

The Role of Big Data in Public Sector Accounting and Budgeting Practices: Evidence from a Pandemic Environment of an Emerging Economy

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Abstract

This paper investigates the actual and potential application of big data in the public sector accounting and budgeting practices in terms of enhancing accountability and openness in the public sector within the emerging economy of Sri Lanka during the COVID-19 pandemic. This research adopted hybrid ethnographic methodology by implementing data triangulation, where multiple datasets from various platforms were combined and analysed. The datasets were combined and analysed using thematic and summative content analyses. Big data use in the public sector could improve both accounting and budgeting practices in developing economies, especially when meeting challenges in a post-COVID-19 era. However, the political culture and the lack of awareness in big data utilisation have been barriers for big data applications. This research offers insights into policy reforms, especially concerning public sector accounting and budgeting practices, for the application of big data.

Key words: Big data, public sector accounting, budgeting, accountability, publicness

1. INTRODUCTION

Studies (*inter alia*, Munne, 2016; Sivarajah et al., 2017) indicate that big data is becoming increasingly important in the public sector of developed economies, as their governments collect massive quantities of data through various digital activities, including social media, Twitter, blogs, Facebook, Instagram, TikTok and other online analytics. According to Munne (2016), the benefits of big data in the public sector were obtained through advanced analytics and automated algorithms by providing improved efficiency and enabling bespoke services to be offered back to the public based on the data analytics. In addition, greater transparency is created, leading to a higher degree of accountability, because transparency facilitates the availability of information to the public. This information can then be used to measure relevant authorities' performance and prevent possible exploitation of power. In contrast, less transparency reduces accountability, resulting in social instability and reduced economic growth (IMF, 2005).

Previous studies, such as by Ballantyne and Stewart (2019), show that the commercial and private sectors have invested in research and development (R&D) on initiatives and practices in big data. However, little research has been conducted on big data in public sector accounting and budgeting practices in an emerging economy context (Moradi and Babajani, 2019). Research on big data has also been given some prominence in many developed economies, such as in the US, UK, Ireland, France, Germany and the Netherlands (Munne, 2016). These countries are committed to improving the tools and techniques needed to access, organise and collect findings and produce innovations from the massive volume of big data. Similarly, Ireland has appointed a task force for the development of big data (Government of Ireland, 2013), and the Obama administration announced in 2012 an initiative in big data R&D (The White House, 2012). In the UK in 2017, the permanent secretary for the Cabinet Office announced the appointment of a new chief data officer to oversee the government agenda through a cross-government senior Data Advisory Board (Reforms Conference, 2017). Although there has been a significant development of big data in developed nations, there continues to be little focus on the development of big data in public sector accounting and budgeting practices in emerging economies.

At the same time, McKinsey (2020) reports a significant average increase, equivalent to seven years' progress, in digitalisation and digital offerings to the public in a matter of months. This happened as a result of COVID-19, resulting in a significant change in public behaviour, such as a growing shift to employ online channels, virtual opinion, social media, digital opinion, online tax payments, etc. In

addition, the impact of COVID-19 on certain emerging economies, such as Sri Lanka, has been found to be significant in terms of its effect on people's well-being and livelihood (Upadhaya et al., 2020). Studies by Ejiogu et al. (2020), the World Bank (2020) and Upadhaya et al. (2020) reveal that the stimulus packages enacted in response to the pandemic have raised concerns over the financial resilience, culpability and budgetary positions of the governments of emerging economies. These concerns are caused by the lack of preparation and planning of the stimulus packages in addressing the magnitude of the crisis.

Sri Lanka is already conducting experiments into the application of big data. This indicates the approval of big data application to complement traditional statistical and survey data. Hence, the insights derived from big data sources could assist in filling the gap of time series data (Fuard, 2017; Lirneasia, 2018). Since the government attempts to eradicate poverty in the context of Sri Lanka, access to time series data on poverty is very important; unfortunately, the time series data are not easily available at frequent intervals at present. Hence, the Sri Lankan government has identified big data as one of the non-traditional sources of data in order to bridge the gap in data shortage to meet sustainable development goals, including poverty alleviation (Lirneasia, 2018). Fuard (2017) claims that Sri Lankan companies are actually unaware of the quantity of data they have access to over time. For example, the banking and finance sector has initiated the application of big data, which could be directed towards regulatory and statutory requirements relating to fraud and compliance. Conversely, the public sector could use big data to facilitate disaster management, predictions, etc. at relatively low costs (Fuard, 2017).

Accordingly, it is thought-provoking to investigate how big data could be useful to mitigate such unforeseen crises and enhance accountability and publicness. This study, therefore, will address the gap in the literature by identifying a potential application of big data in public sector accounting and budgeting practices in general and, particularly, the implications for advancing the accountability and publicness principles in the public sector in emerging economies. This study also attempts to analyse how big data in public sector accounting and budgeting practices in an emerging economy can potentially address social and economic issues, including the government's responses to the pandemic.

This research is structured into five sections. Following this introduction (Section 1), the next four sections discuss key themes arising in the literature on big data in public sector accounting and budgeting practices. These include theoretical aspects of big data and the relevant methodology

(Sections 2 and 3), results and discussion (Section 4) and finally, a discussion of strategic implications along with conclusions (Section 5).

2. LITERATURE REVIEW

Public-sector budgeting

Any country with limited resources faces higher demand from the public. Accordingly, allocating resources and the budget process requires political participation to meet politicians' perceived demand for resources and services (McCay, 2018). The public budgeting process has transformed over time to meet individual, societal, political and economic demands for public goods (İpek, 2018). Traditionally, public budgeting was considered only as a tool to indicate government revenues and expenditures, which was further developed to present revenue forecasts as well. More recently, contemporary budgeting has evolved to integrate performance parameters, such as determining the relationship between costs and intended outcomes. Budlender et al. (1998), for example, have shown that contemporary budgeting can affect public services at more or less the same level. Moreover, contemporary public budgeting aims to monitor the impact of budgets on those involved in financing public services and those who benefit from those services. This streamlines the policy-making process that seeks to maintain cost-effectiveness (İpek, 2018).

Big data analytics and transparency

Big data in this paper corresponds to the development of online technologies that enable the search, aggregation and cross-referencing of massive data sets. In accounting and public budgeting, big data analytics are increasingly used to inform decision-makers and create audit programmes (Arnaboldi et al., 2015; Vasarhelyi et al., 2015; Warren Jr et al., 2015). The political impact of big data was highlighted in the events surrounding the Cambridge Analytica scandal, in which the personal data of Facebook users was collected without their consent (Cadwalladr and Graham-Harrison, 2018). From an evolutionary perspective, big data could also influence accounting regulators and shape the future of accounting and public budgeting, which is expected to affect the dynamics of internal and external forms of organisational accountability.

The public sector differs from the private sector in its lack of competition and heavy dependence on government expenditure and revenue through taxes, social contributions, etc. At the same time, big data could improve public sector efficiency and minimise the tax burden while benefiting the public (Munne, 2016). This, in turn, could positively impact society (Ham, 2011). According to Munne

(2016), the quality of public sector services in health, education and social services could be improved through big data analytics.

