

Embedding RRI in a Higher Education Institution: Lessons learned from Malta

Nika Levikov

Daniela Quacinella

Edward Duca

University of Malta, Malta

Abstract

Responsible Research and Innovation (RRI) has recently gained recognition as a guiding principle for research to be more inclusive of societal needs. In response, the University of Malta led an internal qualitative study to assess attitudes and perceptions towards RRI. This approach paved the way for cultural and institutional changes that may not have developed otherwise. Academics, non-academic staff and students were interviewed alongside an online questionnaire totaling 29 face-to-face interviews and 226 survey responses. Thematic coding analysis revealed the core theme of fragmentation. Sub-themes stemming from fragmentation include challenges around collaboration, communication, politics, knowledge systems thinking and varied ideas of responsibility in research. While most respondents are in favor of RRI practice, several barriers affect an individual's capacity to practice this approach, including lack of time and resources, and lack of recognition of public engagement (PE) efforts in the university's current policies and governance structure. This research allowed for the development of a targeted Action Plan and set of initiatives to successfully begin implementing a culture of RRI best practice, including the establishment of the Committee for Engaged Research and fostering an internal network of individuals who are exemplary in RRI best practice. The thorough and targeted process has produced more significant and tangible results than moving directly into implementation, while also reducing the risk of future problems emerging from rushed initiatives. The authors conclude that such an approach is imperative for successful RRI implementation within institutions, especially when considering cultural/local context.

Key words

Collaboration,
Fragmentation,
Engagement,
Responsible
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Corresponding author: Nika Levikov

Email address for corresponding author: nika.levikov@um.edu.mt

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Introduction

Responsible Research and Innovation (RRI) has gained recognition in the last few years as a guiding principle and policy concept primarily formulated and promoted by the European Commission. It is now a cross-cutting theme in Horizon2020 EU Framework program (Gerber, 2018), aiming to democratize academic and scientific knowledge and tackle grand societal challenges. RRI is defined as:

A process in which all societal actors (researchers, citizens, policymakers, and businesses) work together during the whole research and innovation process in order to align R&I outcomes to the values, needs and expectations of European society. It is an ambitious challenge for the creation of a research and innovation policy driven by the needs of society and engaging all societal actors via inclusive participatory approaches. (EU 2014a)

RRI has increasingly become globally recognized in various institutions and universities. Although some academics have their reservations towards engaged research and other criteria pertinent to RRI, such as open access (Böger et al., 2017), the development of RRI is a recognition of the changing research paradigm towards values based on co-production of knowledge, radical inclusiveness, transdisciplinarity and co-innovation for more socially relevant research (Kupper et al., 2015; Simone, 2018). More researchers are realizing the importance of having research that meets societal needs and the value of public engagement (Owen et al., 2013; Böger et al., 2017), yet the process of implementing RRI best practice at Higher Education Institutions and Research Performing Organizations remains difficult (EU, 2014b). Indeed, aside from not having a unified strategy, the definition of RRI itself can be ambiguous and variable depending on the individual academic, stakeholder and/or institution (Böger et al., 2017). Moreover, responsibility in research and innovation is a context-specific, emergent process that is maturing over time. Thus, it is important to avoid top-down prescription of RRI's focal elements to prevent it from becoming a bureaucratic tick-box exercise. To move beyond a set of theoretical RRI values and propositions, it is imperative to first understand the attitudes, perceptions and level of comprehension towards RRI (Euroscientist, 2016) in a given context and support a cultural change based on shared and bespoke RRI values institutionally (EU, 2014b; Macnaghten et al., 2014).

The research presented here, referred to as an internal study, was conducted as part of the Horizon2020 funded NUCLEUS Project, which ran from 2015 to 2019. NUCLEUS aimed to foster a culture of RRI best practice in ten partner institutions through two core phases. The first was to understand RRI in the local context and secondly, to implement actions to successfully embed RRI culture. It encouraged academics to be open and responsive to societal needs while forging relationships with external stakeholders to drive successful research and innovation (R&I). Gaining an understanding of the local context is crucial considering that bridging the gap between universities and external stakeholders requires an understanding of the reasons behind potential barriers towards RRI best practice (Kupper et al., 2015). This study recognizes the importance of considering the plurality of RRI practices in a given context rather than assuming a pre-existent understanding of RRI and an assumed essence of the concept (Forsberg et al., 2018).

