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*Viewpoints & Discussion:*

## **Research Skills for the Future: Summary and Critique of a Comparative Study in Eight Countries**

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### **Abstract**

With this article we introduce a new article category in the journal, as announced in this issue's [editorial](#)—*Viewpoints & Discussion*. Articles under this category are intended to provide authentic and qualified opinions on topics relevant to the journal. These articles and follow-up discussions will pass through an accelerated, mainly editorial, review process. We invite readers to respond to such articles by sharing their personal thoughts and experiences, as well as to initiate new discussions. We hope these contributions will make the journal a site for lively discussions on research practice.

For this first “Viewpoint” we have selected a topic that should be of interest to many readers: *What key research competencies will researchers and professionals need to have in the future?* To introduce the topic, we look into a recent comparative study on this question that compares the situation in eight research-intensive countries. Reports on the study are available for free download, which can serve as a basis for discussion. In keeping with the idea of “Viewpoints & Discussion,” no claim to offering a systematic and scholarly account of the topic is intended; the only aim is to throw a spotlight on a theme of current interest and to suggest a few pertinent conjectures and questions for discussion.

**Index Terms:** research competence; researcher development; research organizations; research policy; research professionals; higher education system; national research strategies; public-private partnership; innovation promotion; multidisciplinary

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## 1. Introduction

In November 2010, two major French consulting companies, both located in Paris—L'Association Pour l'Emploi des Cadres (APEC, an executive recruitment and counseling company), and Deloitte Consulting (French branch of a British based, international consulting firm that constitutes the second-largest professional services network of the world today in the areas of auditing, consulting, risk management, taxation, and financial advisory)—published a report titled, *Les Besoins en Competences dans les Métiers de la Recherche à l'Horizon 2020*.

The English translation is titled, *Skills and Competencies Needed in the Research Field: Objectives 2020* (a more accurate title would have been, *Core Competencies Required in the Research Professions by 2020*).

The report is based on a joint study that was carried out by the two organizations in 2010 under the direction of Pierre Lamblin, Director of Studies and Research at APEC, and Cédric Etienne, Senior Manager of Deloitte Consulting for the Public Sector, with the collaboration of Marie-Christine Meunier (Survey Manager, APEC), Marie Bancal (Senior Consultant, Deloitte), Ollivier Lenot (Senior Manager, Deloitte), and Jorge Davo (Trainee, Deloitte).

The study's empirical basis consisted in 80 interviews with senior researchers and research managers. The interview partners were from both the private and the public sectors in eight countries that were chosen for the advanced state of their research landscapes: Finland, France, Germany, Japan, the Netherlands, Switzerland, the United Kingdom, and the United States. A total of 45 interviews were conducted in the public sector (higher education institutions, national research institutes, ministries, research funding agencies, etc.) and 35 in the private sector (research departments of business corporations, competitive hubs, etc.). The findings were reported in a Summary Report of 8 pages and a Full Report of 118 pages, including an appendix with eight separate country reports. The two reports can be downloaded in three languages (English, French, and German) from the [APEC website](#). An English version of the Summary Report can also be found in the website of [Deloitte Consulting](#).

*Note.* All versions of the APEC/Deloitte report and its summary, including the original versions in French and the English and German translations, can be downloaded from: <http://recruteurs.apec.fr/Recrutement/Marche-Emploi/Enquetes-Apec/Enquetes-2010/Les-besoins-en-competences-dans-les-metiers-de-la-recherche-a-l-horizon-2020/Consensus-quasi-universel-sur-les-20-competences-du-chercheur-ideal>

The following account is based not only on the English translations of the two reports but also on the French originals and the German versions, as their writing tends to me more accurate than the English versions. We present our own summary, along with some short literal extracts and individual quotes from the interviews, followed by some concluding personal considerations and questions for discussion.

## 2. Aims

The study's aim was to produce an international survey on the essential skills needed within the next 10 years in qualified, research-related jobs both in the public and private sectors. These skills should be identified by drawing on the experience and expectations of practicing researchers and research managers, rather than through some theoretical conjectures. As the authors describe their aim, "for the first time, a forward-looking international study presents the vision and expectations of researchers and research managers with regard to skills and competencies" (APEC/Deloitte [Full Report], 2010a, p. 3). Based on the findings, the study should then identify "the ideal profile of the experienced researcher, common to the public and private sectors, in the eight countries included in the study" (APEC/Deloitte [Summary Report], 2010b, p. 1). Six key questions were investigated:

- (1) What are the main trends in the changing organization of research?
- (2) What skills and competencies are currently sought after in a researcher?
- (3) Which are specific to a junior researcher and which to an experienced researcher?
- (4) How will these change over the next 10 years?
- (5) What is the current degree of mastery of these skills? and
- (6) What actions and strategies have been introduced or planned to produce, attract, and retain researchers? (Full Report, p. 3; Summary Report, p. 1)

The study should be of interest to a wide audience of researchers and research-based professionals in different countries, including PhD students and newly qualified researchers, as well as research educators, research managers, human resources managers, and executives in all types of organization that are involved in research and/or in its application to governmental and commercial challenges. Accordingly it remains at a fairly general level, although there is an Appendix with useful country-specific information.

## 3. Method

### EXTRACT #1. *Research Design*

The APEC/Deloitte Consulting study was conducted between May and October 2010 in eight countries, six of them in Europe: France, Germany, Finland, Netherlands, the United Kingdom, Switzerland, Japan and the United States. These countries were chosen for the scale of their research as measured by two

indicators: R&D spending as a percentage of GDP, and the number of researchers per capita. The scope of the study covers the profession of researcher, in the public sector as well as in the private sector.

After initial documentary research, 80 interviews were conducted in the eight countries with major players in the research field, both private and public: government representatives, heads of research labs (private and public), strategic planning executives, HR managers, university deans, etc. Of the 80 interviews, 45 were conducted in the public sector (higher education institutions, national research institutes, ministries, bodies providing research funding, etc.) and 35 in the private sector (businesses and heads of competitive hubs).

A committee of experts selected and led by APEC and Deloitte Consulting validated the study's main interim and final results.

A final study report plus an appendix consisting of eight individual country reports expands upon this study summary by providing a detailed analysis of the study's findings and a comparative analysis of the macroeconomic, demographic, and political data relating to recent developments in the world of research.

