifying employment gaps and providing a strategic view of talent needs in the long term. This project focuses on the role and need for these agencies and how the project sponsor can better function and build a market in this environment.

1.1 Sponsor Information and Mission

Since its inception, the mission of the project’s sponsor [see Appendix A for the mission statement] has been to assist Zhejiang-based businesses in attracting talents across the country to construct remarkable core teams of leaders and executives. The sponsor’s mission materialized into a target of helping more than a thousand enterprises gain an edge in talent acquisition. To

further its goals, the sponsor aims to become more well-versed in the economic environment as well as the methodologies employed by high-profile recruitment services.

The sponsor's organizational model—which they define through their workflow as the *cooperation process*—has been serving as the main source of its competitive advantage when it comes to providing a professional service package to its clients (See Figure 1). This process includes hunting for high-level talent and conducting occupational checks as well as a personality assessment of the talent. The initial stages of the workflow (steps 1-4) involve understanding and assessing talent needs. In order to accomplish this, a talent search program is conducted followed by providing salary matches and quotations. This phase of the process is concluded after signing agreements which include an early-stage search fee with client companies.

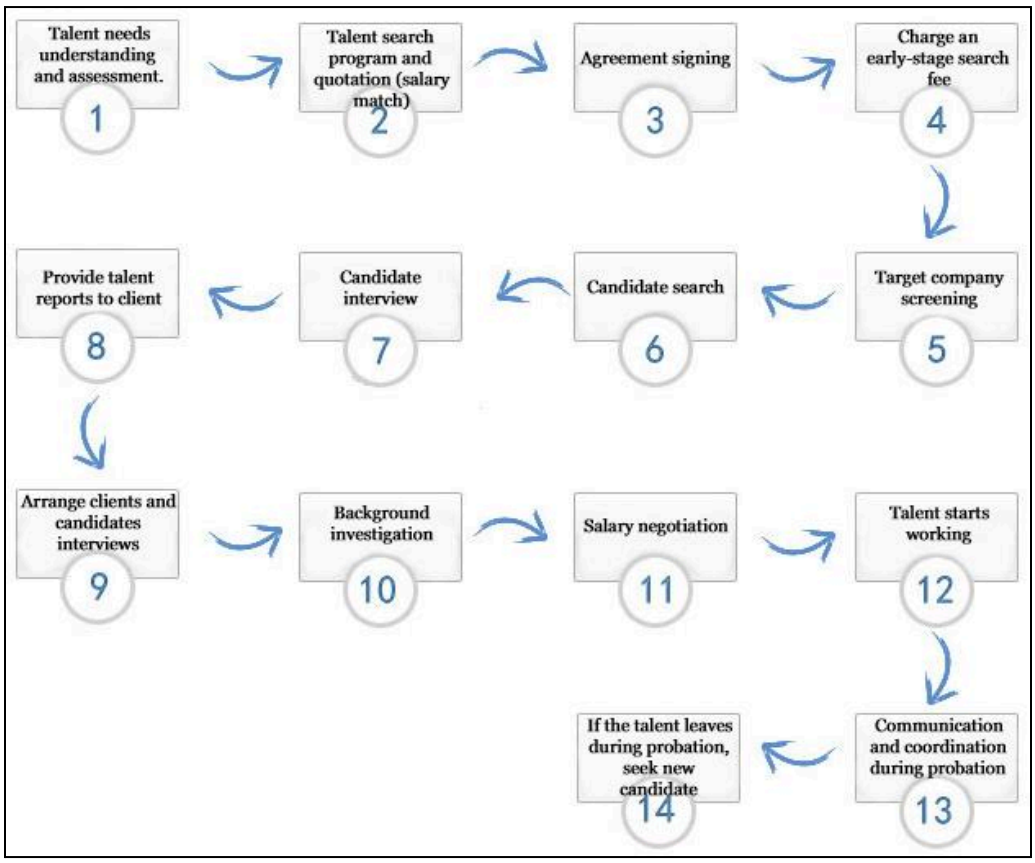

Figure 1: Current Recruitment Workflow

(Source: Translated and interpreted from mingju007.com)

The next ten steps (steps 5-14) involve screening target firms and conducting candidate searches, interviews, and background investigations to generate talent reports. The final executable stages include arranging client-candidate interviews and salary negotiation. During the probation period after the talent starts working, the sponsor enters a monitoring phase to ensure smooth onboarding. The cyclical and modular nature of the workflow allows the sponsor to provide contingencies to both parties if the talent leaves during this period.

The project's sponsor has been refining these processes to service the high-technology manufacturing industry, a major part of which revolves around finding talent from other companies and recruiting them to client companies. The key question proposed by the sponsor to facilitate its growth and survival has been stated as such: how can the sponsor specialize in certain sectors of the high-technology manufacturing industry and attract the desired clients proactively?

1.2 Project Goal and Approach

After identifying the project question or need of the sponsor, the next step was to shape the project goal. The investigation completed in this report is guided by the following research questions: 1) What are the trends of sector growth and potential opportunities for executive search services in Hangzhou's high-technology manufacturing industry? 2) What are the perspectives of potential customers from these sectors on the need for executive search firms? 3) What roles of talents and skill sets do they seek from executive search services?

Those questions help to narrow down the focus of the project to examine the sponsor's client market in specialized sectors. The project goal is to recommend approaches to better fulfill the needs of the sponsor's customers by conducting a comprehensive market analysis of the sectors. These sectors include digital communication devices, new energy, biomedicine, information software, integrated circuits, and smart home devices. To inform this goal the fluctuation of talent needs and skills in these sectors are assessed. The project goal allows for deeper investigation with more specific and detailed recommendations that can enhance or support the sponsor's pre-existing market knowledge. A detailed breakdown of the project timeline can be found in Appendix B.

The remainder of this report includes relevant background for the project that provides an overview of the talent acquisition industry, job hunting in China versus the United States, and the effects of digitalization on this industry. The report introduces information on Hangzhou high-technology manufacturing industries and how this information provides insight into the city's talent needs. The methodology section details qualitative insights from semi-structured interviews and quantitative analysis from surveys of experiences and needs of companies. Secondary research of past studies and data analysis–with specific data sets identified–will also be part of the methodology. The limitations and potential challenges anticipated to occur from the methodology will also be discussed. The result and analysis section will examine the results of the survey, interviews, and secondary research. It will include sector health and growth of the studied sectors in Hangzhou; the relative demands for talent roles in each industry and its amiability to headhunting services; the perceived practices of headhunting firms and talent recruitment demands; finally, the hiring platforms used by companies in the sectors. The final section will include the conclusion made from the analysis topics and recommendations for the sponsor.

2. Background

This section provides background information to establish the talent acquisition business environment in China. It includes information on talent acquisition at a global scale, followed by a comparison of some cultural differences between China and the United States. Next, there is information about why understanding China's more interpersonal view of employment is key to understanding the value of headhunting practices to its economy.

The importance of Hangzhou and its current development state is established, followed by further information about the key industrial zones located there. Next is a discussion of outlooks on specific high-technology manufacturing sectors in Hangzhou. Finally, a discussion of talent acquisition within the city.

These topics set the stage for the study's methodology and apprise the legitimacy of the report's results analysis as well as recommendations in its conclusion.

2.1 The Talent Acquisition Industry

Talent acquisition is defined as "strategies, tactics, and processes for identifying, recruiting, and finally retaining the human resources a company needs." (Pandey and Sarangi, 2023). These processes allow the company to find and hire qualified candidates for the available positions. Talent acquisition can be carried out internally within a company's human resource department or outsourced to a talent acquisition firm. Headhunting firms, or executive search firms, provide more specialized talent acquisition services.

The Association of Executive Search & Leadership Consultants (AESC) defines a headhunting firm as "... a company that specializes in placing highly qualified candidates in executive-level positions across the public, private, and non-profit sectors." (Association of Executive Search & Leadership Consultants, 2023a). These firms must have extensive industry knowledge while recognizing their client's specific needs to select highly suitable candidates.

As with typical talent acquisition companies, headhunting companies must be knowledgeable of industry trends and adapt to rapidly changing job markets. For example, this year's global trend report by Korn Ferry cited company culture, short-term hires, and

bounce-back hiring as client companies' top concerns and preferences (Korn Ferry, 2023). Last year, Korn Ferry listed issues such as diversity and inclusion, career nomadism, and mass resignations among the top concerns for the industry (Korn Ferry, 2021). The difference in trends from one year to the next as highlighted by these articles shows how essential it is for a talent acquisition company to stay relevant. Headhunting firms tend to have areas of specialization. They can appeal to their clients by showing expertise in a specific industry, geographical region, or job position. (Association of Executive Search & Leadership Consultants, 2023b)

There are many reasons why a company might seek a talent acquisition firm instead of handling a hiring process internally. One reason is that the current company employees do not have the proper skill set to handle the hiring process. This could manifest in a couple of ways: (1) It is a younger company that does not have many experienced professionals; (2) A company could be starting a new department and have no in-house expertise on the subject; Or, (3) a company could have a smaller or non-existent human resources (HR) department that does not have the bandwidth for the hiring process.

A common reason for a company to hire a talent acquisition firm is for its connection to a diverse pool of candidates (Tarique, 2021). Since highly qualified candidates may be employed or passive, networks and personal relations play an intricate role in persuading potential applicants. Headhunting companies provide shorter and more relevant candidate lists through a screening and selection process. Headhunters are able to discern skill sets and qualifications of the individual (Tarique, 2021).

There are two main questions that should be asked to assess the demand in a given sector for a talent acquisition firm. The first question focuses on the need for talent acquisition firm services—Are companies in the industry going to be hiring new employees soon? If there are not going to be any new hires in the near future, then there is no need for a talent acquisition firm. The second question considers the future of the sector and its needs—Is the sector growing? If a sector is expanding, then there is an essential need for new talent in the industry.

2.1.1 Job Hunting in China versus the United States

The economic and competitive environment for a company is just as important as its customers or their needs. In order to provide specific and relevant recommendations from this project, understanding China culture, industry trends, and general environment surrounding employment in China is necessary. Some members of the project as well as professionals who may benefit from its results live and work in the United States (US). Understanding employment cultures in the US and China will help to ensure many aspects of both are considered for project recommendations. The US trends and practices may also inform China trends and practices.

The first and most major employment practices difference between the US and China is how the employee is viewed. Employment in the US is viewed as an "impersonal, rational economic exchange" whereas "Chinese employment relations remain more fully embedded in the wider socio-cultural system of which reciprocity is a vital and integral part" (Westwood, Chan, and Linstead, 2004; Fan, Z. et. al., 2019). This difference has a large effect on the job-hunting process. Both views place the heaviest weight on individual qualifications in candidate searches. The difference lies in the Chinese viewpoint, where there is additional consideration for "reciprocity," or whether the client and company can provide for each other as opposed to a one-way relationship. Every job listing has the goal of finding the right candidate for the job, but the reality of the job market is that there are always some cases where candidates are favored for things other than their qualifications. This is a phenomenon that most professionals have a negative view on, but the Chinese culture surrounding reciprocity exacerbates the issue. Studies have shown that Chinese professionals tend to view this phenomenon much more negatively than American professionals (Liu et. al., 2014; Peltokorpi, 2023). This situation exemplifies one difference in the hiring practices of the two countries.

The Chinese job market trends show significant growth over recent years. Another difference between China and US job markets that relates to the headhunting industry is in younger generation employees. Over the past eight years, there has been a significant increase in STEM [Science, Technology, Engineering, and Math] interest among high-school students in China (Bao, L., et. al., 2023). This increase in STEM-field interest is largely a result of politics shifting from a collaborative to a more competitive mindset when it comes to innovation (see

Figure 2 for trends in STEM bachelor's degree awards by year). One question that arises with this trend is whether or not the growth of the industry will provide enough jobs at the same growth rate. This question is important but ultimately minute in terms of its effects on headhunting, as either way there will still be a much larger pool of potential talent to sift through.

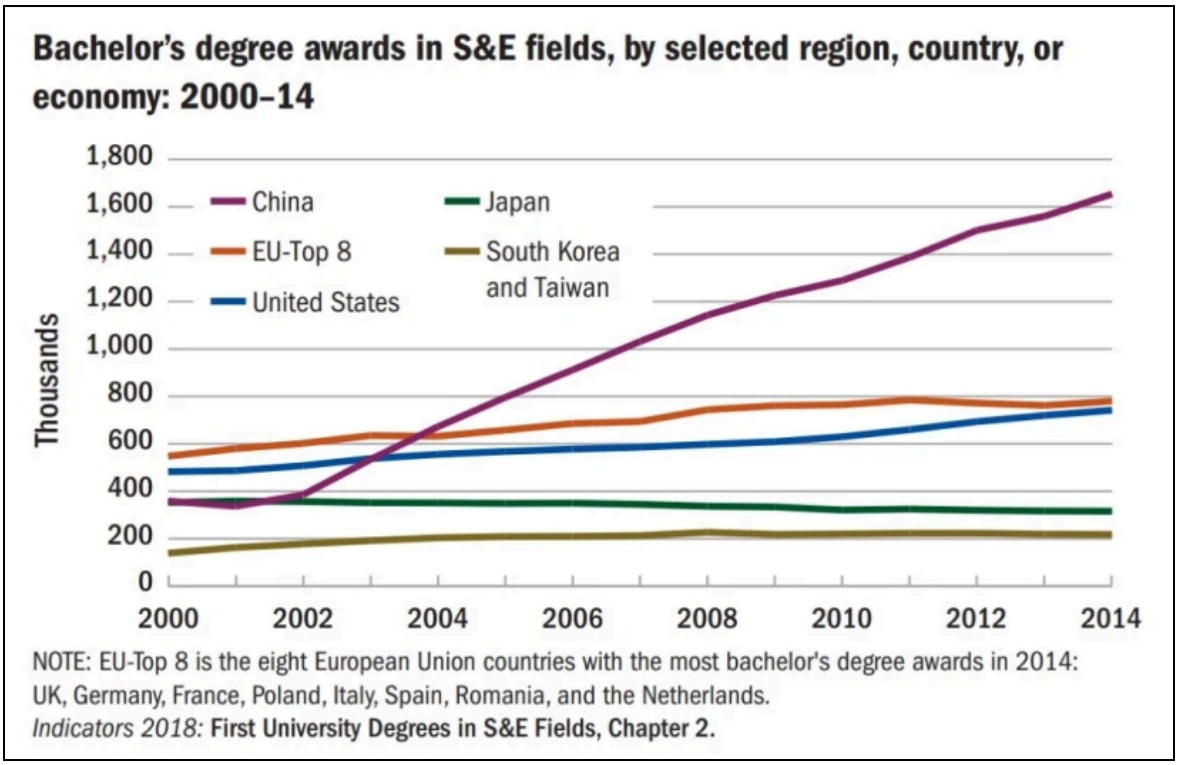

Figure 2: Bachelor's Degree Awards per Year

"Bachelor's degree awards in Science and Engineering (S&E) fields, by selected region, country, or economy: 2000-14". China is shown as quickly overtaking and ultimately exceeding the United States and other important regions in terms of S&E Bachelor Degrees awarded by year (Source: Wolfe, 2018).

The third major difference between employment culture in China versus the United States lies in the approaches taken to hiring in the two countries. The Western model of employment assumes a base level of general experience in employees when it comes to universal employment skills (Cooke et. al., 2021). One of these skills is knowing how to hire staff for their department, everything from initial job posting to interviews and candidate screening. The assumption that every employee will have this skill set comes from a Western perspective, and becomes much less true in China. The Chinese business model relies on human resources professionals for tasks such as hiring, and it is very rare for a manager to handle the entire hiring process for an open position (Fey, 2003). This results in the trend that most middle-managers do not have much (or

any) experience with hiring, reducing the internal hiring capabilities of smaller companies without fully furnished human resources departments (China Centric Associates, 2023).

2.1.2 Leadership and Talent in the Digitalization Era

Digitalization has been described as "the phenomenon of transforming analogue data into digital language (i.e. digitization), which, in turn, can improve business relationships between customer and companies, bringing added value to the whole economy and society" (Reis et al., 2020). The following section will relate the effects of digitalization on business leaders, customers, and workplaces in the context of executive search firms. Gaining insights into this trend and its immense influence on mature executive search markets globally enhances understanding of its potential impact on a less mature market like China (Storm et al., 2023). The data collected in this study may reflect the relevance of these trends in Hangzhou.

The era of digitalization has spread globally for businesses to gain competitive advantages. As stated by (Weill et al., 2021), "large enterprises with digitally savvy executive teams outperformed comparable companies without such teams by more than 48% based on revenue growth and valuation." A study of companies listed in China has also shown that upper management with technological understanding has a positive impact on enterprise digital transformation (Peng & Jia, 2023). However, there is a disconnect between rapid technical advancements and leaders who can incorporate these changes into their business strategies.

Only around 17% of individual top management members and 7% of executive teams are technically adept (Weill et al., 2021). Companies can gain a competitive advantage by training, replacing, or adding leaders to address this issue quickly. Given the dynamic pressures for information technology and technical expertise, firms have been appointing CIOs to top management teams (Bendig et al., 2022). This situation has caused greater interest in CIOs. There has also been increased demand for Chief Digital Officers (CDO) (Kunisch et al., 2020). These examples show that firms are looking to hire more technologically adept leaders in their top management teams to adapt to competitive pressures.

Executive positions such as Chief Digital Officers (CDO), Chief Data Officers (CDO), Chief Technical Officers (CTO), and CIOs are more likely to integrate technical advancement

within the management team and in business strategies (Ojimadu, 2022; Weill et al., 2021). In addition, CEOs with technological understanding have the greatest effect on firms (Weill et al., 2021). Therefore, given strategic technological developments especially in high-technology industries—a focus of this study—executive search firms are more likely to see increased demands in leadership positions such as CIOs, CTOs, and CDOs.

Digitalization changes how companies interact with their customers. The increased accessibility of information plays a crucial role in company reputation as customer reviews and recommendations are widespread (Bankewitz et al., 2016). Companies to maintain competitiveness need to uphold their reputation and improve customer satisfaction. (Harvey et al., 2018). Companies can further cater to their customers by adopting servitization or by integrating their products with service solutions. For example, high-technology manufacturing companies may customize or offer repair services to accommodate higher-quality products (Quintel & Papst, 2021). This change would require additional operational flexibility, resulting in the need for talents to capture a broader and more complex scale of operations.

COVID-19 caused manufacturers to incorporate digitalization to improve production. In addition, the pandemic motivated companies to focus on risk mitigation strategies (Rapaccini et al., 2020). Developing clear risk mitigation strategies benefits the organization and builds its customer trust. For example, manufacturers mitigate supply chain risks by widening their networks of suppliers. They also prepare managers to be more resilient to change and promote fast decision-making in times of crisis (Quintel & Papst, 2021; Rapaccini et al., 2020; Remko, 2020). In another example, increased data storage and analytics puts a company at risk of cyber attacks. There has been a 2,000% year-over-year surge in cyberattacks on operational technology (OT) in the year 2021 (Quintel & Papst, 2021). Supply chain and operations resilience was especially pertinent post-COVID-19 (Frederico et. al., 2023). As a result, demands for operational and customer service managers and executives may be more prevalent in executive search. Demand for operational and customer service managers and executives are also likely more prevalent in executive search.

