Chapter 12

Datafication, fluidity, and organisational change

Towards a universal PSM 3.0

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Abstract
This chapter reviews a range of the organisational structures necessary to deliver datafied, fully nuanced content to audiences. These structures can be found in high technology clusters worldwide, and with them, the delivery of digital content to a mass, group, or individual to suit personal preferences is possible via a wide range of platforms. Such fluidity of delivery is likely to increase the universal appeal of public service media (PSM) content and thereby raise the potential for a well-informed national (and international) citizenry. The Canadian Broadcasting Corporation's response to the increasing datafication of media by significant commercial firms, such as Netflix and Amazon Prime, was to adopt a mobile-first policy in its Hamilton newsroom, a neighbouring urban community to Toronto. Although the transition was found to be highly disruptive for producers and publics alike, local audiences substantially increased, including younger audiences.

Keywords: datafication, fluidity, recombination, high technologies, clusters, public service media, universality

Introducing datafication to assist universality[1]

This chapter reviews a range of organisational structures found in high technology clusters in North America and Europe for the production and distribution of content in large data flows via networked computing. Such datafication can enable the nuanced delivery of digital content to a mass, group, or individual via a wide range of platforms to suit individual preferences. Datafication can enable public service media (PSM) to deliver what Jakubowicz has previously imagined as "public service media 3.0". This is PSM able to operate at national and international levels, to reflect multiculturalism and multimediality, able to offer universal access, and being technologically neutral (Jakubowicz, 2010). Such production requires creatives, technologists, audience analysts, and data scientists

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to work collaboratively – an approach not widely found in contemporary PSM.

Datafication offers opportunities to strengthen one of the core principles of PSM – universalism: "PSM must provide a range of programmes that inform, inspire, entertain and appeal to the diverse interests of the young and the old, the higher and less educated, across the community" (Van den Bulck & Moe, 2018: 877). Without delivery systems that can reach increasingly diverse publics in a more fluid way, the potential to support the development of an informed citizenry will remain low.

Firms, such as Netflix and Amazon Prime, are able to exploit datafication. At a deep backend technological level (concerned with servers, applications, and databases) these companies are adopting new file standards to enable the recombinatory delivery of different kinds of media files to different frontend devices, where users interact directly. For example, Netflix swiftly adopted Interoperable Mastering Format (IMF) in 2018, a file standard developed that same year by the Society of Motion Picture and Television Engineers (SMPTE) working with the UK's Digital Production Partnership (DPP). The DPP was created by the broadcast and film industry in the UK to encourage experimentation with emerging technologies. The IMF format enables the repackaging of content for different play-outs, audiences, platforms, and languages. For example, the same film can be automatically repackaged with a commentary in Hindi for India, or in Mandarin for China. An airline version of a programme can be automatically rendered alongside one for a tablet computer or mobile phone. IMF therefore enables the automatic reassembly of linear content for different platforms including any associated data such as commentary, or alternate or additional material – images, music, and text:

> The IMF framework is based on the Digital Cinema standard of component based elements in a standard container with assets being mapped together via metadata instructions. By using this standard, Netflix is able to hold a single set of core assets and the unique elements needed to make those assets relevant in a local territory. (Netflix Tech Blog, 2016)

The potential reduction in production costs is obvious, but also personal preferences can be accommodated by the technology when coupled with a registration system, thereby potentially increasing universal appeal. Netflix was able to adopt the new file standard swiftly because they are fully datafied. They are adept at data management and have the right tools and data-literate employees. Such orientations and capacities are inherent in high technology firms, therefore this is of interest when considering the potential benefit for PSM evolution towards datafication.

To assist in the visualisation of what PSM 3.0 adaptation might actually look like an analysis and findings is provided on the typical activities undertaken by high technology firms in one particular situation: Toronto-based high

technology clusters. In a four-year international study, I and Michał Głowacki collected data in 2015–2019 from ten city-based high-technology clusters in North America and Europe (Jackson & Głowacki, 2019).

