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EDUCATING FUTURE BUSINESS LEADERS THROUGH VALUES OF RESPONSIBLE RESEARCH AND INNOVATION – EXPLORING THE POTENTIAL OF SENSITISING STUDENTS IN THE LEADING BUSINESS SCHOOL OF A CONVERGING ECONOMY

A JÖVŐ ÜZLETI VEZETŐINEK KÉPZÉSE A FELSŐOKTATÁSBAN A FELELŐS KUTATÁS ÉS INNOVÁCIÓ ÉRTÉKEI MENTÉN – A HALLGATÓK ÉRZÉKENYÍTÉSI LEHETŐSÉGEI EGY FELZÁRKÓZÓ GAZDASÁGÚ ORSZÁG VEZETŐ EGYETEMÉN

The purpose of the research project was to explore the potential for applying the Responsible Research and Innovation (RRI) approach in a leading business school. It was the authors' intention to discern the key issues in how their business undergraduate students see their current and future roles as contributors to addressing major challenges in society. The authors' findings revealed what students starting their university education already know about the societal issues addressed by the RRI initiative, and also in terms of where the greatest room for improvement exists for professors of business courses. The comparison of the results from action research between bachelor students and MBA students revealed preliminary indications of potential regional patterns (Central-Eastern Europe) to be further identified. The professional implications for business school faculty include encouragement to refine the business concept introduced to students so as to become more inclusive and responsive.

Keywords: **responsible research and innovation, university education, societal issues, Central-Eastern Europe, business school, responsible, inclusive, responsive**

A kutatás célja a felelősségteljes kutatás és innováció (RRI: responsible research and innovation) megközelítés alkalmazási lehetőségeinek feltárása volt egy vezető egyetem üzleti képzésében. Az volt a szerzők szándéka, hogy azonosítsák azokat a kulcskérdéseket, amelyek szerint üzleti alapszakos hallgatóik jelenlegi és jövőbeli szerepüket látják közreműködőként a társadalom főbb kihívásainak kezelésében. Eredményeik feltárták, hogy az egyetemi tanulmányaikat kezdő hallgatók mit tudnak már az RRI-kezdeményezés által érintett társadalmi kérdésekről, és azt is, hogy az üzleti kurzusok oktatói számára hol van a legnagyobb lehetőség ennek további finomítására. Az alapszakos hallgatók és az MBA-hallgatók közötti akciókutatási eredményeik összehasonlítása feltárta a lehetséges regionális minták (Közép-Kelet-Európa) előzetes elemeit, amelyeket későbbi kutatások által tovább finomítandók. Az egyetemi üzleti képzésben oktatók számára javaslatként fogalmazták meg a hallgatókkal megismertetett üzlet fogalom finomítását, a befogadóbb és adaptívabb értelmezések elsajátítása érdekében.

Kulcsszavak: **felelős kutatás és innováció, egyetemi oktatás, társadalmi kérdések, Kelet-Közép-Európa, gazdasági felsőoktatás, felelős, befogadó, adaptív**

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Students in business schools, especially first year students, tend to approach the concept of business, and the role of corporate decision makers through various stereotypes. Educators have responsibility to guide them towards more nuanced approaches. This includes what their current and potential future role in business may be, and steering them away from overly narrow definitions of professional scope, or from apathetic interpretations of the impact they can make. The ultimate challenge for professors in business schools is finding ways to connect higher education and solutions for the pressing issues of society, and turn student interest and activity towards the constructive roles they may play in shaping our shared future.

The question arises of how our students, as future decision makers, see science and innovation as relevant tools for achieving both strategic and mundane objectives in their professional lives. Educators share the responsibility for guiding students towards the careful and elaborate application of theoretical concepts and analytical frameworks so that they will be able to make lasting, purposeful decisions. Business students may develop into corporate decision makers, exerting influence over budgets larger than entire economies. In light of the stereotypes with which they tend to start their undergraduate studies, higher education aims to provide a transformative experience for students in terms of establishing the conceptual and strategic frameworks for sustainable solutions in business and beyond.

The purpose of the research project explained in this paper was to explore the potential for applying the Responsible Research and Innovation (RRI) approach in a leading business school. More specifically, our aim was to identify the common basis for the further elaboration of student understanding of their responsibility regarding the key RRI-related values. Building on a robust basis of shared understanding is necessary in order to clarify the potential of our work as educators. It was also our intention to discern the key issues in how our business undergraduate students see their current and future roles as contributors to addressing major challenges in society. Where can major areas of further improvement be identified and what are the potential reasons for their relative weakness?

