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Researchers adapting to open access journal publishing: the case of the University
of Cape Town

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Abstract:

This paper reports on the contribution of the openness movement to the changing mode of distributing scholarly literature. It will be argued that the University of Cape Town (UCT), a leading research university on the African continent with relatively high research output, has a social justice obligation to freely distribute its scholarly research to the widest reading audience possible. Contributing to this social justice obligation through the sharing of research output via open access (OA) platforms, is the University's progressive OA policy and activities to ensure roll-out of the policy, the commitment to support article processing charges (APCs) and following the global trend with regard to OA publishing. The authors, using a case study design, report that these factors have contributed to UCT's researchers adapting to publishing their journal articles in OA platforms. The investigation concludes that in an era of fiscal constraints, the visibility of research is important to source funding and meet the institution's social justice obligation and therefore adapting to new publishing trends is not an option for UCT researchers but an imperative.

38
Keywords: Open access; open access publishing; article processing charges; social justice; scholarly communication; University of Cape Town

Introduction

The last decade has seen a massive change in the way scholarly information is distributed, and this has significantly influenced the shaping of the scholarly literature landscape. Corroborating this 46 ertion, is the supposition by Chadwell and Sutton (2014) that the removal of barriers to 11 e free exchange of information has transformed and will continue to transform the landscape of scholarly communication through building institutional repositories, publishing in OA journals, hosting Open Educational Resources (OERs), facilitating access to research data 43 and advocating for the passage of OA policies. This transformation is accelerated by the growth of the World Wide Web and the development of commensurate technology making information evermore ubiquitous. The growth of the Web has enhanced the capacity to freely share scholarly literature on a global scale, adding to an already surfeit of information. However, as much as there is a glut of information, in reality, it is claimed that there is a dearth of scholarly information available to many as the cost of books and subscriptions has spiralled out of control.

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This spiralling cost of subscriptions is one of the most significant factors that has initiated and is continuing to fuel the growth of the openness movement. The spurred growth of the open access segment of the openness movement is testimony to the desire by OA advocates to make scholarly literature freely accessible to the end user as scholarly information is considered a public good. In terms of the African and South African context, OA should be considered a moral obligation and further, it should be driven by a social justice ethos. Hence, the claim that historically advantaged institutions, such as the University of Cape Town (UCT) should promote OA as part of its social responsiveness agenda *en route* to meeting its moral obligation and the advancement of a just society.

24 As a leading research university on the African continent, UCT has an obligation to freely share its research production as widely as possible. This paper examines policies and practices/services rolled out by UCT to advance the sharing of research output. It is these policies and practices/services that will engender a culture among UCT researchers that will accelerate adaptation to publishing in OA platforms. The authors are advocates of openness and would like to see that other institutions benefit from the lessons learnt by UCT in this area. Hence, the purpose of the paper is to assist newcomers to the openness movement to circumvent the challenges that beset UCT and to build on this exemplar for the growth of openness and thus contribute to social justice in South Africa and Africa.

The primary focus of this paper is on UCT academics' journal article publishing patterns within the different OA streams that are on offer. The paper discusses the benefits of OA with a shift away from improved visibility and citations, to social justice and the moral obligation of the researcher and/or institution. This is a mind shift hence the need for a slightly more detailed discussion on the issue.

Definition, delimitations and assumptions on open access publishing

4 It is not the intention of this paper 2 to engage in a detailed discussion on the definition of OA, suffice to say that it is the explicit removal of price barriers (such as subscriptions, licensing fees, pay-per-view fees) and permission barriers (such as most copyright 2 and licensing restrictions) to the end user. The emphasis in the definition is that electronic scholarly literature is available freely at the point of use – highlighting the 'freeness' of scholarly literature to the end user.

1 The focus of the discussion in this paper is on policies and practices to support publishing in OA platforms. Other areas of OA publishing are discussed, albeit very briefly, to demonstrate how some of the OA publishing puzzle pieces fit together.

It is assumed that it will not be too long from now when publishing in an OA forum becomes the default practice. This assumption is not unfounded as 22 ny writers have alluded to this eventuality. Björk and Solomon (2014) asserts that OA scholarly publishing is currently evolving very rapidly, growing at about 30% a year based on article volume. Ilva, Laitinen, and Saarti (2016) are a lot more forthright when they claim that "open access publishing will become the global norm that will be ac 20 ted in all countries". Credence to the transition into OA is shown by the growth of the *Directory of Open Access Journals (DOAJ)* which imposes stringent criteria for

inclusion in the platform³. Laakso and Björk (2016) interrogated the platform to show the growth pattern of DOAJ. The number of journals on the platform has increased substantially from 744 journals in 2000 to 6 713 in 2011 to 9 512 journals in 2014 (see Figure 1). It is worth noting that 74% of the 9 512 titles do not charge article processing charges⁴ (APCs) (Laakso and Björk 2016: 920-92).

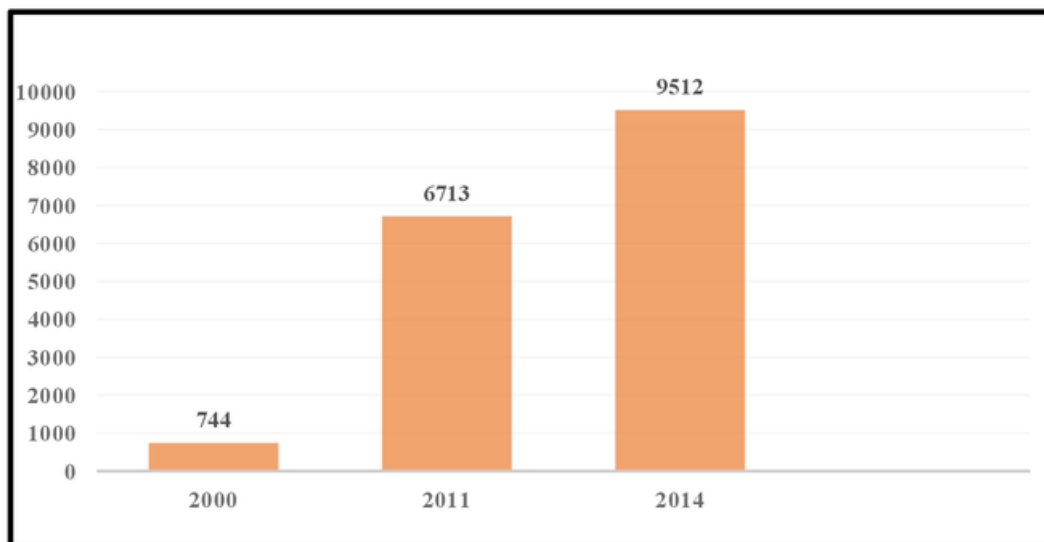


Figure 1: Open access gold journals (Source of statistics: Laakso and Björk (2016))

As much as there has been a substantial increase in the number of gold OA journals⁵, as inferred by the growth of the number of journals registered with DOAJ, there has been a significant increase in the number of hybrid journals (see Figure 2). Clearly, there is widespread increase in the number of journals that provide an OA option. Inferred from this growth pattern is that the number of journals that are completely closed, that is a journal only accessible through subscription, is diminishing rapidly.

