

HOW FAR CAN CROWDSOURCING GO?

DISCUSSING TRANSNATIONAL OPEN INNOVATION STRATEGIES
AGAINST THE BRAIN DRAIN FROM CIS COUNTRIES

1. INTRODUCTION TO OPEN INNOVATION AND CROWDSOURCING

By following Joseph Schumpeter [1], the mainstream in theoretical and practical innovation assumes the exclusivity of an innovation to be an innovator's most crucial competitive advantage: "There was a time, not so long ago, when 'innovation' meant that companies needed to invest in expensive internal research laboratories, hire the most brilliant people they could find, and then wait patiently for novel products to emerge. Not anymore" [2, p. 12]. Since Henry Chesbrough introduced the concept of open innovation [3] we no longer ask *whether* open innovation¹ will be replacing the former concept of closed innovation. Rather we ask *how* open or closed specific innovation processes need to be in order to succeed.

More and more often we find that it can be an advantage to integrate as many actors as possible into the innovation process and to do so as early as possible [4]. This is reflected in the following three dimensions of innovation [5]:

1. Robust novelties: the early integration of customers' and stakeholders' ideas, knowledge and needs leads to more marketable products, procedures, or services.

2. Robust change: broader participation of members increases the organisational changeability.

3. Robust competitive advantage: the early integration of customers and stakeholders into the development process can serve as a marketing strategy as well, because the product is already known to a sometimes large number of potential consumers before its market entry.

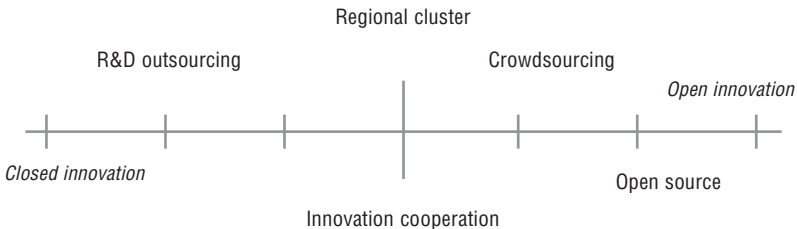
¹ Open innovation strategy is the use of both internal and external ideas and paths to markets by means of systematic integration of customers and stakeholders.

The bottom line is that open innovation strategies effect more robust innovations. This applies to both IN- and for OUT-processes of open innovation, with the first referring to the insourcing of ideas or knowledge and the second referring to the outsourcing of parts of the innovation process [6].

Sometimes, crowdsourcing is said to be a special case of insourcing as the corresponding methods are most commonly used to significantly increase the idea flow into companies, but they can also be interpreted in terms of the predominantly internet-mediated outsourcing of specific elements of the innovation process to an entity that is something between a community and a clientele [7], i.e. in other terms to large numbers of ‘working customers’ [8] or ‘prosumers’ [9]. In any case, following Frank Kleemann, Günter Voss and Karin Rieder [8], crowdsourcing can be defined as a both qualitative and quantitative expansion of yet more common R&D outsourcing concepts ([10] and Fig.1). The result of this expansion can then be interpreted as a new type of market interface [11] or as a new form of value creation [12].

In this paper I will show how open innovation strategies in general and crowdsourcing in particular can be used to reduce or even invert the brain drain from CIS countries to the Western world. In the next section we will therefore discuss the increasing relevance of transnational open innovation strategies against the background of the contemporary global innovation competition. Subsequently, I base on data from the Global Competitiveness Report in order to demon-

FIG. 1. The innovation continuum



strate at a global level that the return on investment in the CIS country's excellent educational infrastructure is still very poor, indicating that the brain drain topic is still acute. I thus focus on two relevant business cases from Switzerland, which practice is most inspiring for the subsequent development of transnational open innovation and crowdsourcing strategies against the brain drain. In a final section, I shall discuss limits of these strategies and corresponding further research questions.

2. ON THE RELEVANCE OF TRANSNATIONAL OPEN INNOVATION AND CROWDSOURCING

“Many western companies create productive partnerships to drive innovation activity but these are generally very limited in scope and impact <...> companies in China have become much more adept at mobilising large networks of specialized partners to support innovation initiatives” [13, p. 13]. This quotation from a contribution to the World Economic Forum in Davos 2006 reflects two different pictures of globalisation at the same time: on the one hand, we are told about a global competition between closed innovation regimes that are shaped by political, economic, legal, educational or scientific borders: China versus the West. On the other hand, “(g)lobalisation is a major driver for open innovation processes, not only because it means more intense and global competition but also because it creates a more global landscape for innovation” [14, p. 27].

