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Attitudes of PhD Holders Towards
the Business Sector in Hungary[*]

Introduction

Effective elements of the R&D structure have long existed in Hungary but their operation had not been harmonized enough for years after the post-socialist transition. Besides the institutional dividedness science policy documents neither fitted to the desirable extent, nor were their aims clearly visible for the different actors of the system.

In the actual science policy documents there are clear aims: one of the most dominant goals nowadays for Hungary is the intense collaboration between academic and business sector (National Research Development and Innovation Strategy 2013–2020). In order to reach to goal of accelerating cooperation it is necessary to have an adequate workforce which is highly qualified and open to work for enterprises.

The aim of this article is to provide empirical results regarding some dimensions of the attitudes of PhD holders towards the business sector as an important factor of such collaborations and give additional concerns by understanding the background of the career decisions of PhD holders deeper.

Theoretical background

The findings of this study are based on a longitudinal research project at the Hungarian Academy of Sciences (HAS) which follows the career path of scholars at the research institutions and evaluate the grants that are provided to them.

The recent study focuses only on the *organisational* dimension of their career (Gläser–Laudel 2015) as well as the beliefs and attitudes towards different organizational sectors and positions they could meet. As the project is an applied research

project with a special focus on the organisational aspect of the career-path, it has severe theoretical limitations in case of attitudes.

In the literature of attitudes there is a great diversity of descriptions for the term and methods for the measures. Definition of attitudes used in this concept is the one which is given by Fishbein and Ajzen (1975) as most investigators would probably agree with: *"a learned predisposition to respond in a consistently favourable or unfavourable manner with respect to a given object"* (Fishbein–Ajzen 1975, 10.). They emphasize the distinction between *attitude* and other phenomena of the attitude area reserving *affect* as the most essential part of attitude. Other categories they point out are: *"cognition (beliefs, opinions), conations (behavioral intentions), and behavior (observed over acts)"* (Fishbein–Ajzen 1975, 12.).

During the different stages of the research project important information on the *beliefs, attitudes, intentions* and *behaviour* of scholars are gained; however, these results are not sufficient for a comprehensive, systematic attitude research. The results are relevant and implicate important concerns about the mentioned science policy issue.

Methodology

In the basic phase of the examination qualitative research was conducted among young researchers with PhD, widening the focus gradually, and finally detailed questionnaires were used. The research phases that have been carried out until now are the following:

- Career Path Research among Young PhD holders in Biology, a complex research with 11 semi-structured interviews, 2 narrative life story interviews, 2 focus groups and a small science field–specific survey (N=102);
- Career Path Research of Scholars with STEM (biology, chemistry physics, medicine) and SSH (sociology, political science, history, literature, linguistics) PhD in Hungary, with 30 semi-structured interviews, max. age 40 years.
- Career Path Monitor among research group leaders and members funded by the Lendület (Momentum) Programme of the Hungarian Academy of Sciences (assorted STEM and SSH fields, max. age 45 years); online survey (N=190).

Most findings of this article are based on the qualitative data from the early, explorative research phases. *Beliefs, attitudes* and *intentions* (Fishbein-Ajzen 1975.) towards the business sector had directly been examined in the very first phase with in-depth interviews and narrative life story interviews through the narratives of the interviewees. Later on the research, organisational career-path (Gläser–Laudel 2015) types were identified among scholars from different scientific fields based on their actual labour market behaviour (career sequences) unravelled from the semi structured interviews. Finally the researchers' *intensions* and actual labour market *behaviour* were tested in special labour market situations with questionnaires.

Results represented in the paper are relevant and new regarding attitudes of PhD holders towards business sector, thus suitable for developing directions and hypotheses for further systematic researches.

Structural Frames

Research Policy Organisations

In 1989, the democratic change in Hungary was slowly followed by the restructuring of different aspects of the polity and the society. As part of this process the former Soviet type of science organisations were replaced with a new structure based on the EU countries' standards and the elements of the previous national system.

