Towards Building Impact Literate Research Culture in African Universities: Case of Makerere in Uganda

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Abstract
In the current competitive knowledge economy, the notion that academic research should yield the widest possible benefits to society beyond the academia has gained traction among governments, funding bodies and the society at large. Universities are under pressure to demonstrate both scientific excellence and impact of academic research. We explored the mechanisms used for tracking, documenting and evidencing research impact in a single case study of Makerere University using semi-structured interviews with administrators and academic researchers. We found apparent absence of an impact literate research culture in the University. We argue that in order build impact agency and increase opportunities to create and demonstrate research impact to fulfill societal demands for socio-economic relevance, universities in Africa need to build an impact literate research culture. This entails institutionalization of learning around the types and indicators of research impact, activities and processes required to achieve research impact and roles and responsibilities involved.

Key Words: Academic research; Research impact; Impact literate research culture; Universities; Africa.

1.0 Introduction

Societal demand for academic research to yield the widest possible benefits to society has become a point of accountability for public universities (Lucio-Villegas, 2016). In many countries this demand is accompanied by funding cuts to universities (Anderson & McLachalan, 2015; Metcalfe, 2010). In Europe, Australia and USA, this is instituted through national research assessment exercises where scientific rigor and societal benefit have become fused in research assessment (Chowdhury, Koya & Philipson, 2016; Donovan, 2011; Oanacea, 2013a). The

Research Excellence Framework (REF 2014) in the UK, Excellence in Research for Australia Initiative, the Performance Based Research Fund in New Zealand, the Dutch Standard Evaluation Protocol and the National Research Council in Canada assess both quality and impact of research to guide decisions on funding allocation to universities and as reputational yardsticks (Alun & Liam, 2014).

Emphasis in research impact assessment is now placed on relevance to user need, propensity to deliver economic benefit and quality of links with end-users in addition to judging research excellence (Buchanan, 2013). As Battersby (2017) observes, what matters now is not just more research on the right topics but entirely new ways of doing research and disseminating that research to achieve demonstrable research impact. Demonstrating research impact entails evidencing both "reach" and "significance" of research in terms of broader value in form of social, cultural, environmental and economic benefits (Marcella et al., 2016; Research Councils UK, 2014; Oancea, 2013a). Reach in this context is not synonymous to geographical scale but rather denotes the extent or diversity of the organizations, communities and individuals who have benefitted from the research considered in relation to overall potential reach. Significance on the other hand denotes the degree to which the impact has enriched, influenced, informed, or changed the policies, practices, understanding or awareness of organizations, communities or individuals (Research Council UK, 2014).

The rationale behind research impact assessment, as articulated by the HEFCE (2011) is based on three primary purposes: to inform allocation of research funding to universities; to provide accountability for public investment in research; and to provide benchmarking information and establish reputational yardsticks. With the precedence set by the REF 2014, broader impact has become embedded as a criterion for research evaluation in Europe, Australia, New Zealand and the US (Alun & Liam, 2014; Donovan, 2011). Universities are being tasked to demonstrate the indicators of impact which is assessed against the criteria of how widely impacts have been felt (reach) and how transformative the impact has been (significance) (Alun & Liam, 2014; Marcella, Lockerbie & Bloice, 2016).

What then is the situation in Africa's universities? This paper reports findings from an exploratory study of knowledge translation strategies and practices at Makerere University. It gives a detailed account of the state of research impact assessment at Makerere University drawing from the experiences of six administrators and eight academic researchers. The paper also provides insight into what ought to be done if we want to build impact literate research culture in African Universities such as Makerere in Uganda.

2.0 Review of Literature

There are competing definitions of what constitutes research impact in literature. National research evaluation exercises such as the REF 2014 which set the precedence for impact assessment make an explicit dichotomy between research quality and research impact. Research quality is taken to mean relative excellence of academic outputs intended for academic consumption whereas research impact is taken to mean the benefits that research outcomes produce for the wider society. The REF broadly defines impact as an effect on, change or benefit to the economy, society, culture, public policy or services, health, the environment or quality of life beyond the academia (Donovan, 2011). Underlying this definition of impact is the notion that academic research must have demonstrable impact in society. The challenge is for universities to produce research that meets the dual hurdles of relevance and scientific rigor (McCormack, 2011).