The internal study paved the way for a conversation with academics, staff and students at the University of Malta (UM) on the topic of RRI and to build connections with staff from different faculties and institutes. Interviews and questionnaires allowed the authors to identify existing resources and opportunities to foster a culture of RRI best practice and key figures that can support this endeavor. The researchers were also able to act as "connectors" by recognizing the potential for collaboration between different departments and individuals who did not know each other despite being involved in similar research projects.

This paper begins by presenting the framework used for the internal study and a detailed review of the insights and major themes that emerged. The value of this approach and how it informed the implementation strategy to embed RRI at an international university will be explored in depth. The authors aim to make a case for other institutions that want to develop RRI implementation strategies with a preliminary stage of formative research.

Methods

A mixed methods approach was used to gather perceptions from university staff, academics and students about university-level performance on various RRI criteria. For this purpose, both questionnaires and interviews were employed to collect a range of quantitative and qualitative data regarding perceptions of RRI criteria and current performance of the university. A total of 29 semi-structured interviews were completed targeting all members of the UM from academic staff, non-academic staff and

students. Rather than a random sample, interviewees were chosen from different faculties and centers to ensure that opinions from a variety of disciplines and sectors were addressed (Meijlgaard et al., 2016).

The interviews and questionnaires explored barriers to and opportunities for the implementation of RRI at the University of Malta, in alignment with NUCLEUS objectives. To break down the wide and multifaceted meaning of RRI, four RRI keys (ethics, PE, open access and gender) (EU, 2014a) were used to explore these questions asking interviewees whether a given key criteria is occurring within the UM. Online questionnaires were distributed via email shots to all university staff and students. The questionnaire regarded views of university performance in two key areas: four internal RRI keys (questionnaire type A) and external stakeholder engagement (questionnaire type B).

A total of 226 responses were received out of approximately 13,000 students and 1,500 staff. The interviews covered both the RRI keys and external stakeholder engagement. The responses from questionnaires were coded inductively alongside the interview responses using NVivo 11 software (NVivo, 2015). Other RRI studies highlight the importance of moving beyond RRI keys as a set of compartmentalized prescriptions with the risk of a top-down tokenistic approach (Forsberg et al., 2018). With these considerations, thematic coding was done analyzing data beyond the four criteria to identify common themes around the recognition of RRI as a process of doing research that involves engagement *with* and *for* society (EU, 2014a) and identify what barriers and drivers might prevent or support this process.

Thematic coding was performed by the co-authors independently to avoid bias and any differences in resulting themes and sub-themes were resolved through discussion (Dierckx de Casterlé et al., 2012; Fereday and Muir-Cochrane, 2006; Lombard, Synder-Duch and Bracken, 2002).

Results & Discussion

The results from this research revealed what current RRI practices, barriers and drivers are present in the cultural, political and institutional context of the University of Malta. The core finding emerging from this study is centered around the theme of fragmentation. This term implies a breakup of parts from the same kind of type into smaller and separated parts. As such, fragmentation is observed as an obstacle towards fostering synergies and collaboration among different stakeholders (Alashwal and Abdul-Rahman, 2009).

Most respondents exhibited a willingness to embrace RRI as a practice and/or supported the concept and expressed a need for it. The discussion below considers widespread support while arguing for the need to address and reduce institutional fragmentation and implement RRI strategies from within the institution before developing plans to establish collaborations with external stakeholders.

Fragmentation was conceptualized on different levels. The authors found that while there are productive collaborations within the UM and with external partners, these collaborations are carried out through each researcher's personal networks, creating an environment where the university can metaphorically be described as a group of small islands isolated from one another. This in turn reduces the efficiency of collaborations and stakeholder engagement. Every faculty and department places different expectations on researchers with differing levels of engagement and values around their roles and responsibilities. This heterogeneity manifests in fragmentation both inside the institution and with external stakeholders and society at large. The fragmentation has been broken into four sub-themes, which are further described below (Fig.1).