In 1993, PhD was introduced replacing the former soviet type doctoral degree, the candidature. Universities regained the right to offer PhD programs and award PhD degree from the Scientific Qualification Committee, a semi-political body at the Hungarian Academy of Sciences during socialism.

Since the democratic transition the R&D structure has been changing continuously, but not only in connection with the structural change but because of the different governments. The changes of the organisations have been so intense that neither the researchers nor the organisations themselves could develop well and the system has been unpredictable for both of them.

The Hungarian R&D structure had effective institutions after the post-soviet transformation but these were not harmonised enough. Instead of having a focused and strong representation in policy making processes and its organisational structure, R&D function was dispersed in three ministries: Ministry for National Economy, Ministry of National Development, and Ministry of Human Capacities.

The National Research Development and Innovation Office have just been developed by the former president of the Hungarian Academy of Sciences at the Prime Minister's Office which may centralise the dispersed R&D deputy.

The governmental R&D background organisations at the ministries are focusing mostly on STEM research as the key of the economic growth, while paying less attention to SSH research.

Characteristics of the Research and Science Policy

Policy making processes and science and research policy documents were overly diversified, too partly due to the mentioned organisational status. There was a lack of unified terminology and well defined aims in the field of research and science policy making – because of the variety of different purposes and the variety of documents, aims were dispersed. The implementation of the written goals was very weak and inconsequent.

Since 2011 the importance of the reinforcement of the research community with young scientist have become better recognised (Report to the Hungarian National Assembly…2013).

The current science policy documents regarding Hungary show less, but clearer directions. One of the most recognizable aims is to accelerate the collaboration between academic and business sector (National Research Development and Innovation Strategy 2013–2020; Csite et al. 2013) and to increase the number of highly qualified labour force (e.g. the number of researchers). A comprehensive policy analysis (Csite et al. 2013) found the following particular aims in the present EU and national science policy documents as common:

- Providing sufficient R&D human resource supply
- Increasing the number of high quality, qualified workforce according to the needs of enterprises
- Increasing the number of graduates with entrepreneurial skills
- Fitting basic research to the regional innovation strategies
- Enhancing the role of the higher education institutions in the regional economies
- Developing knowledge triangles, strategic partnerships with companies, and dual education
- Intensifying technology-transfer, and the foundation of enterprises
- Improving access to the R&D infrastructure for enterprises
  (Csite et al. 2013, 42.)

Research Institutions

The governmental, higher education and business enterprise sector are all active in the Hungarian R&D sector, but NGOs are not visible. The governmental research sphere almost entirely consists of the research organisations of the Hungarian Academy of Sciences. This is the most respectful platform of sciences in Hungary which has various research groups in all scientific fields. In higher education, researcher universities operate many research units in all scientific fields, too. The number of the higher educational research units has continuously been shrinking in the last decade. The number of the state-run research units, after a long stagnation in 2012, decreased drastically in connection with the reorganisation of the HAS institutions. By 2012 in Hungary the corporate sector operates the greatest number of research units (1,583) which has never happened before (KSH 2014).

Researchers

In 2014, 37,329 people were employed as researchers at different research organisations in Hungary. In 2012, the number of the FTE researchers per 1000 inhabitants in Hungary was 6,1 which is lower than the EU27 average 7,6 (EUROSTAT 2012).

After the democratic transformation the number of researcher positions drastically decreased, mostly in the industry. Around 1996, the correction began and has been continuous (KSH 2014). In 2006, the number of full time equivalent business enterprise researchers overtook both the number of academic and higher education researchers (KSH 2014). The trend of the last decade is that the traditionally relatively high number of academic, governmental and higher educational researchers is stagnating and the number of researchers in the business sector is growing. According to this the ratio, for the number of business enterprise researchers is at a very good level in a regional comparison, however, those who own a PhD degree are underrepresented in the business enterprise sector (EUROSTAT 2009). On the contrary their ratio in the government sector is very high in an international comparison – thanks to the traditionally strong academy in Hungary, the survivor of the former soviet-type science system.

