

Workplace Selection Preferences of Electrical Engineering Students of Hungarian Universities – Early Research Findings

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Abstract: The research explores the workplace selection preferences of Electrical Engineering (EE) students in Hungarian universities. The theoretical framework of the interdisciplinary research is guided by employer attractiveness, career decision making, social network, and migration theories. Early research findings based on key informant interviews provided interesting insights. On-line surveys and interviews with EE students are ongoing to expand findings and to answer all research questions.

Keywords: employer attractiveness, career decision making, social capital, social network, migration, electrical engineering students, Hungarian labour market, mixed methods research design

Introduction

This research investigates the workplace selection preferences of electrical engineering students of Hungarian universities. It has been documented that in recent years there is a shortage of engineers in Hungary. A research by Manpower (2015) concluded that between 2010 and 2015 the professional talent shortage increased globally, as well as in the EMEA¹ region, and in Hungary. The research also noted that engineering was one of the top four ‘hardest to fill positions’ globally between 2006 and 2015. Engineering was named as one of the three most significant career opportunities and as the second most critical profession in terms of the future of Hungary (Manpower, 2015). The criticality of the engineering profession combined with the difficulty to fill open engineering positions creates challenges to the Hungarian economy (MTI, 2015; Sági, 2015).

The demand for highly skilled engineering talent is rising in Eastern Hungary. Several high-tech, multinational companies announced investment plans into Eastern Hungary. The total investment value is close to 400 billion Hungarian

¹ EMEA = Europe, Middle East, Africa

forint (around 1.2 billion Euro), and the number of planned new workplaces around Debrecen is more than 4000 (Trangbaek, 2015; autopro, 2015; MTI, 2016; HIPA, 2016; HBN-PA, 2017; HAON, 2017a; HAON, 2017b; HAON, 2018). Table 1 below lists the high-tech, multinational companies which announced investment plans into Eastern Hungary, the investment values, the number of new workplaces planned to be created, and the location of their investments.

Company name	Investment value (HUF)	Number of new workplaces	Location	Source
National Instruments (ni.com)	5.5 billion	210	Debrecen	(HIPA, 2016)
Lego (lego.com)	30 billion	1600	Nyíregyháza	(Trangbaek, 2015; MTI, 2016)
Continental (continental.com)	5.1 billion	681	Debrecen	(autopro, 2015)
Krones (krones.com)	15 billion	500	Debrecen	(HAON, 2017b)
Thyssenkrupp (thyssenkrupp.com)	11 billion	250	Debrecen	(HBN-PA, 2017)
Diehl (diehl.com)	2.7 billion	150	Debrecen	(HAON, 2017b)
BMW (bmw.com)	330 billion	1000	Debrecen	(HAON, 2018)
Total	399.3 billion	4391		

Table 2 List of high-tech, multinational companies which announced investment plans into Eastern Hungary; Source: (Trangbaek, 2015; autopro, 2015; MTI, 2016; HIPA, 2016; HBN-PA, 2017; HAON, 2017a; HAON, 2017b; HAON, 2018)

The investment in the area is linked to the ability of companies to recruit highly skilled workforce. Many of the new workplaces planned to be filled with electrical engineers. Therefore, understanding the factors which attract electrical engineering talent can increase the chance to deliver returns on the planned investments and can promote future and further investments into the region.

1 Literature Review and Theoretical Framework

Employer attractiveness is a very complex concept which is widely researched by multiple disciplines including management science (Gatewood, Gowan and Lautenschlager, 1993), vocational psychology (Soutar, 1983), applied psychology (Jurgensen, 1978), communication (Bergstrom, 2002), and marketing (Ambler and Barrow, 1996; Gilly and Wolfenbarger, 1998; Ewing, et al., 2002). One frequently cited definition of employer attractiveness is *“the envisioned benefits that*

potential employee sees in working for a specific organization. It constitutes an important concept in knowledge-intensive contexts where attracting employees with superior skills and knowledge comprises a primary source of competitive advantage." (Berthon, Ewing and Hah, 2005 p. 151). This definition is relevant to this research as electrical engineering is a knowledge-intensive profession. The definition highlights that despite of the shortage of engineers in the labour market, companies with higher employer attractiveness can increase their chance for success and their competitive advantage.