(Full Report, p. 4; Summary Report, p. 1f)

## 4. Findings

The study (Full Report, pp. 5-11, 13, 25, and 49; Summary Report, pp. 2-8) categorizes its findings into these main lines of development:

- (1) Major trends in the development of the research landscape
- (2) Related demands on the competencies of researchers
- (3) Strategies pursued in the different countries to develop and maintain research competencies

### 4.1. Trends in the Research Landscape

The interviewed researchers and research managers appear to agree largely about a number of common factors that shape the development of research practices in all applied fields. These concern three major groups of factors: structural, cultural, and (in our own terms) methodological, that is (in the report's terms), related to new ways of carrying out research.

#### 4.1.1. Structural Developments: Changing Research Spaces

(a) *Growing research budgets:* The interviewees reported significant increases of research spending both in private and public sector research investments. In the research policies of many countries there is an increasing focus on applied research, partly at the

expense of fundamental research; the study mentions the examples of Finland and Germany (see Full Report, p. 13).

(b) *Reorganization of research activities*: In the course of attaching stronger priority to research and higher education, governments tend to exercise more influence in defining research topics and priorities, while private sector firms tend to reorganize their research activities towards ever more specialization and outsourcing of specific research activities.

(c) *Public-private research partnerships*: Closer ties between public- and private-sector research, as well as between universities and (public or private) research centers, can drive innovation. All the countries covered in the study therefore promote such ties, through initiatives such as national or supranational research programs, joint public-private research initiatives and funding, technology parks, innovation initiatives, and similar efforts.

(d) *Size and cooperation matter*: There is a tendency towards larger research projects, in which the research resources of different players come together and achieve more impact, and towards regional or inter-institutional concentration of resources in competence centers, networks of competence, research hubs, and so-called “open innovation” partnerships in which different players cooperate with a view to successful innovation. “Today, companies no longer innovate only in isolation, and innovations are increasingly produced via networks” (Full Report, p. 18).

One of the common characteristics of research in the various countries is the desire to grow, either alone or by joining forces. This has resulted in a concentration of the research environment. (Research director of a large group in France, cited in the Full Report, pp. 5 and 14, and Summary Report, p. 2)

#### ***4.1.2. Cultural Developments: Changing Research Culture***

(a) *Higher demands placed on researchers and research managers*: Increased competition and rising expectations with respect to the performance and efficiency of researchers go along with stricter approval procedures for research proposals, monitoring of research in progress, and evaluation of completed research projects.

(b) *Increased orientation towards application*: Research is increasingly expected to result in new industrial and commercial developments, or better public policies, including creation of new markets, business ventures, spin-off firms, and so on. With the growing importance of private research funding, “more than ever, the research world must ‘listen to the market’” (Full Report, p. 19).

(c) *Importance of higher education*: There is a growing recognition of the importance of developing higher education systems that not only train a sufficient number of qualified researchers but also make sure their qualifications meet with the needs of public and private sector organizations.

(d) *Researcher profile*: Researchers are now expected, over and above their research skills and scientific expertise, to be skilled fundraisers for their projects, as well as to adapt their research to changing research priorities on the part of funding institutions.

(e) *Internationalization of the research landscape*: research is becoming ever more international, whereby research institutions and countries find themselves increasingly competing at an international level for financial and particularly personnel resources, by trying to be attractive to the best researchers in terms of infrastructure, remuneration, research environment and funding, and so on.

#### **4.1.3. Methodological Developments: Changing Ways of Conducting Research**

(a) *Trend toward inter- and multidisciplinary*: Both the need and the opportunities for innovation lead to ever more research at the interfaces between disciplines. Competition for research funding increasingly requires a multidisciplinary orientation of research proposals.

The selection criteria during calls for projects include interdisciplinary cooperation. For example, as part of the project on childhood, they don't want only doctors to present the project, they want to see the involvement of social science researchers. (Public-sector research director in Finland, cited in the Full Report, p. 58)

(b) *Growing attention to issues of intellectual property, research ethics, and regulation*: The ways in which research is designed and conducted, from initial training to the commercial exploitation of research work, are increasingly shaped by concerns about research ethics, risk management, intellectual property rights, copyright, and related issues.

(c) *The influence of technology*: Innovations in information processing capabilities (e.g., modeling and simulation tools, Internet-based research tools and research collaboration, open-source software), and technology (e.g., computer-supported diagnostic and testing procedures, genome sequencing) change research practices and potentials in many disciplines.

The latest developments in [molecular research] technology have totally changed the way researchers investigate compounds . . . the possibilities offered by simulation have expanded enormously. IT has made a big contribution to reducing testing in humans and replacing it by simulations. The impact on fundamental research is limited; the changes are much more apparent at the level of development. (Research Director of a pharmaceutical group in Switzerland, cited in the Full Report, p. 3, and Summary Report, p. 2, slightly edited)