Against the historical background, we might even say that open innovation re-creates these global innovation landscapes. “During the late 19th and the early part of the 20th centuries, practically all research was conducted outside the firm in stand-alone research organisations” [15, p. 53]. Between 1950 and 1990, the open innovation culture bottomed out. With the new millennium, external knowledge sourcing is back to post-war level(s). Thus, in the long term, it seems as if the age of closed innovation has been just some kind of the *Cold War mode of innovation*.

But, even after the end of the Cold War we still experience the logics of closed innovation regimes as well as their consequences: classi-

cal forms of open innovation, i.e. B2B innovation cooperation or co-patenting, are if at all, then mostly set-up between partners within the same industry, the same country, or the same economic area [14, p. 59–70]. Again we find that economic, political, scientific, legal, or educational borders hinder open innovation strategies. As a result we experience a waste of chances and resources (Table 1).

While Western European countries are well equipped with economic capital and business know-how, they suffer from skills shortages and a lack of ideas and are in need of new markets. Over the prosperity gap we experience lower household income, lower mobility, and poorer market access in the face of a good supply of well-trained talents with relatively high intercultural competence². This means that open innovation in general and crowdsourcing in particular may bring substantial benefits for both sides: western companies could benefit from low-cost idea flows from CIS countries and first-hand information on their emerging markets. In return for this now only virtual brain drain, CIS countries could profit from income that local people (and not members of a distant Diaspora) earn and that is thus allocated on-site the CIS.

TABLE 1. Open innovation as an interface between European economies

	Western countries	CIS countries
Resources	Capital Open innovation (OI) concepts	Talents Intercultural competence
Constraints and lacks	Talents Ideas Markets	Mobility Capital Markets
Benefits from OI	Idea flow Cost reduction Robust innovations	Capital flow OI know-how Brain gain, no brain drain

² Eastern Europeans know more about Western Europe than vice versa. The same applies to language skills in one language of the respective other part of Europe.

Such, open innovation in general and crowdsourcing in particular could provide a solution for a sometimes over-emphasised, sometimes denied, in any case intensively discussed problem of CIS countries: the brain drain to Western countries.

3. THE BRAIN DRAIN OF CIS COUNTRIES

In this context the Armenian data are most striking. Six years ago the World Bank (in 2002) reported that Armenia had lost a workforce of one million people since 1988³ [16]. There is no denying the fact that this mostly high-skilled migration massively hinders economic growth [18]: being among the top remittance-receiving countries of the world [19] obviously does not compensate the negative effects of the still continuing brain drain, because, once drained, the brains' interests in supporting not only their own family but also the overall Armenian economic situation becomes very low quite fast [20]. The same applies to Ex-CIS-member Georgia where "efforts to channel remittances to investment, meanwhile, have met with little success" [21, p. 71]. Therefore, the prevention or at least the containment of further brain drain from the Caucasus seems to be the order of the day. Again, the challenge is to sustainably transform the region's still strong intellectual capital into economic capital. Consequently, new organisational forms of co-operation on the "supra-national level attracting necessary human and financial resources and elaborating fair access of the countries to innovative technologies" [22, p. 10] as well as the "transfer of business skills (helping Armenian enterprises to enter world markets; supporting business and managerial training of new business owners and managers in new companies)" [23, p. 7] are demanded. And, if the competitive advantage of the Caucasian Republics really is the educational background of their citizens then the "efficient creation, dissemination, and use of existing knowledge" [24, p. 117] truly is the key to a Caucasian success story.

³ This equates to more than 25% of the original population. In Eastern Germany, a much lower brain drain ratio used to be the major building block of the Berlin Wall [17].

Regarding Russia, the case is in some way different not only because of the fact that Russia is an in any dimension resource-rich country but also due to an ongoing discussion about the question whether there is a Russian brain drain, or not. On the one hand we are informed about over 100 000 pre-dominantly young scientists who have left the country between 1991 and 2002 and thus caused an estimated loss of 50 milliard US dollars [25, p. 10]. Against this background we could be speaking of a “huge brain drain” [26, p. 889] if there were not voices that relativise the brain. In his brief history of Russia’s post-Soviet brain drain Erik Volz came to the conclusion that the quota of Russian scientists who are permanently leaving the country is very low and that high quotas of permanent emigration can only be observed in specific disciplines (the ‘hard sciences’) and against specific ethnical backgrounds of the scientists [27, p. 38–40].