The focus of our efforts was explicit in-class discussions about RRI-related values with first year undergraduate business students in Hungary's leading business school. The findings were contrasted with results from comparable discussions with first year MBA students in the same school. These discussions were arranged to be in the very first class of their studies at the university. Finally, the educator's reflections were also revealed in terms of the impact that applying the RRI approach had in helping to refresh his own education objectives and methodology. While there is existing information related to the application of RRI principles and tools in higher education internationally, we aimed to potentially explore how the local context (in a convergent economy from a former communist region) may add distinctive features to some of the key RRI-related activities and their potential impact in the courses selected (c.f. Czakó, 1992; Wimmer & Matolay, 2017); hence our choice of context sensitive methods. We also aimed to inform future scholarly and education efforts related to the scope of our work through our open methodological approach.

Responsible Research and Innovation in Education

The European Commission identified and described the major challenges society faces today, and considered the ways that science can play a role in meeting those challenges. Research and innovation have had a major impact on how our lives have developed, especially over the last couple of centuries, and their role is expected to increase further in importance due to constant technological progress. The exploitation of natural resources has intensified, although the productivity of production operations has also been improving. Consumer options have proliferated exponentially, and access to information has reached a level unprecedented in human history.

The so-called "Grand Challenges" defined by the European Commission include issues related to demographic change, (un)sustainable agriculture, (in)efficient energy production, intended green transportation, required climate action, inclusive societies to be developed, as well as protecting the freedom and security of citizens (Klaassen et al., 2014). It is understood that Responsible Research and Innovation endeavours incorporate these considerations into their objectives and their measures of success. As a consequence, the interpretation of the role of research and innovation has reached further than immediate operational goals and satisfying the most influential stakeholders. Funding from the European Union was set to address these challenges under the Horizon 2020 programme.

Responsible Research and Innovation is an approach to the way science is supposed to meet the above challenges and shape our future in a constructive manner. RRI brings the issues related to society and their relationship with science and innovation to more general attention, in order to stimulate the comprehensive and detailed discussion of potential solutions to the Grand Challenges (Klaassen et al., 2014). These discussions are supposed to involve a wide range of stakeholders. The underlying assumption is that due to the complexity of today's scientific environment, the direct involvement of those supposed to benefit from scientific results is recommended for two important reasons. First, stakeholders may provide insights and information that allow for the more refined scoping of research and innovation projects. Secondly, the genuine impact of science may only be realised through the effective dissemination and practical implementation of results in the wider network of society.

In the following sections we provide a brief overview of the education-related experience of working with RRI objectives and tools, as reflected in the international academic literature.

Context oriented, more effective business education

One of the key intentions of applying RRI values in education to bring science closer to society. A key platform for this is higher education, where future researchers and business leaders develop their understanding of the role they can play in addressing primary societal challenges (Apotheker, 2019; Toarniczky & Szilas, 2015). This integration of societal issues in higher education raises the opportunity for citizens to actively contribute to designing research endeavours, and participating in the "co-production of knowledge" (Almeida & Quintanilha, 2017; Bela et al., 2016). The complex considerations of involving students in the science-society dialogue offer plenty of touchpoints with various stakeholders within and outside universities, but the process can be typically structured in three stages: care, know, do (Okada et al., 2019). As the structure suggests, the ultimate validation of educators' related efforts is whether student progress in awareness and understanding of societal issues can be followed up by an active stage. Students can effectuate changes in their environment in this public engagement stage: allowing stakeholders to make more informed decisions, and thus support sustainable social and business prosperity (Okada & Sherborne, 2018).

The intended benefits of infusing RRI values and methods in university education are not limited to having a direct effect on the immediate environment, it is the effectiveness of education itself that is to be improved. Infusing the curriculum with actual research experiences can instil more creativity in courses (Munakata & Vaidya, 2013), across the life and social sciences. The adventure of finding the relevance of scientific results in their own learning excites students and fosters a deeper sense of personalised education and learning. Combined with enhanced pedagogical tools that involve, among other things, the corroboration of expert opinions, e-learning materials developed for different cognitive styles (Hercegfi et al., 2009), or role play exercises (Kazai Ónodi, 2016), students learn to accept reasons to disagree, and take responsibility for developing their own conclusions (Green, 2014). Empowering students in "real world" engagements adds significantly to their skills development as much as their understanding of the effect they can have on their society, beyond immediate implications (Bourne et al., 2018). Improvements in student engagement, creativity, critical thinking and conscious self-awareness provide the foundation for higher education of lasting value.

Ethics and sustainable development in research

Reaching out to communities in applying academic knowledge is an important consideration of the RRI approach in higher education, however, instilling ethics into designing and conducting research is arguably of equal significance. Social workers and civil society representatives can indeed provide insights into the design stage of research, and further, their role is much appreciated in stewarding the entire process of knowledge creation (Cannon & Buttell, 2015). They are particularly influential and contribute valuably when evidence is to be generated for research projects that will have social impact. Ultimately, students involved in such a stakeholder-designed and stewarded research process become socially sensitised and ethically responsible research consumers, much beyond the period of their active studies (Wong, 2017; c.f. Zsolnai, 2006). In the last stage of their university studies, students typically work on their thesis project, a preliminary scientific undertaking ideally connected to issues important to the student from a value point of view. Mentors (with a civil background or otherwise), and thesis supervisors exert major influence on this transformational experience of students, both in terms of encouraging best practices to be applied, and being a partner in the dialogue inherently involved in any ethically reflective academic endeavour (Ripley et al., 2012).