Digitalization changes the workplace. In the context of executives, (Weill et al., 2021) state that " [Digitally savvy top teams] have moved away from the command-and-control leadership model to a coach-and-communicate approach." Communication in teams for

problem-solving requires interpersonal and teamwork skills. Additionally, online communication platforms have made remote working more prevalent (Battisti et al., 2022). The lack of in-person interactions poses a challenge to managers as team dynamics change and the quality of communication decreases. Both interpersonal skills (in managing a nontraditional workplace) and technical skills (in utilizing collaboration platforms) are important in this context (Gilson et al., 2023).

Although executive search firms can find potential opportunities in the changing need for talents and their skill sets as mentioned above. Digitalization can also pose a threat to talent acquisition services. Internal company recruiters are increasingly more reliant on using hiring platforms for their time efficiency, low cost, and wide networks as compared to talent acquisition firms (Wadhawan & Gupta, 2020; Harvey et al., 2018).

2.2 High-Technology Manufacturing in Hangzhou

The study focuses on Hangzhou, a city that balances tradition and modernization. The city is prized for its history and culture, once serving as the center of the Song Dynasty. In contrast to its cultural significance, the city is acclaimed as a major economic and industrial center of modern-day China. Hangzhou's highly developed railway networks allow it to be an export base for many operations across east-central China (Britannica, 2023). The city is home to thousands of high-technology companies, including giants like Alibaba and Geely. The concentration of industry in Hangzhou allows it to serve as a representative sample of the Zhejiang industrial sector and by proxy the entire Chinese high-technology industry.

Despite its enduring history, Hangzhou continues to hurtle forward at an astounding pace. The city's year-on-year GDP growth rate surpassed China's national average by 1.4 percent within the first half of 2023, and investment in the high-technology industry grew by 42.3 percent in the past year (Hangzhou, 2023a). In the citywide 3-Year Plan released in March, Hangzhou announced its push to incorporate digitization into all of its manufacturing industries. This allows for greater efficiency, accuracy, reduced cost, and benefits towards R&D and manufacturing processes (Hangzhou, 2023b). The city's drive to decrease inefficiencies by developing new processes has attracted a lot of attention from foreign companies and investors.

Overall, governmental support, digitalization, and increased foreign investments are factors that build Hangzhou's favorable business environment (Yin et al., 2022).

Many governmental decisions have been made as part of the Chinese government's strategic initiative to excel in the high-technology industry. One of these decisions was to establish High-Tech Zones to promote innovation on a national scale. Though there are many of these zones across China (173 as of 2022), the vast majority of them are not recognized by the state (Zhang Zhihao, 2022). Recognition by the state highly benefits companies established within them with preferential regulation policies and simplified administration. This section highlights two main development zones in Hangzhou as examples of the city's growth in specific sectors.

One state-recognized zone is the Hangzhou Hi-Tech Industry Development Zone (HHTZ), established in 1990. This zone was then integrated with the Binjiang district of Zhangzhou in 2002. The new designated area, known as HHTZ (Binjiang), is generally regarded as the incubator for new and innovative technology companies. It contains a technology hub and a science park. The HHTZ (Binjiang) has five main industries: information technology, biomedicine, new energy, green energy, and digital communication. The information technology industry has six key subfields: communication devices, information software, the internet, cybersecurity, e-commerce, and integrated circuits (HHTZ, 2023). The HHTZ (Binjiang) was home to 2257 high-technology enterprises as of March 2023, as reported by the Binjiang governing body (Binjiang WeChat, 2023).

While the Hangzhou Hi-Tech Industry Development Zone (Binjiang) is known for its long-term establishment, the Hangzhou Future Sci-Tech City represents the momentum to welcome a "future city" to Hangzhou. The development zone, established in 2011, is located in the western Yuhang District. By 2021, it became one of four future science and technology cities approved by the Organization Department of the Chinese Communist Party and the State-owned Assets Supervision and Administration Commission of the State Council. Driven by the concept of industrial and urban integration, the future city focuses on the continuous improvement of basic supporting facilities, a modern transportation system, and a center for medical treatment. By creating an enticing location for residents and innovation, the development zone inevitably attracts and retains talent with high education and entrepreneurial interests (Liang et al., 2021).

This in turn allows the future city to continue its efforts to build an industrial ecosystem with future industries and new enterprises in Yuhang (Hangzhou, 2023c).

The Hangzhou Future Sci-Tech City's current 3 to 5-year plan encourages the growth of the following industries: networks, medical care, high-end equipment, Internet of Things, artificial intelligence, green energy, and new materials (Hangzhou, 2023d). The development zone has ranked first in the country for the highest net influx of overseas talent and is "one of the areas with the highest concentration of overseas talent entrepreneurship in the province" (Zhejiang Provincial Development and Reform Commission, 2022). Development zones with favorable governmental policies and programs allowed the cost of doing business to decrease. Therefore, many young companies will emerge and the increased demand for talent will increase opportunities for the talent acquisition service industry.

2.3 High-Technology Manufacturing Industrial Sectors

Dividing enterprises in a given land-area into sectors is how the Chinese government classifies and categorizes its industries. Data is published about the health and growth of each sector on a monthly basis, an invaluable resource for this project. An example of the data posted is the growth rate of high-technology equipment manufacturing, cited as 9.2 percent in 2023 (Hangzhou, 2023a). This statistic is a good indicator that high-technology manufacturing as a whole is growing, as this equipment is mainly used in the manufacture of high-technology products. The following sections will detail project sponsor sectors of interest. Ultimately, each sector will be evaluated in this project. The sectors will include consumer technology, digital communication/devices, new energy, biomedicine, information software, integrated circuits, and smart home devices.

2.3.1 Consumer Technology

Consumer technology refers to any product to be used directly by a retail consumer. This includes a very broad range of products and sub-sectors that are all intended to be released to the public and are thus closer to an umbrella sector. Due to the broad and diverse sub-sectors under consumer technology, an overall growth rate is hard to formulate. Instead, this project will use reference sub-sectors to indicate the health of consumer technology as a whole. Factoring in the

steady growth of the sector as well as the large number of potential interview/survey candidates, consumer technology is an excellent umbrella sector for research in this project.

2.3.2 Digital Communication/Devices

Digital communication is a major driving force behind Hangzhou's digital economy. During and after the COVID-19 pandemic, there was a significant increase in digital communication through the exchange of information and data using electronic devices and networks. Hangzhou is a national leader in network communication technology and is home to many digital communication enterprises such as New H3C Group and Eastcom (Hangzhou, 2020a). Data from the Hangzhou Municipal Government also show that in the first quarter of 2021, the main industries in Hangzhou's digital economy combined to a total added value of 112 billion yuan. This added value accounted for 26.7 percent of GDP, an increase of 28.1 percent from the previous year. The city continues to modernize its infrastructure through the digital transformation of manufacturing capacity. Hangzhou is responsible for about 70 percent of digital transformation service capabilities for Zhejiang provided by more than 400 digital service organizations (Hangzhou Municipal Government, 2021). As an intermediary industry for the development of other high-technology manufacturing industries, digital communication and devices will be included in this study.

2.3.3 New Energy

With the rapid advancement in the digital economy and integration of digitalized systems into manufacturing companies, energy consumption is substantially increasing. The push for environmentally sustainable sources of this new energy is equally as prevalent. Efforts for green energy development and conservation can be seen with the growth of new energy sectors and the promotion of green data centers in Hangzhou. This increased emphasis on new (green or alternative) energy is reflected in the annual growth rate of 27.6 percent for the sector (Hangzhou, 2023a). Examples of green technology developed in Hangzhou include biological purification technology, atmospheric treatment, water treatment, hydropower equipment, LED, and new energy (He et al., 2022). New energy includes wind power, photovoltaic power, photo-thermal power, and biomass power. As reported in 2021, Hangzhou’s main source of new

energy is photovoltaic and biomass power (Hangzhou, 2021a). The city generated a reported 2.98 billion kilowatt-hours from new energy plants in 2020 alone, coming second to thermal power in reducing 2.98 million tons of carbon dioxide emissions (Hangzhou, 2021a). The push for environmental sustainability will continue to demand more resources and innovation in clean energy, propelling the photovoltaic, power battery, and new-energy vehicle (NEV) industries into further growth (Hangzhou, 2023e). This current and sustained growth in the New Energy sector makes it a prime target for this project's study.

2.3.4 Biomedicine

The biomedicine industry involves the application of biology and technology to develop products for medical diagnosis and treatment. Hangzhou has been promoting the biomedical field and has secured a significant amount of investment towards that goal. Investment rates have gone up by 48.9 percent within the last year in the sector (Hangzhou, 2023a). The Qiantang District, partly encompassed by the HHTZ (Binjiang), is home to more than 1500 biopharmaceutical companies, both foreign and domestic. These companies include seven of the top ten pharmaceutical companies in the world, such as AstraZeneca China, Thermo Fisher Scientific, and Pfizer (Hangzhou F, 2023).

All of these characteristics indicate that biomedicine is a growing and relevant sector in Hangzhou, but despite this growth, it has its own issues. This is due to how recently the emphasis on the sector started, which resulted in a heavier emphasis on research and development as opposed to manufacturing (Zhejiang Provincial Department of Natural Resources, 2021).

2.3.5 Information Software

According to the Hangzhou Municipal Bureau of Economy and Information Technology, Hangzhou's software industry experienced a 13.8 percent year-on-year growth from January to September 2020 as it generated 416.69 billion yuan in revenue. Comparatively, this enormous figure illustrates the maturity of the software industry compared to the other sectors mentioned in the section. This is largely due to the fact that renowned brands such as Alibaba, Hikvision, and NetEase are in this industry (Hangzhou, 2020b). Alibaba Cloud Computing, in particular, has served 900 million Chinese people and 4 million international businesses. The maturity gap in

domestic software products including operating systems, databases, and office software has been narrowed significantly.

2.3.6 Integrated Circuits

The integrated circuits sector lays the electric components and hardware foundation for Hangzhou's digital economy. This industrial sector is designated as one of the nine hallmark industrial chains by the 14th Five-Year Plan. By the end of 2025, the integrated circuits sector in Hangzhou is projected to grow at an annual growth rate of 20 percent and amount to between 80 to 100 billion yuan. The city guidelines to promote the high-quality development and growth stimulation of the industry contain 14 measures including subsidies and introducing various financing methods to corporate giants that have large expenditures in Research and Development (R&D) of key materials (Hangzhou, 2022a). Based on a report released by Zhaopin— one of China's leading online recruitment platforms— the number of positions recruited in integrated circuits has increased 29.5 percent. Despite the rapid growth of the industry as a whole and the resulting demand for talent, there still exists a talent gap. This talent gap may be due to high technical barriers, requiring a deep research background in physics, chemistry, and mathematics (Hangzhou, 2022b). This unique dilemma provides for an extremely promising prospective sector as an investigation subject for the project.

2.3.7 Smart Home Devices

The smart home devices sector falls under consumer technology and is among the top sectors in Hangzhou. The smart home devices industry is the research, development, and manufacturing of intelligent appliances in every compartment of a home ranging from speakers to integrated temperature control and automated kitchen. According to Jianfeng Zhang, deputy secretary-general of the China Household Electrical Appliances Association, the demand for smart home devices among Chinese consumers is increasing with the technology's iteration and upgrade of product functionalities. In order to spur further spending on smart home devices, the Ministry of Commerce and twelve other departments issued a notice in July, 2023 announcing support for enterprises to continue implementation of Internet of Things (IoT), cloud computing, and Artificial Intelligence (AI) to accelerate the R&D of smart home appliances, security

facilities, lightning, audio, and entertainment products and solutions (Fan, 2023). Overall, the sector boasts an average growth rate of nearly 20 percent between 2016 and 2021 (Hangzhou, 2023b). Despite being a comparatively small and niche sector, smart home devices as an emerging industry remains a candidate to be investigated further.

2.4 Globalization in Hangzhou

Recent globalization trends can be observed for talent acquisition in the Hangzhou, Zhejiang area. As a result, this section will further explain how talent skill sets evolved along with the current progression. Panels such as “Talent-driven Economic Development for Common Prosperity" and “Building a Global City for Talent Acquisition" held in the past few years highlight the growing need to attract, develop, and retain educated and experienced talent (Ma, 2022). Competitions such as “Sprint Forward in Golden Boots", an innovation and entrepreneurial competition held in Hangzhou, are successful in gaining traction from both national and international talents namely Beijing, Shenzhen, the United States, and Europe (Li, 2022). Hangzhou is one of seven major cities in China to be the location of choice for returning overseas talents. From 2011 to 2016, Hangzhou received 5.94% of all talent flow to China (Jiang et al., 2020). Overseas talents seeking to work in China and companies seeking overseas talents can both benefit from the connections provided by talent acquisition services.

A collaborative study, conducted by the University of Salford and Leeds Metropolitan University in the United Kingdom in 2010, revealed a “strong need for people who can operate in the complex international economy, requiring high levels of abstraction,...business cultural awareness and communication skills” as Hangzhou’s organizations struggle to meet fluctuating global demands (Cooke et. al., 2019). A case study on Hangzhou corporate investment also revealed, “in 2020, Hangzhou utilized foreign capital worth USD 7.2 billion, accounting for 45.6% of the growth in the province, which is 13% higher than the national average growth rate” (Yin et al., 2022).

The increased presence of international companies points to a strong inclination for globalization in a professional setting in Hangzhou. An employee with global experience will be more likely to understand international trade theories, better identify emerging clients, markets, and resource supplies, and possess the language fluency necessary for international

communication. Overall, talent acquisition needs in Hangzhou are trending towards employees with the mindset to pursue “boundaryless” cross-organization, function, and national boundaries careers.

3. Methods

The research question established in §1.2 Project Goal and Approach states:

How can headhunting companies better service their clients in the Hangzhou high-technology manufacturing industry?

In order to address this question, factors that contribute to headhunting services must first be examined. Some factors influence satisfaction more than others. This report aims to explore the factors that have the most impact in the hopes of providing valuable recommendations to firms in the area.

3.1 Methods Overview

The first step in answering the research question was establishing what factors hold the most influence over client satisfaction with headhunting services. A universal factor that affects all industries is competition. Most companies do not stand alone in their market, and headhunting is no exception. One common way of differentiating a company from its competitors is specialization (Feldman et al., 1997; Gupta et al., 2013). If a company can find a niche with a lower saturation, they effectively reduce the number of alternative companies that clients can choose from and secure a more stable revenue stream. The success of a company that chooses to specialize is not guaranteed, but there are certain metrics that can help predict the outcome. This report will examine the amiability that specific sectors have to headhunting firms as well as their general growth trends and long-term prospects. Information on the overall health of an industry as well as headhunting firms servicing it can be found on census and index charts posted by Chinese regional governments and authorities. This is the main product of the secondary research conducted for this project. This information will be used to identify target sectors for the project sponsor to specialize in to support their strategic direction.

The second major factor that this report will examine is what the sponsor's client needs. This overarching factor has a number of key components— pre-existing gaps in hiring that headhunting firms can fill; qualities a client looks for in a candidate; and preexisting notions a client may have about headhunting firms. These factors to be examined do not have data readily

available from any secondary source. Instead, this information must be gathered by the project team. In order to most efficiently and comprehensively gather the required data, a mixed method of interviewing and surveying is used.

The surveys aim to gather general information from a much larger population of companies in the relevant industries while the interviews dig deeper into the reasoning behind certain notions and decisions a specific company has made. This mixed method was chosen to attain detailed insights into the specific motivations behind different various general sample responses in the surveys. The methods provide complementary insights.

3.1.1 Broad-Based Industry Survey and Sample

An industry survey helps to gather representative data from the sample population about success and client preferences for a headhunting company (as discussed in §4.2 Client Needs). The survey questions have been designed with these factors in mind [see Appendix C for the English copy of the survey].

The demographics section (Questions 1-8 of the survey instrument) collects respondent information for evaluation across various demographic characteristics of the respondents. Demographic information includes company revenue, employee count (company size), and respondent experience and role in the company. Additionally, this section asks about respondent opinion on industry prospects.

The Executive Talent Needs section (Questions 9-12) focuses on the relative demand for different top management positions in the respondent's industry. Each question concerns the perceived demand for specific positions at three different management levels, middle-management, director level, and finally C-Suite level (for example CEO, CTO). Although roles vary amongst organizations' operational structures, the most common middle- and director-level positions were selected. An example structure for these questions, which are answered with Likert-type scales, is as follows: On a scale of 1 (Very Low Demand) to 5 (Very High Demand), how much demand is there for C-Level positions in your industry?

The next survey section titled Talent Acquisition Challenges gets respondent perceptions on new talent recruitment challenges faced by the respondent's organization. The Talent

Acquisition Strategy section focuses on perceived gaps in internal recruitment capabilities and perceptions on headhunting companies.

Respondent opinion on headhunting firms and whether or not they have used them before appear next in the survey instrument (Questions 14-16). There is also a section on important behavioral, analytical, and job-specific skill sets sought out by respondent companies. Additionally, platforms that the company uses to find talent and recruitment companies are also sought. The final section of the survey asks about any additional respondent information they are willing to share that was not captured in the survey instrument. The final section also asks respondents if they would like to participate in a follow-up in-depth interview.

We sought a specific target demographic sample for respondents based on sponsor sector market preferences. The first constraint is that the sample should include only Zhejiang-based companies that are in the high-technology industry. Additionally, the respondent must have enough knowledge of high-level recruiting in their company to answer the questions accurately. Positions in a company that are likely to have this knowledge include human resources professionals as well as high level managers themselves.

A convenience sample of candidates that fit these criteria is used. Sample populations are from professional alumni groups maintained by business professors at Hangzhou Dianzi University (HDU) as well as a list of high technology companies in Hangzhou generated via internet search.

The survey is distributed online using *WenJuanXing* software and analyzed using analytical programs such as Microsoft Excel and SPSS. The analysis involves examining the mean scores from the Likert-type scale answers for each sector separately, and as an overall sample population. Correlations are determined and investigated to determine potential relationships between various factors. Standard deviation descriptive statistics provide respondent level of agreement or disagreement on various questions. Linear regression analysis is conducted to consider a multivariate functional relationship between variables.

3.1.2 Semi-structured Interviews

The second research method employed to identify project findings and recommendations uses semi-structured interviews. The survey aims to provide insights from a large representative population, and the nature of a survey dictates that the data generated from it will be general with less depth (Fowler, 2008). The main goal of the interviews is to establish underlying reasoning and motivations behind specific survey responses and provide context for analysis. In order to facilitate this process, the interviews will follow the same general structure as the survey. In addition, survey responses from the interviewees are examined and points for elaboration will be prepared ahead of time. See Appendices D and E for the preamble and questions used in the interviews.

The nature of the subject matter and range of topics that are explored make it likely that any single interviewee may be more knowledgeable in some areas and less in others. In order to accommodate for this variance in expertise, the interviews will have a semi-structured nature that allows for follow-up questions and removal of others. This approach allows for each interview to produce the most relevant and informed results based on the knowledge of the interviewee.

The interviews are conducted in Mandarin, as that is the native language of the vast majority of potential interviewees. Machine learning tools such as *DeepL* will be used in concert with interpreters to translate and transcribe the interviews into English for content analysis. While necessary for the project, this approach includes information possibly being lost or misinterpreted in translation. In order to mitigate the chance of difficulties, multiple rounds of translation and back-translation are conducted to increase the chances that an accurate interpretation of the results occurs. One of the student project team members is fluent in Mandarin.

Interviews provide context for the surveys. The analysis of the interviews will involve comparing them to the relevant survey results and drawing conclusions as to the motivations behind each answer. This will help to support and provide context to the correlation analysis of the survey results.

