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Towards a Culture of Creativity in Our Universities

Excellencies,

Distinguished Rectors and Presidents,

Dear Colleagues,

Ladies and Gentlemen,

It is a great pleasure for me to take part in your conference and to have the opportunity to speak to you on a topic of mutual concern which I am going to deal with in five parts.

Before I start, let me thank you, Professor Zedania, very much for your very kind introduction and for inviting me to Tbilisi!

I. Rectors’ Conferences – National, International and Strategic Partnerships

Not a very long time ago rectors’ conferences used to be fairly regional or at the utmost national bodies. Let us take the German case as an example. The “German Rectors’ Conference (HRK)” as it stands today was established in 1990 right after German unification by the integration of 21 universities from the former Eastern part of Germany. Its predecessor was the “West German Rectors’ Conference (WRK)”, half a nation’s rectors’ conference – so to speak –, which was founded after the Second World War in 1949. For a long time, Rectors’

conferences only dealt with topics which were of concern at the regional or national level. They tried to represent all of higher education, and even today they consider themselves as the voice of all kinds of university-like institutions. At the same time we have been witnessing a process of sectoral differentiation within the HRK, in particular with respect to Technical Universities (TU 9) and research-intensive, traditional universities (U 15).

Over the past two decades we can also observe a strong trend towards international networks and partnerships between universities. Of course, in Europe this trend goes along with the process of European integration. The “European University Association (EUA)”, for example, is the representative organisation of universities and national rectors’ conferences from 47 European countries. This association, founded in 2001, played and still plays a crucial role in shaping EU policies on higher education, research, and innovation. Moreover, there are also several examples of international strategic networks of universities: The “League of European Research Universities (LERU)” which was founded in 2002 emerged as a prominent advocate for the promotion of basic research at the European level. Another exclusive club is the so called “Coimbra Group”. This group was founded in 1985 and is an association of long-established European multidisciplinary universities of high international standard.

All these groups and networks have their own domains, their particular interests, and strategic orientations. They are not only linked to political developments like German unification or European integration but also to strategic aims and to the positioning of the respective universities in the rapidly increasing international competition when it comes to providing the best conditions for academic research and teaching. These groups and networks achieve much more than just representing and lobbying for their member universities at various levels. They are a strong voice for expressing the interests of their members and they significantly influence science and scholarship, research, training, and innovation policies not only at the national but also at the international level. Much more importantly, they are networks of

mutual learning – from and with each other – predominantly with respect to one of the most important aspects of the future of academia and society at large: international cooperation and its manifold benefits for our well-being as individuals, as institutions, and as scholarly communities.

This also holds true for the “Conference of Rectors from the Black Sea Region”. And it is, indeed, a privilege and an honour for me to be invited to your conference. For many years, the Volkswagen Foundation has been involved in establishing strong links with universities in countries represented in the “Black Sea Universities Network (BSUN)”, especially through the links and ties which evolved for more than 15 years within the framework of its funding initiative “Between Europe and the Orient – A Focus on Research and Higher Education in and on Central Asia and the Caucasus”. Only a few months ago, I visited universities, research institutions, and funding organisations in Armenia, Azerbaijan and Georgia. This was not only a very fascinating experience for me – highlighted by the friendship and generous hospitality of the respective hosts – but also an opportunity for exchanging ideas on how to cope with the manifold challenges ahead of us.

Indeed, the focus of the international funding activities of the Volkswagen Foundation lies on promoting cooperation between scholars and scientists in Germany and in countries outside the European Union, in particular in developing and transition countries. In 2015, in view of the Ukrainian crisis, and assuming that the Minsk Agreement might pave the way towards peaceful negotiations, the Volkswagen Foundation took the decision to launch a call for proposals focusing on trilateral partnerships between Ukrainian, Russian, and German researchers. The Foundation wanted to offer opportunities for parts of the scientific and scholarly elites to exchange their views and ideas, and thus help to overcome the repercussions of the armed conflict in Eastern Ukraine. I am proud to report that the Foundation received more than 200 applications for trilateral projects, workshops, and conferences and eventually funded about fourty collaborations of very high academic quality. Given the size and scope of

the conflict we should not overestimate what these projects can achieve. But I am convinced that even in view of such a crisis small things matter.

Moreover, the aim of the Volkswagen Foundation's international funding activities has always been to ensure that academic institutions in other countries benefit from projects funded, and that local scholars and scientists – especially the young ones – are given the opportunity to further develop their research skills. To the same extent, though, it was and still is intended to encourage and reinforce a stronger international orientation on the part of German researchers. The guiding principle is to move away from the perspective of "research on" something, and to adopt an approach of "research with" someone abroad, namely the partners in the respective regions outside Germany. Research projects are, therefore, developed and implemented with the joint and mutually respected involvement of all parties. It is, thus, in my very own and the Volkswagen Foundation's interest to hear more about your views and ideas concerning the future of universities in the Black Sea region. Therefore, I am very much looking forward to our discussion today tomorrow.