The methodology involved 150 in-depth interviews with personnel from high technology firms and local PSM organisations in conjunction with photographs from "observational walkabouts" in offices and neighbourhoods, and analysis of grey literature (company reports and city strategies).[2]

The case study explored in more detail here are the operations in the Toronto area of Canada of the CBC. CBC's experiment with a "mobile first – river of content" is possibly one of the first large-scale PSM experiments into datafication (personal interview with CBC senior manager, Toronto, 2016). In this case, the CBC newsroom entirely replaced their previous orientation of media-type (television and radio) presentation to a mixed-media data-flow approach. News stories were now selected on both merit and suitability for consumption via mobile phones and other digital devices.

Theorising PSM 3.0

Karol Jakubowicz's thinking on a new model for PSM emerged a decade ago. His analysis of European public service broadcasting (PSB) underlined the need for a new conceptualisation and the reforming of operations connected with the PSM universalist mission, which he argues has

> encompassed two main periods: the time up until the 1980s, before it faced commercial competition (PSB 1.0) and the period of great upheavals and change since then (PSB 2.0). [Public service broadcasting] (PSB) also needed to find its bearings in a multi-channel broadcasting landscape, leading to 'a significant level of commercialisation, where differences with commercial television are, in general, relatively small' (León, 2007: 98). Now is the time for PSB 3.0 – the twenty-first-century version that we would probably invent if we were to create PSB today, necessarily very different from the one we have inherited. (Jakubowicz, 2010: 9)

Jacubowicz imagined PSM 3.0 as being able to operate at national and international levels. It would also reflect multiculturalism and multimediality, reach a level of universal appeal, be technologically neutral, teach the new digital literacies, and engage a participatory public for the greater good. PSM would act as an umbrella for "a broad network of public and civic institutions and groups" (Jakubowicz, 2010: 9). More recently, Mira Burri (2015: viii) argues for the reframing of "PSM as producer, PSM as navigator, PSM as memory institution". Key to such transformation is the process of datafication, that is, turning content, and any related information and communication, into data.

For Davenport (2014: 10) datafication is the act of making sense of data for "decision support, executive support, online analytical processing, business intelligence, analytics". Floridi (2014) terms adaptation to datafication the "fourth industrial revolution" and Brynjolfsson and McAfee (2014) the "second machine age". For Manovich datafication enables a logic of "permanent extendability" and "permanent innovation" (Manovich, 2013: 156). The flexibility of computer coding and data flows offers the imagining and development of new forms of linked content, conversations, games, or immersive experiences that can be expressed as recombinatory media and communications ecosystems. Through the work of these theorists we can conclude the production and maintenance of datafied media and communications requires an agile, fluid, approach that is alien to most producers accustomed to working in a linear way within television and radio.

For Arie de Geus (1999) firms with longevity are those who are continually learning and adapting, what he terms a "living company". The business strategy firm McKinsey also identifies a modern organisation as being a "living organism" (Aghina et al., 2018: para.15). Kung (2008: 128) notes strategies for media firms that involve technology are "challenging because that environment is never static. Rather like all complex systems it is in a constant state of flux". Analysis of the collaborative organisational models found in high technology clusters, explored further on in this chapter, provide insights into fluid, non-linear, data-driven production. These models raise questions of whether PSM can adapt to such data-driven forms and, if so, how will this benefit the PSM mission to provide universal appeal and access? Also, what enables cross-cultural and cross-sector innovation, such as that between content producers and data-scientists, to succeed?

Datafication and media production

For media producers any digital content becomes a data file. That data can then be tracked, monitored, and optimised, leading to new opportunities (Elliott, 2013). For production purposes such remediation of digital content (Bolter & Grusin, 2000) offers opportunities to improve access, appeal, or visibility. Recombination can also be seen in audiences' fluid swarming and media snacking of "spreadable media" identified by Jenkins and colleagues (2013). Manovich terms such adjustments to the structure of digital media "digital compositing". Computer code and content-as-data can be rearranged to produce new creative forms such as immersive media (Manovich, 2001, 2013).

Overall, we are living a "medialife" that is "constant communication and conversation" (Deuze, 2012: 3). Reconceptualising media and communications as recombinatory ecologies or eco-systems is becoming more logical. The concept of fluidity as a theoretical framework is therefore a useful lens for the analysis of modern management and production cultures in a contemporary

media ecology context. The idea that a certain level of organisational adaptivity is required to operate in such advanced datafied production environments is worthy of exploration. Greater organisational fluidity and agile production methods ensures a higher ability to respond to changing market conditions and audience preferences. Appropriately nuanced content and communications are more likely to ensure universal appeal, and the use of appropriate platforms will offer universal access.