Sustainability is another pivotal consideration of RRI-focused higher education practices. Whereas a number of businesses have arguably fostered unsustainable operations for a long time, their role in sustainable development is gradually increasing on the agenda of academic research projects (Balázs & Gáspár, 2010; Harangozo et al., 2018; Lehoux et al., 2018). Innovations that support this transformation of the role of businesses are to be explored and elaborated upon, however, the way related academic work is organised still needs new research approaches for implementation. Among other features, university research for sustainable development should be problem- and action-oriented, span across disciplines, industry sectors, and national borders, and should utilise local knowledge and focus on local relevance (Waas et al., 2010). From an organisational point of view, a diverse institutional set-up, committed leadership and potential alliances with bridging organisations are recommended for the university in order to effectively facilitate sustainable development at regional level (Sedlacek, 2013).

Measuring the impact of RRI: transformational learning experiences

Discussion about the values of RRI and the potential benefits of its applications in higher education is valuable in itself, but measuring the actual impact of RRI-related activities is an expectation that no school management with practical responsibility can overlook. The complexity of RRI-related ambitions requires a number of potential indicators. These encompass qualitative and quantitative measurement options with data to be collected through observation, action research, or more traditional surveys and interviews. Based on an expert-based literature review, the most commonly used assessment criteria related to the impactful university application of RRI values are cognitive engagement, questioning and reframing, as well as fostering dialogue among participants (Heras & Ruiz-Mallén, 2017). There is, however an apparent lack of context-based indicators, and the great number of potential criteria to be considered calls for additional hierarchical ordering. In light of the above challenges, the prioritisation of extent indicators could benefit from involving experts in each specific market, and the implications of the

resulting bespoke measurement schemes are to be tested across different regions (Monsonís-Payá et al., 2017).

Surveys show that university professors who have had the opportunity to familiarise themselves with the RRI framework tend to accept and appreciate its values and potential benefits (Laherto et al., 2018). However, many of them fail to recognise their own responsibility in the process of RRI-inspired education that leads to transformational learning for the students and all stakeholders involved. Their hesitance in understanding and assuming their own responsibility is partly explained by the intensity of the process. Further, early results have confirmed that student awareness and knowledge of the RRI-values can be effectively improved, while challenges requiring more effort and experience have resulted in more limited success yet: taking impactful action, integrating RRI values in processes and stakeholder personal beliefs. All in all, examples show that RRI as a framework has proven to be appropriate for the disorienting dilemma that kickstarts the transformational learning process, but continued external facilitation may be required for stakeholders to sustain their commitment (Toarniczky et al., 2019). Meanwhile, there is an ongoing debate about whether RRI should be introduced as a normative set of values for students, or whether their own meaning-making is to be supported in order for them to identify personal values that reflect societal aspects of research and innovation (de Vocht et al., 2017). For professors and civil stakeholders alike, achieving transformational learning in higher education does not cease to be a challenge to be met in the foreseeable future.

Research objectives and methodology

The purpose of our research was to explore aspects of RRI's potential relevance and impact when applied in business school education. First, we explored a potential common basis of student understanding of key RRI-related values and societal challenges. It was necessary to identify a robust basis of shared understanding to clarify the potential of the related work of educators. We also distinguished areas where business students had significant potential for refining their approach. How could they understand the role they can play in addressing major societal challenges? We also looked for reasons that potential context-driven patterns might be found through our qualitative inquiry.

Research propositions
Our key purpose was addressed through four propositions that focused on more specific aspects of our interest, as explained below.

Proposition #1: First year business administration students find RRI-related values clearly relevant to their understanding of contemporary business.

We selected first year bachelor students attending their very first business class in the business school as the most appropriate subjects of analysis. How have they arrived at university from secondary school, what do they initially think about the reasons for studying at a business school

and what are their future career expectations? These questions were set to form valid starting points to frame the efforts of university professors. How and why they may already understand the relevance of RRI-related values in their interpretation of what business means, and what a business career per se may involve, was expected to provide valuable indications about where consequent coursework should focus more attention. Connecting the efforts of university professors to the Grand Challenges of society was our interpretation of what responsive education can become. There could be potential benefits from such a transformation in school for both students before and after graduation, as well as for the professors willing to grasp their responsibility in making an impact.

Proposition #2: First year business administration students find RRI-related values clearly relevant to their future professional life.