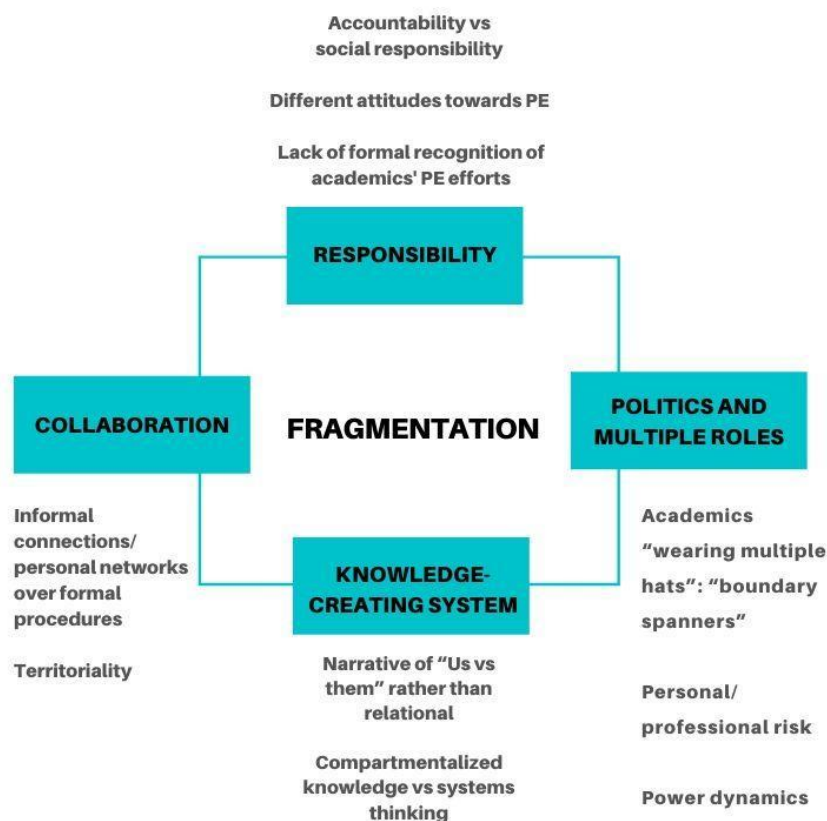


Figure 1: A graphic outlining the four sub-themes that emerged from the core theme of fragmentation.

Collaboration and Communication

Fragmentation was identified in internal collaborations between different departments and externally with stakeholders. The results show that collaboration happens in an informal way driven by personal networks, something that has been observed in other studies and is not unique to Malta (Aniekwe, Hayman and Toner, 2012; Fransman, Newman and Cornish, 2017). While informal connections are a feature in discourse and knowledge transfer, the combination of both informal and formal interactions accounts for a stronger impact towards global problem solving (Dentoni and Bitzer, 2015; Grimpe and Hussinger, 2013).

A formal strategy for stakeholder engagement, rather than stepping over necessary informal networking, would work hand-in-hand and build upon existing partnerships (Grimpe and Hussinger, 2013; Felt, 2017). In the specific context of Malta, it may provide the appropriate framework for researchers to begin collaborations who previously have not done so. Furthermore, such a strategy could allow for a paper trail of collaborations, making it easier for the administration to follow university efforts towards RRI practice. This would, alongside assessing informal interactions, pave the way for reward and recognition (Olmos-Peñuela, Molas-Gallart and Castro-Martínez, 2013), which is desired among academics as observed in this study.

Many interviewees expressed barriers to collaboration because of territoriality, manifesting in the proliferation of departments and centers dedicated to similar disciplines and resulting in competition rather than collaboration towards shared research interests:

"When you have only one place of opportunity – some professors [...] the only place where they can actually work in the whole country is at the university because in the area they lecture, there's no other research in any other institution – that can lead to a situation of territoriality because persons try to create their own empire, their own department, their own institute, their own center with their own people and with their own research officers so that there's no competition, no control. And it's a bit [...], inverted commas, creating your own authoritarian dictatorial regime, in a way." (Non-academic staff)

Another academic expressed this competitive attitude claiming that fragmented communication hinders collaboration:

"[...] this university has a lot of little empires. [...] even within a department there's friction [...]. People don't talk and people say, 'This guy was on TV and they were talking [their] research; they're just showing off.' We tend to be our own worst enemies; there's a lot of gossip going on in Malta. [...] even within the faculty there's a bit of a disconnect. We only get to hear things through the grapevine or because something happens and then my Head of the Department goes, 'But this was discussed at the faculty board' [level...]. Sometimes a lot of initiatives are taken, and we don't [know about them]. I've always said at this university: 90 percent of all problems are a lack of communication." (Academic)

Fragmentation not only occurs internally through lack of communication, but also externally in the variety of organizations such as NGOs who have the same objectives. Rather than coming together, they all operate separately dissipating the efforts and goals that could be achieved from coming together.