For firms in high technology clusters the researchers found faster decision-making, collaboration with a wider range of skilled creatives, and greater autonomy for project-based production teams was strongly evident. To be clear, fluid production does not exclude moments of stasis, for example, the staged releases commonly found in digital making (version 1.0, version 2.0, etc.). A web page also offers structure within which flows of media updates can reside. Agile project management uses "sprints" of activity. Each sprint is interspersed with in-depth reviews, and these moments of stasis allow for adjustment. The concept of *levels of appropriate fluidity* can therefore assist us to see what is happening in combinatory media ecosystems.

Public service media and universal appeal

Adapting to a networked media landscape has been slow and challenging for PSM (Lowe & Steemers, 2012; Głowacki & Jaskiernia, 2017). The next challenge is datafication which requires a more large-scale, holistic, adaptation across the organisation. Petros Iosifidis (2010: 16) commented that "PSB has so far failed to respond, in its organisation, management structures and relations with civil society, to the rise of networked, non-hierarchical forms of multi-stakeholder governance and social relations".

For C. S. Nissen (2014) two cultures have long been observable in PSM; a management culture and a production culture. Nissen's analysis of production culture also evidenced a marked distinction between television and radio producers, with television often seen as a career promotion from an older, less wealthy medium. From the late 1990s PSM organisations began to open "new media" departments, introducing a third culture imported by digitally able workers hired from commercial firms. A fourth phase of cultural adaptation is now suggested as data analysts and scientists become part of contemporary media and communications.

Datafication could assist PSMs to achieve universal appeal and greater potential to deliver an educated citizenry by increasing the visibility, availability, access, and personalisation of quality media selections. To be clear, universality firstly "refers to *universal appeal*. PSM must provide a range of programmes that inform, inspire, entertain and appeal to the diverse interests of the young and the

old, the higher and less educated, across the community [emphasis original]" (Van den Bulck & Moe, 2018: 877). Further "PSM must cater to every specific taste, even outside the mainstream" (Van den Bulck & Moe, 2018: 877). Interoperable Marketing Format (IMF) has been suggested as one high-end technology standard adopted by Netflix that is proving able to deliver recombinatory content selections to different publics via a wide range of platforms. Hence, overall, an audience-centric position has to be taken in tandem with such high technology.

The dependency on PSM achieving datafication is partly financial, partly strategic, and partly policy-related. But it is also about being able to engage with other production cultures such as those evident in high-technology firms. This indicates the need for increased knowledge exchange mechanisms and an enhanced ability to sustain partnerships with datafied firms. At the same time, PSM organisations have strong – seemingly insurmountable – internal resistance to change. The barriers to adaptation are therefore cultural, financial, technological, and regulatory. Alongside this is the need to increase the speed of innovation and exploration – that is for PSM to be more entrepreneurial. Developing new ventures or engaging with new ideas is not incompatible with the PSM mission. It is argued PSM could evolve more swiftly through increased engagement with local high-technology clusters.

Investigating high-technology clusters

Historically, studies on industry clusters have produced analysis of the fabric of such aggregations, notably Porter (1998), but have not attempted to look at the internal culture of the firms within each cluster. Studies of media clusters have taken the same approach (Karlsson & Picard, 2011). Komorowski identifies seven types of aggregation within clusters, one of which is pooling. For Komorowski (2019: 56) pooling is "the organization of interaction between firms through, for example, the provision of networking events, the facilitation of education and training, the image-strengthening of its members or direct services". In 2015, the National Science Centre (NCN) in Poland funded a four-year international project: *Organisational Culture of Public Service Media in the Digital Mediascapes: People, Values and Processes* (Głowacki & Jackson, 2019). The project is the first to look at the internal organisational culture of high-technology clusters in North America and Europe.

The rationale for the study was the challenging national conditions facing the Polish PSM organisations Telewizja Polska (TVP) and Polskie Radio (PR). Both are currently operating within an exceptionally challenging political environment, largely orchestrated by the ruling Law and Justice Party (PiS) government. In 2016 they fired the Polish PSM senior management team in order to have more control.