The HEFCE defines academic impact as the demonstrable contribution that excellent research makes to academic advances across and within disciplines including significant

advances in understanding, methods, theory and application. HEFCE on the other hand defines economic and societal impact which other scholars refer to as broader impact as the demonstrable contribution that excellent research makes to society and the economy. According to HEFCE, economic and societal impact encompasses all the diverse ways in which knowledge and skills generated through research benefit individuals, organizations and nations by: (a) fostering global economic performance, specifically the economic competitiveness of the UK (b) increasing the effectiveness of public services and public policy (c) enhancing quality of life, health and creative outputs (Alun & Liam, 2014; Chowdhury et al., 2016). As Oancea (2013a) observes, formal definitions of impact focus on demonstrable effect of research beyond the academia.

Thus, research impact assessment is being interpreted as part of a social and economic contract between science and society (Marcella et al., 2016; Hessels & van Lente, 2009). In the context of these definitions and the current impact agenda, "impact" excludes impacts on research or the advancement of academic knowledge within the higher education sector. Other international research funders including the US National Science Foundation (NSF, 2014) and Australian Research Council (ARC, 2012) have used the term "broader impacts" to describe non-academic impacts.

Research impact assessment is an emerging field in the higher education landscape and heavily reliant on primary data collection (Boshoff & Esterhuyse, 2016). Bornmann (2012) observes that research into broader impact is still in the early stages and therefore there is no distinct community with its own series of conferences, journals or awards for special accomplishments. Previously, focus has been on scientific impact based on academic quality of research outputs and the vitality of the research centre. Thus, research evaluation focused on the quality of research infrastructure and the quantity and quality of research measured using academic metrics such as novelty value and methodological quality to determine academic credibility (Hessels & van Lente, 2011; McCormack, 2011; Mouton, 2012).

Early attempts to measure research impact were premised on the notion that the purpose of science is to support a country's international competiveness and generate wealth creation. Therefore, impact was measured using metrics based on economic measures (Donovan, 2007; Alun & Liam, 2014). Survey techniques, which make less use of economic and financial variables as compared to econometrics, have also be used as an alternative (Bornmann, 2012; De Campos, 2011; Donovan, 2011). However, Buxton, Hanney, Packwood, Roberts and Youll (2000, p.32) argue that although survey techniques are useful, they only portray a "broad-brush picture" of the economic and societal impact of research projects. They assert that case studies instead, provide the best opportunity of capturing broader impacts of research projects. Indeed, case studies have been used in many studies ranging from capturing impacts in health care research (Kalucy, Jackson-Bowers, McIntyre & Reed, 2009); to arts and humanities (Levitt et al., 2010), and they have also been adopted by HEFCE for the REF 2014 (Chikoore, 2016). Donovan (2011) dubs the use of case studies as "state-of-the art" in providing evidence as a base for increased financial support of university research across all fields. Holbrook and Frodeman (2011) similarly support use of case studies; they argue that although labour intensive, case study seems to be the best way of measuring broader research impact.

A large number of universities now use case studies to showcase their research impact by communicating their research agendas and successes to stakeholders such as policy makers, funding agencies, industry, alumni and the wider public (Alun & Liam, 2014; Chikoore, 2016). Chikoore argues that case studies are seen to provide the best opportunity for universities to capture broader economic and societal impact of research as they are capable of capturing information on both reach and significance that are required for evaluation.

Impact indicator frameworks to be used in conjunction with case studies have also been developed. A widely documented framework for evaluating research impact is the Buxton & Hanney (1996) Payback Framework (Wooding, Nason, Klautzer, Rubin, Hanney & Grant, 2007; Kalucy et al., 2009; Levitt et al., 2010). The framework was originally developed for evaluating the socio-economic impact of health and medical research but has been adapted and applied to evaluate research in the social sciences (Wooding et al., 2007) and arts and humanities (Levitt et al., 2010). The methods suggested in literature to gather evidence and optimize the capturing of broader impacts are key informant interviews with principal investigators and research users, case studies, documents review and surveys (Donovan & Hanney, 2011). Donovan and Hanney explain that the multi-dimensional categorization of benefits from research in the payback framework starts with more traditional academic benefits of knowledge production and research capacity building, and then extends to wider benefits to society.

