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How Economic Assumptions Constitute Publics as Consumers in South African Nanotechnology Governance

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1. Introduction

Over the last 30 years a variety of techniques have been developed that aim to democratize science and technology, which have been variably referred to as 'formalized mechanisms of voicing' (Michael and Brown, 2005), 'technologies of elicitation' (Lezaun and Soneryd, 2007), or 'technologies of democracy' (Laurent, 2011). The emergence of these engagement activities coincided with the growing impact of neoliberal reforms on the governance of science and technology. Although neoliberalism should not be seen as a monolithic and static ideology (e.g. Harvey, 2005), there are several reoccurring characteristics that are widely understood to have led to an erosion of political institutions for public representation, like the tendency to favor markets over governments, trade liberalization over national protectionism, and individual economic self-responsibility over social redistributive measures (Lave *et al*., 2010; Moore *et al*., 2011; Hess, 2013). Public engagement activities with science and technology, in this context, can be understood as attempts to create new political spaces for publics to have a voice.

In some cases, however, as this article will highlight, public engagement activities are themselves founded upon economic assumptions about engaging publics that effectively constitutes these publics as neoliberal consumers. I illustrate

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this through a case study of public engagement with nanotechnology in South Africa, where the opportunities for the public to engage with nanotechnology are constituted as informed, individual decisions about whether or not to purchase a particular technological product. In a critical discussion of the South African case study, I argue that STS scholars need to question the economic assumption that consumer behavior reflects democratic deliberation.

I draw on a range of publicly available documents (including policy documents, newspaper articles, speeches and presentations, and public engagement material) and semi-structured interviews with key actors involved in South African nanotechnology governance (including government ministries, research institutes, standardization organizations, companies, and public engagement organizations). Together, these sources provide a broad view of the events and contexts that shaped public engagement with nanotechnology. This material was gathered through a systematic internet search and during a three-month period of fieldwork in South Africa from September to November 2011. This material was analyzed for the way publics were constituted and for the broader setting in which this occurred, thereby attempting to analyze the economic assumptions that underpin public engagement in South African nanotechnology.

2. Public Engagement in South African Nanotechnology

South African public engagement with nanotechnology followed the government allocation of substantial public funds to nanotechnology as a policy of innovation-driven national development. Nanotechnology, the understanding and control of matter at the nanoscale, was expected to enable scientists to develop materials with new properties that could be used in innovative products across industrial sectors. The South African government envisioned that this technology could strengthen established South African industries while simultaneously tackling development-related challenges in the areas of water, energy, and health (Beumer, 2015, 2016). In the words of the government itself, they invested in nanotechnology 'for the benefit of all its citizens' (SANi, 2013).

From the early moment onwards, actors involved in the governance of nanotechnology aimed to provide the public with a space for articulating their concerns and wishes. For example, in 2008, two years after the publication of the National Nanotechnology Strategy (DST, 2006), the government issued a project brief outlining their plans for public engagement. Unlike other technologies, so the government project brief noted, nanotechnology may impact society along a wide spectrum of different sectors and applications, and 'it is for that reason that we need to cultivate a climate of public discourse to provide an opportunity for a society to switch from a merely passive, observational role to an active participating one' (Cingo, 2008, p. 10).

The government modeled their activities after an OECD planning guide for public participation (2012). Although South Africa is not an OECD member

and the planning guide was still in draft stage, the South African government was actively working with the OECD and decided to pilot its recommendations. This meant that they first had to provide information to the scientific community in order to create a 'sufficient force of advocates of the technology' (Cingo, 2008, p. 11). Then in a second phase they could engage a wider audience, including what they called 'the general public'.

The start of the second phase was marked by the launch of the Nanotechnology Public Engagement Programme (NPEP) in 2008. This program was funded by the Department of Science and Technology and was administered by the South African Agency for Science and Technology Advancement (SAASTA) in Pretoria. In the subsequent years, this government agency focused on disseminating information. They facilitated the publication of various articles in national newspapers and magazines, they published fact sheets on the potential impact of nanotechnology on issues like water, energy, and health, and they organized a media roundtable on nanotechnology and health, a nanotechnology exhibition in the Sci-Bono museum in Johannesburg, and a public tour through the facilities of a nanotechnology laboratory in Pretoria.