The CIMA report (2018) pointed out that technology significantly transforms public services as governments increasingly adopt social media, smartphones, big data analytics and cloud technologies. Adopting technology and big data analytics is expected to improve communication and economies of scale and make decision-making more efficient (McCaffery, 2018). However, despite the increased demand for big data analytics in public sector organisations, their digital competency in using such big data technologies remains relatively limited, as appropriate tools and techniques for using big data need to be mastered by various users, such as public sector employees, the public and constituents. For example, since data analytics are usually updated in real-time, it is much more convenient for a decision-maker to access updated information by simply logging into the system. However, advanced data mining skills and the ability to create predictive algorithms are urgently needed. It also requires a highly specialised skill set. Determining inputs and translating outputs from this field is crucial. Therefore, accountants are in the ideal position to determine the data needed to support an organisation, as they have a holistic view of the organisation and its existing information systems. Accountants will use big data analytics to support value creation through increased efficiency, improved profitability and cash flow, as well as customer management, innovation and intellectual property. With big data now available, it will help businesses focus on new opportunities and create internal value drivers. For example, depending on the size and scale of the business, accountants could use data analytics to drive inventory management, production planning, error rates, quality assurance, logistics, market segmentation, price optimisation and resource management. Various studies have identified the numerous benefits of big data in the public sector (McKinsey Digital, 2011; Yiu, 2012; Zillner et al., 2013; 2014). For example, big data analytics could be used to analyse massive data and provide data-driven insights to detect fraud and planning in the public sector (Yiu, 2012). In addition, Zillner et al. (2013; 2014) have highlighted the use of big data in the public sector to achieve performance objectives, such as ensuring compliance with regulations, monitoring regulated activities, reducing costs, improving quality of service, responding to emergencies to prevent indemnities and/or casualties, preventing fraud and reducing crime.

Some governments have launched open data initiatives to make public sector data available to the public to create transparency and improve services. For example, predictive analytics in policing uses historical crime data to automatically identify trends and patterns and to provide insights into crime-related problems. Such an analysis could therefore enable more efficient and effective deployment of

police forces (PredPol, 2013; Wang et al., 2013). Thus, these initiatives will promote transparency and a trustworthy future for governments (McCaffry and Seton, 2018).

Although evidence for applying big data in the public sector, particularly in accounting and budgeting, is lacking, Munne (2016) has highlighted the possible motives for using and applying big data in the public sector. The main motives are that governments act as catalysts by actively managing the dissemination and use of their datasets (World Economic Forum, 2012), that open data initiatives promote the use of big data, and that the private sector also contributes to a country's economic growth, which in turn benefits public sector budgeting, e.g. through increased tax revenues. Munne (2016) also pointed out certain limitations, such as a lack of political willingness, whereby the attitude of public sector officials might also play a role here.

A lack of awareness of how big data could help the public sector has led to barriers and challenges related to technological and legal challenges. For example, the UK's General Data Protection Regulation 2018 may create barriers to implementing big data and open data initiatives in the public sector. Munne (2016) also discusses that there has been some commercialisation of big data in the public sector. However, there is still no real experience in identifying and sharing best practices. Another constraint is that many countries have not yet developed a common strategy for reusing cross-technology platforms due to the large number of institutions in the public sector, especially in more decentralised environments. However, emerging economies are still in their infancy regarding data protection laws, decentralisation and bureaucracy. Therefore, the generation and application of big data in public sector accounting and budgeting are still largely unexplored and require in-depth study.

COVID-19 impact

In light of the unprecedented events of the COVID-19 pandemic, governments have taken some policy measures to emphasise the importance of public-sector organisations in the economy. Strengthening public sector accounting and budgeting practices greatly improves accountability and transparency, especially in COVID-19 response operations, to ensure government and public sector trustworthiness (Bastida et al., 2021; Heiling, 2020; Moon, 2020). As public sector accounting practices affect the efficient management, reporting and auditing of COVID-19 funds, it is important to consider the different approaches to public sector accounting and the implications of the quality and transparency of public sector reporting (Bastida et al., 2021). Conversely, Bastida et al. (2021), citing the work of the IFAC (2020), argue that to mitigate the impact of public sector interventions due to the COVID-19 pandemic, public sector accrual accounting information is better suited to understand their true

financial position and how they can use their balance sheets to make informed policy decisions about the best way to intervene (IFAC, 2020).

Leoni et al. (2021) pointed out that scholars and practitioners need to take into account the instability and routine nature of exceptional shocks such as the COVID-19 pandemic when developing, using and exploring calculative practices while emphasising the importance of values, culture and institutional context in shaping accounting and accountability systems. As there is a significant, positive relationship between COVID-19 disclosure and corporate performance disclosure in annual reports (Elamrzouky, Albitar and Hussainey, 2021), governments should establish strong guidelines for mandatory disclosure related to COVID-19, where such standardised guidelines could help other stakeholders such as creditors and investors in assessing financial performance (Elmarzouky et al., 2021). As such, in recent literature, Saeudy et al. (2022) provided accounting suggestions on assessing, recording and reporting big data as an intangible asset while delivering new accounting perspectives for using big data techniques in business organisations to survive beyond COVID-19.

Theoretical Perspectives: Publicness and Accountability

Transparency is increasingly well-recognised as an important attribute of a functioning government. For example, effective public sector budgeting practices relate to being accountable for how public money is being spent. Hence, transparency meets public needs through prudent, reliable and useful information by setting a standard best practice for delivering public sector accountability, validity and effective decision-making. Transparency also benefits government stakeholders since increasing public scrutiny of service performance would require the public sector to deliver better services and outcomes. Hence, this will improve the quality of public service (McCaffry, 2018). Since transparency also leads to accountability (International Monetary Fund, 2005), various reforms have been adopted worldwide in the public sector relating to accounting and budgeting, also known as new public management (NPM).

However, Kartalis et al. (2016) indicate that NPM is a broad term that can be used for various functional management ideas – competition, privatisation, management by objectives, decentralisation, etc. These terms are borrowed from the private sector (Hood, 1995). NPM as a public-sector reform has been critically discussed in the literature (*inter alia* Pollitt and Bouckaert, 2000; Grandy, 2009; Wallis and Gregory, 2009; Bogt, 2008; Talbot, 2009). Additional literature (Bogt, 2005; Bogt and Helden, 2005; Duncan and Chapman, 2010; Farnham et al., 2016) has also perceived the

reform as a paradigm shift towards more effective and efficient management of public-sector administration.