The second proposition addressed the same question with a different focus. How do students see themselves in their future professional roles, and how might they see the relevance of RRI-related values to their own future career? This is understood to potentially differ from how they find those values relevant to the general world of business. The underlying consideration was that a more personal reflection when examining the relevance of those values may stimulate different perspectives for students. We had reason to believe that different social norms or potential stereotypes may influence their arguments in a variety of ways. They might associate themselves more easily with positive values than with the way they may deem the relevance of those values for the business world in general, from a more distanced point of view.

Both Proposition #1 and Proposition #2 were also addressed in a different empirical setting: the very first class of full-time MBA students in their fundamental business course. We used this as a reference group for contextualising our research. The very diverse backgrounds of MBA students, both in terms of their employment experience and cultural norms, allows for reflection. How do they see the concept of business differently than bachelor students? How do they see their own responsibility differently in their future career, after graduation? Do values of RRI play a more important role in their approach or vice-versa? While the MBA students in the group received their bachelor degree from different universities, their understanding of the key issues may still provide insights into how university education, together with early career experiences, may shape the relevance and potential impact of RRI values in their thinking.

Proposition #3: RRI-related values provide a basis for refreshing traditional teaching approaches in higher education.

Students were our primary focus in this research; however, the role of professors is, and certainly will be, pivotal for any changes made in business education, and so our last proposition focuses on implications for the educator. Traditional approaches to higher education are focused on the course material to be presented and the learning of its content to be evaluated. More contemporary ap-

proaches focus on the experiential learning of students, and problem-based learning. In this context, introducing the RRI-related issues and values to the classroom was expected to influence the educator's interpretation of their own role as a contributor to solving wider societal issues. A key point in raising this perspective is whether and how focusing on the impact beyond direct university stakeholders may be considered important for the professors. This scope of education exceeds the traditional interpretation of how and why teaching objectives were constructed, and what kind of learning outcomes are expected in university courses.

Methodology

We selected an action research format for our exploratory research. The professor leading the research conducted the RRI-related exercises in a selection of the courses on different occasions. Observations were made about the course experience, in the format of both personal reflections and feedback collected from the students. The quality and general level of coursework elaboration submitted was examined to provide additional insights for the research. The professor was actively involved in teaching while doing the research, and thus the action research format. While the scholarly objectivity of the observations could not be guaranteed in the selected research approach, one of the purposes of the research was the continuous, mutual learning of the RRI-approach by both the students and the professor, beyond the scholarly objectives of potential generalisation in the future.

The exercises in Proposition #1 and Proposition #2 were made in a double-class of bachelor students, then a double-class of MBA students. The professor reflected on personal experiences from all the above research examinations regarding Proposition #3. The examinations were preceded by the professor's consultation with the RRI research team at the university, and guidance received regarding the interpretation of the approach and how it could be applied to existing courses. Preliminary results were also reflected with the involvement of the team, and presented at a scientific conference. Finally, a more detailed literature review supported the structural analysis of findings.

The first student group subjected to the analysis related to Proposition #1 and Proposition #2 were first year bachelor students in the university's English language business programme. They arrived at the university straight from secondary school, and thus their average age of 18-19 years. The total Business Economics class size was 22 students, who were Hungarian nationals with very few exceptions. Their family background, however was more diverse; they had typically travelled extensively in their younger years, and some of them had even spent a period abroad. They typically planned a career in business, mostly with multinational corporations, either in Hungary and abroad, and a few of them planned to start their own business at some stage in their future careers. They were in an advanced group of Business Economics, and presumably had above average motivation and ambitions.

The MBA students in the group involved in the research were enrolled in the full-time MBA programme (four semesters) of the school. It was a relatively large group of 35 students, studying Business Economics in the first semester. The course was compulsory, and so there was no pre-selection or self-selection of the students as would normally be the case for advanced or elective courses. In terms of nationality, the group was very diverse, most of them arriving in Hungary from the Middle-East and Africa, but also from South America, Eastern Europe and the Far East. All enrolled students had at least three years of work experience since receiving their undergraduate degree. They had very diverse backgrounds in terms of the profession and industry they had been involved in, ranging from investment banking to legal advisory or mechanical engineering.

The professor leading the research had at the time of the research over 20 years of higher education experience, with extensive professional experience in financial and strategic advisory at multinational firms. His focus on how theoretical concepts can be applied in diverse business fields had been consistently pursued in all the courses selected for the current research project. His research areas included international business and human resource management, as well as public-private partnerships. With this scholarly background he had experience in how an extended interpretation of business can include social and other public policy considerations, hence the openness towards the RRI-framework. He was involved in the corporate relationship committee of the university, allowing for a refined awareness and understanding of the expectations of future employers towards the graduates of the business school. At the stage of his professional development when the RRI team approached him, he was looking for inspiration and new approaches to teaching in an effort to refine and refresh his existing skills and toolkit.

