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OPINION PIECE

Aspects of Morality and Law Enforcement in Today's Science in Post-Soviet Countries

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Abstract Many reports independently confirm that even more than a quarter of a century after the collapse of the Soviet Union, the results of research and development in those countries that were under its influence are insufficient in comparison to the rest of the world. Given that human intelligence is not distributed unevenly and that science is a powerful driving force for the future of an economy, there is a hidden problem, which, if it can be resolved, may release great economic potential. The first generation of researchers from Armenia, Czech Republic, Georgia, Slovakia and Ukraine, who successfully completed their education after the political revolution, were surveyed. The survey revealed many similarities with regards to ethics, but that there is mounting evidence that the main cause of the current situation is the state of the local legal systems. The conclusion was drawn that a conceptual change in staffing within the relevant legal systems is required to release potential and stimulate wealth creation.

Keywords Corruption · Science · Justice · Moral basis · Economy

Introduction

Although some argue that cultural roots cannot be neglected (Hofstede and Bond 1988), the consensus is that the knowledge and skills of a nation's peoples are a prerequisite for wealth generation (Daly and Townsend 1996). This paradigm shift is supported by numerous and independent evidence on economic growth (McCombie and Thirlwall 2016) compared with patent (Dang and Motohashi

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2015) and publication (Kliegl 2014) statistics. Much has been debated about sources of economic growth in relation to technological change (Kuznets and Murphy 1966). It is no longer disputed that innovation can boost an economy (Maroušek 2013a) and subsequently the welfare of a society (Niwa 2016). However, the ultimate question remains whether the wealth obtained is (or should be) distributed fairly across society (Wolff and Gittleman 2014). In contrast to the above, Maroušek (2013b) argues that any indexes or indicators cannot easily measure development or research once weaknesses have been exposed, as acknowledged by users and sceptics alike, since the quality of underlying inventions and the rate of technical advance varies enormously. This corresponds with Comanor and Scherer (1969), who stated that patents might be a better index of research input than output.

In the late 1980s, the Soviet Union was recognized as being one of the foremost leaders in the world of science, due in large part to its heavy involvement in military programmes (Yegorov 2009; Adambekov et al. 2016). Since the political collapse of the Soviet Union (Starr and Dawisha 2016) and the subsequent economic difficulties (Papava 2015), there have only been reports on the dampening (Robinson 2015) and deterioration (Oleksiyenko 2014) of post-Soviet research. According to Yegorov (2009) the inputs from the research and development system have failed to generate wealth-creating outputs because of a systemic inability to apply the resources to effectively generate commercially viable results. At the same time, it has been observed that even the diffusion of technology from one country to another (Mardoyan and Braun 2015) and scientific internships (Maroušek et al. 2015) have also stagnated across the region. Within this context, it could be said that all these issues are a matter of money and that inventive activity is determined by economic variables. However, Yegorov (2009) claims that pumping money into the establishment of new research institutes and the artificial stimulation of demand for research results from the side of industry has been largely ineffective and inefficient. He places the blame for this squarely on the poor internationalization of scientific research and the inadequate legal protection extended under intellectual property rights. According to Yegorov (2009), the key challenges relate to inertia and the negative impact on these activities and the transformation of the post-Soviet research establishment during the political and economic upheaval in the immediate aftermath of the collapse of the Soviet Union. These challenges relate to the extremely low level of replacement of aging manpower, largely outdated scientific equipment in research laboratories, and institutional mechanisms that are not relevant to the market economy (Maroušek 2014). To make matters worse, Varmus and Satcher (1997) proved that research in developing countries is significantly burdened by numerous ethical complexities that are coupled with generational discrepancies.

Given that similar arguments are often being heard from the all too rare exchange students and post-doc students coming from these countries, a hypothesis has been formulated as the basis for an investigation into the background of this social issue because new inventions create new businesses and new jobs, and respectively improves competitiveness.