In order to being able both to critically reflect the two versions and compensate the lack of information on brain drains from further CIS countries, in the following, this paper focuses on two indicators from the *Global Competitiveness Report* of the World Economic Forum [28] and combines them to a brain drain indicator (Table 2): the ratio between a country’s GCR-rank in indicator 5.02 *gross tertiary education enrolment (Enr)* and its rank in 12.06 *availability of scientists and engineers (AoSE)*⁴.

Concerning CIS countries, it should be noticed that Azerbaijan surprisingly is a brain gainer (ranked 10) while all of the other CIS members being brain-draining countries: Tajikistan (75), Armenia (84), Russia (117), Kazakhstan (119), Kyrgyzstan (120), and Ukraine (128)⁵.

⁴ This indicator thus replaces the GCR’s own brain drain indicator 7.09 that is based on the answer to the question: “Your country’s talented people (1 = normally leave to pursue opportunities in other countries, 7 = almost always remain in the country)” [28, p. 446] because the GCR brain drain indicator is more subjective and diffuse than the presented hard-data based alternative.

⁵ Additionally, it would be interesting to notice that in this rating India ranks first due to the fact that the country combines a substandard educational performance (Enr 98) with a job market that perfectly provides the country with the needed workforce (AoSE 3). In other words, India does not suffer from brain drain, rather it profits from the educational efforts of other countries. The opposite situation is represented by Slovenia that performs excellent at the level of tertiary enrolment (Enr 5) without being able to cover its demand for academics (AoSE 85). In this sense, the country is thus the most effective exporter of its own brainpower.

TABLE 2. Ratio GCR-ranks in ‘tertiary enrolment’ (Enr) and ‘availability of scientists’ (AoSE) in European and CIS countries^a (ranked among 134 countries)

ID	Country name	Enr	AoSE	Enr/AoSE	Rank rating
1	France	30	5	6.00	4
2	Czech Republic	38	11	3.45	7
3	Azerbaijan	95	28	3.39	10
4	Switzerland	45	16	2.81	17
5	Cyprus	62	23	2.70	18
6	Sweden	9	4	2.25	20
7	Finland	2	1	2.00	22
8	Austria	37	20	1.85	27
9	Slovakia	48	29	1.66	32
10	Germany	43	26	1.65	33
11	Netherlands	25	25	1.00	66
12	Tajikistan	86	98	0.88	75
13	United Kingdom	26	32	0.81	83
14	Armenia	65	80	0.81	84
15	Moldova	53	109	0.49	115
16	Spain	18	38	0.47	116
17	Russia	16	34	0.47	117
18	Kazakhstan	36	83	0.43	119
19	Kyrgyzstan	50	116	0.43	120
20	Italy	19	45	0.42	121
21	Hungary	17	49	0.35	123
22	Poland	20	69	0.29	125
23	Estonia	21	74	0.28	126
24	Ukraine	14	54	0.26	128
25	Lithuania	11	65	0.17	129
26	Latvia	12	112	0.11	131
27	Greece	1	17	0.06	133
28	Slovenia	5	85	0.06	134

^a Calculation based on [28].

With special regard to Russia one can find its poor rank in the ratio due to the fact that it performs very good at the level of tertiary enrolment, but loses students on the way from the university to the national scientific and technological job markets. This means that Jason Bush (is absolutely right to agree with the president of *Intel Russia*, Steve Chase, whom he cites in the *Business Week*: “We continue to see very good students come out of the universities <...> the Russians are absolutely tops”. But this positive impression does not support the author’s vision of a “Renaissance for Russian Science” [29, p. 1]. The only thing that can be deduced from this quote is a renaissance of the Russian system of tertiary education. But, against the background of a constant lack of scientists, this reborn excellence draws the attention to rather poor return on educational investment that Russia is suffering from. After enjoying on of the benefits of one of the world’s leading educational systems, many top students in science and technology are still leaving the country.

Accordingly, the question of how crowdsourcing could stop or even invert this brain drain is most relevant for Russia, as well. But how could transnational open innovation and crowdsourcing work in concrete terms, then? What specific techniques are to be applied? How do they need to be implemented to serve as a bridge across the prosperity gap?