Findings and discussion

The following section summarises what we have learned from the cases examined. First, our findings from the open discussion of RRI-related values with first year bachelor students are revealed, structured by Proposition #1 and Proposition #2. This is contrasted by our findings from a similar exercise with first year MBA students. Finally, the educator's reflections are reviewed from the aspects defined by Proposition #3. Findings are reflected upon and potential room for improvement identified, in light of current empirical findings in the context of teaching experience reflected in literature.

RRI-related values as subjects of discussion for first year bachelor students

Students of the introductory Business Economics course were subjected to an enquiry in the very first business class they had in their undergraduate university studies. They received two questions to be discussed in small groups in the class, and their conclusions were openly conferred among all students participating in the debate. Both

questions addressed their approach to six RRI-related values, each of which was previously introduced and defined by the RRI research team of the business school. The six values stemmed, with some adjustments, from the six components of the RRI framework, as defined by the European Commission (Klaassen et al., 2014): sustainability, social justice, inclusive society, relevance of science, open access to information, and ethics. Students did not receive a preliminary explanation of the given concepts, but relied upon their extent knowledge and hunches. They had the opportunity, however to discuss their ideas in smaller groups before they referred their proposed answers to the class (Table 1.).

more ambitious. The centre of their attention, similar to considering sustainable business in general, was focused on environmental sustainability. Apart from sustainability, students valued *open access* at an above-average level. Their initial approach to the value of open access was focused on the interpretation that direct access to valid and more detailed information was what the concept actually meant for them. For businesses, the issue is most relevant in relation to customers, from a range of aspects. As future decision makers themselves, students voiced their claims in a very assertive manner. They demanded access to more information on all aspects of transactions that would allow them to make better decisions. Putting pressure on

Table 1.

Overview of findings at BA-level

BA-level class	Awareness level of business relevane	Personal commitment	Strengths	Weaknesses
Sustainability	Medium	High	Protecting nature	Social or economic aspects
Social justice, gender equality	Medium	Medium	Gender equality	Other social considerations
Inclusion, social engagement	*Low*	Medium	Customers' rights	Other stakeholders
Relevance of science	Medium	Medium	Validity of information, innovation and learning	Clarity on links to applications
Open access	Medium	High	Customers' access to information	Other stakeholders
Ethics	Medium	*Low*	Regulation vs conscience	Trust

Source: own compilation

first question students received, as reflected by Proposition #1, was whether and how they saw the relevance of any of the six RRI-related values to their current understanding of contemporary business. For the purpose of this research project, we proposed that "first year business administration students find clear relevance of RRI-related values to their understanding of contemporary business". We aimed to explore whether and how this statement would turn out to be true or need to be refined, in light of our empirical findings. As a follow-up exercise in the same class, students were asked the second question, as reflected by Proposition #2, querying the relevance of the same values in their envisioned future professional life. Here we proposed that "first year business administration students find clear relevance of RRI-related values to their future professional life." Our findings, as explained by each value below, were enlightening in many aspects.

Highly acknowledged values

First year undergraduate business administration students who participated in the selected class appeared to be quite knowledgeable about the issue of *sustainability* in some aspects, especially regarding the excessive exploitation of the natural environment. Intriguingly, however they were clearly unaware of the social and economic aspects of sustainability. As far as their personal involvement was concerned in taking action related to sustainability in their future professional career, students appeared somewhat

those who have the necessary information is a measure they would resort to in the future in an effort to become more successful themselves.

Moderately acknowledged values

The issue of *social justice* generated, somewhat unexpectedly, the fiercest debate in the class. The discussion quickly became focused on the potential equality issues related to women's employment. Agreement was finally reached on the increasing importance of the topic, acknowledging the positive role of diversity in business innovation and learning about others in an increasingly globalising employment context. Their personal involvement in issues regarding social justice in their future professional careers was also primarily focused on gender considerations. They understood this as a timely question, feeling the expectation of customers, stakeholders and employees related to gender equality. In the end, the class did not reach consensus on whether and when positive discrimination should be promoted in business, and in turn, in their future professional careers. In terms of the *relevance of science*, students claimed that companies are under constant pressure from the environment, due to technological progress or external shocks of different kinds. This is the fundamental reason why scientific results play a key role in the sustainable success of businesses. They need novel solutions, and need them quickly. Recent "fake news" scandals in social media strongly attracted the interest of students,

and made them think about ways that real and fake information could be filtered. Students saw opportunity for their own careers in life-long learning; the relevance of science in education was clear for them. They wanted to stay competitive throughout their careers, and be able to adapt to changes. Science would remain relevant for them, as it would help whenever they faced novel challenges without help from experience.