II. The Formation of Future Leaders

Globalisation

In our rapidly changing, increasingly globalized world, we are confronted with huge problems ranging from local wars and regional conflicts, mass migration, and terrorist attacks all the way through to earthquakes, pandemics, climate change, and financial instabilities. The map of the "Global Risks Landscape" compiled by the World Economic Forum gives you a rough idea about current global risks including natural, financial, technological, and societal hazards. Many of these issues can only be dealt with in an adequate way through increasing our knowledge base.

Universities as strongholds of research and training need to re-contextualize themselves and pay attention to the expectations of other stakeholders, their fears and anxieties as well as their hopes for results and solutions. At the same time the public at large, and politicians in particular, must acknowledge the fact that the search for fundamentally new insights operates under highly fragile, risky, and uncertain conditions. In many instances, the researchers cannot immediately deliver the straight forward answers, forecasts, or solutions we all would like to see so urgently. It takes a reliable, high trust mode of long-term funding for teaching and research in order to fully reap the fruits of scholarly explorations. This particularly applies to the complexities of the multipolar and interdependent world we live in.

Digitisation

The past two decades have seen unprecedented transformations of political, economic, and technological systems. Across the world, the accelerating conversion of information and communication technologies is shifting the balance towards an almost ubiquitous and universal availability of anything, anywhere, any time. The rapid enhancement of electronic communication is not only affecting more and more aspects of our daily life but it also changes the very nature of teaching and research. Whilst students can now access lectures and seminars given in other universities and use electronic textbooks, Massive Open Online Courses (MOOCs), etc., researchers can also make efficient use of digitisation by entering into large-scale, “big data” empirical research work which hitherto nobody even dared to dream of. These processes not only affect research work in areas like the human genome project or high energy physics which have always demanded large data storage and processing capacities; more and more we can also observe a tendency towards the digitisation of knowledge production in the humanities. This opens up new perspectives and research opportunities which so far have not been fully explored. With new statistical methods and visualization techniques at hand, the collaborative work processes of humanities scholars are no longer primarily focusing on the creation of new knowledge but rather also on knowledge design.

Moreover, the demand for large-scale, expensive infrastructures is no longer confined to science and engineering. Several of them have already transcended national borders.

The Role of Universities and Funding Organisations

Since the 1960s we have been witnessing an enormous expansion of the higher education and research systems in many parts of the world. In particular universities have often been considered as a tool for regional development. Overall, the framework conditions for universities and research facilities remain fragmented between and even within countries. However, the increasing demand for truly transnational curricula, dual degrees, etc. as well as for research to be conducted in global networks and perspectives have in recent years led to quite some realignments of internationalization policies and their subsequent implementation.

By and large, universities now realise that they are at the heart and centre of today's knowledge-driven and knowledge-dependent societies. Their functioning or mal-functioning is not only decisive for the future of the region or nation-state they happen to be located in, but also for the future of mankind. Therefore, developing a clear-cut strategy for internationalizing the respective university's core activities in teaching and research is key not only for the institution's leadership but also for its staff members and students. Many universities have already responded to these challenges by introducing vice-presidents or vice-rectors for international affairs, providing the necessary managerial infrastructure, and establishing sustainable contacts to universities in other countries.

Cooperating across national borders in our globalized world is no longer just a matter of students and researchers as well as their institutions but more and more also of funding agencies and foundations. If the latter are really concerned with realizing their full potential and achieving higher impact, they have no choice but to also collaborate transnationally. Indeed, I was very impressed by the commitment and efforts of public agencies and funders when I

visited Armenia, Azerbaijan, and Georgia a few months ago, and Kazakhstan and Kyrgyzstan just recently, in mid-April.

Experience tells me that these partnerships are to the benefit of getting more high quality research projects, of enhancing the career prospects of the researchers and research managers involved, and of achieving better results. Needless to say that these collaborations require a high degree of mutual trust in each other's intentions and modes of operation. As success breeds success, they often turn into lasting friendships and sustainable institutional ties.