3.1.3 Resources and Reports

There are many areas in which secondary research will be required for this project. The vast majority of this will be sourced from resources and reports within online databases (some of these results and references already appear in section 2). The National Bureau of Statistics of China (NBSC) publishes monthly reports of sector-specific health and growth as well as many summary details of the statistics used to determine this information (NBSC, 2023).

The information is organized by geographic region, therefore collecting Hangzhou-specific information is feasible. One relevant index published by the NBSC is the Purchasing Managers Index— a monthly summary of supply chain information collected and used by the Chinese government to quantify manufacturing sector growth. Figure 4 shows an example of summary statistics published, in this case, the gross profits of sectors over time.

Utilizing government generated indexes and statistics, this project analyzes the differences between major manufacturing sectors. This would be very impractical to do with primary research, as a theoretical saturation would have to be reached for every sector examined. This would require hundreds of responses and ultimately not be feasible. Where the sector-wide data fails to be useful, however, is in the nuance of a specific sector's needs. This is what the project wishes to answer through primary research.

Figure 3: Example Sector Growth Data

(National Bureau of Statistics of China, translated) Monthly Profit Growth Rate (%) for the Manufacturing of: Pharmaceuticals, General Equipment, Special Purpose Equipment, Electrical Machinery and Equipment, Computer, Communication and Other Electronic Equipment, Instrumentation and Gauges (National Bureau of Statistics, 2023).

The other aspect of the project's analysis that will be assisted through outside research lies in previous studies conducted on the high-technology manufacturing and talent acquisition industries. Some information from local Hangzhou documents are also used. Best practices for talent acquisition firms as well as specific needs of certain manufacturing sectors have been studied extensively in the past. These studies (see Works Cited) are used as reference material for analyzing the survey and interview data as well as ultimately generating recommendations at the end of this project.

3.2 Methods Limitations

The methods proposed for this project were chosen in order to have a methodology that is as robust and cohesive as possible. Nonetheless, limitations exist for any methodology, no matter how comprehensive. The limitations identified with this project can be summarized into three main points: Canvassing issues, communication barriers, and sample accuracy. Notably time constraints are also a relevant issue, as this project will be conducted within the span of eight weeks [see Appendix B].

The first and potentially most impactful limitation in the methodology lies in the selection of primary research candidates. The nature of the project demands a narrow scope of target sectors for analysis, which results in a smaller pool of potential respondents. The research question is limited to the geographical region of Hangzhou, and generalizability to other cities, regions, and nations is limited.

There is a high likelihood that there will be a low turnover rate of responses and agreements (estimated at around 5%). It is for these reasons that it may prove difficult to secure interviews or survey responses with many companies that fit the desired growth rate, annual revenue, and employee numbers for this project. In order to mitigate this risk, the survey scope is widened to companies of any relative size and employee count. This expansion facilitates a much higher response number, although the percentage may not drastically increase. Additionally, a question in the survey will ask for company size so that the data may be analyzed by this metric if necessary.

The actual response rate for the survey was 8.53% from a convenient sampling pool of an estimated 914 individuals distributed where 78 responses were collected. Out of these 78 responses, 5 agreed to a follow-up interview. This figure is slightly higher than the anticipated 5%. Due to it being a convenient sample of contacts provided by a human resources professor currently working at HDU, there will be sampling bias. Almost 78% of companies represented in the survey have used headhunting and 74% of all respondents across the studied industry answered “yes” to whether they are open to using headhunting (again) in the future. This shows that the respondents are more likely to have more positive affinity towards headhunting in general.

The second limitation of this project is the language barrier. The regional dialect of Hangzhou is Mandarin, thus the vast majority of businesses in the zones use Mandarin as their primary form of communication. Many employees of companies in the region are bilingual and speak English as well, but most are unable to effectively use English to communicate technical and business-oriented ideas. This lack of fluency means that in order to generate this English-written report, some form of translation will be necessary. Due to the nature of in-person technical interviews, every effort will be made to have at least one fluent speaker of Mandarin

conducting them. This structure minimizes the impact of the qualitative data being misinterpreted.

The interviews are put through translation in the analysis phase of the project to mitigate this translation issue. Multiple rounds of scrutiny will be implemented to minimize the possibility of mistranslation. The surveys will be available in both Mandarin and English and will have the same format and questions throughout. Any data generated from the surveys will be analyzed in English.

The final challenge posed by the chosen methodology is the chance of sample inaccuracy. The circumstances of the project dictate that a convenience sample must be used for both the survey and the interviews (Fowler, 2008). This method brings with it a higher chance of bias and misrepresentation in the sample population. This is an unavoidable occurrence and thus will be acknowledged in the results section as such.

4. Results and Analysis

This section examines the results and some analysis of the survey, interviews, and secondary research. Relevant sections of data from all three sources are grouped together and examined at once to answer a specific dimension of the research questions. The first section examines sectors in Hangzhou, their overall health, the relative demands for specific roles in their industry, as well as their amiability to headhunting services overall. The next section explores the best practices employed by headhunting firms in the industry as well as what can be done to set them apart from others. The final section looks at different hiring platforms used by companies in the industry and trends between sectors.

4.1 Sector Analysis

This first section of the results section examines data acquired through our methods and related to sector growth and health as well as their needs for executive search firms. This evaluation includes information on past growth rates and confidence scores for each sector. Next, the demand for the hiring of different positions is examined. Finally, this section assesses the amiability of each sector to future use of executive search firms. The purpose of this section is to provide insights to our sponsor on potential markets and opportunities.

4.1.1 Sector Growth

The size and health of any particular market are complicated and ever-evolving attributes. To evaluate sector health various metrics can be used. This report uses data from *Forward the Economist*, a Chinese organization that publishes articles and analyses on different sectors and trends in Chinese and global markets (Forward the Economist, 2023a-c). The main metrics that will be analyzed to quantify sector growth will be revenue, patents, growth rate, company count, production, and policies.

Digital Communication/Devices

Digital communication/devices is the first sector whose growth trend is examined. Figure 4 displays 2022 growth rates for relevant Hangzhou region digital communication/devices

sub-sectors— these sectors include cloud computing, big data, internet of things, and data centers. Each sub-sector has a positive growth rate, led by the cloud computing sub-sector at 120%. This coupled with the 4.27 out of 5 confidence score for the future of the sector indicates a good future for the industry.

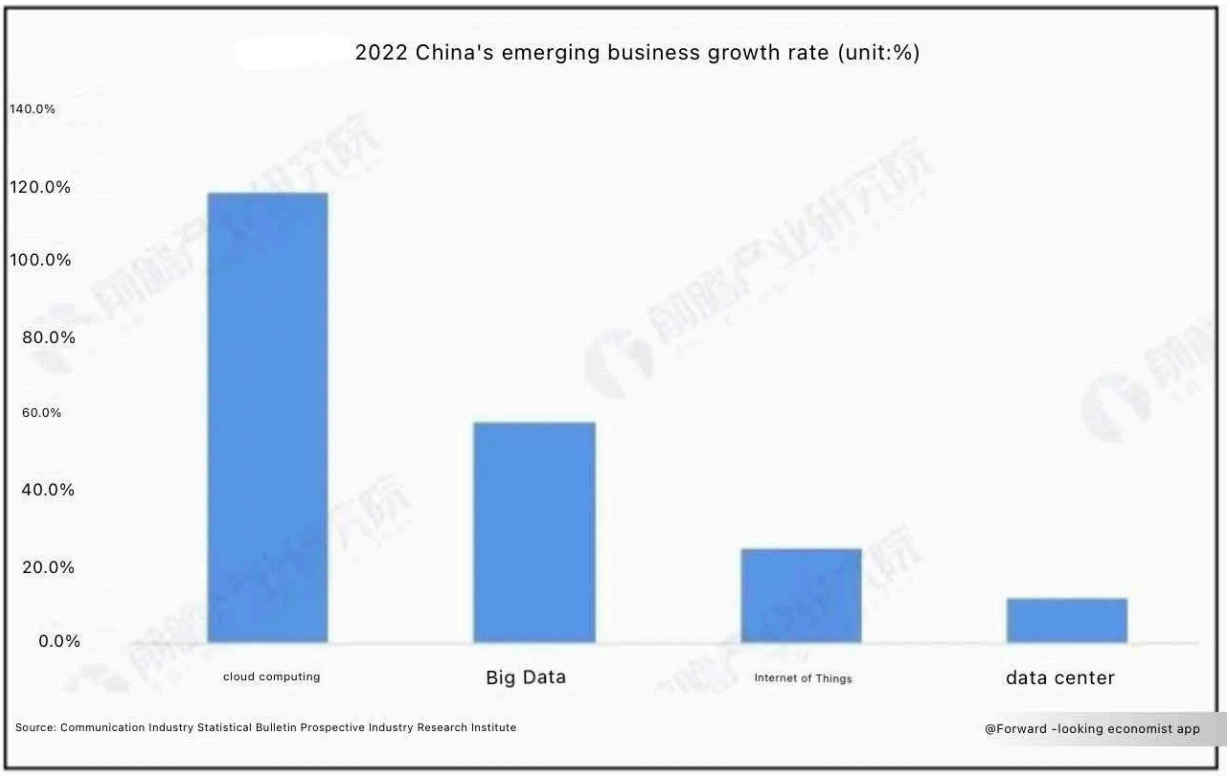

Figure 4: Digital Communication Sector Growth Rate

2022 (%) [left to right: percentage growth rate for Cloud Computing, Big Data, Internet of Things, Data Center] (Forward the Economist, 2023a).

New Energy

The new energy sector has shown major growth in recent years (see figures 5a-d). Figure 5a shows a rapid increase in production over the past few years, growing to more than triple the rate in as many years. Figure 5b shows a very similar trend in shipments of related materials and products out of Hangzhou. Figure 5c shows a rapid increase in new energy vehicle— a related family— sales rate.

Global trends across sectors have been analyzed by region, Figure 5d clearly shows that China has the world's largest and leading global share in the electric vehicle industry. We can assume that global trends line up with China-specific ones. Trends shown in these figures

correspond well with the survey data from the new energy sector respondents [see Appendix G]. The respondents had a high rating of 4 out of 5 on the scale.

The new energy sector, as the same suggests, is relatively new compared to the other sectors examined in this report. This innovative industry comes with its own potential problems and unique opportunities for headhunters. As one interviewee said, "The energy storage sector is very new, so the talent needed for these sectors is very scarce and the competition is very intense" [see Appendix H for the full translated transcripts].

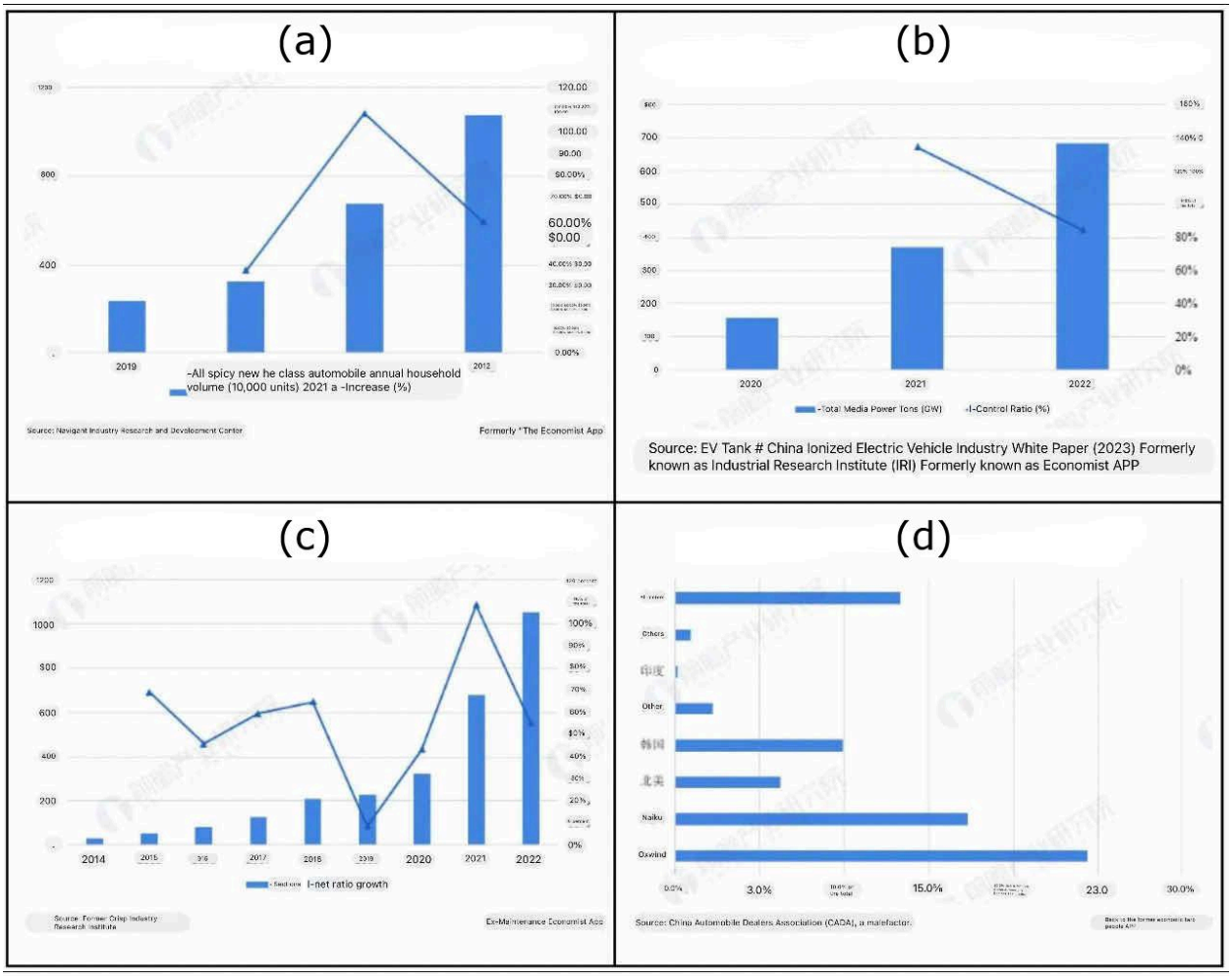

Figure 5: Trends in the New Energy sector (Forward the Economist, 2023b).

(a) Global New Energy Vehicle Production and Growth Rate, 2019-2022 (ten thousand units, %); (b) Global Automotive Battery Shipments and Changes, 2020-2022 (GWh, %); (c) Global New Energy Vehicle Sales and Growth Rate, 2014-2022 (ten thousand units, %). (d) Global New Energy Vehicle Market Share (%) [top to bottom; Global, Others, India, Japan, Korea, North America, Europe, China].

Biomedicine

The Hangzhou biomedical industry is evaluated next using figures 6a-d. Figure 6a shows total revenue of the sector for China in total. The next graphic shows a consistent and slightly positive trend in Hangzhou biomedical product production in China (see Figure 6b). Where the sector begins to show decay, however, is in Figure 6c. Figure 6c shows a sharp decline in the number of newly registered biomedical enterprises since a peak in 2019. This is corroborated by the number of related biomedical sector patent applications in Figure 6d, which has also begun to stagnate in recent years.

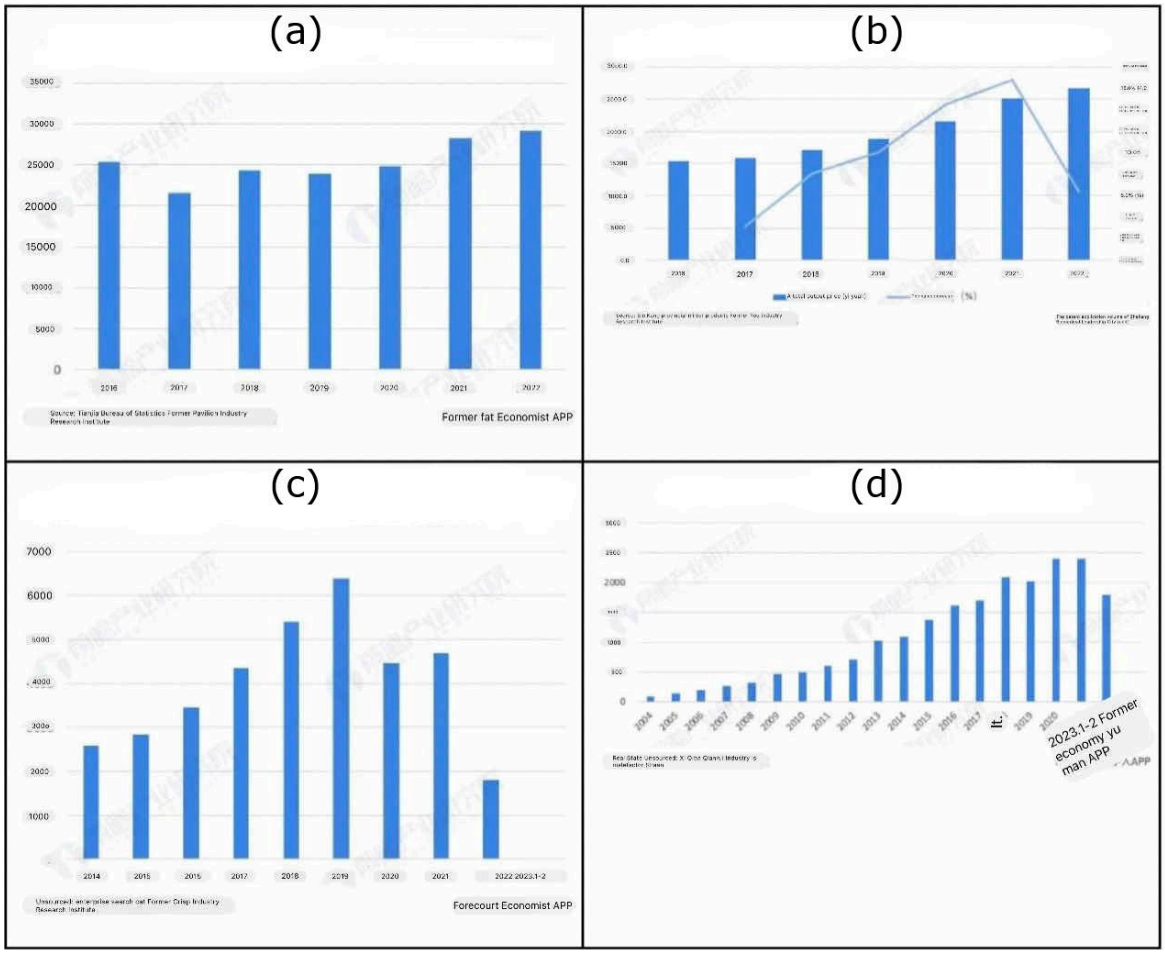

Figure 6: Trends in the Biomedicine sector (Forward the Economist, 2023c).

(a) Total Revenue of China's Biopharmaceutical Manufacturing Industry, 2016-2022 (hundred million Yuan); (b) Trend of Biomedical Production in Hangzhou, 2016-2022 (left axis, bars - hundred million blocks; right axis, trendline - %); (c) Number of Relevant Newly Registered Enterprises in Hangzhou's Biomedical Industry 2014-2023; (d) Number of Patent Applications in the Hangzhou Biomedical Industry, 2004-2023.

Favorable government policies can provide support for growth or at least provide information related to the importance of an industry. Figure 7 tracks the number of favorable policies for the Hangzhou biomedical industry over the past few years. There is a sharp spike of policies in 2021, but the number leveled off to 22 policies a year.