## 4.2. Key Research Competencies Needed by 2020

### 4.2.1. Experienced Researchers

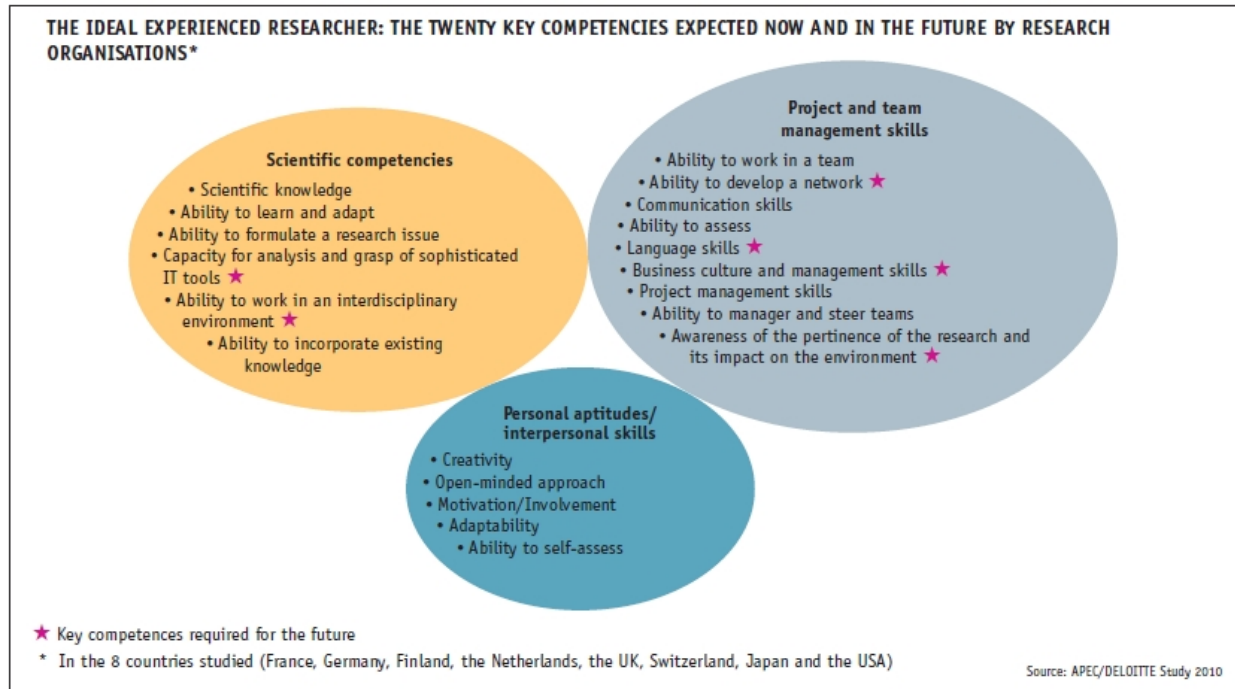
According to the assessments of the 80 senior researchers and research managers interviewed, it appears that the perceived needs regarding the competencies of highly qualified, experienced researchers, unlike those of novice researchers, are fairly uniform in all the countries. Figure 1 depicts 20 competencies that are expected to be indispensable for mature researchers by 2020, in both public- and private-sector research, in all of the countries studied. Together, they constitute for the authors of the study the ideal profile of experienced researchers in future. Six of these competencies are regarded as newly emerging key competencies and are marked in Figure 1 with asterisks. They are:

- (1) A well-developed capacity for analysis, including the mastery of sophisticated IT tools
- (2) The ability to work and cooperate in interdisciplinary environments
- (3) The ability to develop research networks
- (4) Language skills
- (5) Corporate culture and management skills
- (6) Awareness of the pertinence of the research and the ability to assess its impact on the environment

*Note.* Compare the slightly different designation of the six key competencies in the Full Report, pp. 25-34.

In addition to these emerging key competencies, a solid basis of scientific knowledge and skills remains indispensable. “Scientific competencies form the basic kernel of the competencies that the research world expects from any researcher, whether working in a public or private sector environment, and whether a junior or senior researcher” (Full Report, p. 26). Likewise, the ability to adopt new perspectives and formulate innovative research issues is also considered a basic skill by the interviewees in all countries.

In the era of multidisciplinary research, when a new domain is being explored, it’s important to be able to say: What questions should we be asking ourselves in order to become the leaders in a certain domain? What must be done so that this issue will be clear and pertinent for all of the disciplines touching on this subject? Is this an issue that can lead to technological solutions? (Research director of a large group in Netherlands, cited in the Full Report, p. 27)



*Figure 1. Competencies expected of experienced researchers.  
(Source: Full Report, pp. 6 and 25; Summary Report, p. 3)*

The interviewees expect that the demands for the six “new” key competencies will grow considerably in the near future and will become decisive for researchers. Most important among them is now the last-mentioned of the six key competencies, of taking into account the pertinence of research and its impact on society and environment.

Many of the researchers and research managers observe that especially young researchers and research students nowadays have a highly developed awareness of the importance of research and a clear expectation that their research should be relevant and beneficial to society; at the same time, however, they also note that the ability to assess the relevance and impacts of research is not similarly developed.

#### **4.2.2. Young Researchers**

Today’s students want to know what the benefits of a research subject will be to society. This concern has gained ground with the current economic crisis and is currently one of the main factors driving changes in university education. (Research Director of a large company in France, cited in the Full Report, pp. 6 and 38, and Summary Report, p. 3)

A related finding is that the development of research skills strongly depends on the research environment in which (especially young) researchers work: “The more developed an organization’s research support structures are, the more its expectations regarding the competencies of its researchers are precise and focused on specific areas of



expertise. In large structures, support and back-up functions allow the researcher to focus on his/her core activity” (Full Report, pp. 7 and 40; Summary Report, p. 4).

When it comes to recruiting newly qualified researchers, senior researchers and research managers find the 12 competencies listed in Figure 2 particularly important and assume they will remain so in the years ahead.



*Figure 2. Competencies expected of young researchers.*  
(Source: Full Report, pp. 7 and 41; Summary Report, p. 4)

Expectations from young researchers tend to be less uniform than expectations from mature researchers.

#### **EXTRACT #2. *Differing Expectations From Young Researchers***

There are currently real differences between private and public sector when it comes to the recruitment of young researchers: in the public sector, they are recruited almost exclusively on the basis of scientific excellence, whereas the private sector tends to look for a broader range of competencies (communication skills, languages, etc.). The stated aim of many public sector recruiters nowadays, however, is to develop recruitment practices that cover all the competencies mentioned.

(Full Report, pp. 7 and 41; Summary Report, p. 4)

#### **4.2.3. *Variation of Research Competencies Among Countries***

Of the 20 research competencies found to be of general importance by the researchers and research managers involved in the study, 9 were found to be rather similar among the

countries considered. These are: (1) scientific knowledge, (2) the ability to learn and adapt, (3) the ability to formulate a research issue, (4) the ability to incorporate existing knowledge, (5) the ability to assess research, (6) an open-minded approach, (7) research motivation and involvement, (8) adaptability, and (9) the ability to self-assess one’s competencies and research. The 11 other competencies show a stronger degree of variation across the eight countries; Figure 3 lists them and shows the perceived variation in the level of proficiency.

