Will Résumé Data Tell Stories About Job Skills?
Content Analysis of the Russian IT, Internet, and Telecom Industry

Fengchen Wang(✉), William Attatsitsey, and Natalia Volkova

School of Economics and Management, National Research University-Higher School of Economics (HSE University), St. Petersburg, Russia
fwang@hse.ru, uattachichey@edu.hse.ru, nv.volkova@hse.ru

Abstract. Recruitment has been more streamlined, more convenient, and less time-consuming thanks to the advent of digital technology, which enables employers or recruiters to scan through a bank of job seekers' résumés on the job site. As a result of the advancement of e-recruiting, which allows job seekers to exhibit their work-related and education-related experiences, ac-accomplishments, interests, and skills, the digital résumé has emerged. It is critical for both employers and employees to find job skills and relevant experience that match the work required for the role. This study employs a data mining-based content analysis approach, providing a deep insight into the job skills possessed by 5466 job applicants in the IT, Internet, and Telecom industry located in St. Petersburg, Russia. The results report those job seekers place significantly more emphasis and attention on hard skills than soft skills. Some of the main soft and hard skills include project management, team management, negotiation skills, analytical skills, presentation skills, git, javascript, SQL, Linux, Java, and HTML. The demand for English as an essential skill in the workplace has gradually increased as job seekers get younger.

Keywords: Content analysis · Job skills · Soft skills · Hard skills · Digital HRM

1 Introduction

The drastic socio-economic transformation of the labor market that characterized the post-Soviet Union era continues to exist in Russia today. The general demand for specialized professional skills among employers and learners has decreased as formal education has advanced steadily. There were numerous possibilities for employees to further their education or develop their professional skills. However, the type of education and professional skills acquired may vary across positions and generations.

[1] posited that there is a causal link between how people are managed and organizational performance. They argued that the effectiveness of human resource practices, particularly employee selection procedures, performance appraisals, rewards, training, and development often have a direct bearing on organizational productivity and performance. In a similar vein, [2] demonstrated that people and their knowledge, skills, and experience are essential elements of human capital that employees take with them when leaving. On the other hand, being a primary component of intellectual capital, these intangibles lead to economic benefits. If human capital is this crucial to firm performance,

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organizational value creation, and survival then business managers must be cognizant of the transformation of the labor force to adapt management practices accordingly. There is a "growing skills instability" where new technologies will disrupt current job competencies requirements. Most employees will need significant reskilling and upskilling in the very near future.

Recent changes in hiring procedures show that both job seekers and recruiters are increasingly turning to the internet [3]. In the past decade, e-recruiting has spread globally and has become a leading e-commerce application. Both job seekers and recruiters benefit greatly from its many conveniences. Employers in need of staff use it to post job openings and look for talent pools, and job seekers use it to look for openings and apply online in a matter of minutes [4]. Typically, résumés present a systematic, professional profile of an applicant that includes their strengths, accomplishments, interests, talents, and work-related and education-related experiences [5]. The résumé is a critical means for assessing the potential suitability of the applicant for a job position [6]. The emergence of digital résumé is due to the development of e-recruiting. Digital résumés allow for automated processing, such as candidate ranking, comparison, pre-selection, search, and storage [3].

According to [7], as technology and automation advance only employees with a balance of soft and hard skills will have a future job. The lack of soft skills can sink a promising career for someone who has the technical ability and professional expertise but no interpersonal qualities [8]. This study aims to answer the following questions:

- What are the common hard and soft skills for the active labor force in the Russian IT, Internet, and Telecom industry?
- To what extent do these skills vary across different generational groups?

Consequently, our motivation is to examine current skills make up in the labor market specifically the IT, Internet, and Telecom industry; and provide valuable insights and recommendations to both business managers and employees.