"[...] my first summer here [as Pro Rector], I met around 15 to 20 NGOs that deal with disability. [...] if there are 70 blind people [in Malta], there are seven different organizations for the blind. Our civil society is very fragmented [...]." (Academic)

Although many responses from both the questionnaire and interviews revealed a willingness for research collaboration and/or recognition of its necessity for research, a systemic approach for stakeholder identification and engagement appears to be absent. University centers, faculties, departments, and even individual academics, have their own views on stakeholder engagement:

"I see differences between the different faculties and the different departments and how they approach dealing with stakeholders and the level to which they engage with them. [...] I deal with internationalization a lot and different faculties deal differently with the same topic. Some are very keen about it, others are less, some don't want it at all." (Academic)

Another interviewee expressed the need for a more strategic approach to ensure that stakeholder engagement produces effective results to the benefit of both the university and the stakeholder, rather than existing as purely reactionary (on the part of the university):

"If it is done more strategically [collaboration], if you think more about what you want to do and plan it, then things form [into tangible outputs]. With stakeholders, it is like that. You need to know who they are, what are their needs and how you are going to [meet] them and not let it be reactive." (Non-academic staff)

Results also indicate that fragmentation occurs by compartmentalization of knowledge and is driven by diverse interests, motivations and the use of technical terminology. Jargon may act as a silent barrier exacerbating miscommunication given dialogue often occurs under the assumption of having the same understanding of a particular subject or process, as the quote below illustrates:

"Even though you talk to someone from industry about research, he has a different concept of research than someone from hardcore natural sciences and social sciences." (Academic)

Another barrier to communication, and hence, collaboration, is due to language. The Maltese Islands have two official languages: Maltese and English (Malta Government, 2020). The university is an international institution with all operations conducted in English. However, approximately 89% of the Maltese population say they speak English well enough to have a conversation (EU, 2012). The percentage of University of Malta students who cannot communicate in English is not known, but was indicated as a major barrier:

"[...] I traveled to Brussels a lot and the people who are representing Malta at official EU meetings, especially young graduates, cannot express themselves properly in English. [...] The quality of English has gone down a lot. [...] now [we] have to teach everything in English in medicine because we have a lot of students from Kuwait, Oman, etc. Some students come up to me after the lecture [and ask], 'Do you mind if I ask the question in Maltese because I don't know how to say it in English?' [...] the official language of the university should be English because we have 1000 non-Maltese students." (Academic)

The above was only mentioned by one interviewee and thus may not be a widely shared concern. However, English is the predominant language used in academia (Mauranen, Hynninen and Ranta, 2010; Pudelko and Tenzer, 2019; Śliwa and Johansson, 2014), implying that poor language skills could lead to miscommunication, inequality and stressful relationships between peers, which may then lead to altered power dynamics and inequalities in relation to gender, ethnicity and race (Landa, 2006; Pudelko and Tenzer, 2019; Śliwa and Johansson, 2014). Further research should explore whether such realities are also present at the institution, as well as their implications.

Knowledge-creating System: an "Us vs Them" Mindset

When discussing barriers in RRI criteria such as PE, a large number of answers both from the online questionnaire and the interviews blamed external actors highlighting their lack of interest, recognition and value of academic research. This fragmentation in the knowledge-creation system leads to what Packman, Rutt and Williams (2017) define an "us versus them" mindset that fails to address the complexity of topics such as PE, ethics and gender equality and risk leading to reductive conclusions:

"People in Malta do not acknowledge the value of research, do not appreciate the value of research, do not find that research can be of tangible output. [...] and people] are not willing to support research in terms of money." (Academic)

This attitude perpetuates a one-way process of communication in which society is expected to align to the university's interests rather than university taking part of the responsibility for failing in establishing effective partnerships and engagement with non-academic actors. Responses indicated that many staff may not have a well-developed understanding of engagement, which is defined as a two-way process that results in exchanges, learning and benefits for both the researcher and the stakeholder (Mahony and Stephansen, 2017; NCCPE, 2020).

Such an attitude can be further described as a consequentialist viewpoint where the blame is to be found "outside" in the way things are, without questioning the established system or taking a self-reflective stance that recognizes the complexity of being part of the problem that needs to be addressed. Thus, academics take a reactive stance towards identifying barriers to effective collaboration with external stakeholders (Tassone et al., 2018).