Co-production of knowledge between researchers and end-users has been suggested as a strategy to optimize the capturing of broader impacts (Chikoore, 2016; McCormack, 2011). Emphasis on co-production as a means to optimize the capturing of broader impact is evidenced by attempts at developing tools to understand and highlight processes that create broader impact. Spaapen and Van Drooge (2011) document the Social Impact Assessment Methods for research and funding instruments through the study of Productive Interactions between science and society (SIAMPI). According to the SIAMPI approach, stakeholders and productive interactions are essential in the achievement of societal impact. SIAMPI categorises interactions as: direct personal connections, which involve face-to-face contact or interactions over the phone, email or video-conferencing in meetings, conferences and chance encounters; indirect encounters in which contact is mediated by a material or human "carrier" such as articles, reports, guidelines, codes of practices and other individuals who act as intermediaries; and financial interactions in form of economic exchanges between researchers and stakeholders that usually take the form of research contracts or financial contributions. Thus, awareness of productive interactions is needed in order to conduct an assessment of societal impact (Spaapen & Van Drooge, 2011).

Boshoff and Esterhuyse (2016) note that impact assessment basically tracks the productive interactions between the researchers and stakeholders in order to determine which of these can be deemed productive. Productive interactions, in this case, are those interactions that bring about behavioural change, uptake and use in the stakeholder domain. The SIAMPI approach thus prioritises the processes that create impact and not the impact itself. By doing so, the attribution problem in research impact assessment can be diminished and the contribution aspect of research emphasized instead (De Jong, Barker, Cox, Sveindottir & Van den Besselaar, 2014; SIAMPI, 2011). The onus is on universities to track and document the productive interactions between the researchers and stakeholders in order to evidence and demonstrate societal impact of research.

Guinea et al. (2015) observe difficulties in capturing information on a wide variety of results produced during and after the research process of any project for identifying and assessing impacts. They developed the Impact Oriented Monitoring (IOM) methodology which provides the tools to track, identify, document, and assess the results coming out of research projects as well as the way these are translated into and used to achieve impacts. The IOM method employs three main tools for collecting relevant data: the results framework, the coordinators survey and the end users opinion survey. In IOM both the producers and users of research (i.e. project coordinators or grant-holders and the intended beneficiaries) provide information (Boshoff & Esterhuye, 2016). IOM has two interrelated components: the theoretical framework and an impact monitoring system. The theoretical framework guides the collection of data and is

composed of a conceptual model that follows a logic model approach and a set of impact categories based on the Payback Framework (Donovan & Hanney, 2011). Guinea et al. (2015) point to the need for the establishment of a good repository of project results and impacts when implementing the methodology and argue that designing an appropriate data management system will facilitate and improve the use of the IOM methodology. This requires the systematic capture of research inputs, activities, outputs, outcomes and impacts data in both numerical and textual formats (Chowdhury et al., 2016; Terama, Smallman, Lock, Johnson & Austiwick, 2016).

However, impact assessment is fraught with many challenges. Morton (2015) notes that impact studies identify three key challenges: time lag, attribution and context. It is argued that impact occurs over unpredictable time scales, follow up is either too soon when impact is yet to happen or too late when recollections of researchers and end-users are too vague (Bell, Shaw & Boaz, 2011; Chikoore, 2015; Donovan, 2011). Unlike academic impact which can be traced and attributed to authors through citation, attribution of broader impact is difficult due to complex set of interactions between multiple institutions and stakeholders (Donovan, 2011, Oanacea, 2013a). Specific contexts of research use have been shown to have a huge influence on the use of research, thus impact assessment becomes difficult because of limited understanding of the context or changes in the context of research use (Morton, 2015).