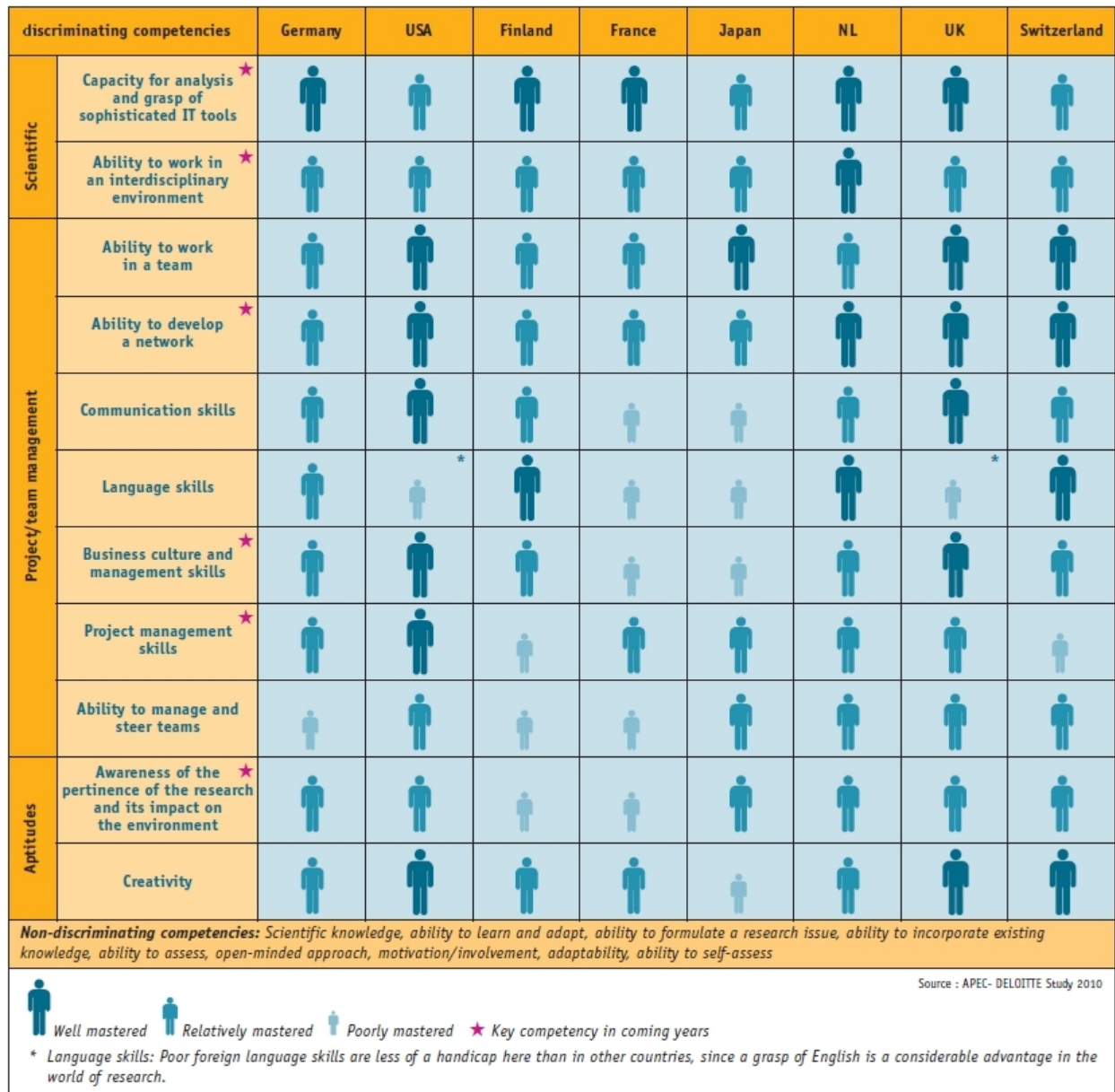


Figure 3. Level of researcher competencies by country.  
 (Source: Full Report, pp. 8 and 43; Summary Report, p. 5)

Inasmuch as Figure 3 is informative of the situation in the eight countries (remember the basis of assessment is the views of 80 selected senior researchers and research managers from the countries studied), the wide variation of the levels of proficiency in the 11 discriminating competencies is indeed striking. The broadest range of these competencies is currently found, according to the interviewees, among researchers in the United Kingdom and the United States, followed by those in the Netherlands and Switzerland. The narrowest range is found among French and Japanese researchers, whereas somewhat surprisingly, Germany's profile remains rather average.

To be sure, these are general assessments that tell us little about individual profiles of research skills. Nor are they indicative of actual research performance, which depends not only on mastered competencies but also on factors such as research infrastructure and opportunities, funding, and many others (remember the eight countries were selected for high level of research performance). In the 11 research competencies at issue here, there are deficits in all the countries considered. All the interviewees identified at least two research skills that in their assessment were only modestly or poorly mastered by a majority of researchers in their countries; these are, in particular, the ability to manage and steer teams and the ability to take into account the environment and its development.

Perhaps the most striking result is this: on the basis of the country profiles captured in Figure 3, we have to conclude that the six earlier-mentioned key competencies do not belong to those skills that are particularly well developed in a majority of the eight countries. This circumstance, along with the wide variation of levels of proficiency, suggests that stronger efforts are called for in securing the research competencies that will be key in the near future.

#### EXTRACT #3. *Disparities in Research Proficiency*

There is a disparity in the current levels of eleven decisive researcher competencies amongst countries and in particular amongst European countries. . . . Most countries need to make improvements in order to reach a high degree of mastery of the six key competencies required for the future. Furthermore, the diversity of the competencies mastered, as perceived by research organizations in certain countries, is indicative of [differently] efficient learning systems, particularly in the case of newly qualified researchers.

Finally, a high degree of mastery of certain scientific competencies coupled with a lower level of mastery in other competencies, as is the case in France and Germany, reflects philosophies of higher education that differ from those of other countries, such as the USA and Switzerland.

(Full Report, pp. 7 and 42; Summary Report, p. 4, slightly edited)

#### 4.2.4. Paradoxes in the World of Research Professions

The research managers who were interviewed make it clear that the competencies required to succeed both in public-sector and private-sector research are primarily those expected by employers. Their pertinent recommendations to young researchers may appear partly inconsistent:

##### EXTRACT #4. *Paradoxes in the World of Research Professions*

Research professions have undergone many changes in recent years. The competencies required to succeed, whether scientific knowledge, project management skills or personal characteristics, are first and foremost those expected and stated by employers, and may sometimes seem paradoxical in many respects:

- (a) Share and protect the fruits of your research
- (b) Maintain your level of expertise and become a good manager
- (c) Stay focused on your research project and be constantly open to the rest of the world
- (d) Be determined to achieve your objectives and ready at any time to abandon a research subject if it is not “profitable”

(Full Report, pp. 9 and 48; Summary Report, p. 6)

Certain research directors also find that the university system is paradoxical. Interdisciplinarity is desired, but channels of excellence and ultra-specialization are encouraged. Much is also said about project management and other relational competencies, but without providing the means to develop these competencies.