To answer these questions, in the following pages I present two business cases of Swiss open innovation service providers.

4. TWO SWISS BUSINESS CASES

Since 1989, **Brainstore AG** has acted as a service provider for open innovation solutions, located at the language border between the German and French speaking part of Switzerland in the bilingual city of Biel/Bienne. Being sited in an ancient factory building, the idea of factory actively cultivates an industrial image: new members of staff are selected on the basis of standardised screening tests and then integrated into a strict division of labour.

Ideas are produced by means of an idea machine. The machine is made up of five elements: idea-boosting, compression, selection, ma-

agement, and implementation support. Usually, a project starts with a kick-off meeting where the client defines the problem, the parameters for calibration of the idea machine and the corresponding management decisions.

During the 'IdeaBoosting' stage different tools are used to boost the collection of up to several thousands of inspirations. First results of net-scouting, trend-scouting and different forms of interviews are presented to the participants of 'CreativeTeams' in order to stimulate their output. These teams of up to 50 people, consisting of client employees, representatives from particular target groups, lateral thinkers (mostly teenagers) and a management team, then meet in the Brainstore building and develop thousands of inspirations per hour.

The subsequent compression process is made up of three steps: a) an 'IdeaCity' in which the inspirations collected in the boosting process are combined and forged into about 200 concrete ideas by a large team; b) a think-tank where experts assess the remaining ideas according to the project criteria; and finally c) the step of the idea design in which the best few dozens of ideas are clearly and comparably visualised.

The highlight of the selection process is, of course, the idea selection. The best ideas are presented to a panel of decision makers and specialists who systematically evaluate them and provide feedback. Rough evaluation, the valuable first impressions, ranking lists and analyses serve as decision bases for the choice of the ideas to be implemented.

Finally, implementation support is also offered. In 'RoadMap workshops', *Brainstore* develops the further steps required for the realisation of each idea together with the project team. Favourite ideas are visually prepared according to their content so that they can emotionally inspire the implementation team on an internal or external level, and so that the significance of the ideas can be grasped. A catalogue of usage possibilities rounds out the programme.

Summarising this we find that the core business of *Brainstore* is idea production based on real-life interaction between up to 100 clients, target group representatives, external experts and lateral thinkers. Basically, the company makes an annual turnover of more than 5 million Swiss francs (CHF) with three products: the 'IdeaPackage' (idea production), the 'IdeaEvent' (production of sup-

port for ideas), and the 'IdeaFactory' (the implementation of in-house idea production processes based on the *Brainstore* method). Depending on the dimension of the project, the prices for the first two products range from less than 100 CHF to up to several 100,000 CHF. The prices are a matter of negotiation. Depending on age, qualification, availability and action time, participants in the idea production process are rewarded mostly within a range of 100–800 CHF (plus catering and transport).

Brainstore operates on a multilingual and international basis: projects can be realised in German, English, and French both in Switzerland (Biel) and Germany (Frankfurt am Main). The company's list of clients includes *Allianz*, *BASF*, *BMW*, *British Telecom*, *Coca-Cola*, *CreditSuisse*, and many more⁶.

Open Innovation GmbH (*Atizo*) is a specialist in crowdsourcing and IT-based open community management located in the Swiss capital Berne. Founded quite recently in May 2007, the company has already been able to attract an impressive list of partners: *PostFinance*, *CreditSuisse*, *Swiss Post*, *Swisscom*, *Toshiba*, *Fuji*, *Mammut*, and *Google* are among the clients of the provider of Switzerland's first crowdsourcing platform⁷.

At first sight, *Atizo* looks like just another Web 2.0 platform: after the login there is a start page informing the community member about the activities of other members, each member can create a profile, there is a message function, and a contact management area. But unlike *facebook.com*, *xing.com*, or *odnoklassniki.ru*, at *atizo.com* the community is not the client but the business partner of the platform provider. This is indicated by two further links called 'projects' and 'rewards': By following the first link a community member enters an area where *Atizo-clients*, i.e. companies with a need for ideas, call for solutions to a given problem. For instance, in one of the projects, the Alpine sports supplier *Mammut* invites ideas for global marketing campaign on the

⁶ For further details on *Brainstore's* activity, see: <http://www.brainstore.com>

⁷ For current projects of the company, see: <https://www.atizo.com>

occasion of its 150th anniversary and attracts community members with a prize of 1,000 CHF for the best ideas. This rather small financial incentive⁸ indicates that the company relies much on its brand power which is indeed quite strong in Switzerland.