2 Methods and Materials

2.1 Data Mining-Based Content Analysis Approach

Content analysis is a highly flexible research technique that enables inferences to be based on a text considering the context in which it was written and read [9]. The technique of content analysis has been widely used in information and communication studies with varying research goals and objectives [10]. Owing to the objectives of this study, the researchers utilized both qualitative [11] and quantitative content analysis [9] approaches in an integrated manner, so that the implementation of one approach could support the findings of the other. With reference to the guidelines of [12, 13], we employed a "data mining-based content analysis approach" in RStudio, which enables to automatically search and classify words, and quantify disclosures based on a dictionary.

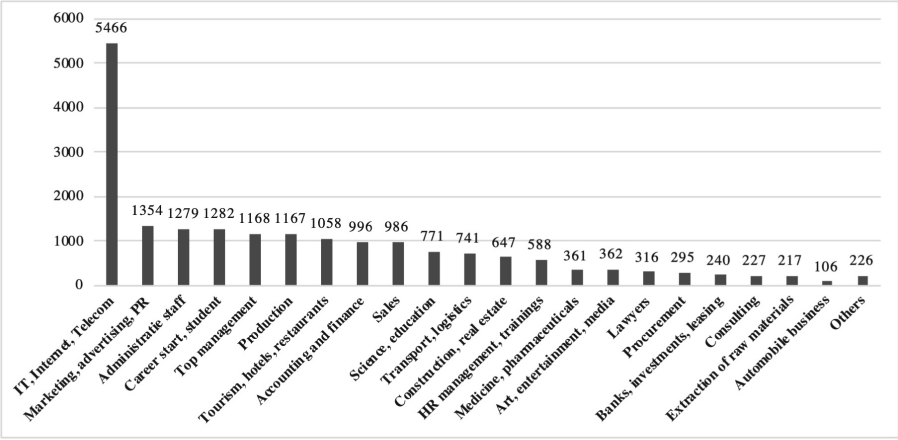

Fig. 1. Frequencies distribution chart by job specializations

2.2 Sample Data

The dataset includes anonymized résumés submitted by job seekers from HeadHunter, the largest job portal in Russia. The original data was cleaned and reorganized in accordance with the study's goal to analyze 19,853 résumés submitted by candidates in St. Petersburg as of the publication date in August 2019. Our research is based on 5,466 résumés with specializations in the IT, Internet, and Telecom industries, which represent 27.53% of the whole data sample. The overall breakdown is shown in Fig. 1.

3 Findings and Discussion

IN line with the theory of generations [14] and Russian sociocultural background [15], all the participants were divided into three generational groups, namely Gen X (born 1960–1979), Gen Y (born 1980–1994), and Gen Z (born 1995–2010). The majority of applicants working in the IT, Internet, and Telecom industries are in the Gen Y cohort, which is not surprising since this generation is currently the most active working population. Additionally, according to the nature and function of the applicant's current or most recent job position, all the job positions were categorized into two levels, namely managerial level, and non-managerial level. The managerial positions consist of positions recorded as chief officer, director, senior, head, lead, supervisor, manager, found and owner. Conversely, non-managerial positions consist of positions recorded as developer, engineer, coordinator, etc. Managerial positions accounted for 39,02% of the applicants as against 60.98% non-managerial positions.

Soft Skills versus Hard Skills. Per the review of literature on human capital, the research team identified two important job skill categories - Soft and Hard skills. Soft Skills are character traits that enhance a person's interactions, job performance, and career prospects [16, 17]. Whereas Hard Skills are accomplishments that appear on résumés, such as education, work experience, knowledge (i.e., mathematics), and level of expertise (i,e., ability to use software programs) [16].