The biomedical industry is also in a unique position with many ethical and safety dilemmas. This issue was mentioned by a company interview from this sector. Despite the current state of the biomedical sector, respondents indicated a strong belief in its future with an average rating of 4.33 out of 5 on the long-term prospects question [see Appendix G].

There are other regulatory and related ethical dilemmas that can slow down work or even stop it entirely, and this constraint also applies to hiring research and development experts in both national and, especially, international organizations because it might be conceived as ethical dumping (Liao et al., 2023). As stated by a biomedical company that was interviewed, "The issue for our company [and others in the sector] is not whether the technology can be developed, but whether the regulations will permit us to do so." The regulations around the biomedical industry make it very different from many other sectors.

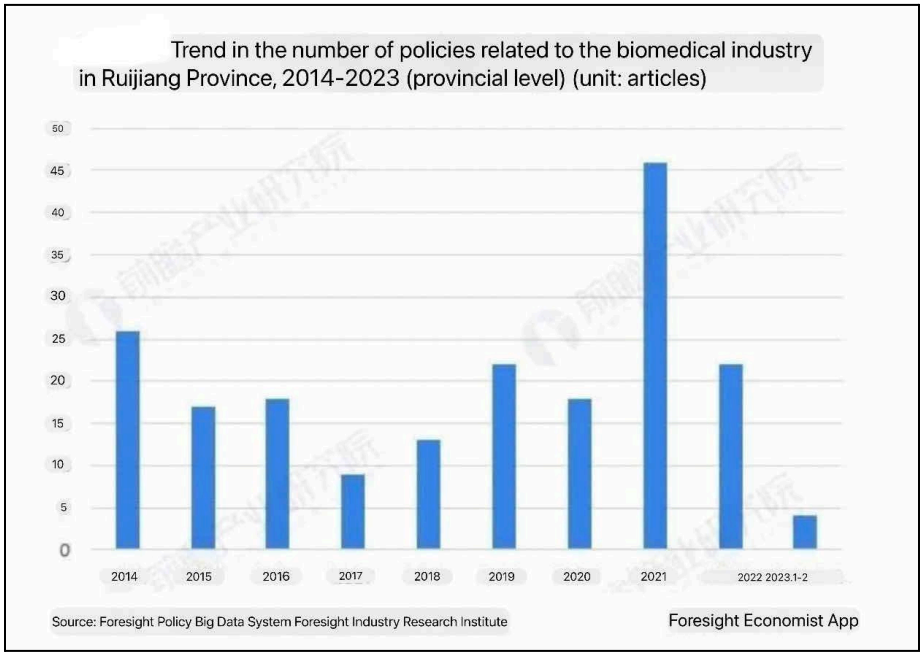

Figure 7: Trend in the Number of Policies for the Biomedical Industry in Hangzhou, 2014-2023 (Forward the Economist, 2023c).

Information Software

The next sector to be analyzed for growth is the information software industry. Figure 8 depicts relevant information on four key sub-sectors that contribute to the overall industry. Figure 8a displays information on the artificial intelligence industry; Figure 8b depicts the size and growth rate of the information software industry in provinces all over China. Zhejiang is shown as having the lowest growth rate, but despite this the industry is still very large; Similar to Figure 8a, Figure 8c contains information on the information software industry; Finally, Figure 8d focuses on the software industry.

Each figure shows recent years annual revenue and corresponding growth rate. The figures show positive growth likely to continue into the future. These results coupled with a staggering 4.38 out of 5 future perspective of the industry by survey respondents— the highest of all analyzed sectors— shows a very promising future for the information software industry in Hangzhou.

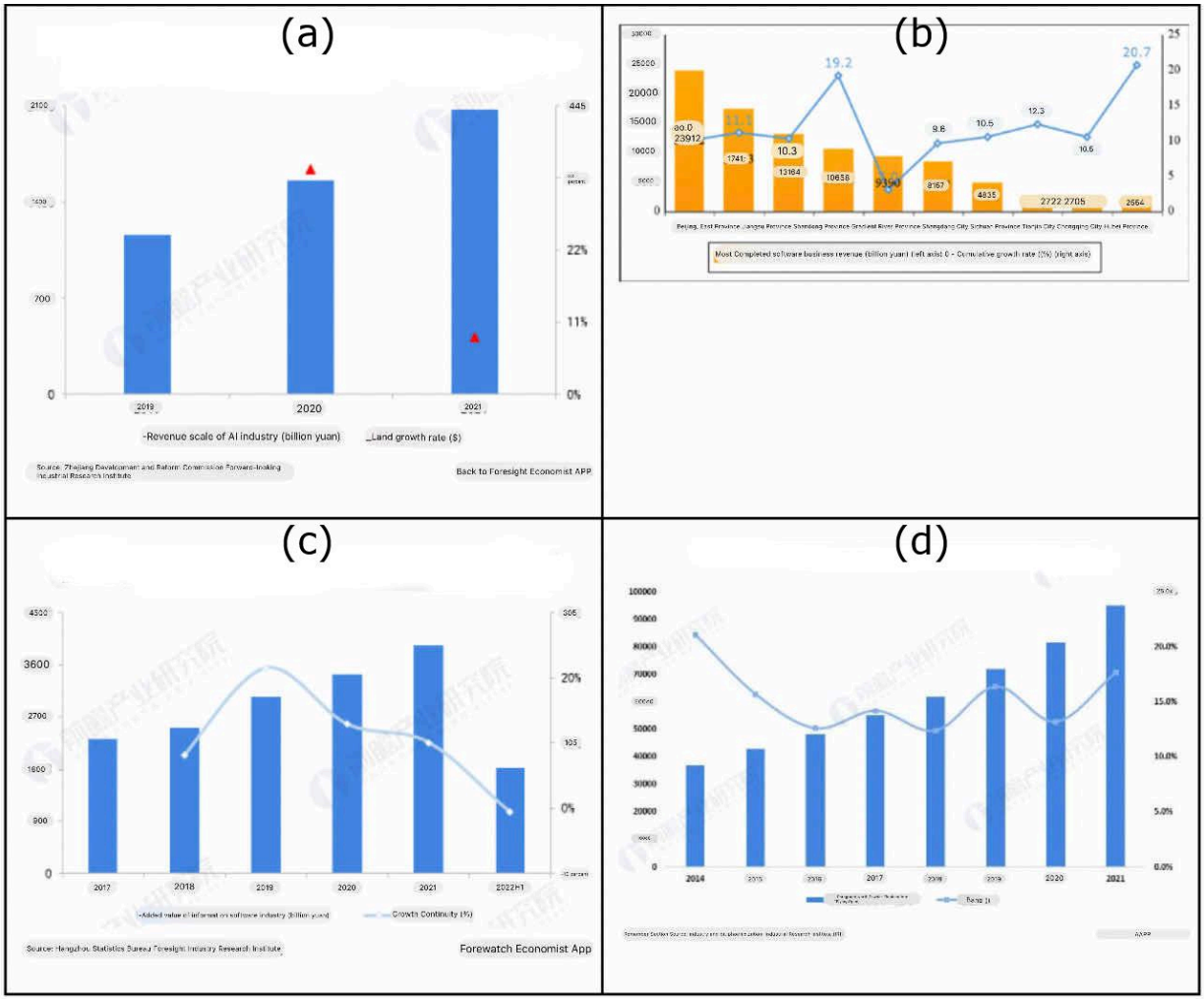

Figure 8: Trends in the Information Software sector (Forward the Economist, 2022a).

(a) Annual Revenue and Growth of the Artificial Intelligence Industry in Hangzhou, 2019-2021 (hundred million Yuan, %); (b) Annual Revenue and Growth of the Cloud Computing Industry in Hangzhou, 2017-2022 (hundred million Yuan, %); (c) Annual Revenue and Growth of the Information Software Industry in Hangzhou, 2017-2022 (hundred thousand Yuan, %); (d) Annual Revenue and Growth of the Software Industry in China, (hundred million Yuan, %).

Integrated Circuits

China's and Hangzhou's integrated circuit sector appears in Figure 9. Figure 9a summarizes sales and growth rate of the sector— each indicates strong upward trends over the past five years. The sales metric has a very promising upward linear trend with no signs of future dissipation. A similar upward trend exists for integrated circuit production (see Figure 9b). Production increase of approximately 30% occurred between 2019 and 2021, indicating stable growth to meet new demands. Figures 9c and 9d show the number of new enterprises in this sector for Hangzhou, with company size distribution also presented. Figure 9c shows a recent

and large spike in new enterprises. Figure 9d shows a remaining and healthy number of large, well-established enterprises in the area.

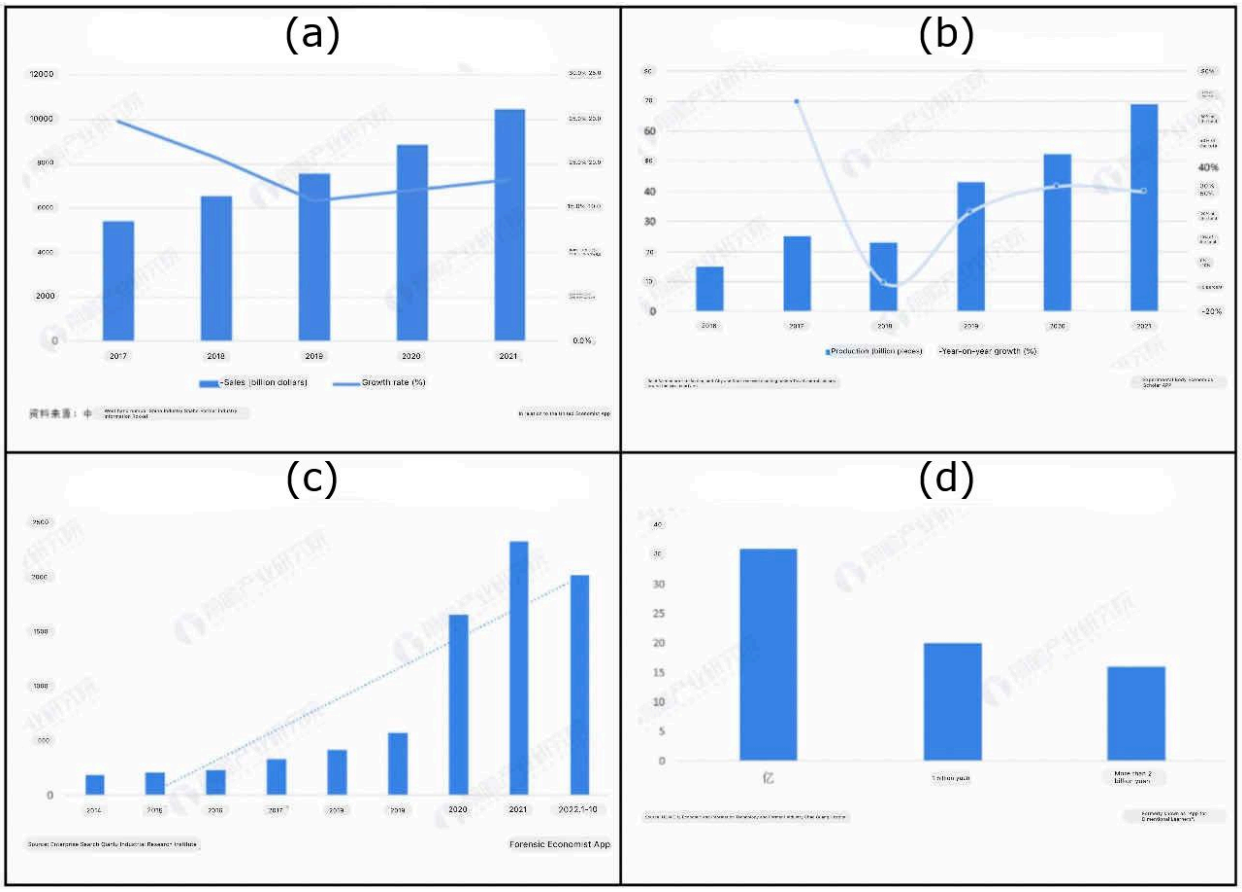

Figure 9: Trends in the Integrated Circuit sector (Forward the Economist, 2022b).

(a) Sales and Growth Rate of China's Integrated Circuit Industry, 2017-2021 (left axis, bars - hundred million Yuan; right axis, trendline - %); (b) Trend of Integrated Circuit Production in Hangzhou, 2016-2021 (left axis, bars - hundred million blocks; right axis, trendline - %); (c) Number of Relevant Newly Registered Enterprises in Hangzhou's Integrated Circuit Industry 2014-2022; (d) Distribution of the number of Integrated Circuit enterprises and their Production Value in Hangzhou as of 2021 (horizontal axis - Hundred Million, 1 Billion, 2 Billion).

Figure 10 tracks the number of integrated circuits industry regulatory policies adopted by the regional government. Each policy is instated with the goal of strengthening the industry overall in the area. Policies are consistently put into place every year between 2013 and 2022 to support the industry.

These policy implementations coupled with the strong upwards trend of many other metrics, indicates a very strong future for the integrated circuits industry. Data from survey question 5, which asked about the perceived long-term prospects of the respondent's industry,

agreed with this conclusion; The average confidence of respondents in the integrated circuits sector was a 4.13 out of 5 [see Appendix G for survey data]

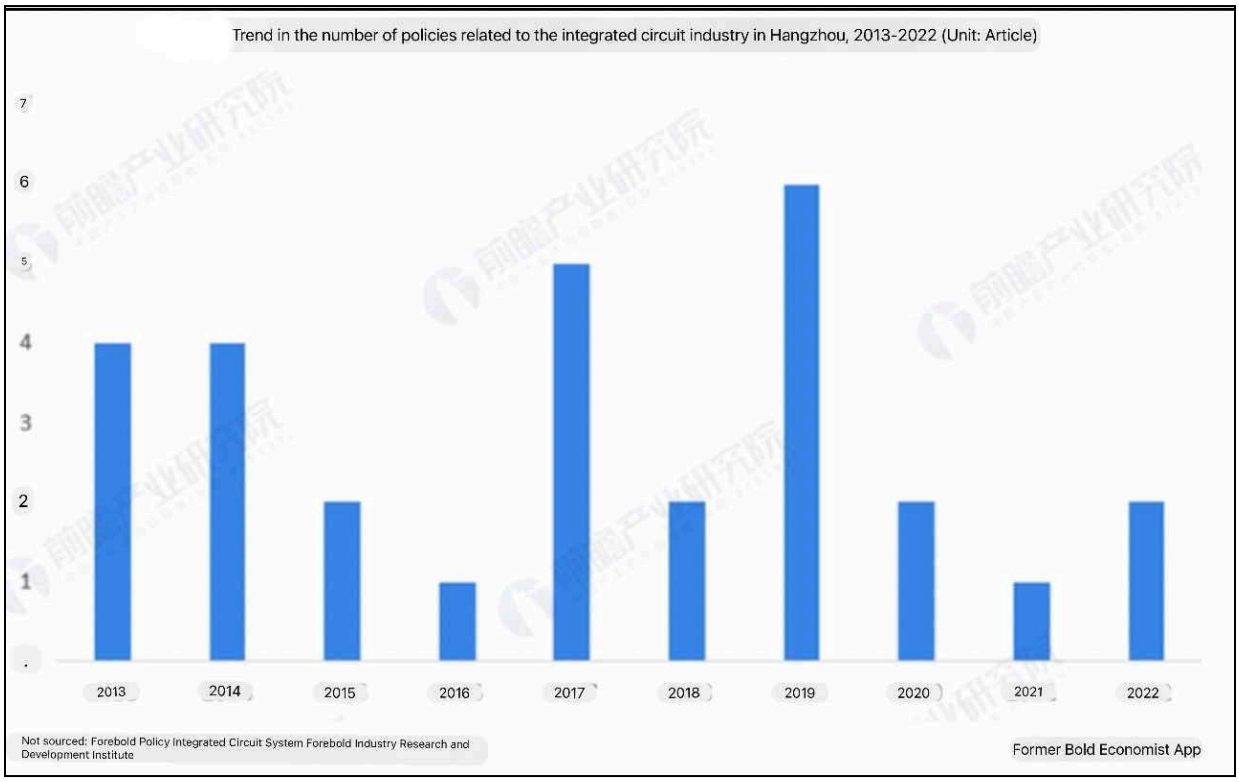

Figure 10: Trend in the Number of Policies for the Integrated Circuit Industry in Hangzhou, 2013-2022 (Forward the Economist, 2022b).

Smart Home Devices

Details on different metrics in the smart home devices sector in Figure 11. Figure 11a tracks the trends in total shipments of smart home devices in Hangzhou between 2018 and 2022. Each year shows an increase in the total shipment count, pointing towards a steadily increasing production. Figure 11b shows a sharp increase in new smart home enterprises in recent years, while Figure 11c shows a similar increase in patent applications in the same timeframe.

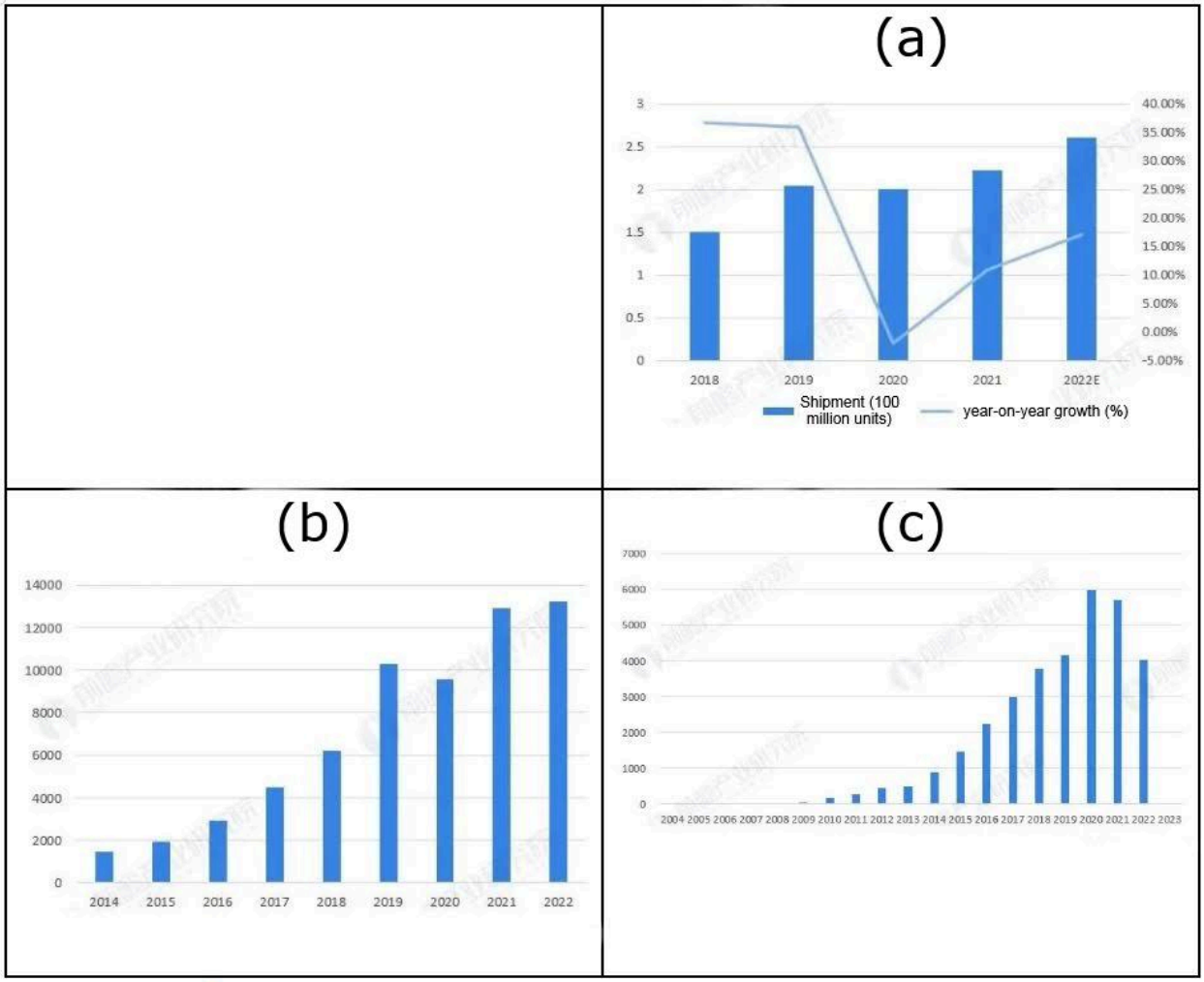

Figure 11: Trends in the Smart Home Devices sector (Forward the Economist, 2023d);

(a) Shipments and Growth Rate of the Smart Home Devices Industry in Hangzhou, 2018-2022; (b) Number of Relevant Newly Registered Enterprises in Hangzhou's Smart Home Devices Industry 2014-2022. (c) Number of Patent Applications in the Hangzhou Smart Home Devices Industry, 2004-2023.