If, for whatever reasons, a community member is interested in contributing an idea to the concrete project then he fills in a form consisting of a head-line of max 50 characters, an idea description of max 500 characters, at least three keywords, and an optional visualisation of the idea. All these data are then included in a list of all ideas posted by *Atizo* community member.

Besides the idea description, the list also includes information on the creative mind that gave birth to the idea. Most important are the dots and number next to the innovator's name indicating his activity level as well as the number of ideas that have been rated or commented by further community members. Often rated or commented ideas are more likely to be perceived and therefore rewarded by the clients. Nonetheless, the client may also reward non-rated ideas when he considers them to be the best.

So far, since the set-up of the platform in May 2007, 90 innovators have received rewards of 40,000 CHF for ideas on 12 projects which equates to an average price of 3,333 CHF per project and an average prize of 444 CHF per top idea.

Two weeks after the start of the first three of the current five projects, a pool of over 2000 innovators has already been contributing more than 600 ideas. 80% of the innovators are men, 70% Swiss, and 90% German speaking⁹. The average age of the community is 32 years. It is obvious that *atizo.com* would benefit from more female, non-Swiss, English or French speaking contributors, and more mature community members from all over the world.

As of 2009, *Open Innovation GmbH* will also provide its clients with a concept development service that complements the triad of the call for ideas, the idea generation, and the idea evaluation (Table 3).

⁸ At present, standard prizes range from 3000–5000 CHF.

⁹ Even though there is an English and a French version of the platform.

TABLE 3. The *Atizo* process

<i>Atizo</i> Ideas (since 2007)	<i>Atizo</i> Concepts (from 2009 on)
1. A company launches a Call for ideas	4. Based on the best ideas, the company pens a briefing and complies a team of <i>Atizo</i> innovators
2. <i>Atizo</i> innovators generate a plenty of surprising ideas	5. The team develops a concept in close collaboration with the company
3. The company evaluates the ideas and rewards the most creative minds	6. The company evaluates the concept and plans its realisation

Source: <https://www.atizo.com>

Based on his experiences in the idea development stage a client may ask specific members to support him in a more closed product development process and to earn more exclusive rewards.

5. TWO OPEN INNOVATION STRATEGIES FOR THE CIS COUNTRIES?

If we compare the two open innovation concepts of *Brainstore AG* and *Open Innovation GmbH* against the background of the specific open innovation demands of CIS countries then we soon find that the *Brainstore* model of open innovation can hardly be considered as an interface that links the CIS to the western innovation society: The *Brainstore* model is based on the physical co-presence of and the direct interaction between the clients, a handpicked small community, and the management of the idea factory. Thus, on the one hand, the model can hardly be of use in a transnational context where visa restrictions and transport costs hinder personal encounters. On the other hand, the example also indicates that open innovation can perfectly work without a large IT-infrastructure. Thus, maybe, the *Brainstore* model could be an inspiration for intra-national open innovation strategies within societies whose members favour direct interaction and lack of IT-infrastructure.

By contrast, crowdsourcing methods like *Atizo* require access to the *World Wide Web*, which is still more a privilege than a standard in most CIS countries. But, once a person is provided with access,

atizo.com works perfectly at the transnational level because it transcends mobility barriers by means of virtual integration. One could easily imagine the well-educated and IT-equipped elites of the CIS countries working at the ‘intellectual workbenches’ of a global innovation society without even leaving their countries.

Of course, for the CIS this would mean still suffering from a brain drain to western societies. But, at least, this specific form of a brain drain would be merely a virtual one: gains in terms of money and knowledge would be realised within the idea-giving CIS countries, and not in the context of distant Diasporas that are hardly connected to their home countries anymore.

Furthermore, crowdsourcing can also be used as a strategy to turn the tables on the brain drain. If we can imagine crowdsourcing agencies situated in CIS countries and specialised in sourcing knowledge and ideas of their Diasporas, then we are talking about a brain drain in the opposite direction. In such a way, crowdsourcing could effect an immense ‘brain gain’ for CIS countries.

Actually, this big leap is just a small step away: where *web 2.0* platforms like *odnoklassniki.ru* are concerned it simply means stimulating existing virtual Diaspora communities to exchange not only snapshots of their latest beach holidays, but also ideas on how to solve the problems of companies and other organisations in their home countries.