Future Leaders

Against the background of the aforementioned developments stemming from global challenges such as climate change, armed conflicts, or migration processes; globalisation and digitisation, international collaboration, thus, are more important than ever. What is needed is a generation of future leaders for academia, society, and the corporate sector which understands – or even better foresees and embraces – the global dimensions and perspectives of their decisions. Future leaders in academia, industry, and government communities will have to work together to tackle the challenges of the future and to mount projects of global scope and scale, develop action plans and monitor their progress. No group can do it alone. And it should be the aim of universities to adequately train these future leaders. Consequently, universities have a twofold mission: They are not only dedicated to regional development but they must also act as key players in the process of social change and development at an international, more often even global level. Perhaps, the university with its longstanding embeddedness in civil society, its intellectual resources, and self-critical forms of knowledge production is the only social institution which in scope, depth, and breadth could possibly be called upon when it comes to rethinking the objectives of social change and to tackling these issues.

Defining the objectives of complex operations and subsequently reconfiguring them is not at all straight forward. Ever so often, people end up at quite different places than they envisaged at the beginning. Let me nevertheless try to outline what we should aim at when we consider to provide the best possible training for the next generation of people who can take over leading functions not only in academia but also in politics, the economy, and civil society.

Concerned Citizens

With respect to the considerations concerning the formation of a new generation of future leaders my friend and colleague, the late Yehuda Elkana, former President and Rector of the Central European University in Budapest, reflected much about the ideal curriculum for training those future leaders. For him, the crucial aim of the ideal curriculum was to educate what he called “concerned citizens” – young people who truly understand and can live up to tackling some of the main problems of the world.

Yehuda Elkana’s concept of “concerned citizens” has two dimensions: a moral or social, and a cognitive one. While the former dimension is often emphasised when it comes to applying academic knowledge in social, political, or economic contexts, the latter dimension – the cognitive intellectual dimension of the “concerned citizen” – was of no less importance to him. Let me quote him to show you what he meant with educating “concerned citizens”: “By this I mean a training of young people which, after three or four years of undergraduate studies, should enable them to understand the major social problems of the world, what is being done to deal with them, what is not being done, and above all, what the epistemological gap is that prevents them from being dealt with.” (Elkana, Yehuda. 2015. “The University of the 21st Century: An Aspect of Globalization”, in Renn, Jürgen (ed). 2015. The Globalization of Knowledge in History. Max Planck Research Library for the History and Development of Knowledge, p. 619).

He warned us of leaving curricula untouched and of neglecting the urgent challenges and problems of our time which I have just mentioned. And he encouraged us to turn to an interdisciplinary way of dealing with problems and, moreover, to a mode of thinking which is non-predictable, non-deterministic, and thus cannot always be reduced toward one, universal, or general theory. This – as he called it – "nonlinear" mode of thinking should also enable us to address complexities, face ambiguities, and endure contradictions.

The Future of the Doctorate

As the "Carnegie Foundation for the Advancement of Teaching" has emphasized, these endeavours are not only a matter of redesigning bachelor and master courses. They also affect the Ph.D. research and training objectives just as well. George E. Walker, the director of the Carnegie initiative on the doctorate, when analyzing the situation in the United States pointed this out very clearly: "When half of today's doctoral students drop out and many who do persist find that they are ill prepared for the work they choose, it's time that all doctoral programmes face fundamental questions about purpose, vision, and quality." Indeed, in the United States between 40 and 50 percent of Ph.D. candidates do not complete their degree and drop out. And this also holds true for 25 percent of those who have received sufficient and prestigious funding from the U. S. National Science Foundation. Moreover, the average time to degree is seven years in the United States and five to six years in Europe. The Bologna Declaration, by contrast, envisages an average time to degree of three to four years.

With the notion of "Steward of the Discipline" the Carnegie initiative on the doctorate tried to provide us with a vision that could help us to strike a balance between the necessary critical analysis of the existing bulk of knowledge and creative thinking required for the production of new knowledge. "The doctorate should signal a high level of accomplishment in three facets of the discipline: Generation, conservation, and transformation. A Ph.D. holder should be capable of 1.) generating new knowledge and defending knowledge claims against challenges and criticisms, 2.) conserving the most important ideas and findings that are a legacy of

past and current work, and 3.) transforming knowledge that has been generated and conserved by explaining and connecting it to ideas from other fields. All of this implies the ability to teach well to a variety of audiences, including those outside former classrooms." (Chris M. Golde: Preparing Stewards of the Discipline in: Envisioning the Future of Doctoral Education. Edited by Chris M. Golde, George E. Walker and Associates. San Francisco, 2006, p. 10.)

Let me illustrate the future needs and requirements of doctoral training by referring to one of a Carnegie Foundation for the Advancement of Teaching 's "Essays on the Doctorate" by the eminent chemist Alvin L. Kwiram (University of Washington at Seattle). For him the development of soft skills as well as supervisory and mentoring needs even extend beyond the doctoral stage and also include the development of teaching skills. He considers these elements as crucial within what he calls an "enhancement curriculum" for doctoral students and postdocs alike.