(Full Report, p. 52)

There is a growing requirement for integrators, people capable of working with a sense of interdisciplinarity, but in parallel, the educational system is increasingly targeted in terms of discipline against a backdrop of scientific excellence. The channels of excellence are increasingly targeted and narrow, with doctoral students being very specialized in a given domain, but not necessarily capable of integrating knowledge or working in a multidisciplinary manner. There’s a paradox between what they would like to get from researchers and what the academic world is bringing them. (Director of a public-sector research center in France, cited in the Full Report, p. 53)

### 4.3. National Strategies to Develop and Maintain Research Competencies

National strategies for promoting research competencies differ widely. They concern three major aspects:

- (1) Policies aimed at the quality of higher education
- (2) Policies aimed at making countries attractive in the international competition for talents
- (3) Policies aimed at developing and retaining qualified researchers

#### 4.3.1. Higher Education

Higher education systems and research policies differ widely in the eight countries with respect to their ability to adapt to the new requirements of the research landscape. The study assesses this ability along two dimensions:

- (1) The transformation pace of the education system, and
- (2) The capacity of the education system to respond to market needs

##### EXTRACT #5. *Higher Education System: Transformation Speed*

Some countries, such as the USA and the UK, are more advanced in this regard. The UK has produced the *Researcher Development Framework*, the work of a British organization championing researcher competencies. It sets out the expected competencies of researchers at different stages in their career development. Finland, Germany, and the Netherlands have also made considerable progress and are gradually introducing training in fields other than the purely scientific. In France and Switzerland, the organization of higher education is more complex to grasp as a whole. Japan lags behind in awareness of this issue.

(Full Report, p. 9, detailed on pp. 49-54 and with an Appendix on the British Researcher Development Framework on p. 85f; Summary Report, p. 6)

In terms of technical competencies, young Japanese researchers have no problems. They're very good. However, more than elsewhere, there is a shortfall in communications and management aptitudes that is even greater than in France, as well as over-specialization that may be a great strength when beginning but can be a handicap [later] when we want to have these people work in other professions. (HR manager of a large company in Japan, cited in the Full Report, p. 53, slightly edited)

It's necessary to develop "soft skills," but these skills shouldn't be acquired through courses given by specialists from other disciplinary fields or departments, but during the time spent within a research team in one's own

discipline. For this reason, it would be best for students to join research teams as soon as possible. It's the idea of learning while doing. (Director of a public-sector research center in Germany, cited in the Full Report, p. 61)

**EXTRACT #6. Higher Education System: Response to Market Needs**

Higher education systems are not all equally responsive and geared to producing the competences employers expect. The gaps relative to the mastery of the previously described competencies result directly from very differing philosophies and development notions for these competencies within the studied countries. While all of the countries have very developed higher education systems, the ideas differ as to what should be learnt at university and regarding the links between higher education and companies. (Full Report, p. 49; compare the detailed discussion of the situation in the eight countries on pp. 49-54 as well as in the country profiles on pp. 87-106)

Across the eight countries studied, higher education institutions are forging closer ties with businesses and listening more closely to their needs, some with more success (USA, Finland, Switzerland) than others. It is difficult, however, for the universities to follow changing needs at the pace desired/desirable from the business point of view.

(Full Report, p. 9; Summary Report, p. 6)

Figure 4 situates the eight countries along these two axes of adaptability:

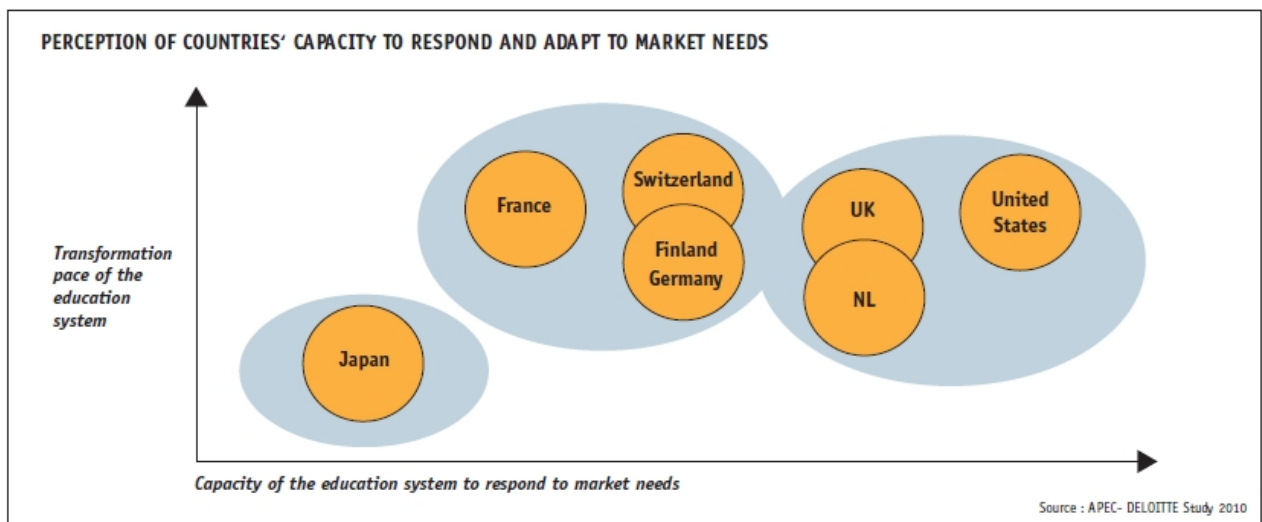


Figure 4. Capacity of countries to respond to the market need for research competencies, as perceived by research managers (Source: Full Report, pp. 10 and 61; Summary Report, p. 7)

### **4.3.2. Competition for Talent**

Large companies and major universities are increasingly competing for the best research professionals worldwide. “The recruitment pool for researchers is now global” (Full Report, p. 10; Summary Report, p. 7).

We recruit researchers wherever they may be, as long as they are the best. It doesn't matter where they come from. The only condition is a willingness to move to where the research is being done. (Research Director of a large company in the USA, cited in the Full Report, pp. 10 and 62, and Summary Report, p. 7)

In some countries, particularly in Japan and Switzerland, the situation is aggravated by new demographic barriers that have emerged. Due to an aging population, there is an increasing shortage of adequately qualified researchers and professionals in many disciplines and professions. Moreover, those individuals who are highly qualified do not always have the profile of competencies that the recruiting organizations need. Accordingly these countries now depend on attracting qualified researchers from other countries.