6. CONCLUSIONS AND RESEARCH QUESTIONS

In this paper I have shown that both intra-national and transnational strategies of open innovation could be used to reduce or even invert the brain drain from the CIS countries to the western societies. This especially applies to transnational IT-based crowdsourcing strategies that could both virtualise the current physical brain drain and effect ‘brain gains’ by means of the re-integration of the Diasporas’ know-how into the innovation systems of the CIS countries.

With regard to the first aspect, the major problem with the virtual integration of resident citizens of CIS countries into a pan-European innovation system is a legal one: the theft of intellectual property is perceived to be the most significant risk of transnational open innova-

tion [14, p. 42]. Thus, the question is whether and how CIS countries could guarantee the IPR compliance of their citizens in transnational open innovation projects.

The second vision of turning the tables on the brain drain draws our attention to possible immaterial incentives that stimulate the Diasporas' contributions to crowdsourcing projects that are set up by resident CIS companies, research institutes, or (non-)governmental organisations.

Moreover, crowdsourcing can not only be a strategy against the international brain drain but also against the intra-national brain drain of CIS countries: "*Leaving* does not necessarily mean leaving the country; many capable young people go into business. While that might be good for the country in general, it is bad for science" [26, p. 889]. Against this background, crowdsourcing can be discussed as a source of additional income for young scientists that could thus 'afford' to stay in science without investing the major part of their working hours in business companies.

At any rate, thinking about the launch of crowdsourcing services we have to keep in mind that only strong brands can attract a critical mass of participants in crowdsourcing projects [30]. Hence, it is a crucial and most interesting research field to find out what foreign and home market brands are sufficiently popular for crowdsourcing in the CIS. Additionally, against the background of quotas of Internet users ranging from 18% in Russia and 0.3% in Tajikistan [28, p. 460], the question of a crowdsourcing-compatible IT-infrastructure in the CIS countries has to be raised and answered either in terms of strategies for an increasing diffusion of Internet or of alternative forms of crowdsourcing in the CIS. For example, the mobile phone could connect a crowd of innovators with a hub that is provided with Internet in order to collect the ideas and send them to idea-demanding partners.

Finally, the impact of cultural differences on transnational open innovation projects between western and CIS societies must be studied against the background of the specifics of their innovation systems. According to Rajes Pillania [31] this also means dealing with a basic research gap in the field of innovation management in CIS country's emerging markets.

References

1. Schumpeter, J. *Capitalism, Socialism, and Democracy*. New York: Harper Brothers Publishers, 1942.
2. Chesbrough, H. Business model innovation: it's not just about technology anymore. In: *Strategy & Leadership*. 2007. No. 35/6. P. 12–17.
3. Chesbrough, H. *Open Innovation. The New Imperative for Creating and Profiting from Technology*. Boston: Harvard Business School Press, 2003.
4. West, J. and S. Gallagher. Challenges of Open Innovation: The Paradox of Firms' Investment in Open Source Software. In: *R&D Management*. 2006. No. 36/3. P. 319–331.
5. Roth, S. Introduction. Towards a theory of robust innovation. In: *Non-technological and Non-Economic Innovations: Contributions to a Theory of Robust Innovation*. Ed. S. Roth. Bern /Berlin /Bruxelles /Frankfurt am Main /New York /Oxford /Wien: Peter Lang Publishing Group, 2009.
6. Gassmann, O. and E. Enkel. Towards a theory of open innovation: three core process archetypes. Paper presented at the R&D Management Conference, 2004.
7. Beuscart, J. S. Napster users between community and clientele: the formation of a sociotechnical group. In: *Sociologie du travail*. 2005. No. 47. P. 1–16.
8. Kleemann, F., G. G. Voss, and K. Rieder. Un(der)paid Innovators: The Commercial Utilization of Consumer Work through Crowdsourcing. In: *Science, Technology & Innovation Studies*. 2008. No. 4/1. P. 6–26.
9. Schelske, A. Transparente Märkte in interaktiven Wertschöpfungsprozessen – Synchrone Konsumforschung mit vernetzten Konsumenten. In: *Zwischen Methodenpluralismus und Datenhandel. Zur Soziologie der kommerziellen Konsumforschung. Aus der Reihe: Konsumsoziologie und Massenkultur*. Hrsg. D. Schrage and M. R. Friederici. VS-Verlag, 2008.
10. Lebraty, J.-F. Vers un nouveau mode d'externalisation: le crowdsourcing. Paper presented at the "12ème conférence de l'AIM Lausanne", Switzerland 2007. Contribution: 16 March 2008. — <http://halshs.archives-ouvertes.fr/halshs-00264354/en>
11. Péliissier, C. Le crowdsourcing, une intermédiation hybride du marché. Paper presented at the conference "5ème doctorales du GRD TIC & Société", at Rennes, France 2008. Contribution: 26 June 2008. — <http://halshs.archives-ouvertes.fr/SHS/halshs-00290831/en>
12. Lobre, K. Crowdsourcing: une nouvelle forme de création de valeur? Paper presented at the conference "Nouvelles perspectives en management stratégique" at Nice, France 2007. Contribution: 24 March 2008. — <http://halshs.archives-ouvertes.fr/halshs-00266548/en>
13. Hagel, J. and J. Brown. *Globalization & Innovation: Some Contrarian Perspectives*. Prepared for the Annual Meeting of the World Economic Forum in Davos, Switzerland, 25–30 January, 2006.
14. *Open Innovation in Global Networks*. Paris: OECD, 2008.
15. *Monitoring Industrial Research: The Annual Digest of Industrial R&D*. European Commission: Directorate General Joint Research Centre, Directorate General Research. Luxembourg: Office for Official Publications of the European Communities, 2006.