Before I return to these visions and objectives of doctoral training more specifically with respect to the increasing needs for structured doctoral training programmes, I would like to briefly outline what I consider as the most important aspects of implementing a culture of creativity in research-intensive universities. At a time when catchwords such as efficiency, alignment, compliance, and conformity seem to dominate the debate, this may appear to you as a somewhat luxurious topic. But I do hope that I can perhaps convince you in the end that striving for a culture of creativity (instead of a culture of compliance) is definitely worth all our efforts.

III. Towards a Culture of Creativity in Our Universities

Achieving Breakthroughs …

A new idea, an insight, or an invention often begins by seeing things differently. As if one were to see them in another light or with the eyes of someone else. The Nobel Prize winner

Richard Feynman once described such a moment which led him out of a long phase of stagnation that induced a new definition of basic physical laws as an intellectual fluke. As he sat in the cafeteria of Cornell University watching two students tossing back and forth coats of arms inscribed plates like frisbees, a new idea occurred to him on how to combine the hitherto separate fields of electrodynamics and quantum mechanics. The inspiration derived from playful observation meant a breakthrough for Feynman (and the world of physics) to a new thought which ultimately – as he wrote about it himself – almost on its own coalesced into a convincing theory of quantum electrodynamics: “It was effortless. It was easy to play with these things. I almost tried to resist it! There was no importance to what I was doing, but ultimately there was. The diagrams and the whole business that I got the Nobel Prize for came from that piddling around with the wobbling plate.” (Richard Feynman,1985, p. 167 f.)

Diversity and Communicative Interaction

Looking back in that way, one could easily get the impression that a creative gain in insight is a matter of coincidence, the result of personal as well as structural contingency. But several studies which pursued the question as to why there are far more ground-breaking insights obtained under one set of institutional conditions than another show that it is not the case.

The American researcher of scientific discovery, Rogers Hollingsworth, has for instance investigated why there are many more breakthroughs at medium-sized universities and research institutes than at facilities which are much larger, and thus in principle could offer manifold opportunities for inter-, and transdisciplinary cooperation. He came to the conclusion that in addition to a clear strategic orientation and an overall research-friendly climate, the balance between a sufficient degree of diversity of disciplines and the most intense degree of communicative interaction had to be put in place. This is demonstrated with the graph you can see on the slide. If the facility is too small and homogenous in orientation, the potential for extradisciplinary stimulation will be missing. If the institution is too large and heterogeneous, there are hardly any opportunities for personal contact. Narrow disciplinary focus

leads to monotony; all-encompassing breadth transforms the degree of diversity into unproductive heterogeneity. In both extremes intellectual creativity is ultimately stymied and along with it the generation of transformative knowledge.

Creativity

All universities and research institutions should aim at establishing and fostering a culture of creativity. Admittedly, "creativity" just like "innovation" is one of the most overused and underdefined terms in current research literature and research policy-making alike. The common denominator seems to be that creativity manifests itself in a piece of work that requires not merely mechanical skills to produce it but intelligence and imagination. To foster such creativity in a research institution, at least the following preconditions have to be met:

Competence: The first precondition of a culture of creativity is to provide the best training for the future generation of academics and to enable researchers in general to develop their skills and their most radical ideas as freely as possible.

Courage: Not only researchers, but also the institutional leadership and external funders must be both courageous and adventurous. You can only encourage people to enter new fields and leave the beaten track if you are prepared to share the risks. The readiness to take risks must be complemented by a high degree of trust and error tolerance.

Let me expand a bit on this and illustrate what I mean by referring to Franz Kafka's famous short story "Vor dem Gesetz" ("Before the Law"/"In Front of the Law") and a man's struggle with the gatekeeper, but perhaps even more so with his own lack of self-determination and courage.

As most of you will remember, in Kafka's story "a man from the countryside" asks a "gatekeeper" sitting in front of the law to gain entry into the law. The gate is open. But the gate-

keeper says that he cannot grant him entry at the moment. A conversation between the two men evolves about the sequence of gates and gatekeepers inside the law and the obstacles to be overcome. The man from the countryside has not expected such difficulties. When the gatekeeper gives him a stool, he sits down and waits “for days and years”. The man continues to observe and hopes to win over the gatekeeper with presents. He simply responds: “I am taking this only so that you do not think you have failed to do anything.” Over time the man’s eyesight grows weak, “and he does not know whether things are really darker around him or whether his eyes are merely deceiving him”. Shortly before his death, already unable to lift up his stiffening body, he waves at the gatekeeper and puts a final question to him: “Everyone strives to reach the Law, so how does it happen that for all these many years no one but myself has ever bagged for admittance? The gatekeeper recognizes that the man has reached his end, and to let his failing senses catch the words, roars in his ear: ‘No one else could ever be admitted here, since this gate was made only for you. I am now going to close it.’”