As the interviewees observe in this context, the personal mobility of researchers is higher now than it was 10 years ago. This is a double-edged sword: countries with recruitment problems have better chances of finding the qualified research staff they need, but at the same time international competition for such staff will increase and make it more difficult to attract the required competencies.

“The internationalization of the scientific market raises the question of the appeal of each country's scientific market. As the international mobility of researchers is developing, the concern on the national level becomes one of retaining or attracting researchers. . . . Knowledge of the expectations and motivations of researchers is therefore essential” (Full Report, p. 21).

Our country still doesn't know how to correctly analyze the expectations of its researchers, and what really motivates them. The offered salary is not the only element that motivates young researchers, especially ones who want to work in public-sector research. If France wants to keep its researchers, it will have to offer recruitment and working conditions that will allow them to give of their best. France will have to make an effort to offer an attractive package. (Public-sector research director in France, cited in the Full Report, p. 21)

Even so, there remain considerable institutional barriers to cross-national mobility that prevent both public and private employers from finding the researchers they need. Among them are politically imposed restrictions in certain key industries (e.g., the nuclear industry and the defense sector) and, more importantly, administrative barriers (e.g., immigration regulations, restricted recognition of university and professional

diploma, different entry requirements for universities). In Europe, some of the administrative barriers have been removed, but even so, many administrative and other restrictions remain, among them different levels of remuneration for qualified workforce, different or lacking financial support for students, and a frequent lack of sufficient foreign language skills.

Cross-national mobility is also impeded by different educational requirements for the same kinds of research and professional employment; the study cites the example of France and Japan, where recruiters place less weight on doctorates compared to recruiters in other countries.

### ***4.3.3. Strategies to Retain Qualified Manpower***

Career development management now plays an important role in securing research competencies in organizations; in the private sector it is an established tool; in the public sector it is an emerging development. Career development can aim at three different major career paths, as summarized by one of the interviewees:

There are three kinds of career paths in business: management (managing and developing a team, managing a strategy), project management (cross-disciplinary, with targets to be achieved in terms of cost, quality, deadline), and expertise (an individual who is an authority to be consulted in a certain field). (Research Director of a major group, Japan, cited in the Full Report, p. 11, and Summary Report, p. 8)

In each career path, training programs and opportunities for acquiring different experiences are essential for retaining and developing research competencies.

There are several different types of training. Some are general in scope:

- (a) Managing interviews with colleagues: how to give feedback, particularly to underperforming colleagues
- (b) Leadership: for employees and project managers
- (c) Concept of “leading through others”, for managers
- (d) How to develop a “winner’s mentality” and learn from setbacks

Some are highly specific to the field of research. The most important course for researchers at the moment is “Managing a global project,” which delivers the tools and strategies for managing complex projects. (Research HR manager of a large group in Switzerland, cited in the Full Report, pp. 11 and 69, and Summary Report, p. 8)

## **5. Conclusions Drawn by the Study**

Based on the findings of the study, its authors suggest four avenues to explore for aligning research competencies to the changing needs of the future research landscape:



**EXTRACT #7. Avenues for Building Research Competencies**

(a) A structured strategy for managing researcher competencies appears to be essential. No country has really developed such a strategy yet. Nevertheless, a number of initiatives have emerged. Europe's higher education institutions should provide the necessary impetus, building on the Bologna process, the Lisbon strategy, and the definition of a common core of key competencies.

(b) Higher education systems have a key role to play in training young researchers and equipping them to adapt to the globalized expectations of their future employers. Clearly, there are sharp disparities in the level of researchers' mastery of competencies across the countries studied. In order to fill these gaps, best practices should be adopted as a model, and not only from the so-called "Anglo-Saxon" model.

(c) Research has become globalized and research projects involve increasing numbers of multidisciplinary and international teams of researchers. The challenge is not to plug a mythical "brain-drain," but to facilitate the international mobility of researchers in all its forms, in particular by the adoption of policies to train and attract competencies.

(d) All those involved in research, in private and public sectors alike, express the same expectations in terms of competencies required for the research professions. A similar approach to the management of competencies is therefore required. Building bridges between public-sector and private-sector research would benefit all concerned.

(Full Report, p. 12; Summary Report, p. 8)

## **6. Critique**

### **6.1. Positives**

#### ***6.1.1. The Relevance and Timeliness of the Study***

The institutional and social context of research is changing. Universities are perhaps no longer the principal venues for research. Industry, in both public and private sectors, has emerged as a key player in the research world. Naturally, the logic of commerce is driving funding, staffing, and direction of research. Research has become a key part of business models. Recognizing this, governments have started looking at research as an element of national economic planning. This has resulted in a variety of incentive schemes to promote research investments, industry-university partnerships, international collaborations, doctoral enrolments and completions, and so forth. Knowledge, learning, and innovation have entered the discourse of public policy. These circumstances have definite implications for researchers. The work of researchers has come under the

purview of research administrators, policy makers, and business managers, leading to close scrutiny of research proposals, strict monitoring of research work, and strategic evaluation of completed research projects. Being a researcher at the beginning of the twentyfirst century is a pretty challenging affair.

Focusing on the demands this new research landscape places on researchers today and in the future, the APEC/Deloitte study undoubtedly takes up a timely and important issue. This empirically based, comparative study certainly merits the attention of reflective researchers around the world.

### **6.1.2. Voice of Policy Makers and Research Managers**

An aspect of the report that we find particularly useful is that it is based on the views of policy makers and research managers, rather than on some theoretical tools of forecasting such as scenario writing, Delphi analysis, trend analyses, or others, and that it presents these views in the form of unfiltered, literal quotes from interview records.

### **6.1.3. Cultivating a Discourse**

Another positive aspect to be mentioned is the kind of *research discourse* this study proposes, quite regardless of how far it actually takes this discourse itself. It is a discourse that allows discussing research and researchers in terms of the important part they play in society today and are called upon to play even more in the future. It is also a discourse that takes the experience and views of senior researchers and research managers to be a major source of insight, both in public- and private-sector research organizations, while remaining open to other stakeholders (policy makers, universities, research centers, etc.) and to the wider perspective of society-at-large, including the development of the global economy.