Important Features of Academic Positions

The institution of tenure is common in Hungary, but the promotion had been incalculable for years after the transition, and still limited for young scholars.
In Hungary there is a linear relationship between seniority and pay in the public servant salary system for academic positions. Performance differences just have appeared sporadically between younger and older scholars.

Academic researchers are paid below the average compared to the researchers of the business sector in Hungary, and paid far below the average of the international (e.g. EU15) wage.

R&D and the Business Enterprise Sector

Getting closer to the companies, we find that in Hungary mostly large enterprises can play role in R&D. However, even these companies hardly keep their R&D departments in our country. Only these enterprises are able to lobby for optimal developmental environment, too. Best part of SMEs are fighting for survival. Without effective, direct subventions these slightly have chance to connect to R&D processes.

Hungary can have some confidence from those start-ups in informatics which turned out a success in the global market and the JEREMIE Programme which proved to be more successful in Hungary than in other countries of the region.

What is narrowing the R&D developmental possibilities of the enterprises and their cooperation with academic sector is their reluctance of venture capital. In addition it is scarcely to find investors for the early stages, mostly for seed capital what is substantial for such collaborations.

Nevertheless creative scientific work requires innovative environment, the ratio of innovative enterprises in Hungary is very low in regional comparison (KSH 2014).

Findings

Beliefs Forming Stereotypes

The first phase of the longitudinal career-path research project was conducted in one narrow scientific field: among young postdoctoral researchers in biology in 2007. As the very first step of the project, focusing on the PhD as a new phenomenon in the R&D system in Hungary it was an explorative in-depth analysis based on qualitative methods: classical and narrative life story interviews, focus groups and a small sample questionnaire survey.

Surprisingly, the young biologists showed extremely weak interest in the business enterprise sector and their *attitudes*, and *beliefs* formed a strong and commonly shared negative stereotype, saying that business enterprise jobs are 'monotonous', 'dull', and 'boring', 'not requiring any creativity'.

This proved to be very important as 'creativity' and 'exciting work' with 'autonomy' were the most important and very positive principles they attributed to their academic researcher jobs. Their stereotype of the academic statuses contained mixed and squarely negative attributes, too: 'sincerity', 'be under cover', 'a man of his cast', and 'deprivation'.

The negative attitudes towards the business sector jobs may partly arise from the traditional intellectual role interpretation according to the common values in higher education (Palló 2009), the tiny amount of information on researcher positions in the business sector, and their unfamiliarity for the respondents.

The positive attitudes towards the academic statuses may partly relate to the same intellectual role interpretation, and the positive experiences: they really enjoy their tasks as researchers and find it is a very important feature of their job. The negative ones are owing to the structural background: firstly the characteristics of the public servant salary system, which is unfavourable for those at the beginning of their career, and not differentiate by performance.

The strong negative stereotypes changed to some extent till 2012 among STEM researchers by attributing the same creative and exciting character to some start-up positions in the business sector. This change should be important in the later cooperation with the business enterprise sector. Let us see now what are the typical career path patterns and strategies of the researchers at the academy. Are they ready to cooperate or change?

Career-path Strategies of PhD Holders

The analysis of the qualitative data identified three dimensions of the job satisfaction which can play a substantial role in forming the career paths of PhD holders. The dimensions of satisfaction proved to determine the career-decisions of the examined scholars are:

> *Tasks* (Creativity, and meaningfulness)
> *Working environment* (Motivation, inspiring colleagues and satisfying infrastructure)
> *Wage* (Being able to live on without problems)

Highly qualified, motivated labour force tries to keep these three dimensions at a consistently high level. The first dimension did not seem to be problematic in case of academics in Hungary: nearly all respondents like their tasks, feel that their job is meaningful and exciting.

Regarding the second dimension there is a considerable variance of the answers: some researchers have reservations about the institutional circumstances at their institutions, others are satisfied. However, the third dimension proved to be severely problematic for many of the respondents.