Toronto's high-technology clusters

The third-largest technology sector in North America is in Toronto, in Canada's most populated province, Ontario. The Toronto high-technology cluster is in fact several linked clusters each with a slightly different nuance. They include firms and organisations involved in health, financial services, information technology, media, and creative industries. This is augmented by smaller firms in a range of other sectors. The clusters in Toronto encompass 14,000 technology companies and 65 business incubators. According to Canadian federal government sources small- to medium-sized businesses (firms with fewer than 250 employees) comprise 98 per cent of the activity. The typical size of most high-technology firms is very small (less than five employees). Only 1.8 per cent of businesses are considered medium-sized, and only 0.3 per cent are large-sized companies (Government of Canada, 2016). The small- and medium-sized enterprises (SMEs) are an important source of innovation due to their ability to "start up" and test the viability of new services in a cyclical fashion. According to the World Bank (2020, n.p.): "SMEs account for the majority of businesses worldwide and are important contributors to job creation and global economic development. They represent about 90% of businesses and more than 50% of employment worldwide".

For the analysis of the Toronto high-technology cluster, the focus is the enterprise incentives supported by the Toronto municipal government and the Ontario provincial government (most of the departments are based within the City of Toronto). Both levels of government put in place policies and programmes to encourage SME growth, which has also resulted in the development of an enterprise corridor, located in centres from Toronto to Waterloo (100 kilometres to the west of Toronto, with the city of Hamilton in between). The Toronto-Waterloo enterprise corridor, it is argued, helped create a suitable climate to assist PSM change, specifically in the case of the CBC.

Toronto's high-technology clusters contain different forms of co-working spaces designed to amplify entrepreneurialism and cross-sector, cross-skill collaboration. This is achieved through training, socialisation (in cafes, chill-out spaces, and associated social media), and targeted knowledge-exchange sessions. These sites of pooling (Komorowski, 2019) range from grassroots co-working spaces to those run by incorporated public-private consortia run by universities, private businesses, and the government. We also found several large international co-working franchises such as WeWork and Techstars in the Toronto setting that also provide co-working spaces across North America and Europe.

To illustrate the significance of the co-working model, in a pre–Covid-19 world, the MaRS complex in downtown Toronto aggregates around 500 government, industrial, educational, and community firms under its public-private partnership structure (MaRS, 2018b). Academic partners include the

University of Toronto, York University Toronto, Ryerson University, and the Ontario College of Art and Design. Corporate partners include American Express, IBM, Microsoft Ventures, Rogers, and Siemens. The Ontario provincial government and the Canadian federal government support this MaRS Discovery District.

MaRS describes itself as "a curated community of entrepreneurs, investors, corporates, academics and government partners" (MaRS, 2018b: para. 1). They claim their aggregated organisations employ over 12,800 people in small, medium, and large high-technology businesses – in a series of linked glass-sided buildings resembling the headquarters of a global corporation. MaRS claims to have raised over CAD 4.8 billion in capital investment (from 2008–2017) and generated over CAD 3.1 billion in revenue (2008–2017):

> We bring together educators, researchers, social scientists, entrepreneurs and business experts under one roof. Founded by civic leaders, we have a mission that is equal parts public and private – an entrepreneurial venture designed to bridge the gap between what people need and what governments can provide (MaRs, 2018a: para. 2).

Our research found several co-working spaces developing specifically for the media and creative industries within the cities in this study. A cross-city finding from the project is that there are few mechanisms for PSM to engage with SMEs. Co-working and the close collaboration found between high-technology firms is significantly different from PSM's model of commissioning content from creative outlets. The lack of ongoing innovation-oriented partnership working between high technology SMEs and PSM is a missed opportunity. Interviews with personnel across the sectors illustrate a very strong commitment in the SME population to the development of services in the public good.[3]

In Toronto the CBC's adaptation to datafication has been challenging, situated as it is within the CBC's community media offerings centring on the cities neighbouring Toronto. Experiments began in 2012 with a "radio with digital components" approach in the Kitchener-Waterloo area of Ontario (personal interview with senior manager, CBC Toronto, 2016). In 2014, local web pages were launched in Hamilton, Ontario, cutting the morning drive-time radio news show to fund development. The audience response was highly negative as the chosen media was inappropriate for their consumption preferences and there was little consultation. In 2016, a further experiment was conducted in London, Ontario; a digital-only, mobile-first approach to news stories.