However, some respondents were able to grasp that issues arise from both sides. According to one postgraduate student:

"Students are inexperienced; [there is a] lack of cooperation from external organizations and a lack of interest and involvement [from students]." (Student)

This viewpoint emerged not only when exploring the topic of public engagement but also when interviewees were asked to evaluate UM performance and potential barriers in other RRI criteria such as ethics and gender equality. Staff, including academics belonging to a range of different fields, responded to the question about barriers in a way that exemplified this reactive stance and binary thinking around complex issues:

“For certain [there] is no issue about gender. There's no difference in pay outside in the industry or inside here. There's no glass ceiling at all. In terms of gender equality [...in my faculty], more than half of my students are female [...]. I think it's [science] perceived as a profession where they [females] can compete on equal terms with males [...].” (Academic)

One academic interviewee specializing in gender studies explained the issue around niche expertise when asked specifically about barriers to addressing gender equality at the UM:

“[...] what we struggle with in regard to gender equality in our daily lives, in our working lives, in our lived experiences, gets mapped onto the way we frame gender in our research. If you're working within a discipline where you've not thought about gender balance, then the chances are you won't bring it to the table when you're designing your data collection, when you're asking your questions, et cetera. It's a blind spot that prevails because the way we do research is almost a snapshot of our biographies and our biographies are how the world is [...].” (Academic)

The above quotes illustrate that gender cannot be accessed solely quantitatively and qualitative methods are needed to understand the social context (Dijkstra and Hamner, 2000; Schmidt, 2014). These results showed that some staff view traditional gender roles as so ingrained in society that it becomes nearly impossible to address on an individual or institutional level. As such, behavior change requires a nuanced understanding of the institutional context.

Similar challenges were found when asking interviewees to identify barriers in ethics and the tendency of reducing this complex topic to a “box-ticking exercise”:

“[...]in my discipline I struggle to understand what that [ethics] means. We don't deal with [ethics], [...] very rarely are there any issues that arise because our research is not person-oriented.” (Academic)

The quote indicates a narrow understanding of what ethics means. According to the interviewee, ethics only concerns humans, while ethicists and other researchers who may take a more philosophical approach see it as going far beyond direct human involvement (Grinbaum and Groves, 2013). Some students and academics recognized this simplistic understanding of ethics and the need for a broader and interdisciplinary view:

“My experience in recent months, years with the ethics process, is that sometimes what we're trying – we're discipline bound. So, what works in one discipline might be questionable or not even understandable in another discipline. My current worry is that perhaps the Ethics Committee needs to be more diverse in its expertise, in its disciplinary expertise.” (Academic)

Another interviewee expressed a related concern:

“Because [ethics] it's philosophy at the end of the day. And looking at the bigger picture, I think it would help because we learn about ethics and that's it. I think employing a more philosophical approach to ethics would help broaden the aspects of what we study.” (Student)

The data also indicate fragmentation in the knowledge-creating system. Senge and Kim (2013) point out that we take the disconnect between the branches of knowledge and between knowledge and practice as a given. As research, practice and capacity-building each operate within the walls of separate institutions, it is easy for people within these institutions to feel cut off from each other, limiting opportunities for interdisciplinary practice:

“With PhD applicants, we have a problem because [one] faculty says: this is not quite my area. The other faculty will say: this is not quite my area. The poor student is hanging in-between not knowing exactly where they fit and this doctorate school is trying to get people together to engage in discussion to try and figure it out, try to get them to realize that interdisciplinary research is the best type of research.” (Academic)

The results provided important insights towards the need to foster an interdisciplinary and cross-discipline culture that enable different knowledge positions to begin to recognize each other (Hart et al., 2013), where new and expansive patterns of thinking are nurtured and people are continually learning how to learn together (Senge, 2006), all of which are essential to successfully embed a culture of RRI.

Politics and Multiple Roles

The results show that politics play a role in creating barriers towards collaboration in research both internally and with external stakeholders. The island state’s extremely small size means that many staff and students have multiple roles, often acting as representatives of external stakeholder groups. Myriad bridges between academia and society have been formed, resulting in increased opportunities for collaboration and dialogue with external stakeholders.