Similarly, Bornmann (2012) adduces that impact assessment encounters four common problems: causality problem, attribution problem, internationality problem and time scale problem. According to Bornmann, causality problem arises because it is not clear which impact can be attributed to which cause, congruent with what Morton (2015) labels as attribution problem; problem of attribution arises due to the diffuse, complex and contingent nature of impact, it is not clear what should be attributed to research or other inputs. Bornmann attributes the internationality problem to the international nature of R&D and innovation which makes attribution impossible. To him, time scale problem arises because of short term premature measurement of impact where potential longer term impact is ignored.

Despite these challenges, internationally, Alun and Liam (2014) observe that research impact increasingly takes centre stage in setting strategic goals for universities. Many universities now make reference to impact in their strategic plans. They note that for the universities that are subject to national research evaluations, it has become imperative to capture electronic records on research inputs, activities, outputs, outcomes and impact. Universities typically implement purpose built Research Information Management Systems (RIMS) to help gather, store and submit these records to the national evaluation bodies (Marcella et al., 2016; Fedorciow & Bayley, 2014). Thus, as Ferdorciow and Bayley observe, strategies for the management of impact capture processes within RIMSs has become an imperative for universities.

Oancea (2013b) reports that studies commissioned by individual universities and university mission groups have highlighted connections between institutional contexts and impact interpretations and practices. According to Oancea, reports for the University of Oxford, the University of Cambridge, Russell Group of Universities, the 1994 Group and the Million+ Group show that many of the universities have embedded their efforts to capture research impact in their wider social accountability projects and plugged impact in their continued public engagement, community interaction and outreach activities. This demonstrates how universities in the developed world are increasingly adapting to the demands to demonstrate impact in their strategies and ways of working.

These demands have, as observed by Ovseiko, Oancea & Buchan (2012), conditioned universities to be able to claim, track and compare the impacts of their research in a transparent

and rigorous manner and on a continuous basis. This has created the need to develop valid and reliable indicators of impact and robust methodologies for attributing, aggregating and documenting research impact. Universities have to adapt to meet the dual demands of excellence and impact in their research activities (Buchanan, 2013). Developing institutional RIMS to store metadata on all research inputs, activities, outputs, outcomes and impact becomes a necessity for universities. However, as Greenhalgh, Raftery, Hanney & Glover (2016) observe, existing empirical studies in this field relate to systems in the developed world, the extent to which frameworks and approaches to impact assessment are transferable to the developing world context, particularly Africa, deserves more attention.

3.0 Methodology
We approached this study from a social constructivist philosophical stance that reality is created in the mind of individuals, thus, there can be multiple, apprehendable, equally valid realities. We believe that truth and meaning do not exist in some external world, but are created by the subjects interactions with the world hence, multiple, contradictory but equally valid accounts of the world can exist (Crotty, 1998; Gray, 2004). We focused on interpreting the different subjective accounts given by participants based on their individual lived experiences in academic research.

We adopted qualitative research approach which is ideal for exploring and understanding meanings individuals ascribe to phenomena and gives voice to the participants (Cresswell, 2014). We used single case study design. Case study design afforded us an excellent opportunity to gain insight into the complex phenomena of research impact assessment at Makerere University as a research-led flagship university within the period of the current strategic plan 2008/09-2018/19. Case study design is fit to study an organization situated in a particular context and within a specific time frame (Baxter and Jack, 2008; Yin, 2014, 2003). We studied Makerere University as a single entity and the academic disciplines as sub-units making the study an embedded case study. We aimed at converging data to gain holistic insight into the state of research impact assessment in the University as a whole. Yin (2003) observes that an embedded case study ensures that data are converged to understand the overall case.

To ensure holistic coverage of the University in the selection of participants, we stratified the University into colleges and put colleges under combined categories of disciplines along the Hard-Soft and Pure-Applied disciplinary dimensions based on Biglan's (1973a; 1973b) classification. We used purposive sampling technique for selecting the participants. We selected one college administrator from each of the disciplinary dimensions giving a total of four administrators at college level, one administrator from the Directorate of Research and Graduate Training (DRGT) and one from the Directorate of Quality Assurance giving a total of six administrators. We selected two academic researchers at the rank of professor or associate professor from each of the combined categories of academic disciplines giving a total of eight academic researchers.