For the government, scientists, and industry, engaging the public was considered particularly important because of the uncertainties surrounding the impacts of nanotechnology, both regarding its benefits and its risks. Nanotechnology was envisioned to bring substantial benefits to South Africa but the possibility that nanoparticles could pose risks to human health and the environment could certainly not be excluded, and occasionally concerns were also raised that the technology could negatively impact privacy, animal welfare, and military capacities—issues that were all marked by substantial uncertainty. The material that was created to inform the public highlighted these uncertainties and regularly included information about the potential health and environmental risks of the nanotechnology (although other issues like privacy and dual-use were much less prominent). For instance, in an article in the *Mail & Guardian*, one of the country's broadsheet newspapers, a scientist is quoted saying that 'yes, there are potential dangers, as there are in any new development. We don't know what will happen when nanomaterials degrade, when they are washed into the river, if they are affected by other chemicals' (Scott, 2009, p. 10).

While the emphasis was squarely placed on informing the public, these activities were considered to be part of the attempt to switch the public from a passive and observational role to an active and participating one. The underlying idea, which was reiterated time and time again by government officials, politicians, and scientists alike, was that the public should be empowered to take informed decisions. One senior civil servant clearly articulated this view in an interview when saying that 'we must keep society abreast of all developments so that eventually they make informed choices about their use of the technology' (interview, Pretoria, 16 September 2011). This view was also put forward in the international arena. For instance at a meeting of the United Nations panel for science and

technology for development in Geneva in 2009, a South African government representative explained that the aim of the government is 'to create awareness around nanotechnology and educate the public to enable the taking of informed decisions about the technology' (UNCTAD, 2009).

When looking closer at the publics that are supposed to be informed, it becomes clear that the informed decisions concerns choices about whether or not to purchase nanotechnology products. The senior civil servant responsible for public engagement described the public that needs to be informed by saying that:

Interviewee:	'it should be my mother in law, it should be my son, it should be my next door neighbor. Whoever. (...) Just people in general'.
Interviewer:	'And why do you need to make them aware, or engage them?'
Interviewee:	'Because at the end of the day they are going to be the consumers of the technology'. (Interview, Pretoria, 28 September 2011)

In other words, the public needs to be informed so it can take decisions for themselves *as consumers*. In a neoliberal fashion, the active and participating role that the public is given is limited to the individual decision about whether or not to purchase nanotechnology products. Another senior civil servant reiterated their objective to 'let people be involved so that they can make their choices: are we going for nanotechnology products are do we not?' (interview, Pretoria, 16 September 2011).

John Law has pointed out that the neoliberal construction of the public as consumers is founded upon several economic assumptions about their behavior:

> Consumers are being made into individual decision makers faced with products on the shelves about which they are supposed to make decisions. These consumers are also rational decision makers because they make use of 'information' (...) when deciding what to buy. (...) And finally, they are under-informed decision makers because, lacking 'information', they cannot choose properly. (2009, p. 246)

In this particular South African case of public engagement, the implicit assumption is that market preferences and decision-making are the most appropriate mechanisms for the public to engage with technology. Within this framework, providing the public with information about nanotechnologies can be understood as an attempt to create market conditions that allow consumers to makes such decisions.

Product labeling has often received a prominent place in discussions of such neoliberal forms of governance (Klintman, 2006) and also the South African attempts to create a label for nanotechnology products can be interpreted in this light, enabling the public to act as a market decision-maker. After all, once equipped with the information required to make decisions, the public can only act as a rational and informed decision-maker if they are able to recognize what products contain nanotechnology and what products do not. The *Mail & Guardian*

summarized the issues at stake by noting that in the end the discussion about 'the need to enlighten the South African public' about nanotechnology revolves around the question 'which nano products are in a shop near you—and are they labeled?' (Mbali, 2011).

3. Limits to Engagement Through Consumption

The construction of the South African public as a consumer of nanotechnology fits well with the neoliberal preoccupation with uncertainty. At the root of neoliberalism lies a concern with the irreducibility of the uncertainty and complexity of modern life and important developments in neoliberal theory have originated in response to the perceived failures of state planning to adequately deal with these uncertainties. Lawrence Busch explains this with great clarity when discussing Walter Lippmann's *The Good Society* from 1937, one of the key publications in the emergence of neoliberal thought. 'Lippmann argued', so Busch observes, 'that the complexities of modern societies demanded that one reject central planning, which would always fail to capture that complexity; after all, complete knowledge was beyond mere mortals' (2011, p. 181).