Materials and Methods

It is important to emphasize that the methods available for analysing the ethical issues affecting scientific research and development in post-Soviet countries are indirect and only shed light on certain aspects or parts of the phenomenon. This is particularly the case because the main sources of data were interviews that were undoubtedly, to a degree, coloured by the human personalities involved. It should be noted that the first generation of researchers from Armenia, the Czech Republic, Georgia, Slovakia and the Ukraine, who passed through decaying education systems are now in their 30s and at the early stages of their careers. It is also important to note that many of the researchers who took part in the interviews have limited opportunities to travel (both for financial and legislative reasons), so their perceptions of the international scientific world are, to a certain extent, limited (Adambekov et al. 2016). The interviews were conducted with 6 researchers (3 from technical fields and 3 from social sciences) from each country (Armenia, the Czech Republic, Georgia, Slovakia and the Ukraine). Within this context, it should be pointed out that Armenia, Georgia and the Ukraine were founding members of the Soviet Union, whereas the current Czech and Slovak republics (formerly Czechoslovakia) were occupied at a later time (Whetten 1969) and are now members of the European Union (Schimmelfennig 2003) operating under slightly better conditions. In addition, given that most Armenian citizens live in a diaspora around the world (Koinova 2017), only those Armenian scientists living and working in Armenia participated.

The survey focused on 5 topics: (1) access to current research; (2) corruption and the legal system; (3) living conditions; (4) research conditions; and (5) internationalization of research. The analysis under the topic "access to current research" focused on the scholars´ ability to access scientific databases (in particular the Web of Science and SCOPUS) and publications of major publishing houses (Springer Nature, Elsevier, Wiley-Blackwell and Taylor & Francis). The topic "corruption and the legal system" focused on and reflected the sometimes desperate circumstances in post-communist countries, whereby a fight for justice often results in even greater injustice or unjustified imprisonment (Fish et al. 2017). The analysis of the impact of "living conditions" was, to a certain extent, predetermined in that it is clear that the incomes in numerous government institutions are insufficient to live off (which virtually eliminates the possibility to travel) with the implication that many researchers need to hold down an additional job (O'Neil 2014). Under the topic "research conditions", the analysis focused on the equipment and other resources needed to carry out research. Lastly, under the topic "internationalization of research", the focus was on the ability of researchers to submit joint international research proposals, accessibility to student exchange programmes, conferences and international scholarships, etc. Each of the interviewees was asked to assess the importance of a statement about one of the topics on a scale of 1–5, whereby 1 represented "not important" and 5 represented "important".

Results and Discussion

While the majority of teachers of the emerging generation of post-Soviet researchers often look back with nostalgia at youth during the communist times; the coming generation is different (Fish et al. 2017). Many of the new generation do not speak the Russian language, tend to take a more critical view of history, and often make the older generation feel guilty about the current situation (Klein and Schröder 2016). A closer look at the data obtained (see Tables 1 and 2) reveals some remarkable points. With regards to "access to current research", there is a vast gap between those scientists working in technical fields and social sciences. In addition, whilst scientists in post-Soviet countries that joined the European Union (Czech Republic and Slovakia) cannot even imagine conducting scientific work without access to scientific databases, many of the scientists in the other post-Communist countries are not even aware of them (compare to Adambekov et al. 2016). However, the situation is significantly better among scientists working in technical disciplines because they can improvise and access scientific databases via "shared" methods of remote access or the better use of social networks like Researchgate (or other websites, although this may give rise to concerns about the legality of their content). However, it should be noted that legally accessing networks at the local level is extremely costly (compare to Fish et al. 2017). This topic was the subject of this research for the reason that keeping up to date about current trends, methods and findings is the starting point for conducting any form of serious scientific work (Maroušek et al. 2017). The supplementary statements on this topic concerned the ability to communicate in English and understand the nomenclature and jargon in the researcher's given field (compare to Gastel and Day 2016). On the issue of "corruption and the legal system", there was strong agreement that this is the biggest factor that undermines research, irrespective of the scientific discipline or country