Overall, NPM is expected to improve the functions of governance and the performance of the public sector (Pollitt and Bouckaert, 2011) because it concerns not only the provision of services (Cristofoli and Valotti, 2005) but also the impact of policies on society (Jacobs and Goddard, 2007; Ham, 2011) and the ability to meet transparency requirements that are directly linked to internal control systems and accountability measures (Goddard, 2005). Furthermore, NPM's impact will continue to be long-lasting (Lapsley, 2009; Hyndman et al., 2014; Hyndman and Lapsley, 2016; Hammerschmid and Meyer, 2005). Although NPM is no longer the dominant paradigm in the public sector, the literature (Coen and Roberts, 2012; Bryson et al., 2014; Steccolini, 2019) indicates that NPM will remain influential, especially in Anglo-Saxon countries. Furthermore, Steccolini (2019) argues that there is no concrete evidence to prove that the problems in public-sector accounting are related to the type of public-sector accounting practices that NPM has stimulated. Hence, rather than focusing on NPM, this study investigates the impact of public-sector accounting and budgeting practices on society and examines new paradigms currently practised in non-Anglo-Saxon countries.

Haque (2002) suggests that economic and societal reforms could have serious implications for public service's nature and quality. Furthermore, he argues that business-like reforms due to public-sector governance have led to the erosion of 'publicness'. Steccolini (2019) quotes the works of Bozeman (1987) to emphasise the emergence of publicness, in which all organisations are now viewed as public to a certain extent, and public policies and organisations can be understood by recognising the mix of public or political and economic- or market-based authorities and resources.

The traditional criterion determining publicness is the degree of distinction between the public and private sectors. However, the determination of clear boundaries has been challenged due to quasi-government state enterprise structures (Emmert and Crow, 1988). Some distinctive features, such as service norms, equality and representation, monopolistic and complex natural and social impacts (Coursey and Bozeman, 1990), have been identified as one of the criteria of publicness. On the other side, Barberis (1998) has emphasised the challenges of such distinctions between the public and the private sectors; hence, publicness has also been analysed by the numerical composition of the recipients of its services, where a greater number of recipients implies a higher degree of publicness. The literature (Kovach and Rosenstiel, 2014; Park and Park, 1992) indicates that public ownership and citizens' entitlement are important for publicness because of the position of the underprivileged, even

in advanced democratic economies (Boyne, 2002). Also, Haque (2002) quotes the works of Bozeman (1987) and Batley (1994) to argue that the role public service plays in society (Ham, 2011) is also a determinant of publicness.

Accountability has been identified as another determinant of publicness (Haque, 1994). Most governments have implemented several processes to maintain accountability (Frederickson, 1991), such as grievance procedures and ombudsmen services. However, many other aspects, such as ethical issues (Berman et al., 1994) and decision processes (Nutt and Backoff, 1993), have also been highlighted in the idea of publicness, but Steccolini (2019) argues that many accounting studies have narrowly referred to 'publicness' as the setting of an analysis wherein there is an emphasis on NPM as the conceptual framework of the analysis. However, due to the diverse features of public contexts (Lapsley, 1988), such as the heterogeneity of stakeholders, public expectations (Bozeman and Bretschneider, 1994; Kaul, 2005), political agendas and power games, the presence of reforms, a complex change process, procedural dimensions (Kang, 2012), and the inability to capture how behaviours are influenced by traditional neoclassical economic views, principal-agent or transaction-cost models (Steccolini, 2019), transparency, accountability and governance (Klijn, 2012) and collaborative and supportive efforts (Klijn and Koppenjan, 2016), this opens the door to various conceptual dimensions to investigate in relation to publicness and public-sector accounting and budgeting practices. That is, publicness refers more to public interests and accomplishments instead of focusing on the organisation itself, which Broadbent and Guthrie (2008) emphasise as public service rather than the public sector due to increased reliance on private networks to provide public services. Hence, it is arguably critical to investigate how accounting could respond to the challenges posed by 'diffused' publicness (Steccolini, 2019), as accounting can provide processes in which values and ideas are translated into daily decision-making (Miller and Rose, 2008). Overall, publicness could be used to investigate various features of the public environment. Although, publicness as a conceptual tool was developed in the organisational theory and in public-policy studies (Bozeman and Bretschneider, 1994; Bozeman, 2004; 2013), in which it was expressed in specific institutions and policy directions. However, the primary governing force of publicness is a juridical-political structure (Harnecker, 1980), where the legitimacy of public activities is based on what the constitution and the basic law of the state view as publicness. According to Kang (2012), public activities dealing with public affairs aim to increase social publicness. Lee (2011) concurs that publicness needs to integrate and reflect social action. Moreover, Pesch's (2008) political arguments relate publicness to a propagative process open to critical debate.

3. RESEARCH METHODOLOGY

In order to gain a deeper cultural understanding of the role of big data in public sector accounting and budgeting practices in Sri Lanka, this study employs data triangulation by collecting multiple datasets from a variety of platforms to augment the robustness of any research to confirm the literature (Salkind, 2010). There was reasonable justification for using data triangulation, as it was challenging to access respondents' organisations and conduct face-to-face interviews (traditional datasets) at a sufficient level of authority due to the global pandemic caused by COVID-19. Therefore, multiple datasets from multiple platforms were employed to answer the research questions.

The methodological foundation of data triangulation is hybrid ethnography (Seim, 2021), which can be defined here as a systematic study of the role of big data in public sector accounting and budgeting through the lens of Sri Lanka cultures consisting of the following components:

- **Offline ethnography.** Using hybrid ethnographic methodology, multiple types of datasets were employed (Table 1). Primary data and interview texts were created by conventionally interviewing respondents face-to-face regarding the role of big data. These interview texts were then analysed by using thematic analysis and summative content analysis.
- **Online ethnography.** In this study, the role of big data was analysed by examining Sri Lankan people's opinions and experiences that have been broadcasted on YouTube, Vimeo or Sri Lankan TV channel news. This abundance of data on the role of big data in public accounting, which has been created by technology and the Internet, has developed on advanced platforms such as Facebook, YouTube, Instagram, blogs, Twitter and TikTok.
- **In-between ethnography.** Similarly, in-between ethnographies (those between offline and online) such as Zoom interviews (instead of traditional face-to-face interviews) and other in-between platforms such as WhatsApp online discussions have also developed considerably. The combination of online, offline and in-between platforms, which is known as hybrid or blended ethnography, has recently been gaining popularity in the literature of social science (Przybylski, 2021; Seim, 2021).

Hybrid ethnography is useful in finding a deeper meaning in the role of big data by combining multiple datasets from multiple platforms (online, offline and in-between) and analysing it through complementary techniques, namely thematic analysis (to discover deeper qualitative meaning) and

summative content analysis (to establish quantitative keyword frequency dominance). These multiple analyses were undertaken to confirm the literature (Denzin, 2012; Mertens and Hesse-Biber, 2012; Freshwater, 2007). Generally, the pragmatist paradigm contends that a paradigm is best viewed in terms of successes and that the best methodology is one that can effectively answer research questions. Accordingly, for a greater understanding of the role of big data in public accounting and budgeting, hybrid ethnography is considered the most suitable methodology.