In economic terms, shortage appears when the demand exceeds the supply (Samuelson and Nordhaus, 2004). The shortage situation can be resolved by increasing the price of the object. The increased price will reduce the demand and increase the supply, which will result in a new equilibrium (Samuelson and Nordhaus, 2004). Based on this economic analogy some may assume that increasing the salary of electrical engineers can address the shortage situation. However academic research suggests, that salary is one, but not the only one factor influencing the workplace selection process.

The Employer Knowledge Framework (EKF) introduces several factors influencing employer attractiveness and groups the factors into three categories (Cable and Turban, 2001). First, *employer information* includes factors such as organization size, level of centralization, geographical dispersion, organization's concern for society and the environment, organization values and culture. Second, *job information* includes factors such as the type of work, job title, job level, job descriptions, salary, and career advancement opportunities. Third, *people information* "refers to the type of individuals that comprise an organization and who would be potential co-workers to a job seeker" (Cable and Turban, 2001 p. 126). The categories and the factors introduced by the EKF provide additional considerations for this research in exploring the preferences of electrical engineers during their workplace selection process.

Several academic research confirmed that the importance of Employer Attractiveness Factors (EAF) differs based on multiple variables. Some variables influencing the importance of the attractiveness factors are gender, age, academic performance, level of education, working experience, employment status of parents, disciplinary background, and country (Lievens, Hoye and Schreurs, 2005; Taylor, 2005; Ng and Burke, 2006; Bonaiuto, et al., 2013; Ng and Gossett, 2013; Bendaraviciene, Bakanauskiene and Krikstolaitis, 2014; Holtbrügge, 2015; Kuron, et al., 2015). Based on the above academic researches, the EAFs can not be generalized to all professions, in all countries, in all life cycle stages of the research population. Therefore, it is recommended to explore the EAFs considered by the electrical engineering students in Hungary during their school to work transition period.

Beside employer attractiveness, several other theories can help to explore the research topic in a wider and deeper context. Theories about the different career

decision making styles (Gati, 1986; Gelatt, 1989; Hodkinson and Sparkes, 1997; Hodkinson, 2008), theories about the influence of social networks (Granovetter, 1973; Bourdieu, 1986; Coleman, 1988; Putnam, 2001), and theories about the impact of internal and external migration (Todaro, 1969; Massey, 1993) are few examples of additional concepts for considerations. Based on its limitations, the main focus of this paper remains in the theory of employer attractiveness.

2 Research Methods

The study uses mixed methods research design (Guba, 1990; Wildemuth, 1993). In the first phase of data collection, qualitative data were collected through semi-structured interviews from 52 key informants. In the second phase of data collection, quantitative data were collected through online surveys from 164 electrical engineering students. In the third phase of data collection, additional qualitative data is planned to be collected through semi-structured interviews from electrical engineering students.

Mixed methods research generally takes longer, requires more resources, and uses different sampling techniques and data collection procedures (Tashakkori and Creswell, 2007). Key informants were selected with purposive sampling. Key informants included hiring managers, HR managers, recruiters of engineering employers, headhunters of recruitment agencies, university professors, career advisors, deans of electrical engineering faculties, and members of several engineering associations in Hungary. The key informants had thousands of meaningful conversations with early career electrical engineers. Therefore, key informants were expected to have deep understanding of the workplace selection preferences of the research population. The face-to-face, semi-structured key informant interviews required a lot of travels within Hungary. However, the personal meetings helped to build strong professional network and identified additional interview candidates using snowball sampling.

Electrical engineering students in eight Hungarian universities had access to the online survey. The research was promoted in various forums considering the different permissions, requirements, and preferences of the universities. Some universities provided direct access to students during lectures and seminars. In these cases, the researcher introduced the research, explained the benefits of participation, and students voluntarily filled out the survey on their handheld mobile devices. Other universities did not allow direct access to students, but recommended online promotion of the research. In these instances, the research information and the survey link were posted in several Facebook pages. The posts were published on the official Facebook page of the electrical engineering faculty and on the Facebook pages of electrical engineering associations. Beside the Facebook posts, students also received an email from the university student

council to promote the participation in the research. Each Hungarian university with electrical engineering faculty received a unique link to the online survey. The unique link helps to avoid accidental mix of data and enables the continuous tracking of survey responses for every university.