⁴ APCs is a fee that the author/institution/funding agency pays to make the article freely accessible to the end user immediately on publication.

⁵ For definition of gold and hybrid journals see *Different models in open access*

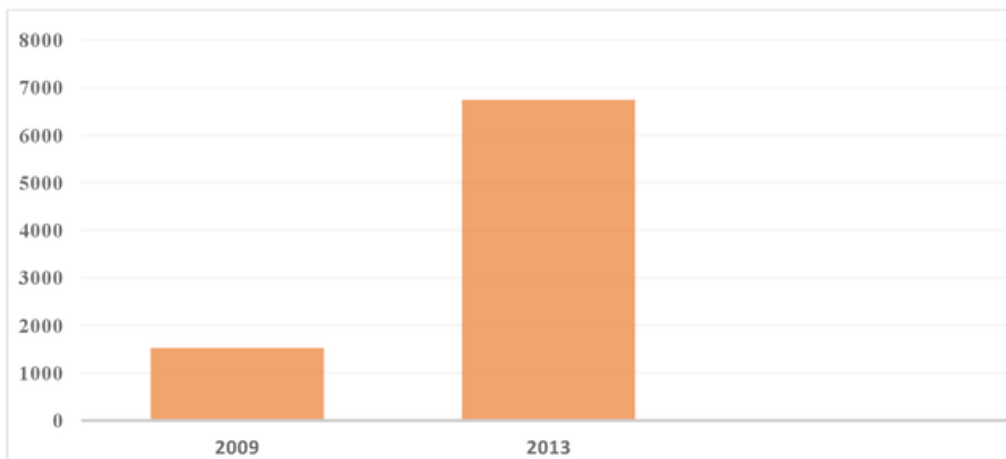


Figure 2: Growth in number of hybrid journals (Björk and Solomon, 2014)

Commer²⁸ rate with the growth in the number of journals that offer an OA option (that is, in both gold OA journals and hybrid journals) is the sizeable growth in the number of OA articles (Björk and Solomon, 2014). Laakso and Björk (2016: 924) present figures that show a radical increase in the growth of hybrid OA articles. In 2007, there were 666 hybrid OA articles in Elsevier, Springer, Wiley-Blackwell, Sage and Taylor and Francis journals. By ²⁸13, that number had increased to 13 994 – which presents an over 2000 percent increase in the number of hybrid articles from 2007 to 2013 (Laakso and Björk, 2016).

⁸ The growth in the number of articles published in BioMed Central and other ‘for profit’ OA journals and hybrid journals denotes that institutions need to have an APCs budget or that researchers make provision in their grant applications for APC funding to publish their research articles in OA platforms. The need for APCs (the authors are not advocates of APCs but view that this as a phase towards openness) is confirmed as many gold OA journals charge APCs. The exemplar of BioMed Central is used to examine this need against the back⁴⁹ up of the growth of OA articles published in that year were 20,700 articles, in 2011 there were 340,000 and 482,361 articles were published in 2014 (see Figure 3) (Directory of Open Access Journals (DOAJ)).

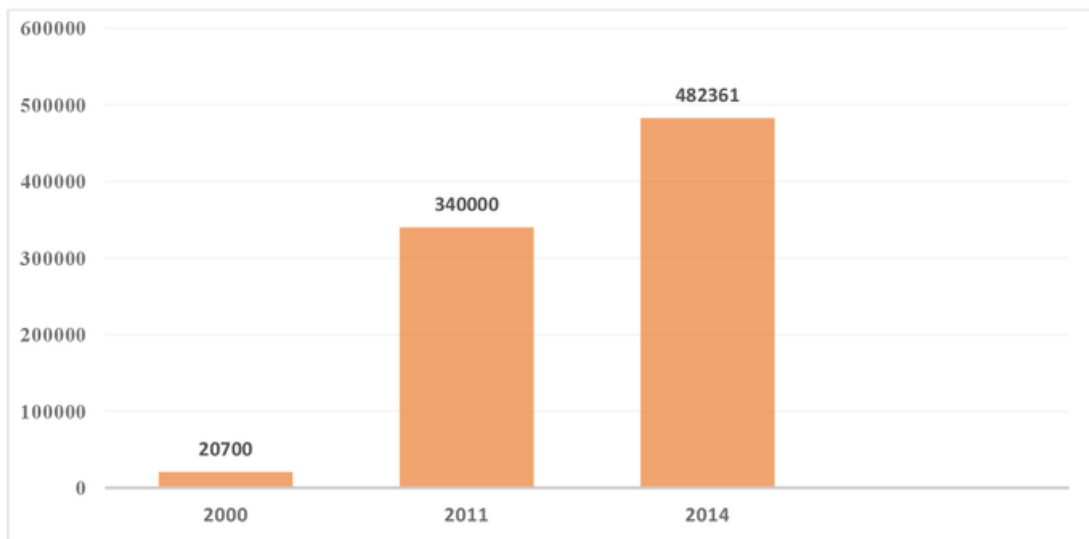


Figure 3: Growth in open access articles (Data sourced from: Directory of Open Access Journals (DOAJ): 2016)

Taking their lead from assertions made in the literature and the growth patterns reflected in the most comprehensive non-commercial OA platform (that is *DOAJ*), the authors examine ways in which the inevitable default practice can happen sooner rather than later. And, if UCT and other highly research productive African universities can adapt sooner, the likelihood of the remaining institutions joining the openness movement becomes a much greater reality.