In general, ethnography is a methodology that encapsulates an epistemological position by providing insight into various cultural groups and gaining clearer understanding of their various opinions on the role of big data in public accounting. Most ethnographic literature (Hammersley and Atkinson, 2007; Skinner, 2012) emphasizes the following important components:

- **Social research.** Ethnographic methodology originates from the tradition of social anthropology (Collins and Durington, 2015). It aims to understand social phenomena by observing people's social activities or talking to people in their natural settings and understanding the social meanings that are embedded in people's opinions.
- **Individual cultures.** In this study, the aim of ethnography is to gain a thorough cultural understanding of a group of Sri Lankan individuals' opinions and beliefs (on the role of big data in public accounting and budgeting). Although, the origin of ethnography stems from cultural anthropology, ethnographic methodology has been used widely in other disciplines such as social science, education and management during recent decades (Urban and Koh, 2012).
- **Immersion.** Ethnography requires researchers immersed in the subject under investigation to make highly detailed explorations of the subject. For example, in anthropological research, the researchers often need to live with a particular tribe in order to study that tribe's lifestyle. However, the advancement of technology and the Internet has led to data variety, data velocity and data volume. Some datasets come from a variety of platforms such as Twitter, YouTube and blogs. In order to examine a particular issue in Facebook or Twitter, most scholars (Przybylski, 2021; Seim, 2021) agree that immersion means that a researcher needs to undertake a deep-level personal involvement by becoming a member of YouTube or Twitter and or actively observing and replying to various opinions. Accordingly, in this study hybrid ethnography was implemented by triangulating the datasets from a variety of platforms (offline, online and in-between platforms; Table 1).

- **Participant observations.** According to the literature (Hammersley and Atkinson, 2007; Skinner, 2012), participant observation is defined as the process enabling any research to learn about and observe deeply the opinions and activities of people in their natural setting. In this study, this was done through observing or participating in a variety of platforms such as YouTube, Vimeo, and Full Interviews on Sri Lanka TV Channel News as well as in direct (face-to-face) interviews with respondents.

Twelve samples were collected in this research from a variety of platforms (online, offline and in-between platforms as well as datasets), as indicated in Table 1. The participants were selected purposefully using a non-random sampling technique in which the participants were selected based on the research objectives with the expectation that each participant provided unique and rich information to maximise the diversity of the population. This sampling technique is known in the literature as a maximum variation purposive sample (Lewis-Beck et al. 2004), which is meant to provide a diverse range of cases relevant to the role of big data in public accounting and budgeting and as much insight as possible into the phenomenon under examination.

Table 1 – Maximum Variation Purposive Sample: Hybrid Ethnography

Samples	Platforms	Datasets	Occupation
3	Offline	Face-to-face interviews, survey questionnaires, published interview reports	Village officers 2, Accountant in a local council, etc.
3	In-Between	Online interviews (Zoom)	Finance/ Accounting Officers 2, development officer, etc.
6	Online	YouTube, Vimeo and Sri Lanka news, documentary news, conferences/workshops	Sri Lanka ministers, civil servants, Professionals (experts), Banking officials, Academicians, etc.

Table 2 – Sample characteristics: The individuals participating in the semi-structured questionnaire

Sample – Semi-Structured	Occupation	Organisation
2	‘Grama Niladari’ – Village Officer	Sri Lankan public official appointed by the central government to carry out administrative duties in a <i>grama niladhari</i> division, which is a sub-unit of a divisional secretariat
1	Accountant	Local council

4. RESULTS AND DISCUSSION

The texts were analysed using thematic and summative content analysis. The interview transcripts were provided verbatim (i.e. in the exact words stated by the interviewees) without any proofreading to preserve the originality without changing the meaning.

Thematic Analysis:

We identified four emergent themes relating to the role of big data in the public sector namely, transparency, governance, accountability and publicness. The findings reveal that the generation of big data and the usage of such data in the public sector could improve the public sector accounting and budgeting practices in terms of transparency and accountability. According to Ham (2011) publicness is required to solve problems that society wants to solve; public services are being able to supply stable services continuously; providing more attention towards impoverished people through fairness and transparency and public entities being accountable for their actions. However, in the Sri Lankan context especially regarding the government actions to respond to the unprecedented events occurred due to current pandemic situation, the fairness, transparency, and stable service in relation to publicness has been challenged and the following statements of a senior level executive at the Ministry of Finance and a senior development officer at the imports and exports department serving as examples:

‘...According to the government policy, COVID-19 has affected the country and due to the economic strength and stability, foreign currency movement was limited to prevent flowing to other countries. So, government published a gazette....in Dec 2019, about 8 goods like ‘Sadikka’, ‘puwak’, ‘turmeric’ were banned to import immediately and temporarily suspended and a gazette was published. But the information was not properly communicated to the relevant parties although there was a small grace period allowing them to import due to the immediate policy change with limited time constraint...’ (Communicated Text 1, Finance Officer 1, Online interviews)

‘...I think this was came from the manifesto. I think after COVID-19 was reported in Sri Lanka around 19th March 2020, the finance ministry decided not to open LCs for imported vehicles for commercial purpose. It’s a cabinet decision and published a gazette on 16th April 2020 to control imports due to COVID-19 impact...also, with the immediate suspension, we nominated certain conditions on certain good like limited credit periods only with the foreign suppliers. The aim was to demote the imports. But leading importers weren’t affected as they bring bulk, but the small importers were severely affected with the newly released gazettes...some small importers like bicycles, vehicle spare parts were in lot of trouble and 180 days credit periods were not practical for them as they only import small quantities...’ (Communicated Texts 2, Finance Officer 1, Online interviews)

‘...Small businesses were negatively affected but according to my knowledge I don’t know if the cabinet considered these factors...’ (Communicated Texts 3, Finance Officer 2, Online interviews)

‘...Small businesses cannot survive in Sri Lanka due to these policy changes. So many small business owners have called me several times to solve these issues. For example, one business said they had been doing the business for 10 years with about 100 employees but due to these immediate changes they don’t know what to do as they couldn’t maintain the cash flow and couldn’t even find ways to pay the salaries for their employees...’

(Communicated Texts 4, Development officer, Online interviews)

‘...due to COVID-19 many foreign suppliers were also affected and sent the goods late. However, we may have done the TT earlier before the new gazette and the supplier has sent the goods late. So, our importers faced a lot of issues with clearance. So much of wastage as it took a long time for this process. Some small businesses just left it without clearing due to insufficient funds...’

(Communicated Texts 5, Finance Officer 2, Online interviews)

Since transparency initiative focuses on meeting public needs through the reporting of reliable, prudent, factual and useful information to empower public accountability, data authenticity and better decision-making, the above response provided for the unforeseen COVID-19 pandemic by the government needs to be revisited and identify ways to improve such decision making by incorporating real time big data (Saeudy *et al.*, 2022). However, Sri Lanka was commended for taking early actions to control the pandemic in the country by the World Health Organisation (WHO) and the special task force formed by the executive president to take immediate actions to manage the issue was highly commended by the public and media as well (TV Dearana, 2020, Xinhua, 2020). However, there is much room for improvement where the big data could have been used to assist in terms of efficient distribution of funds and subsidy to the much-needed public in a post COVID-19 environment. This is supported with the below comment by an academician.