Of course, Kafka’s parable (which is often used to introduce law students to their subject) offers manifold opportunities for interpretation. In several respects it draws us into a reflection on our self-awareness and it sensitizes our consciousness to the task of authentic human existence. But for the purpose of my deliberations on the challenges involved in various domains of international collaboration and creativity in research and higher education it may suffice to point at some of the major differences as well as the quite striking similarities between the man in Kafka’s short story and today’s academics. Most of the latter are definitely not as naïve as the man from the countryside. They would certainly find ways to verify at least some of the claims made by the gatekeeper. But would they have the courage to walk through the first gate and confront themselves with the hitherto unknown world behind it? Perhaps, we might even ask ourselves in our daily endeavours as researchers, as rectors, or as funders: Are we daring enough? Are we ourselves prepared to embark upon a journey into the unknown territories beyond the boundaries and borders of existing knowledge?

Communication: My third point addresses a central element of higher education and research: communication and the rapid changes brought about by digitisation and computer-mediated forms of interaction. Buzzwords like “e-learning”, “e-research”, “virtual laboratories”, “e-science”, “digital humanities”, “computational social sciences”, “self-publishing”, and “open access” may just indicate the direction in which we are already moving. No doubt, the Internet will continue to extend the boundaries of scientific and scholarly exchange even further. Already now the creation, distribution, and absorption of new knowledge are happening almost simultaneously. This in turn leads to a situation where many conventional arrangements and modes of operation become fragile.

Obviously, computer-mediated mobile communication will also reframe the boundary conditions under which our institutions are operating. Not only will libraries and bookstores be transformed into digitized communication and media centres, but also learning and decision-making processes are already and will in future be even more so affected by new opportunities provided on a wide variety of electronic platforms.

However, in spite of this fascinating and rapid transformation of communication one must not forget what lies at the heart of scholarly communication which is so important for creativity: Thought-provoking discussions, critical debates with students and colleagues, and face-to-face conversations among the most creative minds in a given field are essential for achieving substantial progress in research, in particular when it comes to addressing cross-disciplinary and transcultural issues, but also to fruitful interactions with the outside world.

Innovativeness: The fourth precondition is that the institution actively fosters innovativeness. Those researchers who are prepared to take a risk with unconventional approaches need to be identified and encouraged. Academic leaders, university rectors and presidents, as well as heads of foundations and other funding organisations must appreciate un-

conventional approaches and encourage risk-taking by providing incentives such as additional funding and long-term commitments.

To foster creativity and enable more breakthroughs we need first and foremost more “creative spaces”. Research agendas and policies in Europe predominantly aim at establishing larger research clusters and collaborative research units. And, indeed, these clusters play an important role in the strategic orientation of the entire research system. But one must not overlook that these compounds come with their own constraints and administrative needs which might interfere with truly creative scholarly thinking. The creativity of individual researchers – and the strategic development of entire universities – run the risk of being overwhelmed by the agenda-setting of public and private funders. Creative thinking needs time and space for some thorough rethinking of common wisdom and cannot be triggered by ever larger research agendas.

Persistence and Perseverance: To forge new paths in a barely known territory often takes longer than two or three years, the usual lengths of project funding. Mistakes must be allowed as well as changes of direction. To put it in the words of Albert Einstein: “Two things are indispensable for our research work: untiring persistence and the readiness to dispose of something in which we have invested a lot of time and hard work.”

There is a tendency in Europe – and particularly in Germany – to replace basic funding for universities and research by project-based funding. Third party funding, in turn, comes with the requirement to write applications for grants and these grants usually only secure funding for about three years. There is no wonder that short term thinking, and a tendency to play it safe in view of the need to apply for the next grant, absorb valuable time and energy which could otherwise be invested in research. In this respect I find it encouraging that the expert panel evaluating the German Initiative on Excellence as well as the Federal and state governments have opted for a seven year funding period for the next round of applications.

Diversity: As we have already learned from Rogers Hollingsworth's studies, monocultures in academia do not provide an adequate breeding ground for exceptional thoughts. New knowledge is usually formed at the boundaries of established fields, so the interfaces between these areas of expertise must be activated. In order to be successful it is essential to provide ample opportunities for all the researchers to interact intensively so that entirely new paths can be developed and breakthroughs achieved.