Before engaging in a discussion of the policies and practices to facilitate quick and efficient adaptation to publishing in OA journals, it is important to discuss the different models in OA and the benefits of OA, especially within an African context. Such a discussion would provide some assistance in determining the reasons for the publishing adaptation patterns of UCT researchers.

Models in open access

As the open access movement matures, definitions of associated concepts become more nuanced with specific emphases placed depending on the context in question. For the purpose of this paper, the more generic definitions of green and gold route of OA, which are viewed as the two alternative models to providing open accessibility to scholarly content. These two routes have their roots in the Budapest Open Access Initiative Declaration (2002).

The green route, often referred to as self-archiving or the repository route, makes provision for the deposit of journal articles in an electronic archive. Bjork et al. (2014: 237) explain that "green open access is when such articles, usually in the form of the author manuscripts that preceded the finalized article, are made freely available somewhere on the web".

The gold OA journal publishing model, in the opinion of Crow (2002), has turned the conventional commercial model for journal publishing on its head. There are two

streams in terms of this business¹ model. The first stream is publishing with established 'for profit' publishers. Although the publisher, in terms of this model, makes the content free to the end user, the primary objective of the publisher is to make a profit. The profit is generated, in the main, through the payment of APCs which are paid by the author or his/her academic institution or funding agency. In this particular model, the entire journal is made accessible free to the end user. There is a second stream to this model which is referred to as the hybrid model. The hybrid model provides the author or his/her institution with the option of paying a fee to have the specific article made freely accessible to the end user.

Eger, Scheufen and Meierrieks (2015) point out that the literature on the OA model can be broadly categorised along three lines of research: (1) studies that assess the effectiveness of the alternative publishing models in enabling rapid and cost-efficient dissemination of scholarly work; (2) studies investigating how online and free online access have affected readership and citations; and, (3) studies focusing on researchers' attitudes towards OA and alternative publishing models. This paper examines the third trend, that is, the adaptation of UCT researchers to publishing in OA forums against the backdrop of efforts by the university to share its research output. The university has developed an OA policy (2014), which offers researchers the opportunity to deposit their output in an OA institutional repository, the university makes provision for the payment of APCs which offers the researchers the opportunity to publish their output with hybrid and gold OA journals and offers diamond OA option, that is, the hosting of OA journals.

Benefits of open access

Like most other higher education institutions in the world, South African higher education institutions also seek to reap the benefits of OA. Institutions of higher education chase the ideology that OA provides a front-end to the whole of a university's research output. Further, OA serves as a means of marketing the university's research agenda across the globe. Using the green OA route, that is, institutional repositories, higher education institutions showcase their research output to recruit research students who become aware of research activity at the institution via the Web. Another contributing factor reinforcing the ideology is the benefits of institutional repositories for researchers. The growing exposure of the output of researchers, via repositories, contribute to an increase in downloads and ultimately improved citation count. A further benefit of OA to both the institution and researchers is the knock-on effect of advanced visibility which contributes to improved collaboration among institutions and researchers. There is also evidence to demonstrate that improved visibility of research and research output increases capacity to solicit funding (Jisc 2012; Lee-Hwa, Abrizah and Noorhidawati 2012; Parker 2012).

To assist researchers with disseminating the results of their research through scholarly channels, libraries are increasing their service to the research community² offering to publish their work. This diamond route publishing service is fast becoming infectious. Park and Shim (2011) point out that several libraries have recently launched library publishing services to support scholarly communication dissemination. According to Raju, Raju and Claassen (2015) there are currently four South African academic libraries that provide this diamond OA publishing service.

Clearly, there are significant benefits for adopting OA practices. However, in the South African and African environment, the contention is that the benefit should be located within a social justice ethos: it is imperative that South Africa and Africa as a whole robustly pursue sharing of research output as a public good.

Africanising the benefits of open access

The need to Africanise the imperatives of OA was demonstrated by the events over the last 24 months (beginning around February 2015). The South African higher education sector in its entirety has been awakened by the call from student bodies for transformed and free quality higher education. The student protest leadership has sent out a strong call for the decolonisation of the curriculum. Any higher education institution not heeding the call is tantamount to burying their heads in the sand.

One of the ways in which higher education libraries could deliver on the call for affordable transformed education is through fast tracking its library as publisher service. This service provides the library with the opportunity to directly contribute to a decolonised affordable education system. This service also provides opportunities to contribute to a society that is crying out for social justice.

This call for decolonised affordable education demands inverting the global north implicit and explicit pillars of OA. For South Africa and Africa, social justice and moral obligation should become the core explicit drivers of OA and that, contradicting earlier statements of the authors, showcasing individual and institutional output become the implicit drivers of OA. As much as the focus of this paper is on journal articles, one quick and tangible way of inverting the drivers to OA is to publish open textbooks using open source software.

The library as a publisher gives libraries the flexibility to pursue the Africanisation of OA as a concept. The drivers of an Africanised OA movement must pursue the quest for social justice. OA should be driven purely for philanthropic purposes and those institutions that are relatively advantaged have the moral obligation to share their output and not to use OA platforms to grow their profile – the emphasis should be on the development of the continent.

Staying with open textbooks, the proposal is that open textbook agendas should not be the mere conversion of hardcopy into digital format. Libraries need to understand the African context by using technology most prevalent in Africa for textbooks and at the same time recognise African challenges such as bandwidth and electricity. The textbooks that libraries make available must be developed around these challenges: the purpose of OA must be driven by a social justice ethos.

Africanising the purpose of open access

It is proposed that the common purpose of OA practices in South Africa should be the reinforcement of the philosophy of sharing trusted and relevant scholarly content to generate new knowledge and for innovation. This 'purpose thread' resonates well with the African philosophy of 'Ubuntu'. The synergy between OA and Ubuntu is underscored by the innate principle of sharing. Ubuntu is a Southern African term that brings to the fore socialism or humanism – it highlights the fact that one cannot exist as a human being in isolation (Chaplin 2006). Nestled and intertwined in the philosophy of Ubuntu are the unwritten and unacknowledged pillars of OA, which are social justice and moral obligation.

It is important to examine, albeit very briefly, these pillars as they individually and/or collectively uphold the founding principles of OA and should be, for all intents and purposes, the drivers of OA practices in South Africa.

Africa, including South Africa, has been subjected to years of colonialisation and has been ravished in the post-colonial period by inequality and deprivation. One of the most significant contributors to Africa's continuance as the **1**ark continent is the deprivation of access to scholarly literature necessary to **move Africa from the periphery of the world's knowledge production to the** epicentre; that is, allow access to knowledge that will allow Africa to find solutions to current challenges that beset the continent (Raju 2016).