The newsroom was reorganised, and television and radio replaced with a media-neutral approach. The best stories led, regardless of whether they were audio or video, and they were delivered first to mobile phones: "We changed our operating methods, the philosophy" (personal interview with senior manager, CBC Toronto, 2016).

Content is now delivered from CBC's Ontario newsrooms as a "river of data". This has resulted, according to the CBC, in a 70 per cent increase in consumption: "We're now seeing a threefold or triple digit increase in the volume of daily visits to mobile" (personal interview with senior manager, CBC Toronto, 2016). There is still, however, a cultural orientation within CBC towards departmentalism; other CBC personnel refer to digital services as something apart from television and radio. Digital and social media were still framed as being "new" in some instances:

> We're writing our journalistic policies right now to accommodate a computer-to-computer sort of approach. […] We're trying to figure how it fits into the workflow and how we translate this information into stories that resonate with people. (personal interview with senior director of digital media, CBC Toronto, 2016)

The presence of high technology companies in Toronto and wider Ontario undoubtedly have an influence on CBC, not least because they have the advantage of being less regulated. Over the last few years, Netflix has established a solid customer base, and they are not at all constrained by the Canadian 1991 *Broadcasting Act*, unlike CBC.

A key issue holding back datafication, identified by Professor Charles Davis of Ryerson University in Toronto during an interview in 2016, is that film and television companies are strong in product innovation and project management, but "they're much weaker in all the customer-facing parts of the fit, like marketing and targeting customers, and distribution and business models".

Discussion: Organisational change

The project seeks to identify those structures, practices, and values observable in successful high-technology firms that might be useful for PSM organisational and cultural adaptation. Given that results showed observable differences between PSM organisations and other technology businesses, six paired concepts derived from them might improve SME-PSM exchange (Głowacki & Jackson, 2019).

Aggregation versus isolation

High-technology clusters aggregate firms where symbiotic action is beneficial to advance business through innovation. Public-private partnerships were highly evident, largely as jointly-operated incubation or acceleration facilities, such as co-working spaces, where universities and commercial firms wish to increase bidirectional knowledge flow.

The PSM organisations in the study were found to be more likely to partner with cultural and educational institutions rather than firms in high-technology clusters, probably because they have a similar non-commercial orientation. The PSM outlets were much more internally focused. PSM staff had a far lower awareness of the need for change. Change was associated with change management practices rather than adopting a continuous – but varying – level of organisational fluidity. There is also evidence of a residual culture of entitlement within PSM organisations, which amplifies isolationism.

Entrepreneurialism versus islands of innovation

Successful high technology enterprises (particularly the smaller firms) embed entrepreneurialism within the organisational culture. Most firms interviewed were mission-led, working for the common good or tackling global issues goals such as the circular economy, health and wellness, or climate change. This is highly compatible with PSM values.

A far lower level of entrepreneurialism was evident in PSM with active individuals isolated in small research and development departments – several of the smaller PSMs had no such department. These interviewees felt they were working in "islands of innovation". Small experiments were often not taken forward due to a lack of in-house incubation or acceleration programmes.

Agility versus rigidity

High-technology firms have more fluid organisational structures relying instead on trust relationships developed through community of practice programmes such as training, networking, and events. These firms orientate towards processes supporting continuous change. Decision-making is swift within teams who have higher levels of autonomy, increasing the ability to pivot in response to external technological, cultural, and societal changes.

The rigid departmentalised structures of PSM make decision-making much slower than in high technology firms. Content and technology departments are often separated and they have low autonomy. There was evidence that the common PSM practice of "referring upwards" during decision-making either inhibits progress or it can be used to slow down unpopular development.

Advanced versus emerging pro-social workplaces

There was strong evidence that social science is being used to design collaborative workspaces in high-technology firms and co-working spaces to support knowledge exchange and relationship building. Trust relationships are developed in kitchens, project spaces, communication booths, roof gardens, chill-out spaces, and reading or discussion corners.

Several PSM organisations in the study had adapted their offices to provide pro-social spaces; however, this appeared to be a form of "dressing", as the underlying processes to support the incubation of any resulting project were not universally evident.