Serendipity: It is impossible to plan the precise moment at which a radically new idea emerges or a major scientific discovery occurs. The philosopher Ludwig Wittgenstein once said: "Sometimes we do not know what we are looking for, until we finally found it." But there are numerous examples in the history of research which prove that it is possible to establish a particularly stimulating environment more conducive to scientific breakthroughs than others. Although there is no one-size-fits-all kind of recipe we can apply, it is certainly worthwhile to try and try again. To put it in the words of Samuel Beckett: "Ever tried, ever failed. No matter. Try again. Fail again. Fail better."

Achieving and maintaining a culture of creativity is not at all straightforward. On the contrary, it is full of paradoxes and contradictions. Whilst every institution, not least for securing its own survival, has to insist that its members adhere to its rules, quality standards, etc. the creation of new ideas ultimately is about breaking the rules, fighting against common wisdom, and in particular for its leadership about being tolerant to errors made. Epistemologically speaking, radically new ideas can often not be phrased in terms of the initial question, and the openness for "fresh thinking" is not only required by those who produce new ideas, but also by those who are expected to foster their creation or pick them up.

The prerequisites given for establishing a true culture of creativity may nevertheless not appeal to everyone. As the following cartoon demonstrates, there may also be different ways of

not falling into despair, or at least finding a way out of it by waiting for the right moment of inspiration: last minute panic.

Funding Measures for Fostering Creativity

In the United States as well as in Europe, many private foundations – and more recently also public agencies – have developed new, medium-, to long-term funding schemes enabling some of the most creative researchers to pursue their research ideas in a high trust environment. These are for instance the MacArthur Foundation, in the biomedical and clinical research areas the Howard Hughes Medical Institute and the Wellcome Trust, as well as for all areas of science and scholarship the Danish National Research Foundation and the Villum Foundation as well as the Swedish Wallenberg Foundation with its Academy Fellowships, and also the Volkswagen Foundation with its Lichtenberg Professorships and the so-called Freigeist Fellowships. All of them provide their rigorously selected principal investigators with sufficient funds, top-notch infrastructures, and ample time (usually 7 or 8 years) to rethink common wisdom and to ultimately achieve important breakthroughs.

The European Research Council (ERC) which was established in 2007 operates along similar lines. As I was involved in setting it up at several stages (German Council of Science and Humanities in the early 1990s, a Nature article in 2002, a panel of the European Science Foundation in 2003, and a committee established by the Danish Government on behalf of the EU Council of Ministers in 2004) I can tell you that the ERC is a perfect example for the wisdom of Victor Hugo's statement: "There is nothing more powerful than an idea whose time has come."

It took only a few calls for proposals and the rigorous selection of starting grants as well as advanced grant fellows to establish the ERC selection processes and their outcomes as benchmarks for excellence (some even say "the gold standard") in research. As the fellows chosen are free to select their host institution anywhere in Europe, their affiliations have be-

come a matter of great concern for research policy-makers as well as university leaders in many EU Member States. In the case of Germany, the results confirm that we are still producing a lot of outstanding postdoctoral researchers but that more of them decide to work in other countries than foreign researchers that are coming to Germany.

This (relatively speaking) lack of attractiveness of German universities and research institutions is closely linked to the uncertainties a postdoctoral fellow is confronted with, in particular if he or she wants to become a professor. There are hardly any tenure track positions, and even an outstanding performance does not guarantee a reliable path towards a professorship. The Volkswagen Foundation wants to establish role-models for changing this situation by offering Lichtenberg Professorships (supported for up to 8 years) linked with a tenure track option to be ultimately confirmed after 5 years at the latest. Also the “Freigeist” Fellowships offer funding for up to 8 years. Luckily enough, the Federal Ministry of Education has seen the deficits in the German system and currently launches an initiative for establishing significantly more tenure track professorships for postdoctoral researchers.

Despite the strong emphasis on people, the Volkswagen Foundation does not discard the traditional project approach – this, however, with a strong focus on daring and original new research ideas and approaches. In 2012 and 2014 respectively, the Foundation launched two radically new funding initiatives entitled “Experiment!” and “Original – isn’t it?”; the former for science and the engineering, the latter for the humanities and cultural studies. They invite researchers to send in precise proposals with a bold research idea on just three pages which will be reviewed by an international panel without disclosing names and track records of the respective applicants. The application scheme is fast: The decision is taken within three or four months upon submission of a short proposal. The anonymized peer-review ensures that only prospective breakthrough ideas will count. These two small grant schemes only work when all sides are prepared to take risks. Of course, taking these risks also implies that in the end several projects will not be successful. On the other hand, the Foundation hopes that

in turn other projects will be coming up with really ground breaking and highly original science and scholarship. Therefore, we expect to not only have “super results” but also “heroic failures”. Indeed, we already had some of those.