“We all wear so many hats, so you may say this is an ivory tower, but you'd be completely wrong. Most people here are somehow engaged, if not by publicizing their research, by having talks. It's because they are involved in committees and boards and consultancy and unless they completely shut down their academic brain while they're doing their other work, there's for sure some seepage from what they know into their work. It's not even one degree of separation. It's the same person engaged in multiple roles.” (Academic)

Since academics play a dual role as researchers and stakeholders, they can unite different communities by involving them in the research process to both mobilize and democratize knowledge such that value is given to the experiences of non-experts (Hart et al., 2013). Academics acting as “boundary spanners” should not be accepted uncritically, however, since individuals may not inherently take up the bridging act (Packman, Rutt and Williams, 2017). As the research suggests, participation in multiple arenas can become a barrier because of differing political orientations and interests:

“You could do your research, but the consequences can affect everything here – can affect public engagement because you do not show the findings of your research in a truthful manner. The consequences can affect open access because you're not open about everything. [For example, you could be] saying the truth, but you're actually saying the half-truth because the moment you say the full truth, ‘Mr. X’ will think that you're talking about his institution and ‘Ms. Y’ would think that you're speaking about her government or her party in the opposition.” (Academic)

Some interviewees raised concern over speaking out against the government and its policies, despite having gathered empirical evidence to support their claims because of the university’s positioning.

“I know that some academics [...] are afraid to criticize. They're okay to have an opinion or to philosophize or to discuss around, but they are afraid of criticizing because they are afraid there will be repercussions. [...] We at the university are supposed to be the conscience. So, fear of chastisement, fear of being seen as anti-government or anti-establishment may be one barrier [to public engagement].” (Academic)

These results indicate that academics’ ability to play multiple roles in Maltese society and act as boundary spanners is an asset towards RRI practice but also has its downsides, the biggest challenge being political as Malta is heavily immersed in bipartisanship (Briguglio and Bonello, 2018; Falzon and Micallef, 2008). It is therefore essential to recognize this complexity when implementing RRI at UM and understand the role of politics in influencing RRI practice.

The Role of the Engaged Researcher

Individuals have different interpretations of a given practice or term, especially in regard to academic responsibility and the purpose and value of research (Forsberg et al., 2018; Tassone et al., 2018).

As observed in other studies, interviewees expressed varying conceptualizations when discussing their understanding of RRI (Böger et al., 2017; Macnaghten et al., 2014; Tassone et al., 2018), which also sheds light on the opposing attitudes towards recognizing PE as a core institutional responsibility:

"[...] one of our restrictions is that we think our role is basically to teach and [conduct] research and nothing else. I think that's something that needs some undoing." (Academic)

Results show a variety of subjective views around what academics believe is their responsibility. Evaluating perceptions of what responsibility means in regard to PE is challenging when accounting for mixed practices among faculties and individual academics. Regarding barriers to PE as a practice, one respondent notes:

"[Researchers have] an inward-looking mentality that are just interested in what they can get (funds mainly) from the community for research and personal gain (academic or otherwise). Work in the community is not even acknowledged as part of the duties of academic staff. Consequently, academic staff are indirectly penalized as work in the community has no currency in consideration for promotion." (Academic)

While for some, engaging with the community and the co-production of knowledge is viewed as their core responsibility, for others, it is not deemed mandatory. UM measures teaching hours and number of publications (15 minimum) for promotions, procedures which are detailed in a collective agreement – a binding contract on academics' rights and responsibilities:

"I think our role as a university is to be part of the community where we are paid to do that. Our collective agreement mentions that. [...] The role of university lecturers is to be engaged in the community in different ways: providing advice, listening, talking, researching. It needs to be close with industry [...] closely attached to the community. I think that is a fundamental role that we have. Some academics think that they are better than that and they should be spending their time in an office writing papers and sending them out to journals." (Academic)

Interestingly, another quote illustrates the opposing view, that the collective agreement does not include the valuation of PE. When asked to elaborate on improvements towards it, a respondent stated:

"Change the mission statement and collective agreements. Include public engagement in the University's long-term aims, [have] reward schemes, promotion requisites and staff training and awareness campaigns." (Academic)

Another possible reason for lack of engagement indirectly stems from lack of funds and human resources:

"Funds, the UM is severely underfunded, particularly with respect to research funds. For this reason, we lack resources across the board starting from administration staff, ending in Postdocs and PhD students. The good [employees] available spend their time doing the job of 2-3 persons and mostly firefighting. In view of this, work with external organizations in public engagement takes very low priority." (Non-academic staff)