Salaries are out of the focus of the international academic career research not being considered a measure of career success (Gläser–Laudel 2015). On the contrary in the case of Hungary wage proved to be important in career decisions and actual labour market behaviour. It is rooted in the characteristics of the Hungarian public servant pay scale, which is unfavourable for young researchers at the beginning of their career and do not differentiate performance. Because of this structural circumstance the satisfaction with wage usually lags behind the level of the two above mentioned dimensions, causing inconsistency in the overall satisfaction with their academic statuses among young Hungarian scholars, which could result in severe frustration.

Findings show that young and postdoctoral researchers are eager to harmonise these dimensions, namely to improve their financial circumstances, in order to align their possibilities and their expectations which is based on their high qualification and motivational level. In different scientific fields they have different strategies for harmonising these factors, eliminating the inconsistency and getting over the frustration. Their *beliefs, attitudes, intentions* and their *actual behaviour* in the labour market show distinct strategies.

SSH Strategies
SSH careers are '*boundaryless*' (Arthur–Rousseau 1996) in the meaning that SSH scholars are moving across the boundaries of different sectors, organisations and topics. The organisational sequences of the examined career-path stories draw out project-oriented '*multidirectional*' careers (Baruch 2004) which are preferably based on a fix academic position. SSH researchers do not avoid business and enterprise sec-

tor. In their case the routine is to have complementary part-time jobs, consultative statuses, basic or applied research projects both in business enterprise and government sector besides their academic statuses.

Optimally, these projects connect to their own academic research topic. In this case these could improve their academic expertise and even their scientific performance directly. However, in many cases researchers have to work on many separate topics at the same time. It results in fragmented career span.

This strategy raises many questions. Are these complementary jobs point towards the mentioned science policy goals? Can we call this knowledge–transfer? Could the business sector have profit of these co-operations? Could these researchers push a professional advantage or they simply miss some opportunities in their academic performance because of this strategy? A follow-up study should examine both the positive and negative effects on academic productivity of this fragmented career path structure and the impacts on innovation of the business enterprise sector.

STEM Strategies
STEM researchers usually don't have complementary part time jobs or other "industrial" projects besides their academic positions, as it simply does not fit in their schedule. They have more '*linear*' career paths (Baruch 2004). Their narratives show it is because they have to concentrate on their narrow field of research in order to keep up with their peers.

Nonetheless they react to the mentioned inconsistency, too. They have two main strategies: one is to apply for research grants in their field of interest which is a natural and useful part of their career-path, anyway. But the other one is dangerous, as it is to apply for a post-dctoral or even tenure status *abroad*.
The most important finding is that Hungarian STEM scholars prefer foreign academic positions to business and enterprises researcher jobs in Hungary. Both qualitative and quantitative results about their *intentions* and their labour market *behaviour* underpin that most of the STEM researchers would leave the country instead of changing sector inside Hungary.

In the background of this phenomenon we have found different factors. The negative *beliefs, and attitudes* towards the business enterprise sector were one: by the results of the qualitative data, the *attitudes*, and *beliefs* of young STEM researchers formed negative stereotype. What is more, they fear that changing the academy to business sector means the end of their scientific career because of the limited publishing possibilities. They choose the opportunities which could keep them in their scientific career paths without breaking its span – this is exactly what they are optimising for.

Another important background factor emerging from the career narratives is that the reference group regarding wage for these internationally mobile young scientists is usually the international or the EU15 scholars' community and its' attainable standard of living. They compare their financial possibilities to the Western European counterparts.

All these factors regarding the background of the career decisions of the examined scholars must be important as underlying causes of the high level of brain drain among STEM researchers in Hungary. According to a calculation (Csanády–Személyi 2006), one in every four fresh graduate with a diploma in science leaves the country. This rate for PhD holders is even higher (Csanády–Kmetty et al. 2008).