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Robinson (2016) views social justice as the promotion of **a just society by challenging injustice**. He purports that **social****30****justice** advocates for a fair allocation of community resources: a community where **5** people are not discriminated against, nor their welfare and well-being constrained. Social justice is generally equated with the notion of equality or equal opportunity in society. Rawls (2014) posits that **social justice** promotes the protection of equal access to liberties, rights, and opportunities, as we **25** as taking care of the least advantaged members of society. Miller (1999) adds that **social justice is concerned with ways in which resources are allocated to the citizenry by social institutions** – education and information are included as essential resources.

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The International Forum for Social Development (2006) directly links inequalities in the distribution of access to knowledge with social in**7**justice. They have also linked the delivery of quality education to social justice. Education, including technical training and adult education, is critical for ensuring access to decent work and for social mobility, and in most societies is a strong determinant of social status and an important source of self-respect.

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In the South African context **15**, as a normative term, social justice refers to the extension of the principles of human dignity, equality, and freedom to participate in

all ³² the political, socio-economic and cultural spheres of society. These principles are enshrined in the Constitution of the Republic of South Africa.

Moral obligation is the other pillar upholding OA. Moral obligation is viewed as a duty which one ought to perform. However, there is no legal compulsion. In the African and South African context, highly research productive universities on the African continent have a moral obligation to share their research output with the rest of the continent. Further, there has to be a conscious effort to develop open teaching material to support teaching, if not across the continent, at the least across their respective countries. Leading research universities in South Africa have a moral obligation to upholding the philanthropic principles of OA and to ensure that, in an unequal society, it pursues the principles of social justice as associated with the openness movement.

South Africa's research production collaboration status

Drawing from the comments of Kofi Annan (2000), former Secretary General of the United Nations, who asserts that "the university must become a primary tool for Africa's development in the new century [and that] universities can help develop African expertise", it is proposed that OA is one of the golden strands necessary to expand research to achieve desired African development ⁴⁵. In addressing African rectors and vice chancellors, Tise (2011), claimed that South Africa produces 66 percent more research publications than the second placed country, Nigeria. The authors acknowledge that South Africa's research publication status is inclusive of the contributions of traditional universities, comprehensive universities and universities of technology. Collectively, these institutions contribute significantly to the development needs of South Africa and Africa at large. The authors, inferring from the assertions of Chiware and Skelly (2016), attribute South Africa's research output status to good collaboration with the global north and the fact that they (South African researchers) are "better connected to external sources ²⁷ of knowledge". Chiware and Skelly (2016) also claim that global north partners prefer to work with well-established scholars to advance knowledge generation.

South Africa's dominance as a global north research partner is reflected in a comparison with its BRICS peers. South Africa's 'research collaboration publication rate' is 53% while Brazil's is 25%, China's 23% and India's 20%. For all intents and purposes, "South Africa has become a regional hub for collaboration, given its relative strength in higher education, better funding schemes and policy frameworks, well developed research and ICT infrastructures...". (Chiware and Skelly 2016).

However, Kahn (2011) ²⁷ cautions that South Africa's 'research collaboration publication rate' renders South Africa vulnerable should those collaborations weaken. Kahn (2011) goes on to advise that "there is no substitute for building the home base". UCT, with a significant research output, has a moral obligation to develop collaborations with other African universities ⁴ and to grow Africa's knowledge production. As indicated, the one way of moving Africa from the periphery of the world's knowledge production to the epicentre is to stimulate collaboration and share research output.

Open access at UCT

Policy influence

University of Cape Town's Intellectual Property Policy (2011: 3) states that it

encourages research and development and social outreach by creating a research culture that actively responds to the needs of the people of the Republic of South Africa, whilst also contributing to the global research community. In doing so, UCT seeks to protect the rights and privileges which members of the UCT community traditionally enjoy in the pursuit of knowledge, whilst at the same time balancing this with the philosophy of sharing information with others.

In terms of South African labour law and South Africa's copyright legislation, the copyright of research conducted and published as part of an employee's contract of employment, belongs to the employer.

However, in terms of UCT's Intellectual Property Policy, copyright is re-routed to the author. Given this Policy, UCT researchers have jurisdiction to cede copyright to the publisher. In terms of this particular practice, UCT is the exception as opposed to the norm, that is, the institutions hold copyright. Technically, researchers at institutions that do not have such institutional policies, do not have the prerogative to cede copyright to the publisher. Given this circumstance, researchers at UCT have a greater obligation to understand their copyright rights. Further, another right that researchers need to become familiar with is the right to retain copyright, but to grant publishers the right to distribute the published work.

Another policy that has significant influence on the rate of OA publishing is the OA policy of the National Research Foundation (NRF) of South Africa. The NRF Statement (2015) states that

"from 01 March 2015, authors of research papers generated from research either fully or partially funded by NRF, when submitting and publishing in academic journals, should deposit their final peer-reviewed manuscripts that have been accepted by the journals, to the administering Institution Repository with an embargo period of no more than 12 months".

However, if the paper is published in an OA journal or if the publisher allows the deposit of the published version in pdf format then that version should be deposited into an institutional repository and it must be openly available. The NRF policy also makes provision for the data supporting the publication: the data should be deposited in an accredited OA repository with an allocation of a Digital Object Identifier (DOI) for future citation and referencing.

44 These mandatory policies give researchers leverage to challenge stringent publishing agreements. Researchers and their respective institutions are enabled to negotiate waiver agreements from the publishers that would ensure that critical research output is freely accessible to society at large and to the entire research community.

The pivotal UCT policy with regard to its commitment to OA is its Open Access Policy (2014: 4). The policy states that an author:

(a) must deposit an appropriate version [post peer review] of Scholarly Publications into an officially designated *Institutional Repository* or into an acceptable curatorial system which can be harvested by UCT; or

(b) if prevented by a publisher's copyright terms or other good reason from doing so, must notify the *Institutional Repository* in writing that he/she will not be doing so and the reasons for this.