‘...particularly what is becoming more popular right now is big data and machine learning, because these two technologies together going to make a big impact in industry and beyond that as well...’

(Communicated Texts 6, Online, YouTube, Academician)

However, this is still at a primary stage and the indicators for which big data can play a role have not yet been identified as well (Lirneasia, 2018). Moreover, big data have the potential to complement traditional statistics in the interval between official surveys and develop new ways of monitoring the public sector services. Insights derived from big data sources may help to fill the gaps relating to specific data and be complementary to the official surveys and traditional data gathering of the government. For example, mobile network big data can be used to identify the public in need by determining the socioeconomic status of the population, by region and or by provincial councils

as well. Such big data could have helped the government to face the recent COVID-19 pandemic positively where Sri Lankan government could have responded easily and quickly to the relevant parties which were severely affected by immediately providing the emergency financial support that the government decided to allocate from the budget during the COVID-19 pandemic. However, this public sector accounting and budgetary practice could be actioned more effectively even at post COVID-19 stage with the use of big data as well. However, the use of such big data is still at an infancy level where the local council village officers called ‘Grama Niladari’ commented as below.

‘...we were given a list of names on an excel spreadsheet. So, we used it to identify the people to provide the government emergency fund assistance or stimulus packages. We are not much aware of any other method or any technological system...’ (Communicated Texts 7, Village officer, offline interview)

‘...I know the Rs.5000 offer for people at this COVID-19 time is good, but many ineligible people received this, therefore I think about 40% is waste of public money...I know at a disaster we cannot differentiate with their previous wealth as all are affected but once they all come back to normal life, they may not need it anymore, but people continue to receive it like even businessmen also receive it. Due to no tracking and monitoring system and lot of waste of public money...’ (Communicated Texts 8, Online, Sri Lanka TV Channel, Civil Servants)

Although, emerging economies like Sri Lanka is still using the spreadsheets to manage disaster and emergency situations, Worximity (2019) has claimed that it will be difficult to spot trends using spreadsheets especially in dealing with large quantities of data in real time as well. Hence, they suggest that big data needs to be combined with other analytical tools such as business intelligence where trends could be recognised easily.

‘...we could optimise the performance of the system in the future like adaptive systems whereby the system can learn itself and an optimal system that can learn itself as well. To do that, that’s where the big data comes in... so, when you say big data, it’s not about the past it’s about the future. That’s the difference. That is essential... When we have digital applications, they generate lot of data. We can see how we use this big data to improve the services. That’s the role of big data too...’ (Communicated Texts 9, Academician, Online, YouTube)

The respondents mentioned that the major weakness of the public sector in Sri Lanka is that the government accounting systems are not yet developed with the state of art technology. For example, the accrual-based accounting practices are yet to be supported by appropriate computer packages as well. Although, there is some evidence that public sector in Sri Lanka has been transformed by introducing a computer integrated government accounting system, the accounting departments are still working manually on accounting related works such as audit reporting, etc. largely in the public sector. Although the public sector organisations use the computer integrated system to share documents with the Treasury, however they share the same documents manually with the audit department which could also lead to duplication of documentation, wasting of time which could have been used for efficient public services. This is also evident in the budget preparation as the senior accounting executives of the Ministry of Finance and Ministry of Science and Technology mentioned below.

‘...We have recurrence and capital budget. Capital budget is used to improve the department or the institute. All departments have attached ministries. When we prepare the capital budget, and the ministries prepare draft budgets before the government prepare the final budget. So, they include all salaries, overtime, capital expenditures for future projects, etc. in it...’ (Communicated Texts 10, Finance Officer 2, Online interviews)

‘...Finance ministry has a separate budget department, and the treasury manages all department budgets. Ministry’s planning division collects all budgets from all the departments and then they look at finance ministry’s own projects as well...Ministries get the full fund first after the budget approval...’ (Communicated Texts 11, Finance Officer 2, Online interviews)

Also, the many features of the accrual accounting practice have been included in the systems, but the public sector organisations have not implemented those fully yet. One major barrier for this inefficiency is due to the bureaucratic nature of the public sector practices where they work according to the requirements and regulations only. Hence, in this example, the public sector organisations are

not adopting all the features of the accrual accounting as Treasury has not yet considered all these as mandatory. However, treasury has taken some initiative to introduce a new accounting system to improve the use of accrual accounting practices in the public sector as the current system has only been used for subsidiary entities' statement preparations. Hence, this implies the fact that the big data in the public sector is still at a primary level as there is more up to date technology is needed to handle big data. Another example is that the public sector organisations have not been upgraded with the similar operating systems in their computerised systems in line with governmental ministries, making it difficult to link all the systems used in the public sector.

Impact of political culture on the public sector accounting process

Sri Lanka political arena has become a multi-party since its independence in 1948 and the parliamentarians represented by two major parties and many other small parties. Hence, it is difficult in such countries to introduce reforms and implement systems successfully without a support from the political reforms promoters (Luder, 2002). Since, Sri Lanka public sector trade unions have a great patronage from various political parties, often the conflicts arise as and when a change has been introduced within the public sector. Although, Sri Lanka has a parliamentary system similar to UK, however, the executive President has been given more power over the parliament by the constitution. Hence, Sri Lanka needs a very strong parliament with the ability to enforce the changes even against the resistance of the executive president of the country. However, since forming the executive presidency nearly four decades ago, it has become an ongoing conflict between executive and the parliament and leading to many unnecessary delays in the public sector reforms, hence affecting the public service where the public has not been able to receive efficient, transparent services. The publicness in Sri Lanka public sector services is questionable due to the lack of accountability here, for example, in the previous government the ruling party (majority of the parliament) and the executive presidency were represented by two separate major parties in Sri Lanka and the government had ongoing political conflicts where the public sector entities were not properly directed and monitored and the country even had to face with some unfortunate incidents like 'Easter bomb attack' killing many innocent people including foreigners. Although, the investigations are ongoing,

the public view is that such events could have been either prevented or managed if there were no such conflicts between the parliament (constitution) and the executive of the country. Similarly, in Sri Lankan political systems, executives become the ultimate in charge of the treasury and the executive may keep the Ministry of Finance under him/her. Hence, political influences may not be unavoidable in such environment. Accordingly, the publicness with transparency and accountability not only in accounting and budgeting but in the public sector is yet to be improved due to such existing issues in Sri Lanka.