Communities of practice versus contractual frameworks

Co-working spaces aggregate pools of SMEs who start up and are then often acquired by larger firms (Google's business model). In the case of each cluster, these pools of SMEs are where most of the innovation lies. Each co-working space we visited across North America and Europe considered the community manager to be the most critical employee. These skilled individuals run the networking evenings, bagel breakfasts, Friday beers, and after work parties, and it is the community manager who often selects which SMEs have desk space. Trust relationships are seeded in these face-to-face interactions. On new projects, face-to-face engagement is prioritised. When production is going well, one interviewee commented, project management and communication can move online. This enables projects to be facilitated and managed in the Cloud or on dedicated servers to which all parties have access. In a post–Covid-19 industrial environment, good virtual working is likely to significantly rise in importance.

PSM organisations have no role equivalent to a community manager. The PSM-independent production company relationship is overseen by a commissioning editor.

Technology-oriented neighbourhoods versus corporate headquarters

High-technology clusters are almost exclusively found in city regeneration areas. In the case of Toronto this is due to proactive stimulation by Toronto City Hall, aiming to grow business-growth corridors or districts. This held true across all the cities, and these initiatives almost always also included encouraging an active relationship with a university science or technology department.

Although around 30 per cent of the PSM organisations in this study are operating in close proximity to a high-technology cluster there was very little formal interaction. Other PSM organisations were further afield, located in corporate headquarters outside of the city centre, or situated closer to the city's cultural and civic districts. The location – and in several cases, also the external appearance of the PSM – was clearly signaling early twentieith-century industrial and societal orientations. Several of the larger PSM organisations in the study are addressing this, notably MediaCityUK which has the BBC, Salford University, and several large cultural institutions and commercial producers as co-located partners. MediaHub Brussels launched in June 2018, this is a collaboration that includes three universities (Vrije Universiteit Brussel, Université Libre de

Bruxelles, and Université Saint-Louis Bruxelles) plus independent production companies and local government. There are longer-term aspirations to create a media district, Mediapark.brussels, also referred to as Brussels Media City, on a 41,000 square-metre site outside the capital. VRT, the Flemish PSM, aims to open facilities there. These media clusters are more likely to change PSM's organisational culture by reducing isolationism and increasing the potential for collaboration with high-technology firms.

Conclusions on universality through datafication and fluidity

The question this chapter asks through its collection of current academic work is how to ensure the universal appeal of PSM content in a media landscape that is increasingly characterised by the ubiquity of datafied platforms. Datafication enables selections of content to be delivered to individual users, groups, and mass audiences when they want it and how they want it, increasing potential access and appeal. PSM has, however, been slow to adapt, partly due to the departmentalism and rigidity evident in its organisational structures and production processes.

The results of the Canadian element of this large international study suggest relationships with a wider creative sector, particularly high-technology firms, are highly likely to benefit PSM. Co-working spaces may offer a vehicle for SME–PSM knowledge exchange, but it is only one model – further research would be useful going forward. SMEs working in high-technology sectors are – like PSM – interested in developing platforms and services in the public good. The dependency for PSM is being able to operate with sufficient fluidity, to understand data flows and data management, and lastly, to adopt an increased audience-centric orientation.

For the CBC the radical solution was to move towards the previously explained mobile-first, media-neutral strategy:

> We have a concept of the news river, where everything that goes into mobile goes into the news river… The programmes are clients of the news river, so they take stuff out, do their own business, add their own dimension, and put it back in the river for people downstream. (personal interview with senior manager, CBC Toronto, 2016)

We concluded there is a distinct difference in organisational culture between high-technology clusters and PSM largely relating to PSM's orientation to datafication and close-partnership working. The lack of advanced datafication in PSM results in a correspondingly reduced ability to nuance content for delivery to increasingly diverse publics via constantly changing receiving devices. This in

turn reduces public access, hence also universal appeal. These deficiencies have very serious implications when considering universal access for – and appeal to – young audiences who preference mobile phones. Overall, PSM organisations have a lower ability to adapt to external market conditions and reduced opportunities to support the development of an informed citizenry.