Friedrich Hayek made a similar argument when highlighting how knowledge of local circumstances is distributed amongst a great number of individual actors. While essential for successful centralized economic planning, this knowledge is essentially 'unorganized' as it cannot be captured in statistical aggregations that are required for state planning (Hayek, 1945). The market, instead, by shifting the decisions to individuals, would put a check on the excrescences of central planning, and the uncertain consequences of nanotechnology could similarly be dealt with by enabling individual consumers to make purchasing decisions.

The constitution of consumers should further be understood in the light of recent South African history. As Comaroff and Comaroff (2001) have observed, the post-Apartheid promise to empower the public in affairs of the state concurred with the coming of age of neoliberal global capitalism that is often associated with the rise to power of leaders like Thatcher and Reagan. The end of the Apartheid regime ended the international isolation of South Africa and the aim of the newly established African National Congress (ANC) government to reconnect South African markets to the global economy were strongly shaped by neoliberal impetus. The newly elected ANC government focused on achieving economic development through production for foreign markets, privatizing public sector services, and strengthening the value of the Rand through fiscal austerity (e.g. Narsiah, 2002). These developments, so Comaroff and Comaroff show, formed the backdrop for a 'refiguration' of South African publics.

Comaroff and Comaroff (2001) largely focus on the rise of autochthony and belonging (and the corresponding rise of 'alien' others)—developments that are understood to *counter* the increasing permeability of national boundaries that comes with neoliberal global capitalism. But oftentimes the refiguration of the

South African public also *embraced* the neoliberal constitution of publics as consumers. For instance the perceived failure of state interventions to undo the inequalities resulting from racial segregation practices of the past often resulted in attempts that involved the constitution of neoliberal subjects.

The basic income scheme in Johannesburg that is discussed in the work of Ferguson (2009) is a good example of this, where the government provided a basic income to enable individuals to decide for themselves how they want their needs in water and electricity to be met. Instead of investing in infrastructures for water and energy, the government gave individuals the opportunity to purchase these essential needs as products in the market place. The constitution of nanotechnology publics as consumers should be situated as part of a wider set of economic assumptions that became prevalent under ANC rule. Ferguson clearly articulates the attraction of such forms of neoliberal subject constitution by showing how these practices of governance shift responsibility for undoing historical inequalities away from the state and into the hand of newly empowered individuals, while avoiding the pitfalls of top-down defined forms of emancipations that are implicit in many other forms of development aid.

Yet there are substantial reasons to be cautious about the way these economic assumptions shape the constitution of South African publics. I would like to argue that the constitution of nanotechnology publics as neoliberal consumers is very limited as a form of public engagement and is at odds with the purposes of South African science and technology policies more broadly.

There are various instrumental reasons for why consumption choice is a limited (and not very effective) strategy for voicing political views. For one, such forms of political consumerism offer citizens with a simplistic choice between speaking out against a technology by not buying a product ('boycotting') and rewarding technology developers by purchasing a product ('buycotting') (Neilson, 2010). Even in the unlikely circumstances that full information is available to perfectly rational citizens, such 'to buy or not to buy' choices hardly reflect the complex consideration of benefits and drawbacks that go into such decisions (Barnett *et al*., 2005; Jacobsen and Dulsrud, 2007).

What is more, consumption limits the publics' engagement to technologies available in consumption markets, thus excluding deliberation over those technologies in which consumers play no direct role, like military technologies, or nanomaterials purchased by other corporations. And as a mechanism of engagement, consumption furthermore offers publics an opportunity to engage at a moment in time when the technology itself is already a *fait accompli*. This offers much more limited form of engagement than activities taking place at earlier stages of technology development, when technological trajectories are less likely to exhibit path-dependency and when choices about what technologies will be developed are more open to change (e.g. Rogers-Hayden and Pidgeon, 2007).