6 UCT's Open Access Policy was passed 35 by its Council in June 2014. There is an expectation that UCT researchers will deposit a copy of their published article in the institutional repository, OpenUCT. Since the launch of OpenUCT in July 2014, there are now about 17,000 items available to the public of which over 3000 are journal articles. Even though there is raised expectation that researchers will deposit copies of their journal articles in OpenUCT in compliance with the OA Policy, there has not been a significant change in academics' behaviour. The percentage of self-archiving since the passing of the Policy is less than five percent of the researcher cohort.

The authors are optimistic that the rate of self-archiving will increase as the Policy matures and self-archiving gains momentum. There are interventions that UCT Libraries have instituted, as provided for by the Policy, to increase the rate of submission into the repository. The Libraries are engaging in mediated self-archiving through bulk ingestion of journal articles. The Libraries use base 23 information provided by the Research Office, that is, the research output to the Department of Higher Education and Training. These records are enriched with the addition of abstracts and, where the publishers' policies allow, the full text of the articles. In the near future, the Libraries will be using the Converis system to pull full metadata and deposit them into OpenUCT. It is anticipated that the opportunities offered by the Converis system, in tandem with the Policy, will exponentially increase submission rates. As much as self-archiving rates of academics may 8 not change radically, the alternative provided by the Libraries will see a substantial growth in the number of research articles that are in the repository. Such an increase would contribute to the social justice pillar of OA.

The UCT OA Policy is deemed to be very progressive as it is one of few policies, nationally and internationally, that make some provision 6 for APCs. The Policy states that the University will provide funding for APCs for subsidy-earning publications, where researchers are not able to source alternative funding for this purpose. The APCs fund is managed by UCT Libraries which has been responsible for the roll-out of this segment of the policy. Since its inception in 2014, the APCs fund has supported 75 OA articles in 2014, 64 articles in 2015 and 69 articles in 2016. It must

be noted that the APCs fund was depleted by mid-year in each of the three years while the demand for support has been on the increase.

Testimony to the university's commitment to OA, and in particular to the APCs Fund, is the continuation of the fund despite severe university cost saving exercises. At a time when UCT is going through an austerity process with budgets being cut, including the staff compensation budget, the University has increased the APCs budget for 2017 by more than 40% of the 2016 allocation. The Libraries is projecting that it will be able to fund 585 articles in 2019 which is 33% of the projected number of research articles that will be published in that year. This is conditional on the university continuing to contribute toward an APCs budget: the projection is that the other 67% would be supported by funding agencies contributing to paying APCs costs. The Libraries, in collaboration with the Research Office, will advise researchers to include a line item for APCs in their funding proposals. It is posited that the continuation of the APCs budget allocation, as projected by the Libraries, would contribute to the social justice pillar of OA.

In addition to the above mentioned policies and practices, UCT Libraries has also restructured its staff structure to provide greater support to the openness movement and thereby to contribute to social justice. The Libraries is supporting diamond OA publishing, through providing support for OA publishing using open source software. Currently, UCT Libraries are publishing scholarly OA journals, including international journals and has already published a number of OA monographs, including an open textbook. The changing role of academic libraries demands that libraries offer a publisher service (Raju 2016). This 'library as a publisher' service facilitates free access to the research by the reader and at no cost to the author: this new area of OA is referred to as diamond OA publishing. Providing diamond OA publishing highlights the OA pillars of philanthropy, social justice and moral obligation.

Current study

As discussed earlier, UCT has put in place policies and has rolled out commensurate practices that are intended to significantly influence academics adapting to OA publishing. The underpinning philosophy is that the institution's commitment to OA practices must be aligned to the need for social justice.

The authors investigated the influence of UCT's policies and practices in changing the publishing habits of its academics. Despite the fact that the OA Policy only became effective in 2014, the publishing trends of UCT researchers over the last 5 years (2011 – 2015) were examined. The trends were examined using data of the journal scholarly output of UCT researchers from audited lists of the Department of Higher Education and Training as well as the data from the bibliometric databases *InCites* and *SciVal*. Some of the data informing the investigation would include, *inter alia*, journal titles in which UCT academics publish, the publication models (open, hybrid or closed) and faculty or discipline publishing trends.

Methodology and analysis

As pointed out by Kahn (2011), UCT has, over a sustained period, produced the largest number of research articles in South Africa. Therefore, UCT would make a

good case study ¹³ publishing trends. As posited by Creswell (2014) and Denscombe (2012), case studies focus on one instance of a particular phenomenon with a view to providing an account of experiences or processes in that particular instance. Creswell (2014) makes the point that case studies are a design of inquiry in which the researcher develops an in-depth analysis of an activity or process, such as publishing patterns at UCT being reported in this paper. Bless, Higson-Smith and Sithole (2013), in support of the current inquiry, stated that as much as case studies may be descriptive, they may also make use of quantitative data to determine a phenomenon.

The publishing trends of UCT researchers were investigated against the backdrop of OA policies and practices that ³¹ have been developed and rolled out at UCT. Denscombe (2012: 55) advises that case studies work best when researchers want to investigate an issue and “provide an explanation that can cope with the complexity and subtlety of real life situations”. He goes on to explain that a case study lends itself to the study of processes and relationships within a setting and that the use of more than one research method sits comfortably within the case study approach.

A combination of data mining and bibliometrics research methods, within a case study design, was used to investigate the trends in publishing behaviour of UCT researchers. As indicated by Osei-Bryson and Rayward-Smith (2009), data mining is the extraction of hidden predictive information from large databases to identify trends and behaviours. Jackson (2002) added that there were two types of data mining approaches and they differ depending on whether the researcher seeks to build models or to find patterns. This investigation used the second type, that is, the detection of patterns of behaviour through data mining which is a process of seeking ‘nuggets’ of information among the mass of data (Jackson 2002). The bibliometric component involved the measurement of data not intrinsic to the text, that is, the text does not need to be read in order for analysis to be conducted. Instead, extrinsic measures such as affiliation of author, journals in which articles are published and open, hybrid or closed journals are used, as was the case in this inquiry.

For the purposes of this investigation, bibliometric data was harvested from ²³ *InCites*, *SciVal* and UCT’s accredited journal publication count for submission to Department of Higher Education and Training (DoHET). *InCites* and *SciVal* facilitated searching by institutional affiliation to generate profiles for UCT researchers. The search enabled the identification of journals in which UCT researchers published, the top researchers and other publishing trends. *InCites* and *SciVal* index journals from *Web of Science* and *Scopus* databases, respectively. Hence, a limitation in the identification of the total UCT publication count is that these indexes might not totally reflect all works published in accredited journals. To overcome this limitation, the results were supplemented with the publications count data from UCT’s Research Office. The data from all three sources (that is, *InCites*, *SciVal* and DoHET list) were cleaned and analysed to provide further insight. Cleaning of data included correcting the ISSN numbers, confirming the publisher and marking the journal statuses, as

reflected in *DOAJ*, *Sherpa/Romeo*⁶ and on the journal websites themselves, as either being 'open', 'hybrid' or 'closed' (access through subscription only) model journals.