Less acknowledged values
With regards *inclusion and social engagement*, students had very little knowledge. They did not know which members of society should be involved in the decision-making of businesses. Following the discussion of their initial ideas in small groups, they concluded that customers are certainly a key stakeholder group whom it would make sense to involve in corporate decision making. They knew little about other stakeholders who should be involved in decision making, or engaged by the company in any other way. Students quickly claimed that the potential key benefit of inclusion or social engagement for their own future professional careers was inducing more support from stakeholders. Employees were mentioned as a next step in their thinking, the future selves, who could be subjected to inclusion in an effort to gain more commitment from them. They could imagine themselves as more loyal employees to their future company if they were involved in decisions. In the discussion about *ethics*, business was preliminarily understood as profit generation for students in their very first class of their undergraduate studies. Ethics, in turn, is seen as a compromise in business efforts, as not all available business options meet ethical standards. Students emphasised the conscience of individuals when assessing the ethical implications of various options. They understood that regulations were necessary to support ethical decision-making due to the human frailties prevalent across businesses. In a fascinating turn, as much as students appeared to understand how and why ethical considerations are key in general business decisions, they stated their position differently when asked about their envisioned professional career. They appeared keen

to take responsibility in business, and potentially neglect wider social considerations in the future.

RRI-related values for MBA students
A similar exercise was arranged with first year MBA students, in their very first Business Economics class, at the start of the programme. The format of the exercise was the same: they received two questions and worked on their responses in smaller groups, then conferred with the full class audience about the strength and potential refinement of their proposed answers. Students did not receive a preliminary explanation of the given concepts, they relied upon their extent knowledge and related work experience. The first question was whether and how they saw the relevance of any of the six RRI-related values to their current understanding of contemporary business. The second question was focused on the potential relevance of the same values in their envisioned future professional life. The results of this exercise show interesting patterns in comparison with the results from the similar exercise with first year bachelor students (Table 2.).

Highly acknowledged values
Sustainability focuses on environmental sustainability in the eyes of first year MBA students. They were keenly aware of global environmental issues, and agreed that related considerations were and would be integrated in business decisions in the foreseeable future. MBA students appeared determined that they would have sustainability-related issues on their agenda as corporate managers in their future professional careers, one way or another.
Social justice as a value to be potentially considered in business was interpreted as primarily an issue related to equal career opportunities for women. Given the diverse background of students, most arriving to the programme from developing countries, they saw this issue as a forward-looking concept that should be integrated in business considerations across the world. Their personal commitment to gender equality was in some cases more advanced. While opinions varied, they all accepted the fundamental value of equal opportunities and that positive discrimination may be necessary for a more gender-bal-

Table 2.

Overview of findings at BA-level

MBA-level class	Awareness level of business relevane	Personal commitment	Strengths	Weaknesses
Sustainability	High	Very high	Protecting nature	Social or economic aspects
Social justice, gender equality	High	Medium	Gender equality	Other social considerations
Inclusion, social engagement	Low	Medium	Customers' rights	Other stakeholders
Relevance of science	High	Medium	Technological inventions	Social sciences
Open access	Medium	Low	Customers' access to information	Other stakeholders
Ethics	Low	Medium	Social antrepreneurship, refugees	Integration into traditional business

Source: own compilation

anced workforce, especially in management positions. MBA students had a clear position on how *science could be relevant* in business. They were positive regarding the need for continuous innovation in business, especially due to technological advancement. Science, per se, was mainly interpreted as technological inventions and their business applications. Their professional careers would be related to applying scientific results, they agreed, as research and development was a critical aspect of business and management, and it would be even more so in the future.

Less acknowledged values

In terms of *social engagement and inclusion*, MBA students felt there was little relevance in considering the interests of any external stakeholders except customers. They thought through the potential issues of management decisions without customer involvement, and also the benefits of more participatory decision making. However, the idea of involving additional stakeholders in strategic decisions, including product development or production management, was novel for them and they had little to add to the discussion. They followed a similar line of thought regarding their personal commitment to the values of inclusion and social engagement. The discussion of *open access* as a value in business took a specific direction in the class. Access to an extended range of business information was understood to be an ideal too far from the realities of developing countries with striking levels of corruption. Fighting against corruption appeared to be an issue beyond their control, which was reflected by the fact that their personal career aspirations with open access considerations were focused elsewhere. Connecting open access considerations to democratic rights and ideals did not arise in the class discussions. *Ethics* was understood as a separate concept of business. Its relevance in our daily lives is prominently clear, however, how business is or should be related to solving problems of ethical significance was less evident to MBA students. Further, it emerged in the open discussion that ethical problems in society could be a source of business opportunity for profit making (e.g. providing solutions to refugee housing), rather than ethical considerations to be involved in traditional businesses. By contrast, students envisioned personal involvement in ethical business considerations in the future as more elaborate. They felt motivated to do businesses that make a change in society; and social entrepreneurship attracted quite a few of them.