As mentioned previously, relevant literature suggests that NPM has been widely discussed relating to the public sector reforms and provided the foundation for the emergence of New Public Financial Management (NPFM) by incorporating private sector financial management practices to the public sector (Buhr, 2012; Soverchia, 2012). Public Sector Accounting and Financial reporting (PSAFR) reform were introduced based on NPFM (Nagendrakumar, 2017) where NPM being the ultimate foundation for these new reforms in the public sector accounting practices including Sri Lanka (Nagendrakumar, 2017; Abeysinghe and Samanthi, 2016). Although, these reforms were initiated by the Institute of Chartered Accountants of Sri Lanka (ICASL) consolidating the Association of Public Finance Accountants of Sri Lanka (APFASL) as its public sector support (Nagendrakumar, 2018) it has not yet been successful due to lack of political reform promoters in Sri Lanka. Accordingly, a parliament Act relating to this reform prepared with the consultations from the senior public sector accountants also has been abandoned as well. Moreover, Sri Lanka party politics has more negative effects especially when one party loses power and another party acquires the power, since they come with different party cultures and political directions, they tend to either stop the previous government's policy reforms or may try to bring their own political agendas into the reforms rather than creating a policy by forgetting the fact that the public being the ultimate beneficiary. This ignorance has led to many negligence and has affected the publicness where public money has been wasted on many occasions. This has been mentioned by other respondents who are senior development officers involved with the ministry budget preparation as stated below.

‘...Corruption and wastage of public money is also there. As you know the country's Budget reading is usually in November. Some departments do procurement as a matter of urgency in around October either necessarily or unnecessarily...they have not efficiently managed or used the budgeted money and try to use it at the last minute...last minute procurement which are called urgent procurement means people could corrupt money officially...’ (Communicated Texts 12, Finance Officer 2, Online interview)

‘...There is no coordination amongst government department or ministries. So, lot of waste happens...I think problem is no long-term planning with these politicians and the budget handling is a complicated process here...’ (Communicated Texts 13, Accountant in a Local council, Offline interview)

‘...Also, due to corruption and entertaining the politicians, so many ministries have been formed to please the party politicians. So unnecessary number of ministries and departments and hence, the structure has become very complexed....’ (Communicated Texts 14, Accountant in a Local council, Offline interviews)

The political influence has been on debate for while in the country where politicians involve in commanding the government officers as per their own individual interests leading to many issues relating to the publicness of the government. The respondents from National Science Foundation and department of Imports and Exports have mentioned below.

‘...Although COPE committee also could find such frauds relating to certain politicians and officers involved with the incidents, there is no one to proceed with the process of identifying the culprits behind these allegations...’ (Communicated Texts 15, Online, Sri Lanka TV Channel, Ministers/ Members of parliament)

‘...People do not bother to challenge the ministers. So, no actions are taken yet and although there is a process, the implementation is still questionable...’ (Communicated Texts 16, Accountant in a Local council, Offline interviews)

Although, the political culture is a major barrier for efficient reform implementations within the country, public sector accountants have been expected to be accountable for the funds entrusted to them. That is, in the previous practice, Public sector accounting officers were expected to report to the legislature and other stakeholders using the governmental final information, where the financial reporting was more externally focused as well. The new reforms are driving towards preparation of General-Purpose Financial Reports, however, there is not much evidence as a policy decision being taken to drive towards this new direction.

Since the implementation of PSAFR reforms it has required certain basic changes in the budgeting practices as well. That is, the reforms were needed for not only on accrual accounting but also on budgeting practices. Hence, some argued that this should have been initiated with the budgeting practices before the accounting practices to avoid any failures. Therefore, in order to provide a unified public management, there is a need for the incorporation of the NPM principles rather than introducing and individual reforms on its own.

Sri Lanka government is used to prepare a zero-based budget. As a result, the Annual Appropriation Act does not allow the public entities to carry forward the balances to the subsequent years (Nagendrakumar, 2018). This has been highlighted by respondents from the Ministry of Science and Technology, National Science foundation and the department of Exports and Imports as stated below.

‘...If they had over budgeted last year or not implemented it well and for example if they had allocated 10M for a project and the details for the project including projected expenses are given and we can see now if they have utilised these amounts well. If they claim another similar amount now for the next year’s budget even without utilising the previous year’s budget, we cannot approve the budget they are proposing now because we know if this passed to the main budget department in the Finance Ministry, they would definitely question this. Also, we cannot trust them anymore too as the progress with the budget is not so good...’ (Communicated Texts 17, Finance Officer 2, Online Interview)

‘...So, all departments need to provide evidence and reasons to the finance ministry...’ (Communicated Texts 18, Finance Officer 1, Online Interview)

‘...finally, they create a total budget report with annexures from other departments. At the pre discussion times all these things should be discussed. All these things will be collected by the finance ministry and the finance ministry has an online system to monitor these allocations...’ (Communicated Texts 19, Development officer, Online Interview)

‘...NSF sends the budget to the Science and Tech Ministry and they forward it to central bank or the finance ministry. Allocating funds for all future projects... Ministry’s planning division collects all budgets from all the departments and then they look at finance ministry’s own projects as well. So, they include all their recurrences and their own budget and then send the overall...’ (Communicated Texts 20, Development officer, Online Interview)

‘...So, when we prepare the department budget, we do several meetings with the ministry. The department representatives come with their proposal to the meeting. Usually, the accountant from the NSF, department head and couple of other people like finance control person and project handling officer too attend the meeting. From the ministry, our secretary, planning division head, ministry accountant, development officer who handles the whole process also

participate in the meeting. We discuss with them referring to the previous year budget as well and their progress with that along with the new budget proposal...so we all discuss in this meeting and come to final decision with the budget. At the meeting we decide on the final sum...' (Communicated Texts 21, Development officer, Online Interview)

Accordingly, the government prepares financial plan annually. Hence, the annual appropriation account must have to be submitted by the government organisations without carrying forwarding any amount for the next year, because there is lack of knowledge of the amount that is available for next year. Hence, this could lead to malpractices as stated above and as stated by the respondents where certain departments are trying to spend allocated money at the last minute before the budget reading of the country. This could be improved with accruing the commitments for the resulting years with the accrual budgeting practices. Hence, in identifying anticipated revenue, expenses and mainly the service cost in the accrual budgeting practice, big data could assist the process immensely. That is, big data allows to see real time data and it could be even used to adopt and improve performance in service as well as production environments. Accordingly, Worximity (2019) has claimed that it will be a real challenge for public sector accounting and budgeting to use the disconnected data and to identify the impact those data have on the financials and budgets while creating more accurate predictive models that can be used in the decision making going forward especially in the public sector.

Social Media, Big Data and Digitalisation of the Public Sector Accounting Process

This section presents results and discussion by exploring communicated texts and interview scripts obtained using data triangulation by combining online interviews with big social media data such as blogs and tweets. Governance is a way of analysing how governments respond to a changing world and an increasing number of stakeholders by generating procedures, regulations, policies and practices (Weiss, 2013). Technology involvement in governance was much discussed due to a new form of public administration known as digital era governance (Dunleavy, 2010), which shed light on big data applications in the public sector in recent years. Although this concept has been highlighted in developed economies such as the UK (Dunleavy, 2010) and Manzoni (Reform, 2020), public sector services could be re-imagined in emerging economies such as Sri Lanka to benefit the public.