Results and discussion

Publishing trends overall

The data from all three sources confirmed an overall increase in journal publication output by UCT researchers for the period 2011-2015. As can be seen in Figure 4, there has been a steady decrease in the number of closed journals while the number of totally open journals has increased. It is inferred that the publishing patterns of UCT researchers would be in alignment with the trends reflected in Figure 4.

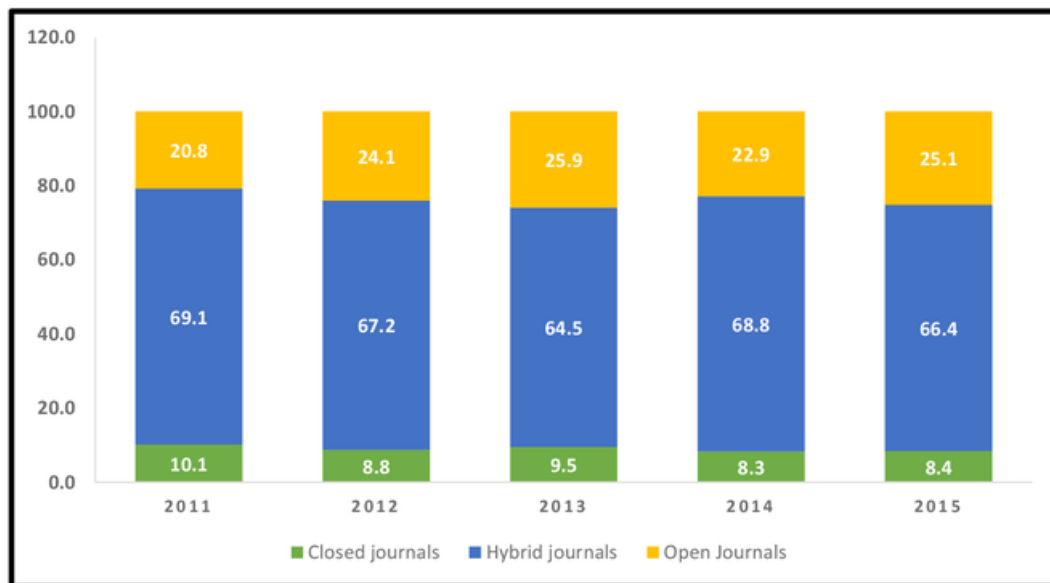


Figure 4: Percentage of journal models (open, hybrid, closed) published by year, according to DoHET list

Journal publishing trends

In analysing the data, the top 10 journals that UCT researchers published in over the period 2011-2015 (see Table 1) was established. All of the journal titles with the exception of one (*Astrophysical Journal*) offer an OA option – be it completely gold or hybrid option. In essence, UCT researchers are publishing, in the main, in journals that offer an OA option.

Table 1: A comparison of the top 10 journals as reflected in the three databases

InCites Top Journals	SciVal Top Journals	DHET Top Journals

⁶ SHERPA/RoMEO is a service which shows the copyright and open access self-archiving policies of academic journals.

SAMJ (South African Medical Journal)	SAMJ (South African Medical Journal)	PLoS One
PLoS One	PLoS One	SAMJ (South African Medical Journal) 10
Monthly Notices of the Royal Astronomical Society	Journal of High Energy Physics	Monthly Notices of the Royal Astronomical Society
Physical Review D - Particles, Fields, Gravitation and Cosmology	Monthly Notices of the Royal Astronomical Society	African Journal of Marine Science
Journal of High Energy Physics	Physical Review D - Particles, Fields, Gravitation and Cosmology	Jaids-Journal of Acquired Immune Deficiency Syndromes
South African Journal of Botany	Physics Letters, Section B: Nuclear, Elementary Particle and High-Energy Physics 17	Minerals Engineering
Physics Letters, Section B - Nuclear, Elementary Particle and High-Energy Physics	The Lancet	AIDS 10
Lancet	African Journal of Marine Science	Physical Review D - Particles, Fields, Gravitation and Cosmology 10
African Journal of Marine Science	European Physical Journal C	International Journal of Tuberculosis and Lung Disease
JAIDS-Journal of Acquired Immune Deficiency Syndromes	JAIDS-Journal of Acquired Immune Deficiency Syndromes	Astrophysical Journal

Completely open
Hybrid
Closed

In Figure 5, there is clear evidence that researchers from UCT's Health Sciences Faculty publish in journals that offer an OA option. As much as the authors would like to attribute this to the policies and practises at UCT, there has been a major trend by health sciences publishers to offer an OA option for their journals.