Table 1. Top 10 hard skills and soft skills

#	Hard Skills	Freq.	#	Soft Skills	Freq.
1	SQL	2343	1	Presentation skills	404
2	Git	2186	2	Team management	366
3	Java/JavaSE/JavaEE	2035	3	Teal-leading	311
4	JavaScript	1653	4	Negotiation skills	286
5	Linus	1593	5	Organizational skills	199
6	CSS/CSS3	1493	6	Business analysis	178
7	HTML	1117	7	Team-work	172
8	MySQL	994	8	Sales skills	168
9	Atlassian JIRA	943	9	Time management	163
10	C/C++	927	10	Leadership skills	161

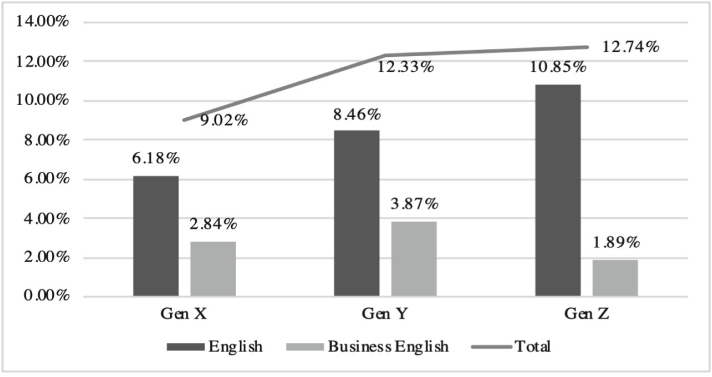

Fig. 2. Demands comparison of English skills by generations

Soft Skills. Our result shows that the overall frequencies of soft skills are less than the hard skills. As shown in Table 1, "Presentation skills" has the highest frequency at 404, followed by "Team management" (366), "Team-leading" (311), and "Negotiation skills (286)" in all. Among these soft skills, the skills directly related to "team" have been significantly emphasized. For instance, as in, "Team management", "Team-leading", "Team-work", "Team building", and "Team-player".

Hard Skills. The 10 most reported hard skills by job applicants shown in Table 1 relate to the programming language and software frameworks. "SQL" ranked first, occurring 2,343 times, followed by "Git" 2,186 times, and then "Java/Java SE/Java EE" with a frequency of 2,035. Job applicants from the IT industry have presented more hard skills to their prospective employer with less or non-existent soft skills.

With increasing globalization, job applicants can no longer meet the needs of the market just by possessing hard skills. One significant demand of job applicants today

is to be able to speak several languages, acquire cross-cultural competence and knowledge about other countries and societies, such hard skills and qualifications are defined as transnational human capital [18]. One revelation in this study is that the foreign language skill dimension of transnational human capital was specifically highlighted by job applicants. There are two English language skills categories, General English and Business English. All three cohorts showcased their general English language skills with some amount of business English proficiency as well. The general English language increased at a rate of 2% for every generation, from 6.18% of Gen X to 10.85% of Gen Z. Gen Y has the highest demand for business English at 3.87% which is higher than the rest. This is illustrated in Fig. 2.

4 Conclusions

What is evident in our result is that applicants report more hard skills than soft skills as unique selling attributes. Job applicants' Self Presentation downplays the impact of soft skills on their overall job performance. Soft skills should not only be preserved for managers only. Additionally, we found out that more women in the Gen Y category are acquiring hard skills than their male counterparts and in line with literature women are significantly represented in the IT, Internet, and Telecom industry in Russia. This encouraging trend is expected to continue for the "social media Generation", Gen Z.

It is expected that IT and high-tech industries will become the main drivers of growth of the Russian economy, creating well-paid job opportunities locally and making inroads into the very competitive international markets. This can be achieved within the shortest possible time owing to the Russian government political support, the latest scientific developments, and highly professional developers of high-tech equipment and software.

We, therefore, recommend that IT professionals and other job seekers include soft skills training in their individual development plans; develop and present themselves holistically as having competencies in both soft and hard skills. Secondly, people managers and employers in the customer service-oriented IT, Internet, and Telecom industry must factor soft skills training into curriculum and development programs in order to deliver value to customers.

To sum up, reforms are required at all levels of education to address the concern of business managers about the lack of soft skills of IT, Internet, and Telecom professionals. This will not only sustain the employability of employees but will also deliver valued customer-centric services.

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