Table 1 Scoring by researchers in technical disciplines (1–5, see the "Materials and Methods" section, the higher the points the greater the level of concern) according to country (*AM* Armenia, *CZ* Czech Republic, *GE* Georgia, *SL* Slovakia, *UA* Ukraine)

	AM	CZ	GE	SL	UA
1	0	0	0	0	0
2	9	15	12	15	14
3	10	4	5	4	15
4	9	12	11	8	6
5	5	5	5	4	8

Table 2 Scoring by researchers in social sciences (abbreviations as in Table 1)

	AM	CZ	GE	SL	UA
1	10	0	12	0	9
2	10	15	9	15	14
3	10	2	7	3	15
4	4	3	2	2	4

(compare to Fish et al. 2017). Particular attention should be paid to the fact that the highest levels of indignation over this issue were expressed by those researchers working in post-Communist countries that have already joined the European Union (compare to Maroušek et al. 2012). This may be interpreted to be the result of, for example, the quality of critical journalism in these countries (see O'Neil 2014). With regards to "living conditions", those respondents working in countries that are members of the European Union, generally expressed satisfaction. The greatest concerns were expressed by those researchers operating in the Ukraine, which is currently at war (Dunn and Bobick 2014). It should be pointed out that most of the Armenian respondents expressed a desire to emigrate to the United States of America because almost all of them had (close) relatives there (compare to Makaryan 2015). However, the relative satisfaction of Georgians with staying in their country can be explained by two factors. At first, the pride mixed with the nationalism that awakened after the recent occupation by Russia. Secondly, they are well aware of the desperate situation in neighbouring Ukraine (which is being occupied now, Freedman 2014) and for that reason they are respectful of what's left. It is also evident that the younger generation is not satisfied with the conditions that their parents' generation used to consider satisfactory (Adambekov et al. 2016; Maroušek and Kwan 2013). In general, the living conditions, and respectively the economic and social circumstances for starting and raising a family or business were critically evaluated regardless of the scientific discipline of the interviewee. All of the researchers stated that they were ready to move to the West (compare to Makaryan 2015). Whereas the researchers from the Czech Republic and Slovakia expressed a preference for moving to more western parts of the EU, those from Armenia preferred the USA because of the strong diaspora there; however, Western Europe was also an option. Researchers from the Ukraine and Georgia expressed a preference for Central-European countries (like the Czech Republic and Slovakia) because of the generally warm welcome they receive, and the linguistic and cultural similarities (compare to Fish et al. 2017). The analysis of "research conditions" revealed big differences between the technical and social disciplines. While the social science experts are relatively satisfied regardless of their location, the researchers in the technical fields are not, thereby stating that the shortcomings in their workplaces did not critically limit their work but that it was slowing them down. Surprisingly, the highest levels of dissatisfaction were found to be amongst those researchers located in member states of the European Union. Intuitively, one would expect the opposite to be the case because the expectation is that they operate under better conditions. However, they argue that the reason is that they have better contact with their colleagues in the West and are therefore more aware of how obsolete their equipment is (corresponds with Maroušek et al. 2014). The lack of "internationalization of research" seems to be a much more important issue for those researchers working in the social sciences. Whilst the Czechs and Slovaks mainly point towards the lack of money, the scientists from the other countries also lay the blame squarely on administrative barriers (see Klein and Schröder 2016).

Conclusions

The new generation of researchers from post-Soviet republics represent an untapped economic potential. There exists a significant risk that if they do not emigrate westwards their skills might stagnate since their work is being undermined by various factors. In addition, they have acquired a national self-consciousness and are proud of the moral principles they uphold, thereby distinguishing themselves from the despised generation of their parents. As a result, they refuse to engage with corrupt academic structures or cooperate with the business sector because of the strongly held suspicion that the majority of post-Soviet business tycoons came into their wealth under strange circumstances. The issues surrounding the creation of a start-up are a common problem, many failing through a lack of capital or the unenforceability of the law. In general, the previous generation is being blamed for the current situation. This intolerance manifests itself in all aspects of everyday life in post-Communist countries, not only in the subculture of researchers, which may be a precursor to a future split in the social contract.

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