As many interviewees pointed out, PE is not formally recognized by the University. This lack of institutional interest, acknowledgment, incentivization and reward for PE is common in HE institutions in many other countries. Even in the UK, where PE practice has a longer tradition and practice compared to other countries, there is still a disconnect between personal motives to engage and institutional support for engagement (Watermeyer, 2015). Academics more actively involved in the community and engaging with diverse stakeholders are doing that out of their own goodwill and time rather than as part of what is required:

"I don't think that this sort of work is valued by the university. Having an academic involved in policy making or involved in promoting the research we do, or any activity which is not academic in nature, is not given much value by the university unfortunately. That's something which universities need to address, to give value to these sorts of activities." (Academic)

This subjective and fragmented practice of engaged research is reflected in academic views on which research is valuable to society:

"[...] I'm not saying that 'Dr. X' presenting his or her paper about physical exercise is not important. It's obviously important for them, but on the scale of things, someone coming up with a new device or new research that could help people could strike a better match with people's interests [versus] someone coming up with a new theory of gravitation, for example. Although it wouldn't affect people directly, at least we're saying this is our contribution: fundamental knowledge in science [...] science and innovation is not simply what you can do in science. [...] It's important, basic science." (Academic)

What is striking about this statement is that although blue sky and fundamental research are poorly recognized as valuable for wider publics (Cadogan, 2014; Courchamp et al., 2015; Sarewitz, 2012; Stipp, 2010), it is of clear relevance to the academic whose research is focused in this area. The question of what should be considered imperative for societies to understand and take part in easily becomes subjective when attempting to answer.

Realizing the confusion around what RRI stands for was important to inform the implementation plan, and reducing this fragmented understanding was key towards formal recognition of PE efforts.

Conclusion

The internal study was crucial to initiate dialogue and collaborations, to engage staff with the concept of RRI and to develop a bespoke strategy for effective implementation of RRI best practice. It revealed a need for a shared set of values and definition of RRI relating to what being an engaged researcher means, leading to positive societal change.

A way of dismantling the potential conflict between what is and is not important for society is by making research engagement a fundamental aspect of all research fields. It facilitates questioning around advocacy: who gets to decide what research is important? Questioning and engagement would help provide insight for citizens into why some researchers practice blue sky research, but also paints an accurate narrative on how such studies eventually lead to cures for diseases, for example, which is often the main type of news that citizens will respond to (Russell, 2010; MacLaughlin, Wihbey and Smith, 2018; Selvaraj, Borkar and Prasad, 2014). Consequently, by bringing stakeholders into the beginning of the research process, publics can embrace the value of all research, which the authors argue also plays a role in developing critical thinking skills.

Embedding an RRI culture at a HE or research institution entails addressing society's need to understand and value research, and inversely, academics valuing knowledge and experiences of society (Kupper et al., 2015; Owen et al., 2013). RRI practice should be adapted as a two-way process of mutual listening and learning where external actors are viewed as partners in the research process rather than solely as an audience (Packman, Rutt and Williams, 2017).

To successfully support this approach, it is important to address the different forms of fragmentation that were identified in this internal study. It is a paradigm shift where research, education and innovation are no longer viewed as separate activities. Other studies (Lucas, 2007; Senge and Kim, 2013) have reached similar conclusions, highlighting the need to embed a learning culture where these activities are integrated and existing in connected entities.

Actions Stemming from Results

It was agreed to develop a new committee, which is now officially established as the Committee for Research Engagement (CRE), serving as a foundation for building a self-sustaining RRI ecosystem at UM to address the fragmentation identified in this study. Its main role is to establish and formalize a protocol for Engaged Research and connect, coordinate and facilitate the flow of information on existing RRI activities happening in different academic and administrative entities at UM. It was imperative that

members of the Committee were formed by internal and external actors to build synergies between them. External members were selected following the Quadruple Helix model (Leydesdorff, 2012). Recognizing the fragmented understanding of RRI, researchers designed a participatory workshop informed by the insights and results of this study. The workshop aimed to start a cross-disciplinary and cross-sector dialogue to reach a shared understanding of Engaged Research and align motivations and objectives of UM and its stakeholders.

Several other core actions have been planned or are currently underway as a result of this study (Table I), including RRI workshops across campus – which is now referred to as “Engaged Research” based on reactions to the ambiguity of the original acronym (Böger et al., 2017) – and establishing formal collaborations internally. The workshops are offered to staff and students and introduce RRI, although future workshops on more specific topics, such as PE, are being planned.