We conducted face-to-face audio recorded semi-structured interviews from February 2017-June 2017. We transcribed audio recorded data manually concurrently with conducting the interviews. This enabled us to familiarize with the data set. Given that our intention was to explore the state of research impact assessment at Makerere University to interpret, explain and develop understanding rather than to generate theory, we used basic qualitative description and interpretation by giving straight forward accounts of participant's experiences with research impact assessment.

In the analysis of data, we were guided by Bryman's four stages of qualitative data analysis (Bryman, 2016). At stage one, we read through the data set carefully and took notes as we identified major themes emerging from the data. At stage two, we took note of analytic ideas and marked

chunks of text with analytic ideas by underlining. At stage three, we coded the data, we developed categories and themes and reviewed them; review of categories and themes entailed cross-case comparisons which helped to eliminate repetitions. At stage four we related general theoretical ideas to the analysis. Bryman (2012) emphasizes the importance of researchers own interpretations. At this stage we employed reflexivity. Guided by interpretive phenomenology rooted in the tradition of Martin Heidegger (1889-1976) as the school of thought, we allowed our own prior understanding based on literature to influence our interpretations reflexively. To ensure confidentiality and anonymity we assigned each participant a pseudonym. AD denotes administrator, AR denotes Academic Researcher. For the disciplinary categorization, HP denotes Hard Pure, HA-Hard Applied, SP-Soft Pure and SA-Soft Applied.

4.0 Findings

Participants expressed mixed feelings in regard to monitoring, tracking and evidencing non-academic use of knowledge generated through academic research. They acknowledged the need and expressed interest in monitoring and tracking non-academic knowledge use, but saw it as something very difficult to do. Focus on tracking of knowledge use was largely in the scientific community using academic metrics. ADU2 and ADSP cited use of traditional academic metrics of measuring use in the scientific community. They noted that there were no targeted mechanisms in place for tracking knowledge use in policy and practice:

> I just subscribed to one of the sites called research gate. Research gate gives you views on the use, how people are using or make use of your publications on a weekly basis, how many citations milestones attained and things of that sort. Otherwise apart from that we don't have mechanisms. (ADSP)

> You ask me about how we track, I should say we track mostly citation and it's on Scopus… so what I normally do, I import data from Scopus, year by year it shows me publications indexed by Scopus, this is one area to tell how much research is produced. I have been tracking that for years, I know what happens, you know as I told you, this is indexing…I went to Scopus and downloaded all the citation data even including abstracts and we put them on an app, we have developed an app for Makerere…Scopus allows you to do that, because I was so much interested in productivity of research and I have been interrogating these questions for quite some time…actually we have two data bases, we have Web of Knowledge/Science and Scopus we have access to, not the institution/University, I have access through my friends, like I can download all Web of Science data and I can download Scopus data. We created Makerere's own data base derived from Scopus and Web of Science, purely for tracking knowledge production. Tracking non-academic use? No not really, it is not my interest; I don't pick interest in that. (ADU2)

The accounts given by ADU2 and ADSP indicate that much of the focus was on monitoring the level of knowledge production. Monitoring of research productivity was based on externally defined criteria by web based data bases like Scopus. Access to these data bases was at individual level as expressed by ADU2.

Participants expressed pessimism in relation to tracking non- academic knowledge use. ADSP expressed that the interest, means and knowledge to track, gather and document evidence on non-academic use of knowledge generated through research was lacking as expressed in this extract: "evidence of use in policy and practice? No, that evidence, tracking it that way, we do not have the means and possibly we don't have the interest or we do not have the knowledge to do it". Similarly, ADSA expressed that tracking knowledge use directly is very hard and tricky because one cannot know when and where such knowledge would be applied although it would be of interest to know how research was influencing policy:

> That's very hard to be honest with you, you can't know when a research output will be put to use and it is not that easy to directly monitor because it is not so easy and the application may not

necessarily be in Uganda, it could be outside Uganda. So, the tracking is a little tricky. But of course we would be interested to know what impact a research output has had to move say policy to another level. (ADSA)