The mixed methods research unites the benefits of the qualitative and quantitative methods, which improves the overall strength of the findings and offsets the limitations of the two methods. The research was designed to ensure high level reliability. Careful research design and proper documentation allows the research to be replicated by others at different times, in different regions, with different population. However, the limitations of the research should be recognized in terms of validity and generalizability. First, the research participants are contacted only one time during the project. Therefore the internal validity of the research can be lower than in case of a 'before and after' or in case of a longitudinal study. Secondly, the data and the analyses presented in this paper are based on 52 semi-structured interviews with key informants and 164 online survey responses from electrical engineering students. The second and third phase of data collection is still ongoing. Therefore, the final findings of the research may differ from the early findings presented in this paper. These limitation should be carefully considered before making any generalization of the research findings presented below.

3 Analyses and Early Research Findings

The different types of research data collected during mixed method research should be analysed differently (Tashakkori and Creswell, 2007). During the semi-structured interviews, key informants were asked to list the EAFs considered by the electrical engineering students during their workplace selection process. Then, key informants were asked to identify the three most important factors influencing employer attractiveness. Majority of the key informants emphasized salary and other monetary benefits as the most important EAF. Few of the key informants answered the interview question by simply singing the famous pop song of ABBA: "*Money, money, money...*". Beside the monetary compensation, interviewees also highlighted the importance of several non-monetary EAFs. Many key informants mentioned the significance of flexible working schedules and work-life balance. Some key informants indicated that EAFs are changing over time and they recognize an increased relevance of flexibility and work-life balance in recent years. Several key informants revealed that most electrical engineers can be demotivated by repetitive, monotonous work and can be motivated by professionally challenging, creative work.

The online survey included thirteen EAFs presented in Table 2 of this paper. Several scales measuring employer attractiveness were considered during the

selection of the thirteen EAFs. These measurement scales included Lyons Work Values Surveys (LWVS) (Lyons, 2003; Kuron, et al., 2015), the Organizational Attractiveness Extraction Scale (OAES) (Bendaraviciene, Bakanauskiene and Krikstolaitis, 2014), the Employer Attractiveness Scale (EmpAt) (Berthon, Ewing and Hah, 2005), and the scale used by Universum in the World's Most Attractive Employers survey (Universum, 2019). The electrical engineering students were asked to select the five most important factors they consider during their employer choice and rank them in order of priority. A score was assigned to every factor with a rank: the most attractive factor received score of five; the second most attractive factor received score of four; the third most attractive factor received score of three; the fourth most attractive factor received score of two; and the fifth most attractive factor received score of one. If a factor did not make into the top five ranking, it received score of zero. At the end of the scoring process an average score was calculated for all the thirteen EAFs.

Based on the above described scoring method 'Competitive salary and monetary benefits' was identified as the most important EAF, followed by 'Long term job security' and 'Flexible working schedules allowing work-life balance'. Table 2 below lists all the thirteen EAFs with their corresponding average rank.

Employer Attractiveness Factor (EAF)	Average Rank
Competitive salary and monetary benefits	2.96
Long term job security	2.15
Flexible working schedules allowing work-life balance	2.05
Good colleagues to work with	1.63
Wide range of development and career opportunities	1.15
Good leadership to work with	1.03
Attractive work environment	0.96
Professionally challenging, creative work	0.88
Convenient location	0.71
Innovative modern technology	0.70
International travel opportunities	0.47
Positive employer image	0.18
Inspiring mission	0.13

Table 3 The list of Employer Attractiveness Factors (EAF) in descending order of their average rank
(Online survey question: "Which of the following factors are most important for you when making your employer choice? Please select top 5 and rank them.) (n=164)

An important contradiction should be noted between the findings from online survey and the findings from key informant interviews. Although 'Long term job security' is the second most important EAF based on the online survey, none of the key informants mentioned 'Long term job security' as an important EAF during the interviews. On the contrary, several key informants highlighted the short term time orientation of electrical engineering students during their workplace selection process. One of the key informants described the electrical

engineering students as a generation who “*want it all, and want it now*”. Another key informant explained that as soon as the early career electrical engineers accept a job offer, they immediately start to look for the next job to take advantage of the labour market opportunities.