Comparison of BA and MBA student reflections

Sustainability appears to be a highly acknowledged value for both BA and MBA level students, at the beginning of their studies at the university. The personal commitment of MBA students is even stronger, potentially reflecting their work experience, and/or their different cultural background. However, both groups focused their reflections on sustainability in terms of the impact on the natural environment, and did not think much about the wider implications of the concept.

All other RRI values received less enthusiastic support by the students, in either the BA or by the MBA group. Social justice, mainly interpreted as gender equality, was acknowledged more strongly by the MBA students, probably due to their personal involvement in business organisations and how they may have been confronted by gender issues in management positions. Science also appeared more relevant for the MBA students, particularly in terms of technical inventions, which is potentially explained by the responsibility they had had in their jobs regarding adopting innovative solutions. The technical focus of MBA students and their apparent insensitivity to social science could, at least in part, be due to the relatively large proportion of students with an engineering background in the class.

The cultural background of MBA students, mostly originating from emerging economies, potentially explains how the value of open access drove their attention to discussion about corruption in business and society. Their lacklustre approach to their personal involvement in promoting open access as a value is probably also related to their work experience in their own country. In comparison, the mostly Hungarian BA students approached open access more positively, especially in relation to their future careers.

Educator's reflections on teaching practice refreshment

The way the RRI-related methodology affected the professor coordinating the exploratory research was not our primary interest, but it gradually emerged as another focus of the examination. Preliminary insights into related reflections were inspiring, hence the inclusion of Proposition #3 in the project: "RRI-related values provide a basis for refreshing traditional teaching approaches in higher education". While the priorities of education have not changed, and were not even expected to change as a result of research, our agenda expanded to explore what and how could be refreshed in the existing emphases of teaching. Possibilities included both content-related and methodological innovations, either directly from the RRI toolkit or indirectly through the sparking new ideas that would inevitably emerge. Learning outcomes included aspects of skills development even before the current research, but understanding more of the RRI initiative allowed for the foci of such activities to potential be refreshed. While the professor involved in the research had applied a "less is more" approach in the content of teaching for many years, the decision about what to include in the more limited content of classes provided room for potential refinement.

As a result of the exploratory action research, three aspects of innovation opportunities were identified regarding renewal of the professor's teaching practice in the future. First, the central idea of RRI that there are a limited number of major challenges in contemporary societies that research and innovation should address has become more explicit in the professor's approach to teaching. There has long been a gradual increase in focus on sustainability (especially environmental), social justice (promoting di-

versity), inclusion (participatory decision making), and ethics (conscious stakeholder approach) in progressive business practices, and thus a related emphasis in higher education is gaining strength. Open access has also been recently proliferating, especially related to innovative business models such as sharing economy applications. These changes have been spreading without the conscious approach highlighted by the RRI framework. Science education, starting with considerations of how science can and should be relevant in our lives, however, would not emerge organically in a market-focused business education approach: the rise of this focal point was more overtly connected to the RRI initiative. Nevertheless, all six values (or policy keys) of RRI have become explicit subjects of open discussion in the class room, allowing for free interpretation by the students, or for that matter, by the professor. This is a clear outcome of the action research project.

The second implication of teaching practice is an increased focus on adding more context to the theoretical and conceptual knowledge learned in the course. There can be multiple aspects of context, including more information about actual customers, shareholders, regulatory bodies, employees, or civil communities, all embedded in the general environment of businesses. Most importantly, however, the context of knowledge means obtaining more information about the students themselves, where they come from, and how they approach fundamental business issues when starting their journey of learning at the university. While this has always been a subject of consideration for professors, RRI's explicit focus on bringing change to the lives of members of society calls for more conscious and detailed reflections on student values and their congruence with any deliberate attempt at making an impact. The interactive teaching methods embedded in the RRI toolkit provide ample ground for debates and discussions around those values and ambitions. Professors are able to better understand what issues matter to students the most, and how and why they are willing to learn about some aspects rather than others.

The third and perhaps most important teaching-related outcome of the action research is the inspiration for developing a more responsive format of education. Creating awareness and some level of knowledge about major social challenges is a first step, and it is not necessarily missing in higher education even without the RRI framework being introduced. Providing analytical tools, and even some good practices to guide students towards progressing solutions toward mitigating the problems, is a higher level of outcome, still usually part of the curriculum in one way or another. Reaching out to communities and local businesses, and establishing direct contact between them and the students is an even more ambitious aim, and only some courses in leading universities would get to that level. Allowing students the experience to explore what they may not know about social challenges in a local and global context, encouraging them to act on that knowledge, and building impact measures into the learning outcome structure of various courses, appears to be global best practice that only selected schools aspire to achieve. RRI provides a framework for setting a school's ambitions high in terms of outreach and making an impact, with the maximum level of engagement by the students. The key learning outcome for the professor in the current research was understanding how and why connecting business education to tackling societal problems was a very natural approach that leading business courses would adopt in coming years.