The public services in Sri Lanka could be improved with innovation, flexibility, transparency and accountability using digitalisation, technology and big social media data. This is evident in the Sri Lankan context, where the government has formed the Information and Communications and

Technology Agency (ICTA) to reform and digitalise the public sector through initiatives such as making electronic documents available online and establishing the government information service web repository (Vidanage, 2015). However, these implementations have been influenced by the rapid changes social media and web-based applications have brought, as the usual processing times in the public sector are inadequate to keep pace with these rapid technological changes. Hence, information centralisation has been difficult for the government since the public has begun generating big data (Vidanage, 2015). However, there is still a need for big data to be applied in public sector accounting and budgeting for governance and accountability. This is supported by the comment below.

‘...fraud detection though big data, for example who do not pay taxes. So, we can collect large volume of data and the systems can identify where these things happen actually. They can visualise somebody who does not pay tax and that’s how they create the fraud network and look at activities and real time data from various kinds of sources and pull them together to say somebody is actually committing a crime...that’s a one interesting application...’ (Academician, Online, YouTube)

Interestingly, as Sri Lanka is an agriculture-based economy, the agricultural exporters also suffered drawbacks during 2016–17, when ICTA emerged as a powerful sector, doubling the number of employees with the backing of the liberalised telecom industry. The country has also adopted 5G technology as the fifth-generation technology for broadband cellular networks (Oxford Business Group, 2019). This is a significant milestone to impact performance and initiate new digital solutions in the public sector. However, there has been some debate on applying such technology and the usefulness of large quantities of real-time data, such as big data, in the public sector to provide efficient and reliable service to the public in Sri Lanka.

Overall, following the discussions on the literature and the theoretical perspectives of the role of government, the following thematic framework has been synthesis to follow the literature that the role of big data encompasses publicness, transparency, accountability and government (Figure 1). Interestingly to note, the interview and communicated texts of the empirical findings indicate almost similar themes with some additional themes. Apart from publicness, transparency, accountability and government, there are additional themes relevant to emerging economies such as Sri Lanka, including diminishing corruption and bad practice among public sector workers and streamlining political cultures towards a more robust attitude toward technology adoption and implementation.

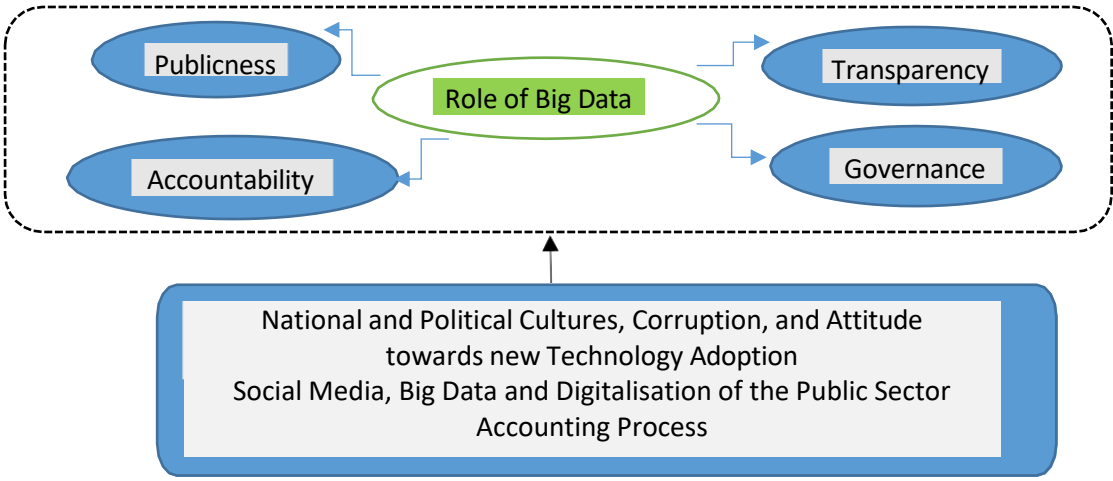


Figure 1: Empirical themes and categories
(The role of big data in the public sector accounting and budgeting practices)

Summative Content Analysis:

Summative content analysis was applied in this section to complement the thematic analysis findings in the previous section. As per the relevant literature (Brown et al., 2021; Rapport, 2010), the summative content analysis examines a word frequency count to find the first rank (the most common) and the second- and third-rank keywords in context (KWIC) that appear in the interview texts (Table 3). The frequencies of KWIC are central to understanding the role of big data in the public sector in Sri Lanka. However, although summative content analysis has been widely used in empirical literature in social science research (Kortegast et al., 2021; Wiese et al., 2012), the focus of the investigation is not merely on counting semantic words. Any interview text contains many irrelevant words, such as ‘hmm’, ‘we’, ‘I’, ‘and’, ‘or’, ‘the’ and other pronouns or identifiers that do not carry any meaning contextually. However, the summative content analysis focuses on KWIC within the overall meaning of the interview texts. The NVivo software package was employed to run a text search query to find all occurrences of KWIC in the texts. Methods include searching ‘exact matches’ to find words or searching ‘synonyms’ to discover similar words. For example, by running a word frequency query on the word control, NVivo can count the exact frequency with which the word ‘control’ appears. However, it can also count or group synonyms or similar words, such as ‘control’, ‘controlling’, ‘controlled’, ‘check’, ‘monitor’, ‘monitoring’, ‘observe’ and ‘observation’. This research uses synonyms and groups of similar words to find the most frequently occurring KWIC.

Table 3
Summative Content Analysis of the Texts

Relevant Keywords in Context (KWIC – Synonyms)	Ranking	Count	Percentage
See, comprehend, etc.	1	67	20.62%
Take, involve, read, etc.	2	53	16.31%
Data, information, knowledge, etc.	3	47	14.46%
Online, internet, etc.	4	43	13.23%
Authority, role, etc.	5	40	12.31%
Budget, budgetary, finance, etc.	6	33	10.15%
Ministry, ministers, etc.	7	22	6.77%
YouTube, Twitter, WhatsApp, etc.	8	20	6.15%
Total		325	100.00%

Table 3 indicates that the KWIC category ‘see, comprehend, etc.’ appears 67 times, representing 20.62% of the interview texts excluding irrelevant words. The word ‘see’ is contextually similar to ‘look’, ‘looked’, ‘discern’, ‘catch’, ‘notice’, ‘identify’, ‘recognise’, ‘detect’, ‘note’, ‘understand’, ‘grasp’, ‘comprehend’, ‘figure out’, ‘visit’, ‘visualise’ and others. These findings are represented in a word cloud (Fig. 2), where the word ‘see’ is larger than many of the other KWIC. This finding implies that the role of big data in Sri Lanka is to help the government identify and comprehend people’s insights as reflected on YouTube, Instagram, blogs and other social media, allowing them to make informed decisions. Big data identifies hourly, daily, weekly and monthly opinions on governmental issues such as environmental debates, export and import problems and barriers to small businesses. These issues can be regarded as direct input for the government to understand public information and make more efficient and effective decisions. There is no need to conduct expensive surveys or ask people’s opinions to identify the areas that need urgent solutions.