IV. The Growing Importance of Structured Doctoral Training

Humboldt Revisited

Let me now transfer what I have just said about some of the most important ingredients of a culture of creativity to what I consider to be the hotspot of scholarly formation: the doctorate, the intermediate phase right after the completion of an academic masters’ degree and putting an eye on a prospective postdoctoral research career. The doctorate surely is a phase which is earmarked by deeply questioning one’s personal identity, values, beliefs, and mindsets in an existential way, and thus influences the development of one’s personality, self-efficacy, and communicational self-confidence. Indeed, the doctorate is the decisive phase of scholarly self-activation.

Perhaps, not surprisingly for some of you, the concept of self-activation of scholars and students echoes well with the classical concept of a modern university as expressed in Wilhelm von Humboldt’s, the Brothers Grimm’s and von Savigny’s writings. They all focus on the formation of scholars and future leaders for various walks of society as something which is closely connected to activating their sense of both, creative and critical thinking. Basically, Wilhelm von Humboldt’s concept rested on four pillars (cf. Rainer C. Schwinges (ed.): Humboldt International: Der Export des deutschen Universitätsmodells im 19. und 20. Jahrhundert. Basel 2001):

- the integration of teaching and research;
- the complementary principles of Lehrfreiheit (freedom to teach) and Lernfreiheit (freedom to study);

- the demand for solitude (Einsamkeit) and freedom in the autonomous pursuit of truth;
- the introduction of the seminar system as the backbone of a community of scholars and students (Gemeinschaft der Lehrenden und Lernenden).

In the mid-19th Century this was complemented by Justus von Liebig's concept of lab-based training for future chemists and physicists, and subsequently developed into the success model of the German research university around 1900 which was copied in several parts of the world, in particular in the United States.

It seems to me that our digitised and globalised world offers new opportunities for realizing Humboldt's vision under quite different circumstances. What we are still lacking is, however, a programmatic renewal of the respective doctoral training schemes in our universities. It will take some vitally needed "out-of-the-box" thinking about the objectives of future studies in our universities, and quite a wide array of diverse visions for the content of such curricula.

The Humboldtian ideal of the integration of research and teaching – the very idea that a small group of students learns how to conduct sound research directly from a professor – was initially elaborated at a time when only one per cent of a cohort had access to a university. Humboldt's university was home to only a very small number of professors, lecturers, and students. Today, by contrast, European education policy aims at leading about 40 percent of the 20 to 30 year olds to a tertiary degree. And universities, consequently, need to cater for an ever increasing number of students. This also holds true for the doctorate. Since the year 2000 graduation rates at the doctorate level have increased significantly in almost all OECD countries. And this shows that doctorate holders form a significant part of the respective working age population.

This development also means that an increasing number of doctorate holders afterwards will leave the universities and seek employment outside academia. Let me give you examples of two European countries to demonstrate the multifariousness of career paths in the United

Kingdom and Finland. Note that only a very small percentage of doctorate holders will actually become a professor with a permanent position at a university, and that many will leave academia even though they had worked for a while as permanent research staff. And the example of Finland shows the well-known “bottle neck effect” of an academic career path, and at the same time the various options doctoral candidates have for non-faculty jobs outside academia. In fact, unemployment rates for doctorate holders are luckily enough almost everywhere very low. As the example of the “American Society of Cell Biology” demonstrates, for a Ph.D. candidate a faculty job, indeed has to be conceived of as an “alternative career” given the fact that only a small percentage of degree holders will end up as professors.

Of course, under these circumstances the Humboldtian ideal of the integration of research and teaching has to be revisited and reconfigured to the needs of those who will take on leading positions in tomorrow’s world. Nowadays, universities in this respect have a double task of educating the next generation of academics and at the same time providing a functionally adequate education for those who prefer the corporate, political, or civic sector for their future careers. If this challenge is not met, the higher education system is failing to meet the needs of the majority of its students and of society at large.

We not only have to rethink and reconfigure the requirements of doctoral training as outlined earlier in my speech; but we also must acknowledge that the thoroughly revised concepts need to be complemented with structural frameworks for doctoral training at universities which strike a balance between the respective research and training opportunities. We must ensure that the doctorate does not end up in chaos. Doctoral candidates cannot be left alone completely with their research, and at the same time they have to develop their own approach and personal autonomy for unfolding the potential which lies in them. This means that professors have a supervisory and an advisory or mentoring role to play. It is important that doctoral candidates and professors meet personally on a regular basis and thoroughly dis-

cuss their ideas for their doctoral students who want to be respected as early career researchers. Perhaps, these structured frameworks for doctoral training are based on a topic which provides new perspectives for career opportunities outside academia as well. This means that elements of practise based doctoral training have to be integrated in the concept of a graduate school, and that funding schemes need to provide room for complementary internships, traineeships, or jobs in the respective field of practice.