Moreover, not only is consumption a narrow form of public engagement, there are also substantial reasons for questioning whether consumption is a suitable

form of deliberation in the South African context specifically. It is well known that contemporary science and technology policies in South Africa are strongly informed by the legacy of Apartheid. During the Apartheid era, public policies for science and technology were aimed at either strengthening racial segregation or at addressing the drawbacks of international boycotts to the Apartheid regime (Cherry, 2010). Successes in these areas made that science and technology became entangled with an idea of South Africa as a white, Afrikaner country that could sustain itself in a hostile environment (Dubow, 2006; Edwards and Hecht, 2010).

The challenge for contemporary science and technology policies, as the first post-Apartheid science and technology strategy highlights, is hence that 'the system was built for 5–8 million people and now has to grow and develop to serve *all South Africans*' (DST, 2002, p. 73 [italics mine]). In this context, each and every post-Apartheid policy has emphasized that science and technology should help to create a South Africa 'in which *all citizens* benefit from the fruits of our investment in knowledge and its exploitation' (DST, 2008, p. v [italics mine]), as the Minister of Science and Technology wrote in the first sentence of the 10-year science and technology strategy.

Of course it may prove elusive to find perfectly egalitarian forms of public engagement that reflect these objectives and manage to give voice to *all* South Africans. Research in political participation has long highlighted that all forms of political participation are characterized by some inequality in one way or another (e.g. see Verba *et al*., 1978; Armingeon and Schädel, 2015). But public engagement activities that constitute publics as consumers may be particularly far removed from the objective to give voice to all South Africans. When compared to other forms of public engagement, consumption has been shown to rely particularly heavily on both financial resources and high levels of education (Stolle and Micheletti, 2013). South Africa is marked by substantial inequalities on both accounts. South Africa ranks as the most unequal country in the world when measured by the Gini coefficient, the World Bank's main indicator for inequality (World Bank, 2014). And what is more, although there are signs of an emerging black middle class, these inequalities still strongly mirror the societal divisions that were created during the Apartheid period. The stark inequalities in South African society, predominantly divided along racial lines, hence prevent large proportions of society to engage in the consumption behavior that would allow them to engage with nanotechnology developments. As a form of public engagement, consumption falls short of including *all* South Africans in critical ways.

4. Conclusion

This article highlighted that even when expert judgment is opened up for public engagement, economic assumptions can underpin the constitution of these publics. The public engagement with nanotechnology in South Africa is shaped

in a way that enables South African citizens to engage with nanotechnology exclusively by taking informed decisions about whether or not to buy nanotechnology products, thereby building upon economic assumptions about the governance of uncertainty that constitute publics as individual consumers.

Although there can be good reasons for constructing publics as consumers, limiting the public engagement with nanotechnology to consumption decisions is unlikely to fulfill the democratic objectives of public engagement in South Africa. The government aimed to cultivate a climate of public discourse in which publics could take an active and participating role in ensuring nanotechnology would benefit *all* South African citizens. Yet the decision to purchase a product or abstain from buying products makes it hard for publics to articulate more nuanced positions, it forecloses opportunities to voice their views about nanotechnologies that do not enter consumer markets, it enables publics to engage with nanotechnologies only at a moment when changing those technologies in response to public views has become relatively difficult, and it fails to enable *all* South Africans to articulate their views since consumption of nanotechnology products is likely to be skewed towards the wealthier parts of society in the formal economy. In the best case, reducing publics to consumers provides limited information about the benefits and drawbacks of consumer technologies; in the worst case, it risks reifying historically entrenched inequalities through the governance of technoscience.

Articulating the economic assumptions underpinning the constitution of publics provides a first step to theorizing the way attempts to democratize science and technology are situated in wider political economies, and it is furthermore crucial for enabling a critical engagement with the way economic ideas shape technology governance. The importance of doing so is highlighted by the fact that despite the stringent drawbacks of constituting neoliberal publics in South Africa, this form of public engagement has gone by entirely unquestioned in South Africa. Actors across the board have embraced this form of public engagement and the only criticism that these activities have received in fact questioned whether sufficient funds were made available to realize this neoliberal construction of the public (interview, Pretoria, 21 September 2011). Only by making the economic assumptions underpinning the constitution of these publics explicit, as has been done in this article, can we open them up for critical scrutiny.

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