The main question is, under which circumstances would they be willing to come back, or stay. Under what structural circumstances can they harmonise better the mentioned factors in order to gain satisfaction at their academic positions in Hungary? Could the business enterprise sector in Hungary offer any remedy for this brain-drain problem?

Further research should focus on it and the role of higher education in the formation of the attitudes of PhD holders towards business sector positions. By providing more information and direct experience especially in STEM fields, higher education may turn business and enterprise sector a bit more familiar for the most creative minds.

Conclusions

Our research found distinctive differences between SSH and STEM scholars career path strategies based on partly their different *beliefs, attitudes*, and *intentions* towards the business sector and their labour market *behaviour*. Among the factors behind these strategies we have recognized a common structural determinant: the importance of the characteristics of the public servant salary system.

Further research should measure systematically the attitudes of scholars, the structural determinants and their importance on career decisions. Other relevant research directions: measuring attitudes towards the business sector among PhD holders in particular types of collaboration (e.g. forms of technology – transfer, strategic partnerships and other sectorial collaborations), examining the influence of professional identity formation on the attitudes of PhD holders towards business sector collaborations, and the influence of values in higher education on their professional identity.

References

A kutató-fejlesztő helyek kutatóinak számított létszáma, KSH (2014)
    https://www.ksh.hu/docs/hun/xstadat/xstadat_eves/i_ohk002f.html
Arthur, Michael B. – Rousseau, Denise M. (eds.) (1996) *The Boundaryless Career. A New Employment Principle for a New Organizational Era.* New York: Oxford University Press.
Baruch, Yehuda (2004) Transforming Career: From Linear to Multidirectional Career Paths. Organizational and Individual Perspectives. *Career Development International,* 9/1. 58–73.

Csanády, Márton – Kmetty, Zoltán – Kucsera, Tamás – Személyi, László – Tarján, Gergely (2008) A magyar képzett migráció a rendszerváltás óta. *Magyar Tudomány,* 200/5. 603–621.

Csanády, Márton – Személyi, László (2006) Brain Drain. Közelkép a diplomás magyarokról. *Századvég,* 41/3. 79–122.

Csite, András – Major, Klára – Mike, Károly – Remete, Zsuzsa – Zsár, Virág (2013) Stratégiai irányok meghatározása, javaslat a tudománypolitikai stratégiára. HÉTFA http://www.oktatas.hu/pub_bin/dload/unios_projektek/tamop721/HETFA_TAMOP721_kutatasi_zarojelentes.pdf

Fishbein, Martin – Ajzen, Icek (1975) *Belief, Attitude, Intention, and Behavior: An Introduction to Theory and Research.* Reading, MA: Addison-Wesley.

Gläser, Jochen – Laudel, Grit (2015) *The Three Careers of an Academic.* Discussion paper Nr. 35/2015 09/2015. https://www.tu-berlin.de/ fileadmin/f27/ PDFs/Discussion_Papers/35_2015discussion_paper_Nr_35_Glaeser_L audel.pdf

Doctorate Holders Working as Researchers by Sector of Performance (% of Total Doctorate Holders Employed as Researchers) EUROSTAT (2009) http://ec.europa.eu/ eurostat/statistics-explained/index.php/File:Doctorate_holders_ working_as_researchers_by_sector_of_performance_%28%25_of_ total_doctorate_holders_employed_as_researchers%29,_2009.PNG

"Investment into the Future" National Research-development and Innovation Strategy (2013-2020) „Befektetés a jövőbe" Nemzeti Kutatás-fejlesztési és Innovációs Stratégia http://2010-2014.kormany.hu/download/b/35/f0000/06_11_NGM%20 KFI%20strat%C3%A9gia_Kozlonyhoz.pdf

Palló, Gábor (2009) A fiatal kutatók tevékenységének erőtere: A magyar tudományrendszer vázlata. *Magyar Tudomány,* 170/2. 11–22.

Report to the Hungarian National Assembly on the Activities of the HAS and on the General Situation of Hungarian Science (2013) http://www.parlament.hu/irom39/13472/13472.pdf