Figure 12 shows the number of policies targeted at the smart home devices in Hangzhou over the past nine years. There is a drastic increase in favorable policies in 2020 that carry on until the present day, indicating a strong and continuing push for the smart home industry to grow in Zhejiang. The average of the respondent prospects question for the smart home industry was the least promising of the sectors, but still overall positive at 3.2 out of 5 [see Appendix G].

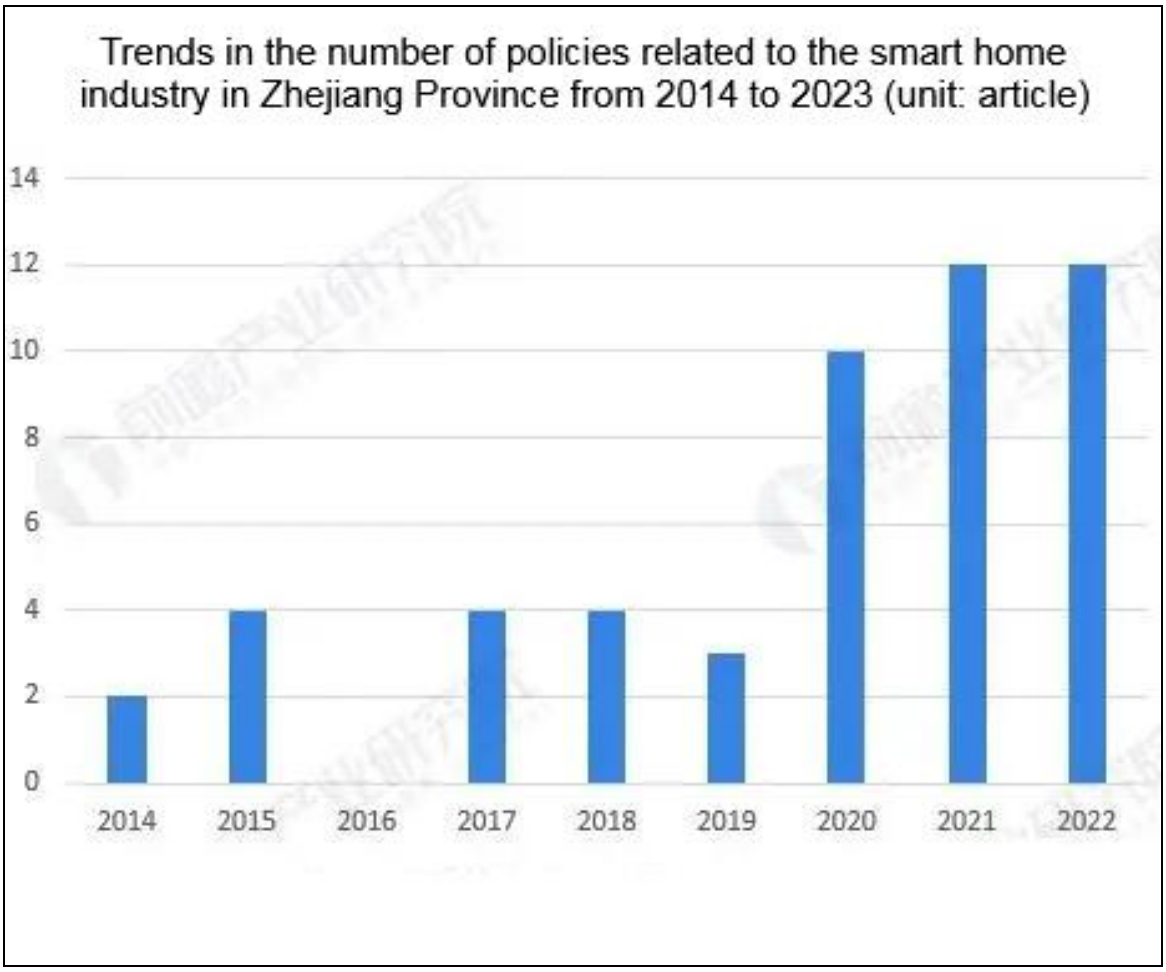

Figure 12: Trend in the Number of Policies for the Smart Home Devices Industry in Hangzhou, 2014-2022 (Forward the Economist, 2023d).

Though the health and growth of each sector is different from the others, they can generally be ordered by relative growth to each other. The sector that ultimately comes out on top is the integrated circuit sector, as there is consistent growth and very favorable policies for the sector in Hangzhou. Additionally, their confidence score was high with a 4.13.

The next best sector in terms of growth is the digital communication/devices sector, which has good growth overall and is rapidly developing with favorable policies to support it. The third-best sector is the new energy sector. There are local policies in place that are guaranteed to last for at least the next ten years, going a long way towards its growth. Next up is the information software sector, which is a large and established sector in the area but is not

showing significant signs of growth in recent years. Growth rate is typically tied very closely with demand for new talent, meaning they likely will have little demand for headhunting firms.

The fifth sector on the list is the biomedicine sector, which shows a decline over recent years but is projected to pick back up with additional government policies in the near future. Finally, the sector at the bottom of the list in terms of growth is the smart home sector. There is an overall positive development trend for the sector, but it is saturated with large, established corporations and therefore will have a smaller demand for headhunting services.

4.1.2 Talent Requirements Across Industrial Sectors

The survey asked the sample of companies on the relative demand for different positions. Key positions that are relatively the same in any given industry were listed and respondents were asked to indicate the relative strength of demand using a Likert-type scale from 1-Very Low Demand to 5-Very High Demand. A value of 3 represents average expected demand. The positions included executive-level, director-level, and manager-level groupings [see Appendix F for a glossary defining these roles].

For executive-level positions, particularly C-Suite roles (i.e. CEO, CFO, CTO). Chief Technology Officer (CTO) had the highest expected relative demand with a 3.69 (out of 5) mean score across all sectors (see Table 1 last column). This results confirms evidence from the literature research found in §2.1.2 which specify a pressure for information technology and technical expertises in executive teams to incorporate technical advancements in business strategies (Ojimadu, 2022; Weill et al., 2021). The second highest expected demand was for the Chief Operating Officer (COO) role, with a 3.67 mean score out of 5. This is also consistent with the importance placed on resilience in operations and supply chains post-COVID-19 (Frederico et. al., 2023).

The information software and new energy sectors have a particularly high expected demand for COO positions, while the integrated circuit sector has relatively higher expected demand for CTO positions. The digital communication/devices and smart home devices sectors have consistent demand for each position with no true outliers. The biomedicine sector showed an equally abnormal demand for both COO and CTO positions.

The two director-level positions with the highest average demand were Research and Development (R&D) Director and Operations Director, with averages of 3.88 and 3.84 out of 5 respectively (see Table 1 last column). The digital communication/devices industry had a particularly high demand for Information Technology (IT) Directors. This is unsurprising as the digital communication/devices sector relies heavily on the creation and maintenance of information software. The new energy sector has a large demand for Supply Chain Directors. The biomedicine and information software sectors have a shared demand for Operations Directors, while the integrated circuits sector has more demand for R&D Directors. The smart home devices sector has no particular outliers for director level positions, the demand is across the board.

Overall trends for management-level positions were very similar to the director-level roles, with R&D coming in at the highest demand of 3.83 out of 5. For the management-level position responses Customer Service Managers now occupy the second spot in terms of demand with a 3.78 out of 5. Operations Managers are tied for third with Quality Assurance and Quality Control (QA/QC) Managers with a 3.75 out of 5.

Of the sectors examined, integrated circuits was the only one that had the same position in highest demand, with R&D Managers scoring a 4.25 out of 5. Three sectors ranked Customer Service Managers as the highest demand, including digital communication/devices, energy, and information software. Of the three, the energy sector also ranked Supply Chain and QA/QC roles equally as important and information software ranked R&D the same. The biomedicine sector ranked R&D, Operations, and Finance positions as having equally high demand with a 3.67 out of 5. Finally, the smart home devices sector ranked Operations and Production positions as having an equally high 4.8 out of 5 demand.

Overall, the results show a larger demand for lower-level positions, as the director- and manager-level positions each have an overall average demand of 3.67 and 3.69, respectively. This is significantly higher than the C-Level positions which only have an overall average of 3.57.

Table 1: Average Respondent Scores for expected talent demand.
Bolded number is the highest for each sector. Question: On a scale of 1 (Very Low Demand) to 5 (Very High Demand), how much demand is there for the following positions in your industry?

Position	**DCD**	**NE**	**BIO**	**IS**	**IC**	**SHD**	**All**
Executive Level							3.57
Chief Executive Officer	3.36	3.40	3.83	3.10	3.63	4.00	3.41
Chief Technology Officer	3.50	3.60	**4.17**	3.43	3.88	3.80	3.69
Chief Financial Officer	3.36	3.40	3.83	3.33	3.50	3.60	3.47
Chief Operating Officer	3.45	4.00	**4.17**	3.76	3.50	4.20	3.67
Chief Marketing Officer	3.45	3.60	3.80	3.52	3.37	4.40	3.58
Director Level							3.67
Production director	3.19	4.20	3.50	2.65	4.00	4.60	3.38
Supply chain director	3.33	**4.60**	3.33	3.10	3.75	4.40	3.57
R&D director	3.57	4.25	4.00	3.70	**4.25**	4.60	**3.88**
Operations director	3.48	4.50	**4.17**	**3.95**	4.00	4.60	3.84
QA/QC director	3.52	4.40	3.50	3.35	4.13	4.60	3.75
Finance director	3.38	3.75	4.00	3.45	3.63	4.20	3.61
IT director	3.71	4.00	3.17	3.60	3.88	3.80	3.65
HR director	3.57	4.50	3.17	3.55	3.63	3.60	3.67
Customer service director	3.52	3.80	2.83	3.70	3.38	4.20	3.64
Manager Level							3.69
Production manager	3.24	4.00	3.33	2.85	3.50	**4.80**	3.45
Supply chain manager	3.43	4.20	3.33	3.20	4.00	4.60	3.59
R&D manager	3.52	3.80	3.67	**3.95**	**4.25**	4.40	3.83
Operations manager	3.57	3.60	3.67	3.85	3.75	**4.80**	3.75
QA/QC manager	3.62	4.20	3.50	3.55	4.13	4.60	3.75
Finance manager	3.48	3.40	3.67	3.60	3.75	4.40	3.66
IT manager	3.67	3.60	3.17	3.80	3.88	3.80	3.68
HR manager	3.48	3.80	3.50	3.75	3.75	3.80	3.68
Customer service manager	**3.75**	4.20	2.83	**3.95**	3.63	4.40	3.78
# of Respondents	**22**	**5**	**6**	**21**	**8**	**5**	

*DCD = Digital Communication/Devices; NE = New Energy; BIO = Biomedicine; IS = Information Software; IC = Integrated Circuits; SHD = Smart Home Devices

4.1.3 Talent Acquisition Firm Usage

The sponsor can also find value in knowing the history of usage of talent agencies. This provides an idea of how much demand has traditionally occurred across sectors and overall. The survey asked whether or not the respondent's company has ever used an external headhunting firm. Table 2 displays the results to this question separated by sector:

Table 2: Company Respondent Sectors Past Headhunter Use

Sector	**Yes**	**No**
Digital Communication/Devices	77.27%	22.73%
New Energy	100.00%	0.00%
Biomedicine	66.67%	33.33%
Information Software	76.19%	23.81%
Integrated Circuits	87.50%	12.50%
Smart Home Devices	60.00%	40.00%

The results displayed in Table 2 suggest that, for all sectors examined, the majority of companies have utilized external headhunting firms in the past. This result suggests a well-established presence of executive search firms in Zhejiang that service these sectors. The only notable exception is the smart home devices sector, which has the highest percentage of companies that have not utilized headhunters in the past at 40%. This is still a minority, but it suggests that this sector may have less saturation than the others.

The next issue is whether there is a need or potential need for external hiring firms in the future. This information is valuable to the sponsor because it provides insights on future market opportunities. Table 3 displays the results by sector based on responses of Yes, Maybe or No on whether companies will consider hiring headhunting firms in the future.

Table 3: Company Respondent Sectors and Future Considerations on Headhunter Use

Sector	**Yes**	**Maybe**	**No**
Digital Communication/Devices	68.18%	22.73%	9.09%
New Energy	100.00%	0.00%	0.00%
Biomedicine	83.33%	16.67%	0.00%
Information Software	61.90%	28.57%	9.52%
Integrated Circuits	75.00%	25.00%	0.00%
Smart Home Devices	60.00%	0.00%	40.00%

The results displayed in Table 3 show that a majority of companies would consider utilizing external headhunters in the future. The new energy, biomedicine, and integrated circuit sectors have high percentages of respondents who answered yes, with 100%, 83.33%, and 75.00% of respondents within each industry, respectively. The remaining three sectors each have percentages between 60-70%, which is still relatively positive.

Another interesting result lies in the percentages of companies that answered “no” to the question. Five out of the six sectors had less than ten percent of respondents give this answer. The only sector that had a rate higher was the smart home devices sector, which had a 40.00% “no” response rate. This is very high compared to the others and suggests that there are issues with the services provided by external firms in the sector. This could be a result of low saturation rates, low-quality service, or greater internal hiring means to name a few possible explanations. Considering these factors, the outlying result perhaps signals that the sponsor will not likely to find any new firms willing to try headhunting in this sector.

It is also important to note that, though the biomedical field does show a particularly high amiability to headhunters, there are many aspects that make it unique. As discussed earlier, there are ethical constraints that exist in the field that require many more regulations to be put into place. In addition, there is a particularly high demand for technical talents as opposed to other sectors. As stated in an interview:

“Most of the time we are in urgent need of technical talents. The operational level is not so demanding, because if you have a really good product then there must be a market.”

This sentiment pushes companies in the biomedical field to focus more heavily on product development than operations or marketing, effectively increasing the demand for technical talent, as mentioned in §2.3.4. This situation is an additional challenge for headhunters in the sector, however, because the right technical skills are hard to find, and “Headhunters cannot help us in finding technical talents, as this kind of talent has to be recommended by authoritative experts in the field.” Biomedicine is a very tight-knit sector that significantly relies on word-of-mouth referrals and expertise to acquire new talent, something that headhunters may have difficulty doing if they do not specialize in biomedicine exclusively.

4.2 Client Talent Requirements

In this section we consider the second major research question of identifying the current needs of the sponsor client which includes pre-conceived ideas and opinions about headhunters, challenges in the recruitment process, and what skill sets are most desirable in a candidate. These findings will be crucial for the sponsor to better understand the strengths and weaknesses of headhunting as well as the opportunities in hiring gaps that could be better serviced. The question is evaluated using survey results.

The sponsor can benefit from insights related to the perceived benefits of external headhunting firms as opposed to internal hiring means. Survey respondents were given statements such as, “Utilizing a headhunting firm is more cost-effective than internal recruitment.” Respondents ranked their agreement with the statement on a scale of 1 to 5, with one being Strongly Disagree and 5 benign Strongly Agree. Table 4 summarizes the results of each statement divided by sector.

These results show a few key insights. A clear and important insight is the relative importance of time-effectiveness in headhunting. Not only is time-effectiveness the highest average overall across all sectors, but it was also the top choice of four out of the six sectors. This result appears in the top two sectors in terms of growth, integrated circuits and information software. The only sectors that did not rank it as the highest advantage are biomedicine and smart home devices, though these sectors still indicated a positive sentiment towards time-effectiveness with a 3.5 and 3.6 out of 5 respectively.

Table 4: Perception of External Talent Acquisition Firm Characteristics Compared to Internal Recruitment (by sector)

Question: How much do you agree with the following statements? Headhunting firms as compared to internal recruitment…							
Statement	**DCD**	**NE**	**BIO**	**IS**	**IC**	**SHD**	**All**
Are more cost-effective	2.91	3.40	2.67	3.19	3.25	3.60	3.33
Are more time-effective	3.50	3.40	3.50	3.71	3.50	3.60	3.63
Are more resource-effective	3.27	3.20	3.83	3.38	3.13	3.60	3.49
Produce candidates that possess specialized expertise	3.36	3.00	3.50	3.09	3.38	3.80	3.36
Produce candidates that integrate successfully with the organization's culture, vision, and mission	2.86	2.60	2.83	2.95	3.00	3.80	3.00
Produce candidates that maintain extensive social networks in industry	3.41	3.20	3.17	3.43	3.50	3.80	3.50
Produce candidates that exhibit long-term commitment and loyalty	3.00	2.60	2.83	2.90	3.00	3.80	2.99
Produce candidates that have extensive past experience	3.23	3.00	3.17	3.19	3.25	3.80	3.32

*DCD = Digital Communication/Devices; NE = New Energy; BIO = Biomedicine; IS = Information Software; IC = Integrated Circuits; SHD = Smart Home Devices

The next highest-ranked comparative characteristics are resource-effectiveness and the fact that candidates have extensive social networks in the industry. These statements had an average agreement rate of 3.49 and 3.5, respectively. Resource-effectiveness was ranked as the top statement by the biomedicine sector. The social network statement was tied for first within the integrated circuits industry with a score of 3.50 out of 5. The literature from §2.1.2 has shown that time efficiency is crucial for companies that want to gain a competitive edge by quickly training, replacing, or adding technically adept roles such as CIOs and CDOs to top management teams (Bendig et al., 2022).

The overall lowest-ranked statements talked about a candidate's integration into the company culture and their long-term loyalty. Each of these statements had an overall score of 3 out of 5 between all sectors, which means that they see no difference between external or internal hiring for these metrics. Four individual sectors felt that there was actually a negative impact on

company-culture integration when an external firm was used, and three also agreed that there was a negative impact on loyalty.

Another useful insight for the sponsor relates to the challenges that respondents typically face when hiring high-level talent. Averages for each challenge separated by sector can be shown in Table 5.

Table 5: Averages for Challenges Divided by Sector.