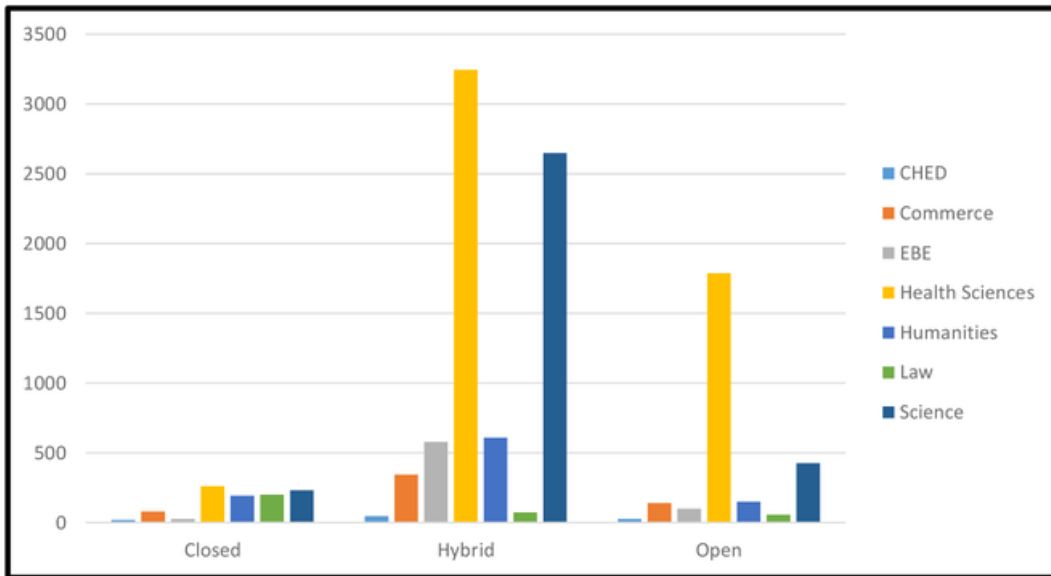


Figure 5: Number of articles published in different journal models by faculty

If one examines Figure 5 closely one would notice that the only discipline where the closed journal model dominates both the hybrid or open model is in Law. The authors do not accept that this is so because of the nature of the discipline (see Law related discussion below). An alternative to overcome this challenge is for libraries to extend their range of services to include 'library as a publisher' services.

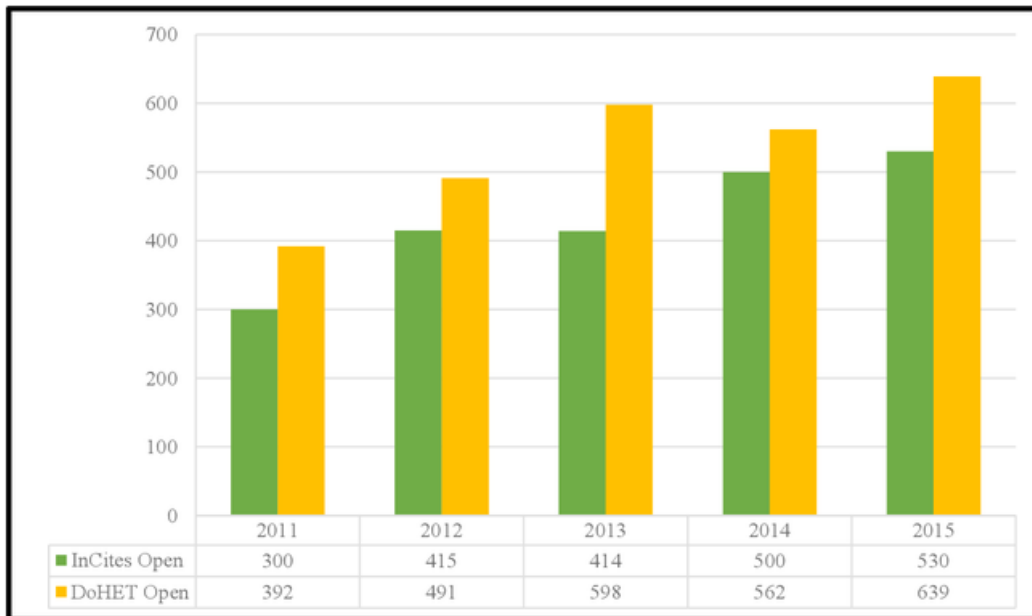


Figure 6: A comparison in the number of the articles published via gold OA

Figure 6 shows a significant increase in the number of articles that are published OA by UCT researchers. In analysing the data gleaned from *SciVal*, *InCites* and the DoHET list, it is reassuring to see that the growth of OA articles is on the increase. In terms of data gleaned off *InCites*, there is an almost 77% increase in OA articles published by UCT researchers from 2011 to 2014 and an almost 61% increase of open articles that appear on the DoHET list⁷. The growth in the number of OA articles is predominantly in the health sciences discipline – as explained earlier this discipline seems to be a fore-runner in OA publishing. Overall, the fact that research information is accessible free to the end user contributes to the social justice agenda of UCT.

In all three data sources, the top two journals in which academics at UCT choose to publish are gold OA journals (see Table 1). Of the 16 titles that appear in an aggregated 'top 10 list', 18.25% are fully open and 75% are hybrid journals. Only one journal (6.25%) is completely closed. It is interesting to note that the top two journals appear on all three data sources as the two journals at UCT most published in. It is encouraging to note that critical medical research is freely accessible to all South Africans and Africans.

Despite the fact that the hybrid model is not the preferred model for the authors, if UCT academics continue to publish in these hybrid journals, it does present the university with the second option of making those articles freely available via its institutional repository. With the continuous development of repository infrastructure and other support, it is anticipated that there would be growth in the number of items in the repository that would be freely accessible to all. Further, there is expectation that as the number of journals offering a gold OA option grows, UCT researchers will publish in such OA journals.

Publishing trends per discipline/faculty

An analysis of all three databases indicates that the majority of UCT's research is published in the discipline of Health Sciences (as mentioned already). Figure 7 corroborates the earlier assertion that Health Sciences researchers publish in OA forums. In Figure 7, it is clearly evident that in the Health Sciences, the number of open titles are a significant contributor to the large number of articles that are published OA. The number of titles that are closed is very small which in effect means that the researchers have greater options to publish open. On the other hand, Figure 7 also shows that in the discipline of Law, the number of titles that are closed is significantly higher than for any other discipline. Therefore, the options to publish open is much smaller. Despite this challenge, UCT legal researchers have a higher open publication percentage than researchers in some of the other disciplines: this demonstrates the will of legal researchers to publish open. Hence, it is here that the library needs to make greater contributions with regard to the 'library as a publisher' service to provide legal researchers with structures to publish open.

Another contributory factor for the high publication rate for Health Sciences in open forums is APCs support provided by the university. The Library has a shared

⁷ *SciVal* does not provide such data.

membership with BioMed Central, which gives the UCT author, particularly Health Science researchers, a 50 percent discount on the APCs.