Structured doctoral programmes will also help to make academic expertise in a respective research field more visible – for colleagues at other universities but also for interest groups outside academia. The accessibility of such expertise is decisive for the future well-being of society, and it provides an interface to meeting future challenges in a rapidly changing world. In this sense the most successful form of knowledge transfer cannot and should not be measured in terms of patents and licenses granted but lies in the training of excellently qualified researchers who can then take over leading functions in science and scholarship, in business, and in wider sectors of society. The provision of a continual flow of highly-qualified researchers trained not only in the most up-to-date methods and techniques but also in communicative and ethical respects, to my mind, is the best means for the transfer of expertise out of our universities into various domains of society.

Structured Doctoral Programmes for Central Asia/Caucasus

As part of its funding activities in Central Asia and the Caucasus and in order to support the internationally embedded training of doctoral students in the region even more sustainably, the Volkswagen Foundation is planning to advance the establishment of structured doctoral programmes at universities in Central Asia and the Caucasus, wherever possible in coordination and close cooperation with local funding organisations. It is intended to publish the respective funding offer early in 2017. To facilitate the conceptualisation of such projects and the preparation of proposals, funds may already be requested within the current call to de-

velop concepts and to establish an organisational and administrative framework for structured doctoral training. The deadline for these preparatory activities is 15 June, 2016.

The call addresses universities in countries such as Armenia, Azerbaijan and Georgia but also in Central Asia who, in close cooperation with universities in Germany, wish to establish the conceptual and infrastructural conditions for implementing bi-, or trilateral doctoral programmes at their institutions. The offer is open to faculties and departments in the humanities and social sciences as well as in science and engineering.

V. The Way Ahead

Responsibly shaping the future requires a sound knowledge of the past. Perhaps, it is in this sense helpful to remember that humanistic scholarship, at least the *studia humanitatis* as developed in the Renaissance, involved two dimensions – the ethical and the cognitive. They are no less than a connection of *virtus* (virtue) and *doctrina* (tuition), and thus encompass not only a study of man but also studies to the benefit of mankind. The educational aim was not only the teaching of facts but also the advancement and perfection of scholars as individuals, as strong characters and comprehensively trained personalities. Seen in this tradition, academic training not only involves a mode of disciplinary thinking but also a kind of ethical formation of the scholar as well as an ethical and political commitment to reflexivity and critique. This, however, is not only a matter of great concern to the humanities, the social sciences, and cultural studies but a huge challenge for science and engineering as well.

It was only last summer that the pressing questions of how to train the next generation of researchers and finding curricula ready for the 21st Century were raised in two of the leading science journals. For example, the 16 July 2015 issue of “Nature” addressed the topic of “Building the 21st Century Scientist”, at least for the STEM disciplines, and stated that “the science classroom was in for a radical change”. And only a week later “Science”, too – in its

24 July issue –, dedicated the editorial to “Rethinking graduate education”, also with a special focus on science and engineering, which comes to the conclusion that more collaborations and encounters with other disciplines are necessary to widen one’s horizon and to enable the young generation to responsibly face the challenges of the future.

Interdisciplinary Collaboration and Communication

Let me finish off on an optimistic note by demonstrating through an anecdote that one and the same problem can be solved with the help of the perspectives of various disciplines and that gaining insights and providing convincing results is very often simply a matter of proactive communication: A hiking group enters a village and stops in front of a church which attracts their attention. Among them are a mathematician, an experimental physicist, and a humanistic scholar with a background in media and communication studies. They get into a dispute about the steeple – the tower of the church – which is a really impressive one, and it doesn’t seem all that easy to estimate how high this steeple is. Each one tries to find out how high it is by using his own specific methodological approach. The mathematician moves fourty steps away from the tower. He then measures the angle and calculates the height. The experimental physicist – apparently the most sportive one of them – climbs up to the top of the tower. Then he releases a stone from his hands and measures the time spent by the stone to fall down to earth. This allows him to also calculate the height. Given these quite cumbersome approaches, it probably doesn’t come as a surprise to you that the humanistic scholar is the first one to present the correct result. But how did he do it? Well, it’s pretty simple, he conducted an interview with an expert. He rang at the door of the nearby rectory and asked the local priest who immediately provided him with the right answer.

In our age of the internet, social networks, and search engines this anecdote may seem almost archaic, but it demonstrates that personal communication and interaction can be quite important when one wants to gain insights. In this sense I’m happy to enter into interaction and communication with all of you, and thus to open up an arena of mutual learning.

Thank you very much for your attention!