Question: Rate the significance of these challenges when recruiting high-level talent in your industry:							
Challenges	**DCD**	**NE**	**BIO**	**IS**	**IC**	**SHD**	**All**
Difficulty in scouting candidates with the desired expertise.	3.38	3.20	4.17	3.60	3.63	4.00	3.63
Difficulty in attracting candidates with the desired expertise.	3.19	3.20	3.50	3.65	3.50	3.60	3.53
High levels of competition in the industry.	3.81	4.00	3.33	3.70	3.50	3.60	3.79
Difficulty in negotiating salary and benefits (healthcare, vacation, etc.).	3.38	3.20	3.33	3.55	3.88	3.80	3.51
Geographical boundaries.	3.14	3.60	3.67	3.00	3.13	3.80	3.26
Cultural boundaries.	3.05	3.40	3.00	2.95	3.00	4.00	3.09
Large amount of time required to hire for a new position.	3.33	3.20	3.17	3.45	3.25	3.40	3.43
Limited internal expertise on the technical aspect of the role (new department, new technology, etc).	3.29	3.00	3.00	3.05	3.14	3.60	3.28
Limited internal hiring capabilities (small HR department, too busy, etc)	3.33	3.00	3.33	3.30	3.13	3.60	3.28

*DCD = Digital Communication/Devices; NE = New Energy; BIO = Biomedicine; IS = Information Software; IC = Integrated Circuits; SHD = Smart Home Devices

Of the challenges listed above in Question 13, difficulties tied to high levels of competition in a given sector ranks the highest in terms of the overall average. The second most challenging aspect overall is that candidates tend to lack the required expertise for a given position. Competition is the greatest challenge listed by three sectors, digital communication/devices, energy, and information software. The integrated circuits industry cites salary and benefits expectations as their greatest challenge, something that headhunters are uniquely positioned to help with in negotiations. Both the biomedicine sector and the smart home

devices sector cite a lack of experience in candidates as their biggest issue, and the smart home devices sector also says that cultural boundaries are an equally pressing issue in the hiring process. Table 6 displays the average answers to survey questions 17 and 18, which ask about which skills are particularly valuable to a company that they look for during the hiring process.

Table 6: Average Responses for Important Skills
Relative importance of skill sets (analytical or behavioral) are ranked by sector. Bolded: The highest averages by sector and category.

Question: Please indicate the importance that you would put on the following skillsets for high-level talent:							
Skill Sets	**DCD**	**NE**	**BIO**	**IS**	**IC**	**SHD**	**All**
Interpersonal / Organizational Skills							
Creativity and innovation	3.91	4.00	3.83	4.38	4.13	4.00	4.05
Interpersonal communication	4.23	4.00	4.00	**4.43**	4.13	**4.60**	4.36
Prioritization	4.14	4.00	4.00	4.19	3.75	4.40	4.12
Active listening	4.32	4.00	4.17	4.14	3.88	4.40	4.24
Leadership	4.36	4.40	**4.33**	4.29	**4.25**	4.40	**4.42**
Organization and delegation	**4.41**	**4.60**	4.00	4.19	**4.25**	**4.60**	4.37
Planning	4.27	4.40	4.00	4.24	4.00	4.20	4.34
Technical / Analytical Skills							
Critical thinking and decision-making	4.09	4.00	**4.33**	4.24	4.00	**4.40**	4.21
Analysis	**4.41**	**4.40**	4.17	**4.52**	4.25	4.20	**4.42**
Digital Fluency	4.23	4.20	3.83	4.19	3.88	**4.40**	4.19
Big Data Analytics	4.14	4.00	3.67	4.10	3.63	4.20	4.09
Programming and coding	4.14	3.60	3.17	4.05	3.88	3.80	3.92
Robotics	3.68	3.80	3.17	3.90	3.88	3.80	3.79
Optimization (lean manufacturing)	4.23	4.00	3.67	3.90	**4.38**	**4.40**	4.12
Experience in machining, fabricating, and complex assembly	3.91	4.00	3.50	3.38	3.63	4.20	3.82
Product design	4.00	4.20	3.83	3.95	4.13	**4.40**	4.06

*DCD = Digital Communication/Devices; NE = New Energy; BIO = Biomedicine; IS = Information Software; IC = Integrated Circuits; SHD = Smart Home Devices

The overall highest averages in each category of skills are equal with each other, leadership and general analysis skills both have a 4.42 out of 5 average. Every skill in the interpersonal/organizational (I/O) category had an average score above four. The technical/analytical (T/A) skills category had a similar trend, but a few skills did fall below a 4 out of 5. These skills were programming, robotics, and experience in machining. This logically makes sense as these are skills that are not generally required for all positions in a company, they are typically only relevant to more technical roles. The overall averages for answers to each category are 4.27 and 4.07 for the I/O and T/A categories, respectively. This is a large enough difference to infer that interpersonal and organizational skills are generally regarded as more important than technical and analytical skills, but they are close enough that both are definitely important. The highest averages for each sector and each category are highlighted on the table.

4.3 Hiring Platforms

Question 20 in the survey asks about different hiring platforms that respondents have used in the past to field candidates for open positions. Figure 13 shows the overall results of the question. The most popular answer by far was online job portals with 92% of respondents indicating that they've used them before. The next four answers have a similar percentage of responses, with job fairs, headhunters, social media, and word-of-mouth referrals having percentages of 62%, 56%, 51%, and 38% respectively. The lowest percentage was for targeted advertisements with only 17%. Once again, this supports the literature mentioned in §2.1.2.

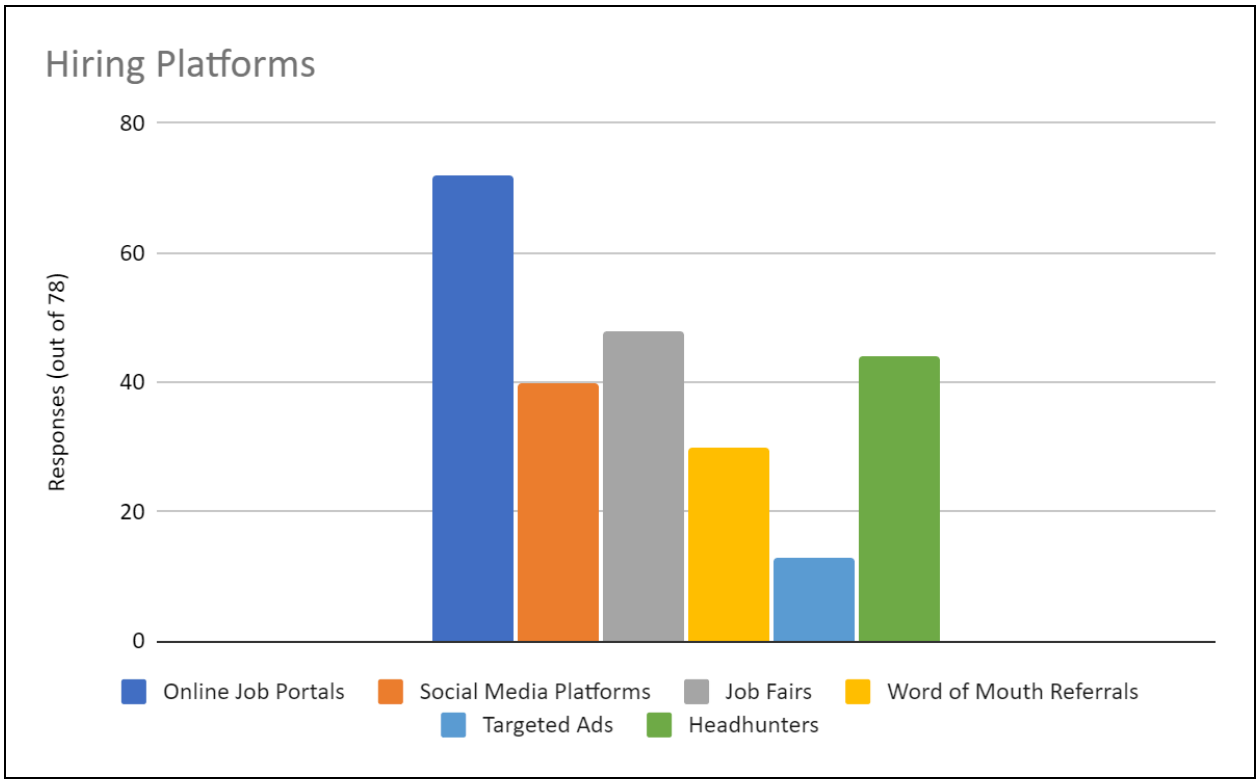

Figure 13: Hiring Platforms used by Respondents as per the Survey.

5. Conclusion and Recommendations

This section discusses the results and subsequent analysis of the data generated from the survey, interviews, and secondary research. Recommendations for the sponsor company based on the conclusions are laid out in the beginning of the section. Afterwards, Next, conclusions that pertain to the relative growth of a sector are discussed. Finally, the hiring needs of companies in each sector are discussed in the final section of this section.

5.1 Recommendations

Based on the results discussed in §4.1 Sector Analysis, our team recommends that the sponsor focuses its efforts primarily on the Integrated Circuits sector, and secondarily servicing the Digital Communication/Devices and New Energy sectors. It is also recommended to keep a close eye on the Biomedicine sector as Hangzhou is likely to introduce new policies to support its growth. The Information Software and Smart Home Devices sectors are both large sectors, but have generally stagnated in growth and will likely have little need for headhunters in the near future. This is also consistent with the current prioritization efforts of the sponsor, as mentioned in §2.3.6 Integrated Circuits. These recommendations are supported by growth data found in §4.1.1 Sector Growth as well as amiability metrics found in §4.1.2 Need for Talent Acquisition.

Our team also recommends that the sponsor prepares to handle more clients that are looking for manager-level roles, specifically those related to Customer Service, Research and Development (R&D), and Operations departments. This is based on data analyzed in §4.1.2 Need for Talent Acquisition that suggests that these areas have the most demand for new talent. Executive search firms that use a contingency model, as the sponsor does, are also better suited to hiring for manager-level roles. Additionally, candidates with strong interpersonal and organizational skills should be prioritized over strong technical and analytical skills, though the ideal candidate will have a strong foundation in both skill sets. This is supported by averages analyzed in §4.2 Client Needs.

Finally, our team recommends that the sponsor focuses on advertising quick turnaround rates as well as extensive networks of connections when marketing themselves. These were the main advantages of executive search firms as perceived by survey respondents, discussed in §4.2

Client Needs. It is also recommended that these marketing decisions are reflected primarily in the sponsor's website, as digitalization is becoming an increasingly popular method of recruitment and it is likely that many potential new clients will visit the website.

Potential areas for further study include looking further into topics such as globalization and specific policies' effects on executive search firms. This can include exploring the use of executive search services by foreign companies. There is also the potential to dive much deeper into any of the questions asked in the survey and the motivations behind the answers.

5.2 Team Reflections and Challenges

The team inevitably faced numerous obstacles throughout the process of the study. These challenges include the prevalence of language barriers, time constraints, limited resources for secondary research, and expertise gaps. This section will provide additional details about each of the mentioned challenges.

Communication was one of the most significant challenges that the WPI team faced. The WPI team's language skills were mostly limited to English except for one member. Our partners in HDU had varying skill levels in English but were native Chinese speakers, resulting in all technical discussions being limited to exclusively Chinese. Communication between the two partner teams was thus limited to a few individuals and a process of relaying information. Although the members were attentive in communicating across two languages, some things were inevitably lost in translation or miscommunicated, which led to delays. In addition, communication with the sponsor was limited to strictly Chinese, presenting a significant challenge for the WPI team. The complexity of business vocabulary made discussions with the sponsor difficult to translate. Translation applications such as DeepL and WeChat were used to partially mitigate this issue. The prevalence of the language barrier also contributed to the existence of the other challenges mentioned below.

Time constraints and resource restrictions were also among the obstacles that the team faced. The entire study was conducted over a period of four months, including preparation, research, and methodology screening for the first two months. The rest of the project was limited to the remaining two months, and included conducting the study, analyzing the data, and ultimately writing this report. Our planned schedule experienced a two-week delay as well due to

unforeseen circumstances, which limited time for interviews and data analysis even more. Accessing government sources from China and finding literature on industries in Hangzhou also proved difficult due to the aforementioned language barrier.

The final limitation for this project was due to our lack of expertise in the talent acquisition field. The WPI team was composed of students studying fields related to Science, Technology, Engineering, and Math (STEM). This resulted in the team spending a significant amount of time researching business and industry concepts in order to gain a sufficient understanding of the issue that this study addresses. Despite the increased challenge, the interdisciplinary knowledge and skills we gained due to this project are exciting and gratifying for all members.

5.3 Growth

Two main categories of analysis were conducted in order to answer the research question generated for this study: how can headhunting companies better service their clients in the Hangzhou high-technology manufacturing industry? The first area of analysis involved quantifying sector growth based on metrics that are measurable. This involved the use of two main methods: secondary research and a survey. Based on data posted by secondary sources, the team quantified whether or not a sector was growing or not as well as how well it was growing relative to its peers. It was found that the studied sectors were all growing, save for two, the biomedicine and information software sectors. The growing sectors were also ordered based on their relative growth to each other, which listed from most to least growth are integrated circuits, digital communication/devices, new energy, and finally smart home devices. The smart home devices sector was actually ranked below the two non-growing sectors based on data gathered from the survey.

The second half of the growth analysis involves assessing the past and potential usage of executive search firms in each sector. Two questions on the survey asked about past headhunter use as well as openness to it in the future and a cross-tabulation analysis was done for each. The majority of companies in all sectors have used executive search services with the exception of the smart home devices sector. Among them, the new energy, biomedicine, and integrated circuit

sectors from most to least have the highest number of respondents who would use this service in the future. The other three sectors all have overall positive responses in the 60-70% range.

5.4 Assessing Client Needs

The second half of the analysis involved assessing the needs of any potential future clients. This analysis was conducted by sector and involved the use of the remaining survey questions as well as the insights generated by the interviews. The first part of the analysis in this portion involved assessing the most in-demand positions that executive search firms would likely be called to fill. It was concluded that managerial positions were the most popular category of position across all sectors, beating out director- and executive-level positions in terms of demand. Positions that belonged to Customer Service, Research and Development, and Operations departments were also in the most demand for the majority of the sectors.

The next part of the analysis involved examining the perceived benefits that executive search firms provide as opposed to handling hiring internally. It was concluded that headhunters were best known for services that produced candidates more quickly than traditional internal means. It was also concluded that candidates produced by headhunting firms tended to have wider social networks in the professional community.

After benefits were assessed, the survey asked companies what skills they were most looking for when it came to new hires. Technical skills as well as analytical skills were ranked lower overall than interpersonal and organizational skills, suggesting that talent with a strong foundation in people skills better serves their respective companies than strictly technical talent. Specific skills in demand for each sector are examined in §4.2 Client Needs.

The final part of the analysis involved asking respondents which platforms they have used in the past to get the word out about their open positions. Over 90% of companies highlighted the importance of online recruitment services such as LinkedIn and Liepin. This is consistent with other research that indicates digitalization is rapidly taking over the hiring process. Headhunters were the third most used method for finding candidates across all sectors.

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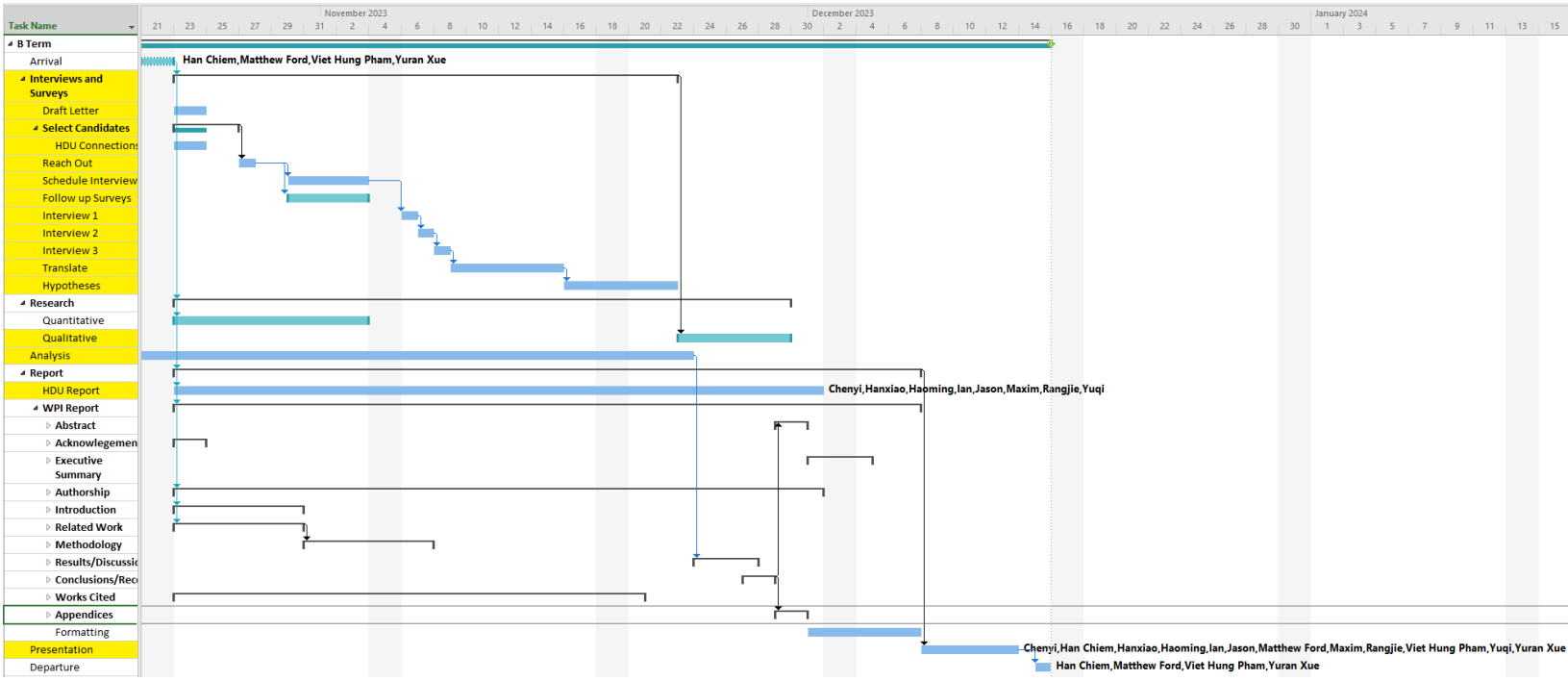
APPENDIX A: Sponsor Company

Hangzhou Mingju Enterprise Management Consulting Co., Ltd. (Mingju) is a talent acquisition firm that specializes in solutions for technical manufacturing companies. Founded in 2014, Mingju focuses on building a network of trust and support for the needs of its Zhejiang clientele. Whether operating out of Zhejiang or bringing expertise from the province to the rest of China, Mingju aids companies in candidate searches for executive and management level positions. Mingju was among the top 20 organizations to make the 2022 Hangzhou Human Resource Service Organizations Attracting Talents List (China.com, 2022).

APPENDIX B: Project Timeline



APPENDIX C: Survey Structure and Questions

We are a collaborative team from the Hangzhou Dianzi University Business School and the Worcester Polytechnic Institute in Massachusetts, United States. We are partnering with a talent acquisition company to perform an analysis of the manufacturing industry in Hangzhou. We send this survey to your company in order to understand human resources needs for companies within the industry.

The survey should only take around ten minutes. All information will be kept confidential, only the research team and the survey's sponsor will have access to the data. Additionally, any statistics published will be aggregated and anonymized. Your participation in this survey is entirely voluntary and you may withdraw at any time if you no longer want to participate.

If you are interested, you may receive our results as well as any data generated from your survey. We appreciate your consideration for participating in this survey.