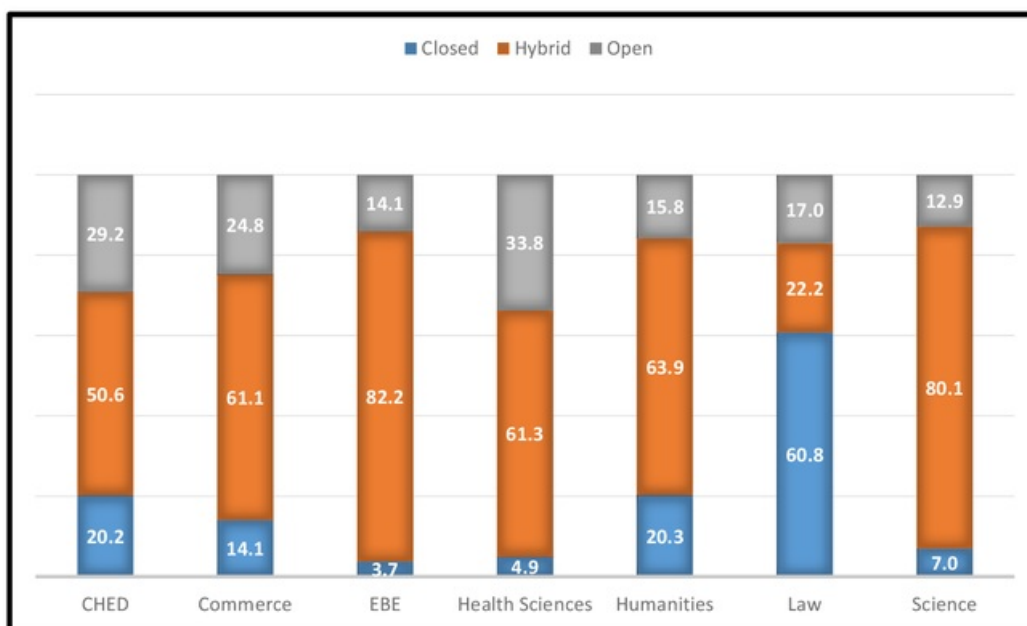


Figure 7: Percentage of journal models (open, hybrid, closed) per faculty

Conclusions

The essence of OA, especially in the African context, is to contribute to social justice by making published research more accessible. In the traditional subscription process, the greater percentage of African institutions do not have access to critical content to generate new research. A vicious circle prevails in that funding is required to buy access to information for the generation of new knowledge or to support the growth of research. The visibility of research output is what contributes significantly to the acquisition of funding. Therefore, it is incumbent upon those African institutions who are financially better off than others and who are more steeped in a research culture to openly share their research for the holistic development of research on the African continent. To consolidate South Africa as a significant contributor to the changing African research landscape, the authors would also like to recommend that there be a national OA policy monitored by the national Department of Science and Technology. In an effort to grow institutional/researcher commitment to OA, the authors would also like to recommend that the 'reward system' for accredited journal articles be revisited. It is suggested that national government deducts 50% of the publication reward for journals that are not OA. Further, those articles that are published in journals that are completely OA should get an additional percentage to 'normal reward' amount. It is the view of the authors that these recommendations will provide the South African government with better 'return on investment'.

UCT, a relative new comer to the openness movement, has done well over the last few years to gain lost ground and is now among the leading institutions on the

continent with regard to sharing its research output via OA platforms. There are a number of contributory factors to this accelerated growth of openness at UCT and some of them include a progressive OA policy and related activities to ensure roll-out of the policy. The commitment to supporting APCs *en route* to developing a culture of publishing OA is another positive for UCT. The growth of the openness movement itself has allowed greater opportunities, in terms of a larger number of open journals, for UCT researchers to publish in.

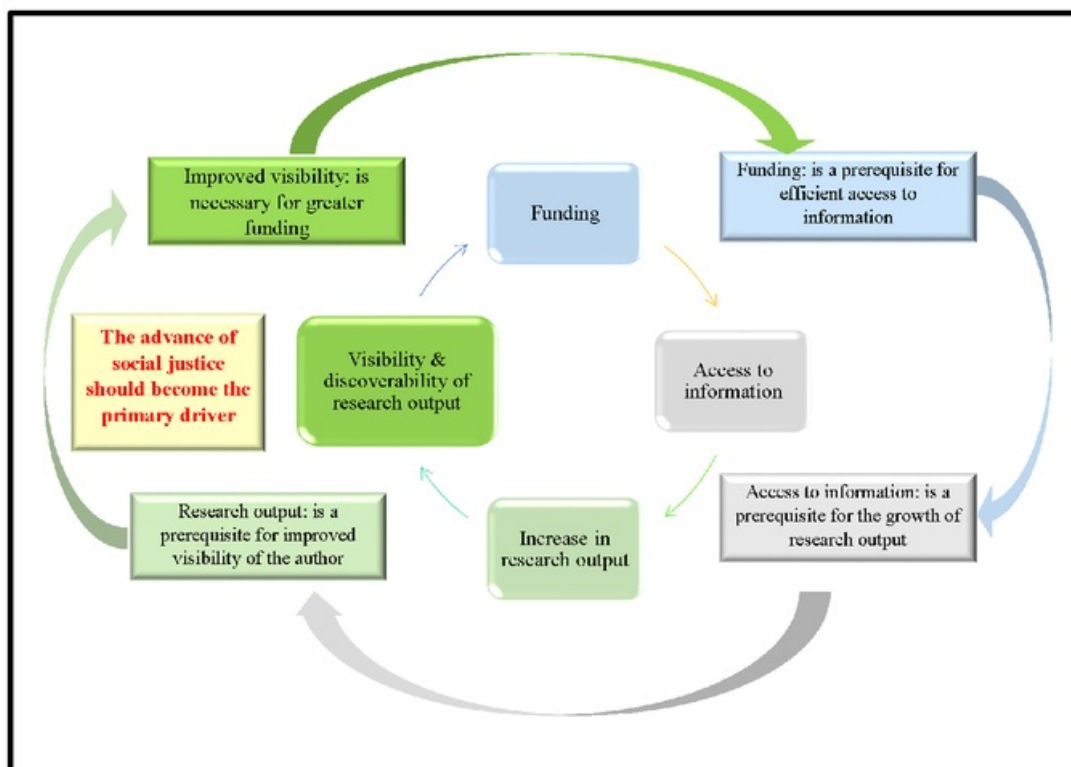


Figure 8: Funding makes research go around

As much as there has been no significant movement away from the 'publish or perish' syndrome, another **4** substantial cliché influencing publishing patterns is 'visibility breeds funding'. As a leading research university on the African continent, UCT researchers have to adapt quickly to forums that give them the greatest visibility to improve their chances of securing greater funding for continuation of their research programmes (see Figure 8). Adapting to new publishing trends is no longer an option but an imperative in an era of fiscal constraints, as visibility of research is an important funding leverage.

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8	Anastassios Pouris. "Scientometric research in South Africa and successful policy	<% 1

9	ejournals.library.ualberta.ca Internet Source	<% 1
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