However, there was evidence of emerging strategies devised to monitor, gather and document evidence on the use of knowledge generated through research in the University in some of the colleges in the hard applied and hard pure disciplines. ADHA revealed that they had networked with the alumni and made field visits to see the impact of research and they envisaged rolling out a planned curriculum intervention-the transformative education model through which they hoped to capture that information. Similarly, ADHP revealed monitoring through post training surveys. However, these interventions were not implemented fully and there was no data base with information on knowledge use:

> We are building our networks with alumni at various levels, we have a few visits that we make with them to get feedback mechanisms at strategic level, therefore, we see the impact, well, we have planned deliberate curriculum interventions to translate higher education research to impact livelihood and so with the model we are able to collect the data and see our performance. We do not have the data base but we have just started. . . I am hoping that in the next eight months I can have a feedback on the adoption of technologies as well as their impact on household transformation. (ADHA)

> There is what we call post training survey whereby we tend to follow up where we have gone . . . for example I was talking about those technologies, handling some of the products, we have those surveys where by you go and follow up, the researcher goes and follows up after sometime to see whether they are using those technologies that they have passed on, but I can't say the data base is there for evidencing that, it is still premature. (ADHP)

It was only in the hard applied and hard pure disciplines that evidence of strategy for tracking non-academic use of knowledge could be seen. Administrators in other disciplines and in the administrative units were pessimistic and thought it was very difficult and not feasible to monitor and track non-academic use of research knowledge because of either lack of interest or the means and knowledge to do it.

Participants revealed that a planned and targeted impact assessment had not been done. They gave reasons to explain why the University did not have planned mechanisms for impact assessment. However, they acknowledged that there was need to do a targeted impact assessment:

> That has also not been done because the University needs to do a tracer study to find out about the graduates they have trained as outputs of the knowledge generated here, what is it they are doing out there? The impact is there, but we need to assess it. I would think that we have not done a kind of targeted or a kind of planned assessment of what Makerere has done. (ADU1)

> No, we have not done impact assessment yet. It is something that you can only do if you have a lot of money and if I am interested in funding research and knowing whether it makes a difference or not, so that should be the interest of the government of Uganda. If it commits money here for research, it needs to do an impact assessment to see how much it is being utilized to know how useful it is, but from an individual point of view or a team point of view, it will really be a high core. (ADSP)

The accounts given by participants in these data extracts illustrate the absence of an institutional strategy of impact assessment. Impact assessment was seen as something very difficult to do. These findings indicate absence of an impact literate research culture in the University. There was no evidence of institutionalized mechanisms which were being implemented across the University to assess research impact.

Planned and targeted impact assessment had not been done in Makerere University. Documentation of information on the use of knowledge generated through research done in the

University in policy and practice was in unstructured form, mainly in the annual reports of the colleges and the University. These reports do not even show clear pathways to the impact reported. There was no institutional data base in RIMS with concrete information on research inputs, outputs, outcomes and impact.

At the disciplinary units some of the participants reported monitoring use in the scientific community actively by checking the citation index because it was easier (ARHA1), while others said they did that passively (ARHA2, ARSA1) but all of them stressed that they did not monitor and track evidence of knowledge use in policy and practice:

> The only thing I do, I make one attempt in the scientific community, every day I check my citation index but not monitoring use in practice because it is easier. I go to Google scholar and I see how people have read my work, how many people are citing my work. In practice, no I don't. (ARHA1)

Participants expressed ignorance about monitoring and evidencing use of knowledge in policy and practice and questioned how it could be done and whether it was the mandate of an academic to do that. ARHP1 was quick to say "I don't. That is not my role; do you think it will be our role?" Other participants expressed similar views:

> No. I don't. What do I monitor? It is like deliberately doing a study to monitor whether what I did has been used. No I don't do that, but I know for sure , some times when I am on the internet and I am searching for something, I would see that my article which I have published is being used. But it is not as if I was monitoring, but I know that it is being used. Why would I monitor? Do some people do that? How do they do it? I don't know. (ARSA1)
>
> In policy and practice, it is a little bit difficult to track…actually I do not even have the time and maybe I don't have the skill on how to track and that is the truth, because that is also where most researchers fail. You may produce knowledge and you don't have the skills to track, these days it is a software thing but you need some skill on how to do it. That one is one of the weaknesses which I can say, sometimes we don't know how much of our knowledge is being used outside . . . to track it officially to know how it is being used is difficult, that's the truth. (ARSP1)

Some of the participants expressed that impact assessment was not a priority because it does not yield any benefits to the researcher:

> We don't have any mechanism and as I have told you when I do research, publish it, present it for promotion that is all. The other things which happen about that research are none issues. . . the reason is why should I put in money to cross check whether people are using my research when I have already used that research for promotion? So it all goes back to the issue of money and time and the potential benefit. (ARSA2)

These expressions demonstrate absence of impact literacy and challenges of research impact assessment.