Towards PSM 3.0

At the beginning of this chapter the questions under review were whether PSM can adapt to data-driven media forms, and if so, how will this benefit the PSM mission to provide universal access and appeal for increasingly diverse publics? Also, what enables cross-cultural and cross-sector innovation to succeed? Through the investigations it's become clear the most critical element is whether PSM can adapt to datafication. Streaming, social media, and other forms of recombinatory content (Bolter & Grusin, 2000) require high cognizance and practical ability with databases, data analytics, and data management. Thus, returning to the questions in our research we can attempt answers as follows.

How will datafication benefit the PSM mission to provide universal access and appeal?

Organisations that are datafied can more easily produce recombinatory content. Datafication also enables the nuancing of content to different audiences at different times on different devices, which could support PSM's mission of providing universality. Accessibility could also be increased alongside stronger potential to support an informed citizenry.

Can PSM adapt to data driven media forms?

Encouragingly, PSM is already experimenting with data-driven media. The Japan Broadcasting Corporation (NHK), the Japanese PSM, has developed early warning systems such as tsunami alerts that aggregate available geolocated data to pinpoint safe and unsafe areas, to assist the public. The European Broadcasting Union's two-year MediaRoad project (2017–2019) encouraged PSMs to engage with SMEs involved in emerging technologies by running Sandbox Workshops. In this study, the example of CBC and its mobile-first data strategy for local content in the cities of Hamilton and London, Ontario, has been successfully expanded to all their newsroom content. Their audience figures for mobile have risen dramatically (by 70%) as a result. This is significant as young audiences rely on mobile phones for news. CBC now refers to news content as being a

river of data of different kinds (visual, audio, and text). The material can be recombined to suit different communities, regions, or time zones.

What enables cross-cultural and cross-sector innovation to succeed?

The co-working model typically found in high-technology clusters enables a wider range of creatives to work together in trust relationships. These enable agile production teams to work together more quickly, to work virtually online, and to deliver projects faster due to fewer decisions being required as a consequence of having more autonomy. "Living" companies such as high-technology SMEs benefit from continuous knowledge exchange or pooling. Larger companies can benefit from these sites of acceleration and incubation by partnering with SMEs. Organisational structures facilitating public-private partnerships would be highly useful to accelerate innovation in the PSM project.

Finally, returning to Jakubowicz's imagining of PSM 3.0, one would look towards a PSM organisation that is: 1) able to operate at national and international levels providing a public sphere reflecting multiculturalism and multimediality; 2) able to offer universal access; 3) able to teach the new digital literacies and engage a participatory public for the greater good; and, 4) able to act as an umbrella for "a broad network of public and civic institutions and groups" (Jakubowicz, 2010: 18).

To achieve Jacubowicz's imagining of PSM 3.0 substantial new production and managment literacies have to be achieved. Organisational structures have to be adapted and – perhaps more significantly, as suggested in the Toronto research related to the CBC and SME cultures – offer new collaborations with a much wider constituency. These relationships will need to be both forged and sustained.

Notes

1. This chapter presents findings from an international study, *Organisational Culture of Public Service Media in the Digital Mediascapes: People, Values and Processes,* which was funded by the National Science Center (NCN) (project website: www.creativemediaclusters.com).
2. The other comparative cities were: Austin (US), Boston/Cambridge (US), Brussels (Belgium), Copenhagen (Denmark), Detroit (US), London (UK), Tallinn (Estonia), Toronto (Canada), Vienna (Austria), and Warsaw (Poland). The PSM organisations considered were: National Public Radio (NPR) station KUT in Austin; Public Radio Exchange (PRX) in Boston; Vlaamse Radio- en Televisieomroeporganisatie (VRT) in Belgium; Danmarks Radio (DR) in Denmark; public radio station WDET and Detroit Public TV in the US; the British Broadcasting Corporation (BBC) in the UK; Eesti Rahvusringhääling (ERR) in Estonia; the Canadian Broadcasting Corporation (CBC) in Canada; Österreichischer Rundfunk (ORF) in Austria; and Polskie Radio (PR) and Telewizja Polska (TVP) in Poland. The project was funded by the National Science Centre of Poland (NCN).
3. The European Broadcasting Union's MediaRoad project (2017–2019) sought to address this lack of interaction between SMEs and PSM organisations by offering a "sandbox" for collaborative technical experimentation (MediaRoad, 2017). The project, supported by a Horizon 2020 European grant, also offered the opportunity for the development of policy.

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