Demographics/Background Information:

1. *Company Name: [Text Entry]
2. What is your company revenue in 2022?
    a. < 50 million CNY
    b. 50 - 100 million CNY
    c. 100 million - 2 billion CNY
    d. > 2 billion CNY
3. How many employees are there in your company?
    a. < 50 employees
    b. 51 - 200 employees
    c. 201 - 500 employees
    d. > 500 employees
4. *Which industries are you in? Select all that apply:
    ☐ Digital Communication/Devices
    ☐ Production and Storage of Energy
    ☐ Biomedicine
    ☐ Information Software
    ☐ Integrated Circuits
    ☐ Smart Home Devices
    ☐ Other (please specify): [Text Entry]
5. How promising do you believe the long-term (3-5 years) prospects are in your industry?

6. *What is your role in your company?

   a. Upper Management (C-level, Vice President, Directors)
   b. Middle Management
   c. Human Resources/Recruitment
   d. Other (please specify); [Text Entry]

7. How many years of professional experience do you have?

   a. Less than 1 year
   b. 1 - 5 years
   c. 5 - 10 years
   d. 10 - 15 years
   e. More than 15 years

8. How long have you worked in your company?

   a. Less than 1 year
   b. 1 - 5 years
   c. 5 - 10 years
   d. 10 - 15 years
   e. More than 15 years

Executive Talent Needs:

9. On a scale of 1 (Very Low Demand) to 5 (Very High Demand), how much demand is there for C-Level positions in your industry?

   a. Chief Executive Officer (CEO)
   b. Chief Technology Officer (CTO)
   c. Chief Financial Officer (CFO)
   d. Chief Operating Officer (COO)
   e. Chief Marketing Officer (CMO)

10. On a scale of 1 (Very Low Demand) to 5 (Very High Demand), how much demand is there for these director-level roles in your industry?

   a. Production director
   b. Supply chain director
   c. Research & Development (R&D) director
   d. Operations director
   e. Quality assurance/control director
   f. Finance director
   g. Information Technology (IT) director
   h. Human Resources (HR) director

i. Customer service director

11. On a scale of 1 (Very Low Demand) to 5 (Very High Demand), how much demand is there for these middle-management-level roles in your industry?

a. Production manager
b. Supply chain manager
c. Research & Development (R&D) manager
d. Operations manager
e. Quality assurance/control manager
f. Finance manager
g. Information Technology (IT) manager
h. Human Resources (HR) manager
i. Customer service manager

12. Are there any other positions that are not listed above that you find to be relevant in your industry? Please specify. [Short answer]

Talent Acquisition Challenges:

13. Rate the significance of these challenges when recruiting high-level talent in your industry:

a. Difficulty in scouting candidates with the desired expertise.
b. Difficulty in attracting candidates with the desired expertise.
c. High levels of competition in the industry.
d. Difficulty in negotiating salary and benefits (healthcare, vacation, etc.).
e. Geographical boundaries.
f. Cultural boundaries.
g. Large amount of time required to hire for a new position.
h. Limited internal expertise on the technical aspect of the role (new department, new technology, etc).
i. Limited internal hiring capabilities (small HR department, too busy, etc)

Talent Acquisition Strategy:

14. To your knowledge, has your company ever utilized a talent acquisition firm in the past?

a. Yes
b. No

15. Would you consider utilizing a talent acquisition firm to meet your high-level talent hiring needs?

a. Yes
b. No
c. Maybe

16. How much do you agree with the following statements?

a. “Utilizing a headhunting firm is **more cost-effective** than internal recruitment”

b. “Utilizing a headhunting firm is **more time-effective** than internal recruitment”
c. “Utilizing a headhunting firm is **more resource-effective** than internal recruitment”
d. "Headhunting firms produce candidates that **possess specialized expertise"**
e. "Headhunting firms produce candidates that **integrate successfully with the organization’s culture, vision, and mission"**
f. "Headhunting firms produce candidates that **maintain extensive social networks in industry"**
g. "Headhunting firms produce candidates that **exhibit long-term commitment and loyalty"**
h. "Headhunting firms produce candidates that **have extensive past experience"**

17. Please indicate the importance that you would put on the following skill sets for high-level talent:
    a. Creativity and innovation
    b. Interpersonal communication
    c. Prioritization
    d. Critical thinking and decision-making
    e. Active listening
    f. Leadership
    g. Organization and delegation
    h. Analysis
    i. Planning

18. Please indicate the importance that you would put on the following technical skill sets for high-level talent:
    a. Digital Fluency
    b. Big Data Analytics
    c. Programming and coding
    d. Robotics
    e. Optimization (lean manufacturing)
    f. Experience in machining, fabricating, and complex assembly
    g. Product design

19. Are there any other skill sets that are not listed above that you find to be relevant in your industry? Please specify. [Short answer]

20. What tools, platforms, methods, or channels has the company employed to find candidates? (Select all that apply)
    a. Job-portal platforms like Liepin, Zhaopin, and 51job.
    b. Social media platforms like WeChat, Weibo, and Douyin.
    c. University career/job fairs, entrepreneurial competitions, social networking events.
    d. Word-of-Mouth referrals and other traditional methods of networking.
    e. Targeted advertisements.
    f. Headhunting firms, executive search firms, or other talent acquisition services.
    g. Other (please specify): [Text Entry]

Recommendation:

21. Do you have any additional recommendations for headhunting companies operating in your industry? [Short answer]

22. Would you be interested in participating in a follow-up interview to further discuss the topics in this survey? If yes, what is the best way to reach out to you? [Text Entry]

23. Do you know any other companies that might be interested in participating in this study? [Text Entry]

APPENDIX D: Follow-up Interview Preamble

Thank you for taking the time to fill out our survey on talent acquisition in Hangzhou. We would like to schedule the interview within the next few weeks if possible. The total time of the interview would be approximately 1 hour. If you are interested in a follow-up interview with us, you can send the time and format of your intention (online/ in person) to our email.

APPENDIX E: Interview Structure and Questions

Demographics/Background Information:

1. Please tell us a little about your company and what you mainly do in it?

2. Please tell us about the company's development history and changes in the number of employees, and what factors do you think have influenced the company's past and future growth?

Talent Acquisition Needs:

3. Do you anticipate the need to hire many new higher-level positions in your company in the next 3-5 years? Why?

4. What are the main challenges you typically face when attempting to find a new hire? How have you worked to overcome them in the past?

[Potential Follow-Up Questions]

a. Are candidates difficult to find?

b. How easy or difficult is the interviewing process?

c. Were there any challenges with onboarding?

Talent Acquisition Strategy:

5. Has your company hired headhunters in the past? Please tell us the specifics.

[Potential Follow-Up Questions]

a. How did you find out about and contact headhunting companies?

b. How do you decide which headhunting company to hire?

   i. Does your company focus more on the quality of the headhunting company, or the size?

   ii. Which behavior of the headhunting companies have made/would make you feel upset or disappointed?

6. When considering the recruitment of high-level talent, what do you think are the most important skill sets (such as leadership, communication, etc.)? What technical skills do you consider most important?

7. How did you obtain information on candidates when you were recruiting internally?

    a. What are some advantages and disadvantages of these methods?

    b. How do you anticipate high-profile recruiting channels or methods to change in the near future (trends)?

Recommendation:

8. Do you have any recommendations for headhunting companies operating in your industry?

9. Is there anyone else (either at your company or at another) that you think would be interested in this survey/interview?

APPENDIX F: Glossary

Production Director/Manager	Business professionals who supervise and manage all facets of a process or project related to production and distribution.
Supply Chain Director/Manager	Business professionals in charge of organizing and carrying out an organization's supply chain initiatives with staff members, suppliers, and other stakeholders.
Research & Development (R&D) Director/Manager	Business professionals who ensure research and development activities will maintain an organization's competitive position and profitability.
Operations Director/Manager	Business professionals who oversee an organization's day-to-day operations and implement operational policies, objectives, and initiatives.
Quality Assurance and Control Director/Manager	Business professionals who monitor the staff and steps involved in production processes and ensure a company's products meet high-quality standards and are ready for sale or distribution.
Finance Director/Manager	Business professionals who build and deliver financial policies and strategies that improve the business' financial status.
Information Technology (IT) Director/Manager	Business professionals who oversee an organization's IT department, develop new methods for using software and hardware that can increase a company's efficiency and reduce costs while maintaining effective IT use.
Human Resource (HR) Director/Manager	Business professionals responsible for planning, directing and coordination human resources activities, policies and programs for a company or organization.
Customer Service Director/Manager	Business professionals who direct and manage all aspects of an organization's customer service policies, objectives, and initiatives. Develops service level standards focused on reducing response times and providing high customer satisfaction.

Note: Sourced from Fauteux et al. (2021).

APPENDIX G: Frequency Table and Heatmap of Likert Scale Averages

	Question	2	3	5	6	7	8	9A	9B	9C	9D	9E	10A	10B	10C	10D	10E	10F	10G	10H	10I	11A	11B
AVG	Digital Communication / Devices			4.27				3.36	3.50	3.36	3.45	3.45	3.19	3.33	3.57	3.48	3.52	3.38	3.71	3.57	3.52	3.24	3.43
	Production and Storage of Energy			4.00				3.40	3.60	3.40	4.00	3.60	4.20	4.60	4.25	4.50	4.40	3.75	4.00	4.50	3.80	4.00	4.20
	Biomedicine			4.33				3.83	4.17	3.83	4.17	3.80	3.50	3.33	4.00	4.17	3.50	4.00	3.17	3.17	2.83	3.33	3.33
	Information Software			4.38				3.10	3.43	3.33	3.76	3.52	2.65	3.10	3.70	3.95	3.35	3.45	3.60	3.55	3.70	2.85	3.20
	Integrated Circuits			4.13				3.63	3.88	3.50	3.50	3.38	4.00	3.75	4.25	4.00	4.13	3.63	3.88	3.63	3.38	3.50	4.00
	Smart Home Devices			3.20				4.00	3.80	3.60	4.20	4.40	4.60	4.40	4.60	4.60	4.60	4.20	3.80	3.60	4.20	4.80	4.60
	ALL			4.15				3.41	3.69	3.47	3.67	3.58	3.38	3.57	3.88	3.84	3.75	3.61	3.65	3.67	3.64	3.45	3.59
STD DEV	Digital Communication / Devices			0.86				1.43	1.44	1.37	1.47	1.50	1.14	1.13	1.26	1.30	1.10	1.21	1.16	1.33	1.18	1.02	1.05
	Production and Storage of Energy			0.63				1.36	1.20	1.36	1.10	1.74	0.75	0.49	1.30	0.87	0.80	1.30	1.10	0.87	0.75	0.63	0.75
	Biomedicine			0.75				1.34	1.21	1.21	1.07	1.17	1.26	1.11	1.15	1.07	1.50	1.15	1.07	0.90	0.69	1.37	0.75
	Information Software			0.72				1.19	1.33	1.17	1.15	1.22	1.19	1.30	1.05	0.80	1.06	1.20	1.11	0.86	0.95	1.31	1.25
	Integrated Circuits			0.78				1.22	1.27	1.22	1.41	1.32	1.00	0.97	0.97	1.00	0.78	0.99	0.93	0.99	0.86	0.71	0.71
	Smart Home Devices			0.40				0.89	1.17	1.20	0.75	0.80	0.49	0.49	0.49	0.49	0.49	0.75	1.17	1.50	0.75	0.40	0.49
	All			0.80				1.35	1.33	1.25	1.29	1.35	1.27	1.21	1.17	1.12	1.13	1.16	1.10	1.13	1.04	1.23	1.11
	A Freq	15	8		10	2	11																
	B Freq	10	17		39	13	41																
	C Freq	30	16		17	32	28																
	D Freq	4	45			24	7																
	E Freq	27				18	2																
	SUM																						

11C	11D	11E	11F	11G	11H	11I	13A	13B	13C	13D	13E	13F	13G	13H	13I	14	15	16A	16B	16C	16D	16E	16F
3.52	3.57	3.62	3.48	3.67	3.48	3.75	3.38	3.19	3.81	3.38	3.14	3.05	3.33	3.29	3.33			2.91	3.50	3.27	3.36	2.86	3.41
3.80	3.60	4.20	3.40	3.60	3.80	4.20	3.20	3.20	4.00	3.20	3.60	3.40	3.20	3.00	3.00			3.40	3.40	3.20	3.00	2.60	3.20
3.67	3.67	3.50	3.67	3.17	3.50	2.83	4.17	3.50	3.33	3.33	3.67	3.00	3.17	3.00	3.33			2.67	3.50	3.83	3.50	2.83	3.17
3.95	3.85	3.55	3.60	3.80	3.75	3.95	3.60	3.65	3.70	3.55	3.00	2.95	3.45	3.05	3.30			3.19	3.71	3.38	3.10	2.95	3.43
4.25	3.75	4.13	3.75	3.88	3.75	3.63	3.63	3.50	3.50	2.88	3.13	3.00	3.25	3.14	3.13			3.25	3.50	3.13	3.38	3.00	3.50
4.40	4.80	4.60	4.40	3.80	3.80	4.40	4.00	3.60	3.60	3.80	3.80	4.00	3.40	3.60	3.60			3.60	3.60	3.60	3.80	3.80	3.80
3.83	3.75	3.75	3.66	3.68	3.68	3.78	3.63	3.53	3.79	3.51	3.26	3.09	3.43	3.28	3.28			3.33	3.63	3.49	3.36	3.00	3.50
1.22	1.18	1.13	1.14	1.25	1.10	1.04	0.90	0.96	1.01	0.95	0.77	1.00	0.84	0.93	0.94			1.04	0.78	0.91	0.88	0.77	0.65
1.17	1.02	0.40	1.02	1.02	0.75	0.75	0.40	0.40	0.63	0.75	0.80	0.80	0.40	0.71	0.00			1.36	1.20	1.17	1.26	1.02	1.17
1.11	1.11	1.26	0.94	1.07	0.96	0.69	0.90	0.76	0.47	0.47	0.75	0.58	0.69	1.00	0.47			0.75	0.76	0.69	0.50	0.37	0.69
1.07	0.96	1.24	1.07	1.03	0.89	0.86	0.58	0.73	0.71	0.92	0.63	0.92	0.67	0.80	0.64			0.96	0.88	0.84	0.92	0.59	0.79
0.66	0.66	0.60	0.66	0.78	0.83	0.86	0.70	1.12	0.71	0.93	1.17	1.00	0.97	1.12	0.60			1.20	0.87	0.93	0.48	0.71	0.71
0.49	0.40	0.49	0.49	1.17	1.47	0.49	0.63	0.80	0.80	0.75	0.75	0.63	1.02	1.02	1.02			1.02	1.02	1.02	0.75	0.75	0.75
1.14	1.06	1.07	1.01	1.09	1.01	0.97	0.84	0.95	0.85	0.91	0.91	1.00	0.86	0.95	0.87			0.98	0.85	0.90	0.92	0.84	0.80
																66	59						
																23	9						
																	21						

16G	16H	17A	17B	17C	17D	17E	17F	17G	17H	17I	18A	18B	18C	18D	18E	18F	18G	20A	20B	20C	20D	20E	20F
3.00	3.23	3.91	4.23	4.14	4.09	4.32	4.36	4.41	4.41	4.27	4.23	4.14	4.14	3.68	4.23	3.91	4.00						
2.60	3.00	4.00	4.00	4.00	4.00	4.00	4.40	4.60	4.40	4.40	4.20	4.00	3.60	3.80	4.00	4.00	4.20						
2.83	3.17	3.83	4.00	4.00	4.33	4.17	4.33	4.00	4.17	4.00	3.83	3.67	3.17	3.17	3.67	3.50	3.83						
2.90	3.19	4.38	4.43	4.19	4.24	4.14	4.29	4.19	4.52	4.24	4.19	4.10	4.05	3.90	3.90	3.38	3.95						
3.00	3.25	4.13	4.13	3.75	4.00	3.88	4.25	4.25	4.25	4.00	3.88	3.63	3.88	3.88	4.38	3.63	4.13						
3.80	3.80	4.00	4.60	4.40	4.40	4.40	4.40	4.60	4.20	4.20	4.40	4.20	3.80	3.80	4.40	4.20	4.40						
2.99	3.32	4.05	4.36	4.12	4.21	4.24	4.42	4.37	4.42	4.34	4.19	4.09	3.92	3.79	4.12	3.82	4.06						
0.80	0.79	0.67	0.90	0.76	0.85	0.76	0.77	0.72	0.72	0.86	0.60	0.77	0.69	0.92	0.73	1.04	0.74						
0.80	1.10	0.63	0.63	0.63	0.89	0.89	0.49	0.49	0.80	0.80	0.75	0.89	0.80	0.75	0.63	0.63	0.75						
0.37	0.69	0.69	0.58	0.82	0.75	0.69	0.75	0.82	0.90	0.82	0.69	0.75	0.69	0.69	0.75	0.76	0.69						
0.61	0.73	0.58	0.73	0.79	0.87	0.83	0.76	0.73	0.66	0.87	0.79	0.81	0.65	0.92	0.92	0.95	0.72						
0.50	0.66	0.60	1.05	0.66	1.12	1.05	0.83	0.97	0.83	1.12	0.60	0.99	0.60	0.78	0.70	0.86	0.78						
0.75	0.75	0.63	0.49	0.49	0.49	0.49	0.49	0.49	0.40	0.40	0.49	0.40	0.75	0.75	0.49	0.75	0.49						
0.81	0.79	0.68	0.75	0.72	0.77	0.79	0.73	0.75	0.69	0.78	0.66	0.82	0.80	0.87	0.78	0.91	0.76						
																		72	40	48	30	13	44

APPENDIX H: Interviews Notes (Translated to English)

Item 1: Company A Interview Notes

Interviewer(s) : Yuran Xue

1. **Please tell us a little about your company and what you mainly do in it?**
    a. Company A is a high-tech enterprise focusing on artificial intelligence technology development, including industrial applications and providing personalized solutions. We hold intellectual property rights to the world's leading artificial intelligence video analysis core technology, as well as rights to computer vision, image processing, pattern recognition and other software; we are in the field of intelligent applications for gas, water, energy and other areas to provide customers with competitive, safe and trustworthy products, solutions and services. We focus on the use of AI technology to help industries to realize the comprehensive uses it has when it comes to the goal of "automation and intelligence" in their industry. This is how we create value for our customers.
    b. As an employee, I am responsible for the development and implementation of various management systems in our company; I also manage the daily needs of the human resources department, as well as the development of work performance programs and employee relationship management; management of administrative daily affairs; and the management of corporate intellectual property rights and qualifications.

2. **Please tell us about the company's development history and changes in the number of employees, and what factors do you think have influenced the company's past and future growth?**
    a. Our company was established in 2019. Our current number of employees in the company (including internship positions and part-time employees) is more than 200.
    b. Factors affecting the company's past and future development: changes in market demand; enterprise science and technology research and development capabilities; diversified business, a significant increase in personnel, and changes in management model because offices are cross-regional.

3. **What are the main challenges you typically face when attempting to find a new hire? How have you worked to overcome them in the past?**

a. Challenges: few job-matching candidates, adjustments in talent profiles, unfixed project scheduling time points.

b. Solution: sort out project hiring needs and find matching talent by identifying clear candidate profiles.

Follow-up questions

- **Are candidates difficult to find?**

  According to the changing market environment, the difficulty of recruiting candidates at different time points varies.

- **How easy or difficult is the interview process?**

  The interview process is relatively smooth but the response time to candidates can sometimes be long.