The difference between the responses of students and responses of key informants about short and long term time orientation was also confirmed by two other survey questions. First, 85% of electrical engineering students agreed or strongly agreed with the following statement: ‘I’m ready to make short term compromises to achieve my long-term career goal(s).’ Second, only 20% of the survey respondents agreed or strongly agreed on the statement that ‘I try to maximize the short-term benefits even if I have to sacrifice my long-term career goals.’ In fact, 46% of the respondents disagreed or strongly disagreed with the second statement. Figure 1 below shows the number of respondents on a five point Likert scale for the two questions about time orientation in the online survey.

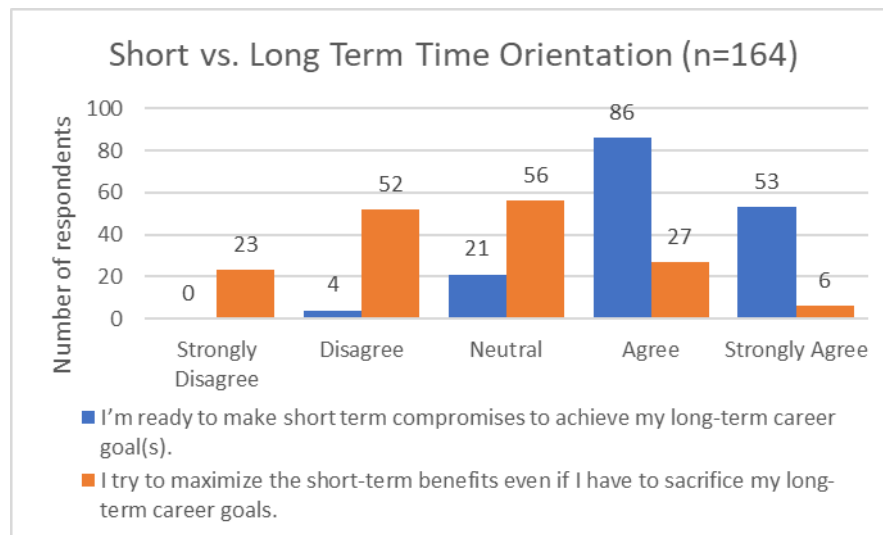


Figure 4 Short vs. long term time orientation on five point Likert scale (n=164)

In summary, the answers of electrical engineering students showed that majority of the respondents have *long term* time orientation and they *are ready* to make short term compromises for their long term benefits. On the other hand, the answers of key informants showed the opposite result. Key informants suggested that electrical engineering students have *short term* time orientation and they *are not ready* to make short term compromises for their long term benefits. It is important to note that additional responses to the online survey may change the early research findings shared in this paper.

Conclusions

Both the qualitative and the quantitative data showed that salary and monetary benefits are the most important EAFs for electrical engineering students of Hungarian universities. Flexibility in working schedules and work-life balance are also important factors during the career decision making process. Key informant interviews and online survey responses of electrical engineering students showed consistency in the above two conclusions.

However, key informant interviews and online survey responses of electrical engineering students showed inconsistency in terms of short vs. long term time orientation. On one hand, key informants emphasized that electrical engineering students are short term oriented. On the other hand, majority of electrical engineering students declared long term time orientation and willingness to make short term compromises in order to achieve their long term career goals. The additional information planned to be collected during the second and third phase of data collection may offer resolution for the contradiction between the qualitative and quantitative data.

It is important to recognize the limited generalizability of these findings. Career decision making is a very complex phenomena which can not be simplified to the ranking of different EAFs. Therefore, it is recommended to extend the research with other theories which may refine its findings and provide a clearer picture about the workplace selection preferences of electrical engineering students in Hungary.

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