5.0 Discussions, Conclusion and Recommendations

Findings at the institutional level and disciplinary units signified the absence of an impact literate research culture in Makerere University. An impact literate research culture where there is an institution wide understanding of and commitment to attaining broader research impact enhances knowledge translation. Individuals know what is needed to achieve and measure broader research impact and how they can contribute to that. At the same time, the institution values and resources activities taken on to achieve and measure broader impact of research by establishment of systems and structures to support impact activities (Bayley & Phipps, 2017; Fedorciow & Bayley, 2014).

Demonstrating research impact is heavily reliant on primary data collection (Boshoff & Esterhuyse, 2016). It entails evidencing both reach and significance of research in terms of

broader social, cultural, environmental and economic benefits (Marcella et al., 2016; Oancea, 2013a). Reach is not synonymous to geographical scale but rather denotes the extent of uptake in terms of diversity of organizations, communities and individuals who have benefitted from a particular research undertaking. Significance designates the degree to which the research has enriched, influenced, informed or changed policies, practices, understanding or awareness of organizations, communities or individuals (Research Councils UK, 2014). Therefore, emphasis in research impact assessment is placed on relevance to user need, propensity to deliver economic benefit and quality of links with end-users in addition to judging research excellence (Buchanan, 2013).

Case studies are now being used to demonstrate research impact by a large number of universities particularly in the developed world (Alun & Liam, 2014; Chikoore, 2016). The current study has established that in Makerere University, there was no formal impact assessment done, no mechanisms were in place to capture information on the reach and significance of knowledge generated through research done at the University. Available information on research impact was only in unstructured form in reports, particularly the annual reports.

Several studies have demonstrated that impact assessment is feasible but fraught with many challenges. Three key challenges identified in impact assessment are time lag, attribution and context (Bornmann, 2012; Morton, 2015). Despite these challenges, internationally, research impact increasingly takes centre stage in setting strategic goals for universities (Alun & Liam, 2014). Strategies for the management of impact capture processes within RIMSs have become an imperative for universities (Ferdorciow & Bayley, 2014). Universities now implement purpose built RIMs to help gather and store information on research impact (Fedorciow & Bayley, 2014; Marcella et al., 2016). However, absence of an impact literate research culture was apparent in Makerere University.

Mechanisms to track and evidence impact had not been put in place. The University needs to be able to track and evidence the impacts of research on a continuous basis. Developing institutional RIMS with metadata on research inputs, activities, outputs, outcomes and impact to create institutional memory becomes a necessity for the University. Building impact portfolios in RIMS could act as an indicator of the effectiveness of the interventions made through research and guide decisions on whether more of the same interventions or new ones may be required either in creating and disseminating knowledge or in addressing the barriers to knowledge translation.

These findings highlight the need for universities in Africa operating under similar conditions to create an impact literate research culture. Building an institution wide impact literate research culture will create impact agency and increase opportunities to create research impact. Impact literacy entails understanding of the "what", "how" and "who" of research impact. Academic researchers and research managers need to be educated on the types and indicators of research impact (what). At the same time institution wide knowledge on the activities and processes required to achieve impact (how) and roles and responsibilities involved (who) are essential in building an impact literate research culture (Bayley & Phipps, 2017). Creating an impact literate research culture requires universities to commit to professional development of staff, cultivate protracted relationships with potential research users such as government departments, industry and the community through engaged research and teaching of research should be enriched by factoring in impact considerations. At the same time, universities should create RIMS as institutional memory for tracking and evidencing research impact. This will require the creation of new units, for example impact offices or research offices adequately staffed with people with requisite skills sets to manage research including impact activities.

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