This way of situating research and researchers in practical contexts also gives rise to criteria of research requirements and performance, leading the report towards a desirable (or in its terms, “ideal”) competency profile of researchers as well as to corresponding notions of research and professional training programs in universities, of human resource development policies in organizations, and of national or regional research promotion strategies in the eight countries considered. It thus offers research educators, managers, and policy makers a broad picture of future directions and priorities for improving research opportunities and expected outcomes. We suggest that the report offers particularly useful pointers towards enhancing research degree programs and also towards strengthening the attractiveness of research-based professions and research careers. On such a basis, useful discussion can be developed.

## 6.2. Critical Considerations

### 6.2.1. Research Methodology

Despite its design as an empirically based, comparative study, the report gives a scant account of its *research approach*. Even in the Full Report, the Section on “Methodology” (p. 4, fully cited in Extract #1) is barely half a page long and gives no accurate details about the study design, the way the interview partners were selected and interviewed, and the soundness of the data and the analytical procedures. With the exception of the very useful country profiles in the Appendix, which for each of the eight countries compile useful statistical data about their research intensity, research organization and funding, research personnel, research promotion strategies, and recent developments, the report thus remains at the level of impressions and opinions rather than offering “hard” quantitative analysis—perhaps the price to pay for the positives mentioned above. Somewhat paradoxically for a report on research though, one might wonder what kind of research the report is based on and what research competencies were flowing into it.

### 6.2.2. The Role of Research Management

As a second critical consideration, there is a certain tendency of the report towards what we might call *managerialism in research*—the belief that research is a commodity that can be defined, designed, delivered, and managed by organizations and policy makers by way of introducing ever more requirements concerning research aims, research qualifications and funding conditions, forms of interdisciplinary and inter-institutional research collaboration, research monitoring and performance measurement, and the like. Perhaps a more balanced view would be that while such measures can indeed improve the institutional framework for research and can help to create new research spaces and opportunities, in the end it is still the dedication and ingenuity of individuals that shape the quality and innovativeness of research initiatives and outputs. There are limits to what top-down policies and managerial and organizational strategies—in one phrase, research management—can achieve, unless care is also taken to create and cultivate free spaces for individual creativity.

### 6.2.3. Soft Generalities vs. Hard Realities

A specific difficulty of such a comparative study consists in finding a proper balance between country-specific as well as sector- and organization-specific details that risk being of little interest to a majority of readers on the one hand, and general observations on today’s research landscape on the other hand that one can hear on the bus as it were. There is a fine line between useful generalization that helps us recognize overall patterns of development and overgeneralization that boils down to trivialities. At times the report comes dangerously close to telling us such trivialities, say, when it emphasizes repeatedly that closer ties between researchers across disciplinary and institutional borders are desirable or that the future research landscape requires a broader profile of competencies that would include more so-called “soft skills.”

Everyone knows it, no one does it: for example, in the educational programs that train future researchers and professionals, those involved certainly like to speak of the importance of multi- and interdisciplinary collaboration, of teamwork and application-oriented work, and of the “new” skills required in the future; but when it comes to the evaluation and funding of such programs, as well as to the admission and promotion of talents, what really counts are still the “old” criteria of excellence such as disciplinary specialization, “hard” competencies, individual publications, and so on. Some earlier articles in this journal have come to similar conclusions (e.g., Sherren, Klovdahl, Robin, Butler, & Dovers, 2009) and have also raised some pertinent questions on collaborative interdisciplinary research initiatives (e.g., Armstrong & Jackson-Smith, 2013, in this issue; Smithson, Hennessy, & Means, 2012). To do justice to the authors of the APEC/Deloitte study, they themselves note this discrepancy between claims and reality when they refer to the “paradoxes of the research world” (Full Report, pp. 9, 48, and 52; Summary Report, p. 6; compare Extract #4 in this Viewpoint). Likewise, despite some tendencies towards overgeneralization and repetition of trivialities, the Full Report still offers a wealth of specific information about the situation in different countries and organizations and that is what ultimately counts.

### **6.3. Discussion Points**

#### ***6.3.1. Where Should We Go From Here?***

As much as we find it positive that the report presents an empirically based, comparative study of today’s research landscapes in different countries—we miss a complementary, openly and systematically *normative* perspective of how research *should* develop in the coming years so as to meet contemporary key challenges at the global, national, and regional levels. After all, the fact that certain developments can be observed does not tell us that these developments are also desirable or respond adequately to crucial societal needs (whose needs in the first place?), or that there are no better options to serve those needs.

One might also wonder why there is almost no discussion at all in the report of the broader societal *roles and responsibilities of researchers*; broader, that is, than serving the interests of their employers and organizations. Are today’s research environments ensuring that researchers can serve society well and can play a responsible, sometimes necessarily *critical* role in the ongoing processes of innovation and social change? We invite our readers to submit their comments about the developments they would find most desirable, if not urgent, but which they do not see taking place as they deem them necessary. In what ways may the picture painted by the report fail to do justice to our readers’ vision of a *desirable* future research landscape?

#### ***6.3.2. Research as a Business Model?***

A related but more specific limitation of the report appears to be what might be seen as its tacit orientation towards the needs of the business and corporate world. Research appears to be treated primarily as a factor of commercial success, both for individual

organizations and national economies. That a majority of the interviews were held with research managers in public sector organizations—“45 interviews were conducted in the public sector (higher education institutions, national research institutes, ministries, bodies providing research funding, etc.) and 35 in the private sector (businesses and heads of competitive hubs)” (Footnote No. 1, Full Report, p. 4; Summary Report, p. 1)—does not contradict this observation, as it does not rule out a focus on mainly commercial and economic issues. A particular focus of the report seems indeed to be on the medical-pharmaceutical sector, a fact that is not made very transparent in the report. One cannot help the impression that there is an attempt in the report to avoid references to the commercial interests involved, for example, in the way interviewees are designated (e.g., “Research Director of a large company, France,” or “Research Director of a major group, Japan”). It is difficult to see why there should be a need to conceal the organizations for which the interviewees talk. In fact, the discussion could have been enhanced by identifying the companies involved and their business sectors clearly, as there is no *prima facie* reason to suppose that the issues and the dynamics of research would be the same or similar across all sectors.