Category	Action	Sub-theme corresponding with action
Network	Informal recognition of RRI champions (consultation, aid in embedding RRI culture) Expansion of internal and external stakeholder network Development of university-wide external stakeholder protocol	Communication Collaboration Politics & Multiple Roles
Governance Structure	Establishment of the Committee for Engaged Research Policy recommendations based on review of all Collective Agreements, existing policies and official documents and statutes	Politics & Multiple Roles Collaboration
RRI Awareness	RRI workshops (for all students and staff) RRI literature database on the UM library website, as well as RRI resources page on the RSSD* website 'Teaching RRI principles' lecture incorporated into the required academic teacher training under OPAD**	Responsibility Knowledge-creating Systems Communication

Table I: An overview of current actions that have been developed under the Action Plan for the NUCLEUS Project (and beyond) stemming from the results of this study.

*Research Support Services Directorate

**Office for Professional Academic Development

A critical aspect of establishing relationships is formulating an external stakeholder engagement protocol. The authors have identified key individuals with the insight and experience to help the institution develop one (Fig. 2). Moreover, this initiative is being carried out embodying RRI principles: respect, accountability and openness with holistic approaches.

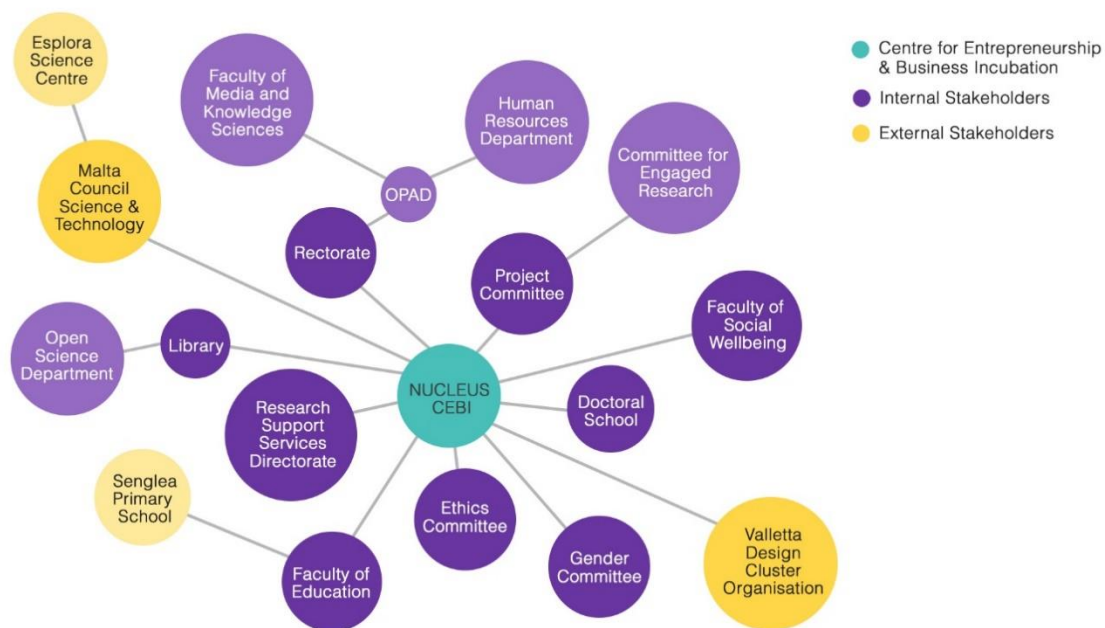


Figure 2: The internal network built from this study and subsequent follow-ups and initiatives, allowing the authors to identify key individuals that are integral to developing a university-wide external stakeholder protocol. The network has also resulted in more collaborations on existing and new projects.

The authors conclude that establishing a governance structure that facilitates and ensures the longevity of the NUCLEUS project is paramount. By establishing a committee – and for other institutions, this may take shape as policy reform or establishment of an “engaged research office” or similar entity – the above actions will continue. Beyond that, the authors are confident that over time, RRI best practice will spread across the entire institution so that academics will embed RRI in their research practice while students will enter their careers with clarity on how to involve society.

Limitations

The study design would not allow for quantitative analysis of the questionnaires, which contained open-ended responses rather than categorical. Furthermore, the poor response rate made the sample size too small. Semi-structured interviews worked very well to gain insights, however, a series of similar questions resulted in interviewees repeating certain answers. It is possible that this led to rushed answers nearing the end of the interview and/or unwillingness to elaborate on particular subjects, also in accordance with limited time.

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