- **Were there any challenges with onboarding?**

  Salary mismatch/personal plan inconsistency.

4. **Do you anticipate the need to hire many new higher-level positions in your company in the next 3-5 years? Why?**

In recent years, the market technology is developing fast, which puts higher demands on the R&D capability of the company. There is a demand for more complex talents, such as project managers who have project management ability and need to be familiar with the knowledge of platform development.

5. **Has your company hired headhunters in the past? Please tell us the specifics.**

We have contacted headhunters but have not cooperated with them to date. We instead mainly use the Liepin network to provide headhunting services, guaranteed to match the relevant personnel on board for one month. However, due to the small talent pool of Liepin itself, the recruitment effect is not ideal, so cooperation with headhunters has been put on hold.

6. **When considering the recruitment of high-level talent, what do you think are the most important skill sets (such as leadership, communication, etc.)? What technical skills do you consider most important?**

Leadership is critical and transcends business skills in importance. Leaders need more decision-making and execution power, the ability of comprehensive coordination, cross-departmental collaboration, and the ability to promote cooperation between teams to promote the smooth implementation of the company's strategy.

7. **How do you get information about candidates?**

Follow-up questions

- **What are the advantages and disadvantages of these methods?**

Human resources service platform: large talent pool, push more candidates, but the matching degree is low.

Informal recruiting occasions: there is a basic understanding of the candidates, but the circle of contacts is restricted and the number is small.

- **What trends do you expect to see in high-level talent recruitment channels in the future?**

Internetization, process specialization.

8. **What do you like or dislike about the services of headhunters?**

The service method is not transparent enough, unilaterally emphasizes the advantages, conceals the potential problems that may exist, and does not carry out risk warning.

9. **Do you have any recommendations for headhunting companies operating in your industry?**

The pool of job-matching candidates is small. Based on the future demand for composite talents becomes bigger, help reserve talents to plan their careers and prepare in advance.

Item 2: Company B Interview Notes

Interviewer(s) : Zixuan Ye, Rangjie Zhu, Yuran Xue

1. **Please tell us a little about your company and what you mainly do in it?**

   I am responsible for human resource management at Company B which includes talent cultivation, social recruitment, and university recruitment. I focus on university recruitment. Company B is in the financial technology industry that targets the financial technology (fintech) industry in general including banks, security companies, and insurance companies.

2. **Please tell us about the company's development history and changes in the number of employees, and what factors do you think have influenced the company's past and future growth?**

   There are about 1500 employees at the company, 90% of which are technical staff. Factors that affect the company's past and future development include development of the general fintech industry. More than 20 years ago, domestic financial institutions still manual review their credits, statements, and financial data while the U.S financial sector was already relatively developed and adopted by Wall Street using mathematical models to computerized finance. There is such a demand in China to adopt similar financial technologies up until the present financial reforms by the national financial institutions. For example, rating requirements for bonds. Recent developments are fast because the demand for fintech is still increasing. Up until 2010, awareness of job positions was weak then gradual accumulation up until 2020 when there was rapid development.

3. **What are the main challenges you typically face when attempting to find a new hire? How have you worked to overcome them in the past?**

   Because of the relatively high complexity and entry threshold/barriers of our business, for middle and senior personnel, industry experience will be lacking. For example, for the recruitment of a development director, aside from technical requirements, they need to also understand the fintech industry and the regulations for the financial business. Some product manager candidates may have rich experience with the technology but does not necessarily

meet the needs for understanding the industry demand, requirements, and standards of the company.

Follow-up questions

- **Are candidates difficult to find?**

  For middle and senior talents, excellent job-matching talents are scarce or relatively stable in peer companies - they are typically also very prudent. The cycle of changing jobs is different from fresh graduates. We still need some more channels to obtain information on outstanding talents. This is a relatively big challenge, so we are recruiting high school students. Channels for middle and high-level talents run in parallel.

  It will be very difficult to find a special match. If the personnel are particularly matched, he may not consider changing jobs now, or may have other demands.

4. **How did you obtain information on candidates when you do recruiting internally?**

   There can be some recommendations from employees within the company. For example, some employees may have worked in the same company that are also in the business before and may also know some former colleagues.

5. **Do you anticipate the need to hire many new higher-level positions in your company in the next 3-5 years? Why?**

   In the past two years, the demand for senior technical personnel is not large because the expansion period has ended and the general environment in the past two years has not been particularly good. Right now, business talents are favored - perhaps when expanding to 2,000 or 3,000 employees, technical talents will be considered again. The in-house research development team will iterate slowly from a small scale, and will not consider extensive recruitment because innovations are generally small and infrequent - considering new technology is difficult because old products used at many customers' sites. This poses a significant challenge to the stability of the system.

6. **Has your company hired headhunters in the past? Please tell us the specifics.**

   Headhunters have been hired before.

Follow-up questions

- **How did you find out about and contact headhunting companies?**

  Some of them are headhunters with previous experience and may have worked with them. Another way is that headhunting will also take the initiative to find us. We will also proactively search for headhunters with good reputation in the industry.

- **Does your company focus more on the quality of the headhunting company, or the size?**

  We give priority to service awareness/consciousness and professionalism and not scale. Finding the right talent is the most important; whether to guarantee the landing of talents is the icing on the cake. We can handle the subsequent processes. If we are satisfied with the service, we will consider long-term cooperation.

- **Which behavior of the headhunting companies have made/would make you feel upset or disappointed?**

  Failing to get the company's actual needs, they may have misunderstood, or the candidates they recommend are not matched. Professionalism is understanding the pain points of demand in advance. After exchanging with the headhunter, there is still no clear understanding of the demands leading to repeated/iterative exchanges - this is most resented.

7. **What trends do you expect to see in high-level talent recruitment channels in the future?**

   Social relationship. Headhunting will trend away large and comprehensive - not enough depth. Headhunting may appear more for a certain industry with a demand for a certain type of talent and have a fuller talent pool. In this case, the candidate recommended will be more accurate.

Item 3: Company C Interview Notes

Interviewer(s) : Aodi Wang, Haoming Wen , Yuran Xue

1. **Please tell us a little about your company and what you mainly do in it**?

   I am a human resource business partner (HRBP) at Company C which is a cloud-based music platform.

2. **Please tell us about the company's development history and changes in the number of employees, and what factors do you think have influenced the company's past and future growth?**

   The company is now entering the relatively matured stage after rapid growth from the early stages and since Company C is an online platform, it needs professional and experienced (senior) technological experts. These experts have to be able to integrate into the corporate culture and utilize other professional talent in order to boost its commercialization value through higher quality and quantity (of registered) membership, advertising, pan-entertainment, and other internet cash flow methods.

3. **What are the main challenges you typically face when attempting to find a new hire? How have you worked to overcome them in the past?**

   We have different problems at different stages in the recruitment process. These challenges include limited internal search dimension of candidates and how to accurately determine the target company's candidates as well as attracting these talents. Difficult because excellent talents do not lack opportunities and job offers.

   Follow-up questions

   - **How easy or difficult is the interviewing process for high-level talents?**

     We think it is not divided into high-level and general personnel - all interviews are structured and skillful. The focal point of the interviews is to judge the qualities of the candidates. For example, professional qualities and soft-skills. Based on the responses, our interviewers are trained to ask follow-up questions. However, high-level candidates will need to be evaluated further for other qualities.

4. **Has your company hired headhunters in the past? Please tell us the specifics.**

We have used headhunters for some of our key job requirements because we look for talents in relatively deep professional fields while there are very few talents in more sophisticated and narrow areas such as social live broadcasting and community direction of our content. Company C like any other major internet platforms look for these talents and headhunting could hopefully help reduce cost and control the budget.

Follow-up questions

- **How did you find out about and contact headhunting companies?**

Recommended by parent company using a headhunter database. We will also do self-expansion based on past experiences cooperating with headhunters. Some headhunters will also reach out on their own.

- **When talents are urgently needed, can internally training keep up with tight demand?**

We do both internal training and external selection. However, relatively speaking the time cycle of internal training will be longer because it takes time to prepare for future development. For example, if some positions core to our team need to be replace soon, it's difficult to immediately train recruits to fulfill the skill and ability gap.

- **Does your company focus more on the quality of the headhunting company, or the size?**
  - We think willingness is an important factor. We want to ensure that the headhunter invests effort and a highly capable and especially competent, team to help us. Another factor is whether the headhunter can communicate with and influence talents. Past success stories can help us determine this.
  - We won't have any inclination about the size of the headhunting company because headhunting is an industry where recruitment is based on results.
- **Which behavior of the headhunting companies have made/would make you feel upset or disappointed?**

Many headhunters not only support Company C but also other companies in the industry as well - potentially rival companies. Because of this case, we will worry about the leakage of our information.

5. **When considering the recruitment of high-level talent, what do you think are the most important skill sets (such as leadership, communication, etc.)? What technical skills do you consider most important?**

Our requirements for technical personnel are divided into different situations. One independent contributor and one with a team. The person working with a team needs to have basic management and leadership skills while also possessing excellent technical (coding) and professional foundations. At the same time, this person needs to understand the business and have product consciousness to provide quality feedback. That is, the high-level managers of Cloud Music would have climbed up from a professional field and not from a management field. For independent contributors, we are not too demanding on management skills but higher technical requirements.

6. **How do you get information about candidates?**

We judge what resources are currently on hand and talent pool priority for operations positions. We then assess if this talent pool is not enough and may affect the product. If so, we will be looking for headhunters' help.

Follow-up questions

- **What trends do you expect to see in high-level talent recruitment channels in the future?**

  We think headhunting will still be needed if high-end positions need to be filled in a short time. It is difficult to get updated information about candidates from online resumé. Generally, it is a problem of poor information. We also think social networking platforms like Maimai are gradually replacing Linkedin.

7. **What do you like or dislike about the services of headhunters?**

During the offer phase, if any risks are identified, the business team will be promptly reminded and responsible for the landing of candidates after they enter the company. Headhunting companies tend to adopt a sales model and do not care about other risks (opaque and hidden) and subsequent landing, preferring packaging.

Item 4: Company D Interview Notes

Interviewer(s) : Haoming Wen, Yuran Xue

1. **Please tell us a little about your company and what you mainly do in it?**

Company D is a global provider of AIoT product solutions and full-site capabilities. The company is formerly known as the Storage and Multimedia Division of H3C. I am primarily responsible for recruiting, the process of regulations of some recruitment guidance, and the overall performance management of the company.

2. **Please tell us about the company's development history and changes in the number of employees, and what factors do you think have influenced the company's past and future growth?**

In 2011, Company D mainly focused on the video surveillance business in the previous period. Then we expanded business on displaying and controlling products, such as large screens of LED and LCD. Now we are actively developing energy storage. Earlier in the year, outdoor camping is very popular, a lot of cooking equipment and phones need to be recharged, so people will always bring an outdoor power source. And also in Europe and the USA, the entire power supply system is not stable enough, so there is also a lot of market space for home energy storage. The market and demand have influenced our development trend. For the development of the company, there are two important parts. The first part is that, can we seize the opportunity. The second part is, after we seize the opportunity, can we combine the opportunity and the products with the business model or policies. From the perspective of HR, energy storage is the opportunity, can we recruit someone who understands this area?

Company D has more than 10,000 employees, but I still think Company D is a small and medium-sized enterprise.

3. **What are the main challenges you typically face when attempting to find a new hire? How have you worked to overcome them in the past?**

a. When we want to recruit talents for our new business, such as energy storage, sometimes talents are suspicious of the stability of the business. Candidates will doubt whether the

company makes a very careful decision about expanding business to this area, or whether the company will make a long term investment in the new business. We need to ensure that candidates can trust us.

b. Some sectors, such as energy storage, were not popular, so the talents in these sectors are very scarce. So the competition is very intense. The company's talents used to work for may raise their salary, set favorable policies, give long-term incentives to retain and bind them to the development of the company.

Follow-up questions

- **How easy or difficult is the interviewing process?**
  - Easy. This part is not a problem.

4. **How did you obtain information on candidates when you were recruiting internally?**

Our own recruitment website, some normal platforms such as Qiancheng and Lieping, and campus recruitment.

5. **Do you anticipate the need to hire many new higher-level positions in your company in the next 3-5 years? Why?**

Yes. We are developing a lot of new business which includes a lot of fast updated technology areas, so there is some demand for high-level inter-disciplinary talents. For example, a management researcher, or R&D leader. We have some demand but not too much for these high level talents, because we want the core talents who have teams. If we recruit these core talents, they can bring their teams over. Our demand for technical talents is more than the demand of management talent, because the main category of the talents we want should have both technical skill and management skill.

6. **Has your company hired headhunters in the past? Please tell us the specifics.**

Follow-up questions

- **How did you find out about and contact headhunting companies?**

Headhunting companies reach out to us.

- **Does your company focus more on the quality of the headhunting company, or the size?**

  Both of them are important. Quality is the most important. If the size of the headhunting company is small, the talent database will also be small. And also mostly small companies only focus on a small amount of sectors, the reusable value of these companies is small.

- **Which behavior of the headhunting companies have made/would make you feel upset or disappointed?**

  Cannot understand the requirement of talents well. Service price. Make mistakes on the background of candidates. Being too enthusiastic and too aggressive about providing service.

7. **What trends do you expect to see in high-level talent recruitment channels in the future?**

   Headhunting companies may segment the field in the future. High-level talents are basically less likely to come forward to get a job (job-hunting), you need to contact them proactively.

8. **Do you have any recommendations for headhunting companies operating in your industry?**

   Understand the requirement of talents better. The relatively quick exchange of information of talents between headhunting companies and us.

9. **What qualities are you looking for in talents?**

   Most important: cardinal virtue (prudence, justice, temperance, fortitude).

   Communication ability. Learning ability. Teamwork ability. Anti-pressure ability.

   Problem solving ability. Logical thinking ability.

Item 5: Company E Interview Notes

Interviewer(s) :Chengyi Ye, Yuqi Xuan , Yuran Xu

1. **Please tell us a little about your company and what you mainly do in it?**

   We are a bio-company that works on stem cells. Two years ago our company had the IQP project with WPI. Our company is one of the more cutting-edge companies in genetic science and jointly built by top-notch scientists and academicians in China as well as the United States. And also we are the first company to combine medical treatment and the use of stem cells for daily makeup. Our company is involved from the technology side to the consumer connection side. I am in charge of the overall operation here.

   Company Goal: Using technology as a precursor, after the second phase of clinical application is formed in a certain field, basically you will be able to get to market. This is not only going to the market to sell market capitalization, but also going on the stock.

2. **Please tell us about the company's development history and changes in the number of employees, and what factors do you think have influenced the company's past and future growth?**

   Ethic constraints: From the IQP two years ago, we know that research on stem cells in the U.S is subject to legal restrictions because of the conflict between ethics and science. The same as two years ago, their research field is still subject to regulations. The issue for our company is not whether the technology can be developed, but whether the regulations will permit it.

   Scope of application: Actually there are tons of applications in real medical clinical applications such as burn wounds and various surgical wounds. It is able to treat wounds with stem cells. Stem cells can also directly intervene in disease, such as cancer. Then there are also some that are used in the reconstruction of human organs. In the human body, for example, if you break your leg, it's impossible to say that it will grow back, but with stem cell technology, it is possible for you to grow it back. And also in some very top fields,

including artificial hearts. These artificial internal organs can be cultured with stem cells, and then do human transplants. So it's actually widely used in clinical medicine.

Non-medical field (cosmetics): Cosmetics are used externally. The standards for its use and its scientific standards are completely different from those of other systems. Will the stem cells be involved in hormones? Proliferating where you shouldn't be proliferating? Just targeting the target to proliferate? So it has higher technical requirements for cosmetics.

In addition to the general environment just mentioned, it is making non-stop breakthroughs at the technology and application level.

1. **Do you anticipate the need to hire many new higher-level positions in your company in the next 3-5 years? Why?**

Medical field *[Only technical talents]:* The field of our company involves both regulations and the expansion of these application scenarios. From now on, most of the time we are in urgent need of technical talents so that we can make a breakthrough in gene segment, culture fluid, or technical operation. About the operational level, it is not so demanding, because if you really have a good thing, for example you can cure the disease to save lives, you can fight cancer, then I believe there must be a market. If you have a great operational talent, claiming that we have nailed one medicine which can solve cancer, but in fact the medicine has no effect, then this is useless.

Non-medical field (cosmetics) *[Both operational talents and technical talents]*: We are the only company that is allowed to use stem cells on cosmetics. From the market point of view, it is very large. But from the practical point of view, it is also quite cruel because the competition is too strong. Other companies use a louder voice and more money to publicize. We have the real technology, but it's being treated like it's fake. It could be one of the relative shortcomings of the operation. So from the perspective of development, we will further strengthen our operation level. About the technology, we will expand in the traditional cosmetic field to become more advanced, more effective, and safer.

3. **What are the main challenges you typically face when attempting to find a new hire? How have you worked to overcome them in the past?**

It is difficult to meet talent requirements. When we are writing a portrait of a talent, I want this person to be perfect, but the fact is that all talents are specialized, it is not possible for him to have all of the ability A, ability B, and ability C. The degree of match rate can have a 70% is already very high.

Also, how much is it going to cost us to attract these talents and then provide them with what kind of a stage so that he can really play a role?

4. **Has your company hired headhunters in the past? Please tell us the specifics.**

Not considering hiring them now.

Technical talents: As I mentioned before (talents requirements), headhunters cannot help us to find technical talents.

Operational talents: **First:** the first cost of talents (not the cost of hiring headhunters) will be high. For example in Hangzhou, I want to find Internet operation talents, maybe these kind of talents are all over on the Lieping (website) . But if you hire headhunters, they may help find a very high-level talent. We don't know what position to give the very high-level talents, the same as the salary.

Second: talents won't be able to fulfill their abilities when they are mismatched. For example, Alibaba began layoffs last year. In fact, it is difficult for high-level operation talents there to find another job because other companies cannot reach the scenario of their original work. These talents are useful for Alibaba because the system is too complete, only a very few companies can have the same complete system.

Third: for finding regular talents, the time cycle is very long for headhunters to find candidates, and headhunters can only recommend to you a very small account of candidates.

Fourth: Even if I could recruit one or two suitable talents with the help of headhunters, how long will they be able to stay?

So in short, we will not consider hiring headhunters. But in the future, one day there is a breakthrough in both policy and regulations and our technology. Then it's very likely that

we'll see exponential growth. In this case, the structure for our company will be changed to be more complete. Every key node needs professional input, we will hire headhunters. For now, when we talk about headhunters, the vast majority of the sense is for an extremely core person. But when our scale is expanded to regular force later, most likely it means middle and upper positions.

5. **When considering the recruitment of high-level talent, what do you think are the most important skill sets (such as leadership, communication, etc.)? What technical skills do you consider most important?**

Technical Talents: These kinds of talents have to be recommended by authoritative experts, and be approved by the president of their hospital (for example: by Rengduo Chen, one of the highest authorities in the field of dermatology in China). The technical talents should be heard of, if authoritative experts have not heard the name of the talent, it means the talent is not good enough.

Operational Talents: Being able to help me deal with the regional government, and the regional government can respond by providing some of the corresponding high-level and high-tech enterprise policy. For example, returnee talent policy, high-tech enterprise policy, green channel for medical listing, etc. Or they are able to link to some system of values in specialized fields.

6. **How did you obtain information on candidates when you do internal recruiting?**

Websites such as Qianchengwuyou (前程无忧). Talents have to be recommended by authoritative experts.