Further, the empirical fact that research and researchers have been harnessed to serve the interests of business does not imply that this is the best option, or the ultimate destiny, for the human capacity for systematic inquiry, creative problem solving, and innovation. We invite readers to comment on this interface between business and research: How legitimate, how productive, perhaps how indispensable is it that research be considered a *business model* as it were? Should research indeed be seen as a factor of business success that deserves being the foremost priority of all the players involved in research, including national and international research policies and the researchers themselves? The discussion can be enhanced by identifying *other contexts*, real or potential, where research could make a contribution, for example, in the development of new fields of inquiry, new professions, and new careers, or in enabling new spaces and new forms of interaction that would help promote community, social justice, and personal and planetary well-being.

### **6.3.3. What is the Proper Unit of Analysis?**

In terms of the study’s approach and method, the unit of analysis appears to be the research *organization*, that is, the private- or public-sector entity that employs researchers. As the report states, “80 interviews were conducted in the eight countries with major players in the research field, both private- and public-sector research managers (laboratory directors, HR managers, University deans or rectors, ministerial representatives . . .)” (Summary Report, p. 1; similarly in the Full Report, p. 4). The persons who were interviewed appear to represent the viewpoints and priorities of the organizations, both business organizations and universities (which, in most cases, have become rather indistinguishable from business organizations themselves). Where is the *voice of the researcher* in such an account? We would be interested in the readers’ thoughts about this issue; do practicing researchers find themselves adequately represented and supported by research managers? The discussion might be enhanced by considering the experience of researchers in different research environments—

commercial, governmental, academic—and discussing the specific issues they face in negotiating their researcher identity.

#### **6.3.4. How Far Should Researcher Profiles be Standardized?**

We find it an interesting feature of the report, yet at the same time a possible reason for concern, that it proposes a standard “ideal” profile of researcher competencies for the year 2020. Is there such a thing as an *ideal researcher profile*? One might wonder how meaningful it is to define “the” 20 most important research competencies for “the” researcher of “the” future. The question poses itself whether research competence is not something much more complex than that. Apart from being at least partly specific to each field of research, is it not perhaps also constituted by a much more personal set of competencies than what can be captured usefully in a generalizing kind of researcher profile as the study outlines it?

To be fair, it is certainly a difficulty of a broadly aimed report such as the APEC/Deloitte study that if it is to be useful to policy makers and research managers, it does need to define some general criteria and patterns that are conducive to high-quality research. But then, are we not perhaps talking about a virtue rather than a difficulty here, in the sense that a wide variety of individual and field-specific researcher profiles should be considered an asset rather than an obstacle to creating a productive and innovative research landscape?

Likewise, should educational policies not give more weight to *local and regional contexts*, along with national contexts? How much sense does it make to import North-American and European standards of excellence to the entirely different situations and needs of developing countries, for example? While it is obvious that there is now a growing interest in many countries to promote research and professional competencies as drivers of social and economic progress and hence, to increase the number of highly qualified professionals and academics, it appears less obvious that these efforts should all adopt the same standards of competence and excellence (for a recent discussion in the context of the needs of countries such as India and Malaysia, see Dash, 2013).

In short, one may wonder how far the standardization of researcher profiles and education, as well as of the different countries’ strategies for promoting research and innovation, should really go. We see a risk that if taken too far, such standardization may ultimately not be as conducive to research quality and performance as the study implies. How important is *diversity*? Is it not indeed vital that researchers bring to research their very different, and very personal, profiles of skills and experiences, of motivations and expectations, rather than some kind of streamlined standard profile defined by policy makers and managers on the basis of current-day views and needs? How much space can and should research management give to individual and field-specific diversity of researcher profiles and personalities?

### 6.3.5. What Notion of Professionalism?

As a fifth and last discussion point that we wish to suggest here, it seems to us there is a peculiar one-sidedness in the report's account of the "soft skills" that are said to be of increasing importance in the future. Although the discourse that this study initiates is basically open—it has the potential to include, and to some extent does include, a multiplicity of different key players and stakeholders—it seems to us that in the resulting account of the research landscape, an *employer's perspective* rather than a wider societal perspective is effectively predominant. If, for example, we look at the list of the six "new" key competencies that are to complement classical scientific competency, it is conspicuous that a majority of them (though not all, to be fair) appears to be geared towards managerial skills and organizational needs such as, in essence, project and team management skills, an understanding of business or corporate culture, interpersonal and networking skills, mastery of IT tools, the ability to be innovative and to assess the relevance and economic potential of research proposals, an application-centered and "market-oriented" focus of researchers, and so forth (compare Figure 1 above and the discussion in the Full Report, pp. 25-34; also note how prominent the word *market* is throughout the full and short versions of the report).

While there is nothing wrong with the call for such market-oriented competencies—they are certainly important—one must wonder why there is virtually no mention of other competencies that we would consider just as important. These other basic competencies, we would argue, have to do with the *humanistic core of education*. We are thinking, for example, of a basic understanding and ability to think in terms of philosophical, sociological, and historical categories, as a basis of competent and responsible action—a competency that in our view is clearly underdeveloped in contemporary management education and which also might be strengthened in many areas of professional education and practice. We are equally thinking of *critical reflection skills* grounded in systemic thinking, problem-structuring and other generalist skills, and quite generally in competencies related to ethically conscious, reflective practice (for a systematic discussion of such competencies, see, e.g., Ulrich, 2001; for a fully worked-out example of their application to the competency profile of a particular "applied" research profession, see Ulrich, 2012a, b). How can we help future researchers, professionals, and decision-makers in developing such humanistic and ethically grounded, reflecting competency, a competency that would reach beyond a predominantly business-oriented and managerial perspective? What, one might ask, is the report's underlying notion of *professionalism*?

### 6.3.6. Conclusion

Despite the inevitable limitations of any such study, the APEC/Deloitte report takes up an important topic and offers much food for thought. Our hope is that you, our readers, will share your views on the developments of the research landscape that the study highlights or perhaps also fails to highlight adequately. Be sure to download and read at least the Summary Report, if not the Full Report, to form your own opinion. We then invite you to contribute your thoughts on the issues raised above or on any other aspects of the Report

you find relevant, as well as on this Viewpoint and/or the comments of other readers. As suggested at the outset, please upload your comments through the journal's submission system, assigning them to the new article category "Viewpoints & Discussion." Your comments will then be passed through a rapid, mainly editorial review and you will soon see them published. We look forward to some lively discussion.

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