IV

TRENDS IN THE KNOWLEDGE-BASED SOCIETY

16. Armenia. Growth Challenges and Government Policies. World Bank Country Study. Washington, DC: World Bank, 2002.
17. Zapf, W. Wie kann man die deutsche Wiedervereinigung bilanzieren? In: *Vom Zusammenwachsen einer Gesellschaft*. Hrsg. H.-H. Noll and R. Habich. Frankfurt /M.: Campus, 2000. S. 17–36.
18. Gevorkyan, A. V., K. Mashuryan, and A. Gevorkyan. Economics of labor migration from Armenia: a conceptual study. In: *Armenian International Policy Research Group (AIPRG)*. Working paper No. 06/05. 2006.
19. Rata, D. and Z. Xu. The migration and remittances factbook. World Bank Press, 2008.
20. Manasaryan, T. Diaspora: The Comparative Advantage for Armenia. Paper presented at the 2nd Armenian International Policy Research Group Conference, Washington, DC. 17–18 January, 2004.
21. Samson, I. The search for a development path: challenges for Georgia. In: *Georgian European Policy and Legal Advice Centre (GEPLAC) Research Papers*, March 2006. – <http://www.geplac.org/eng/Reports.php>
22. Ivakhnyuk, I. Migration in the CIS Region: Common Problems and Mutual Benefits. Mimeo, 2006.
23. Minoyan, V. and L. Freinkman. Armenia: What drives first movers and how can their efforts be scaled up? In: *Munich Personal RePEc Archive (MPRA)*. Paper No. 10010. 2005. – <http://mpra.ub.uni-muenchen.de/10010>
24. De Saumya, M., D. Andrew, and G. Gyulumyan. The Caucasian Tiger. Sustaining Economic Growth in Armenia. World Bank Publications, 2007.
25. Ismail-Zadeh, A. Russian science in transition. In: *Euro-Science News*. 2004. No. 26. P. 9–11.
26. Gelfand, M. Doing Science in Uncertain Times. In: *PLoS Biology*. 2004. No. 2/7. P. 886–891.
27. Volz, E. Utechka Umov: The history, implications, and solutions concerning Russia's post-Soviet brain drain. In: *Journal of Undergraduate Research (Rochester)*. 2002. No. 1/1. P. 35–40.
28. Porter, M. and K. Schwab. Global competitiveness report. Geneva: World Economic Forum, 2008.
29. Bush, J. A Renaissance for Russian Science. In: *Business Week*. 2004. No. 8/92004, Issue 3895.
30. Füller, J., K. Matzler, and M. Hoppe. Brand community members as a source of innovation. In: *Journal of Product Innovation Management*. 2005. No. 25. P. 608–619.
31. Pillania, R. K. Editorial. Innovation and knowledge management in emerging markets. In: *Knowledge and Process Management*. 2008. No. 15/3. P. 184–185.