Conclusions and further perspectives

Our findings are inspiring in terms of what students starting their university education already know about the societal issues addressed by the RRI initiative, and also in terms of where the greatest room for improvement exists for professors of business courses. Indeed, as Proposition #1 claimed, first year business administration students did find the RRI-related values clearly relevant to their understanding of contemporary business, however, the connections they understood were certainly limited in scope, providing ample challenge for their professors of business to build up their awareness and knowledge in other aspects. Our investigation regarding Proposition #2 explored a similar pattern, focused on how students find RRI-values relevant to their future professional lives. Students start their higher education studies with a robust knowledge of environmental problems, consumer rights, gender equality, and to an extent how science can help in generating knowledge with a level of validity and reliability. Their awareness of the Grand Challenges of society and the connections with RRI-related values and policy keys is naturally very limited beyond that scope.

The comparison of our results from action research between bachelor students and MBA students revealed preliminary indications of potential regional patterns (Central-Eastern Europe) to be further identified, however, the comparison can only be limited, as the MBA students came mostly from developing countries, while Hungarian students were enrolled in the university's English language programme, and so their socialisation was connected to globally accessible knowledge via the internet and personal travels. With that in mind, tentative propositions can be drafted for further research in the future. Student awareness of sustainability beyond issues related to the natural environment is strikingly limited, potentially connected to the socialisation of their parents and grandparents in a political system where social issues were addressed by the central government with little role for companies and civil organisations to play. While students showed a decent general awareness of them, gender issues were not felt severely by first year female students, potentially because of the general requirement in socialist countries that women were expected to work, rather than staying at home, as in a wide range of other cultures. The overt concerns of students regarding consumer rights is an interesting insight, showing a potentially strong pattern regarding the increasing focus on market mechanisms in a converging economy over the

last thirty years and more, supported by access to information on parallel global consumer trends.

Proposition #3 aimed to explore the professor's perspective of the potential outcomes of the current research. The findings are in line with the general claim of the proposition that the RRI framework would provide a source of refreshing ideas and inspiration for teaching in the business school. One of the more specific outcomes was that the Grand Challenges of society and their relevance to science education has become more explicit in the teaching practice of the professor. The role of context also increased in both the content of the selected courses and the general pedagogical approach: more attention was paid to the values of the students involved and their journey of learning, to be developed together with the professors. Finally, the action research drew attention to the importance of the responsiveness of education, focusing student attention on the actual change they can make in their own environment, beyond the scope of improvements in general awareness and knowledge. Overall, the research clearly added new dimensions to the professor's teaching approach for the future.

The professional implications for business school faculty include encouragement to refine the business concept introduced to students so as to become more inclusive and responsive. It should be inclusive in the sense that more actual stakeholders of the university's local or wider environment be called into cooperation, creating a general approach to the "co-creation of knowledge". It should be responsive with regard to the conscious awareness of key societal challenges and steering student efforts towards tackling those challenges in a range of potential avenues. Teaching faculty are, and have always been, free to include outreach programmes in courses, and they should feel more tempted to do so in the future. There are various opportunities, including promoting social entrepreneurship as a career opportunity for students, as well as proposing RRI-related topics for thesis writing, which is the ultimate integrative learning opportunity for business school students. Professors may initiate an upgrade of their educational credo and toolkit accordingly, with or without support from school management.

There are potentially wide-ranging implications for university management. One primary development goal could be to develop a more responsive educational approach in the business programmes. Faculty will be invited to work not only on building the awareness and understanding of RRI-related opportunities and values by students, but also on driving their attention to the possibility of outreach elements to be included in the curriculum. Alternative approaches to outreach can be phased into the student journey, and how exactly it is built in the programme. The ultimate achievement is clear, however, if students make societal impact during their university years, not only after graduation. Institutional support for colleagues willing to become involved in the "RRI-revolution" in the business school is to be provided, with champions of the case called for, in an effort to facilitate cooperation between colleagues. Last but not least, the commitment shown by university management to include RRI values in the school's mission is potentially a key driver in how universities can stay relevant in an ever-changing social-economic landscape, both locally and globally.

The limitations of the current research stem from its exploratory nature. Addressing RRI-values in education has not been fully operationalised for systematic research, which limits the generalisability of research outcomes. The more focused objectives of the research, in fact, were less ambitious. As part of a general awakening of the teaching faculty in the focal business school, the professor leading the project understood action research as an opportunity to explore the development potential of applying the RRI-framework; this explains the open approach to research. With the potential clearly identified and confirmed, follow-up research will focus on particular aspects of the learning opportunities depicted in the current study. Coordinating the involvement of more professors and courses in the school, and potentially beyond, is clearly the professional responsibility of open minded professors in the coming years.

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