The words ‘take’, ‘involve’ and ‘read’ rank second, implying that by analysing the extensive data on the internet, also known as big data analytics (Brühl, 2019), the government can be deeply involved in public issues and people’s welfare. For example, traffic data can also be obtained from GPS satellite devices (the Global Positioning System as an advanced satellite-based radio navigation system) to improve road safety and reduce accidents through analytical safety modelling. The fact that the words ‘budget’, ‘budgetary’ and ‘finance’ appear 33 times (10.15%) suggests that such actions could impact the government’s financial budget.

Table 3 also indicates that ‘data’, ‘facts’, ‘knowledge’, ‘information’ and ‘analytics’ appear 47 times and comprise 30% of the interview texts. This implies that big data analytics produces relevant data

and useful information. This valuable knowledge for the government can lead to enhanced productivity and improved public sector decision-making. While the respondents mentioned the KWIC of ‘authority’, ‘role’ and ‘power’ in the interviews, Table 3 reveals that these words were ranked fifth (40 times or 12.31%). For example, big data analytics using data from CCTV (Closed-Circuit-Television), areas with a high crime risk and hot-spot data could assist the government and decision-makers in responding to problems. They then have the authority and power to stop crime and implement more robust, predictive policing. With the availability of big data, all public-sector users can efficiently access large data sets.

The Word Cloud

Summative analysis was carried out by evaluating keywords in context (KWIC), which are frequently occurring terms that are significant and relevant in the interview texts. In the given texts, specific KWIC occurred with varying frequencies, indicating the significance of issues in implementing big data in the public sector in Sri Lanka. Moreover, a word cloud (a visual display of text data) was also provided (Figure 2). Word clouds use the size of the text to show the frequency of KWIC, disregarding unnecessary and irrelevant words such as a, an, or, and the. Typically, a word cloud takes the most frequently used words and displays them in an appealing visual representation that identifies key words in different sizes and colours based on their frequency of use. Using a word cloud, we can look for specific patterns of words and phrases, or the lack thereof, in text data. Hence, to visualise data, we computed the word frequency to create a word cloud using NVIVO’s ‘Explore’ tab and ran a query to obtain the following Figure 2.

- Apart from publicness, big data has raised transparency issues related to efficient processing activities and valuable big data analytics. This has increased institutional trust in the technology used through public transparency, whereby the public is able to verify institutional performance.
- Overall, this has enhanced the accountability of the public sector, resulting in effective and efficient governance. This is in line with the public sector accounting and financial reporting reforms and New Public Management (NPM), which were initiated in the 1970s by incorporating private sector management practices with those of the public sector as outlined in the relevant literature (Buhr, 2012; Hood, 1995). The reforms require changes relevant to the country's needs. In the case of Sri Lanka, both accounting reforms and budgeting reforms need to be implemented simultaneously to establish efficient and effective systems that provide a better service to the stakeholders, especially during and after the pandemic.
- However, when implementing such reforms to benefit the public, the above theme and categories also depend on factors such as Sri Lankan culture, political culture, levels of corruption within the country and the public's attitude towards new technology adoption. For example, although publicness has become more accepted as a concept, issues such as country-specific political cultures and corruption may still act as a barrier to adopting new technology for the purpose of increasing big data usage in the public sector. Even so, an increase in demand for technology and an increase in awareness of smart technologies such as web-based applications will stimulate more opportunities for the government to achieve this goal. Recent project approval by the UN to increase the use of big data within the public sector in Sri Lanka will also boost this sector. Therefore, it is recommended that further quantitative studies be undertaken with the aim of increasing various sectors' in-depth understanding of how big data could be generated and how big data on a broader scale could assist in utilising accountability and publicness to improve public services in Sri Lanka.
- As per the new sustainable development goals (SDGs) published by the UN in 2015, Sri Lanka has a specific target to be achieved by 2030. Here big data can play a bigger role, as the SDG agenda calls for a focus on data and ensuring progress and remedial action to be taken in case consistent progress is not maintained. Including the aspects of the economic, environmental and social dimensions of development, the SDGs present aspiring targets for Sri Lanka. However, Sri Lanka appears to have a relatively strong numerical ability relative to the South Asian region (Lirneasia, 2018), but challenges remain in regards to providing accurate, timely data for measuring performance as well as providing better services.

5. SUMMARY AND CONCLUSION

In summary, this research investigates the role of big data in public sector accounting and budgeting practices during and after the pandemic in Sri Lanka. Hybrid ethnography was employed as a methodological direction by implementing data triangulation, where multiple datasets in a variety of platforms were combined and analysed using thematic analysis and summative content analysis.

With the use of big data in Sri Lanka, the public sector could provide efficient, accurate and timely data to measure and monitor the government practices, especially during a pandemic such as COVID-19. For example, the Sri Lankan government needs data on poverty over time in order to monitor their policies, plans and budgeting to achieve the goals of poverty alleviation. Some data are available from the department of census and statistics; however, it is still difficult to access real-time data that are generated through online social networking platforms, apps, etc. However, the recent project approval by the World Bank just before the global pandemic to provide funding for a public sector efficiency-strengthening project in Sri Lanka (World Bank, 2019) will contribute momentum to the future of big data as well as the adoption of big data analytics in the public sector.

The overall findings of this study reveal that big data use in the public sector could improve both accounting and budgeting practices in Sri Lanka as has been shown in many developed economies such as the USA and the UK. This study will assist public sector entities to understand the importance of educating and increasing awareness of big data potential within the public sector in emerging economies. Lastly, utilising big data in public sector accounting and budgeting practices will assist governments to face the challenges of the post-pandemic environment more efficiently and effectively while maintaining transparency, enhancing publicness and accountability, and improving governance.

This study offers insights on policy reforms especially in public sector accounting and budgeting practices using big data within the public sector. This research will enable the governments and public sector in emerging economies to investigate avenues of applying big data to mitigate issues such as transparency, accountability and publicness. The limitations of this study are mainly due to the short period of time when offline and online interviews took place. There were difficulties accessing many officers for face-to-face interviews due to COVID-19 restrictions. This led to a limited sample of data. Hence, a further study could be implemented using larger samples to investigate the post-pandemic environment and how big data has evolved since COVID-19, especially within emerging economies.

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Appendix 1:

Discussion Guide/ Semi-Structured Questionnaire

Thank you for participating in this survey. We are investigating how technology; Big Data has been used in public sector. Therefore, we appreciate if you could provide your view on the following areas.

1. What is your opinion about the public sector accounting and budgeting practices in Sri Lanka? Please comment.
2. Have you seen any changes of the public sector accounting or budgeting during the last 5 years? Please comment.

Rapid advances in technology and development of software analytical tools and techniques mean we can now gather and share data in large quantities.

3. Have you seen any technological advancement or any sophisticated tool being implemented in the public sector (your organisation)? Please comment.
4. Does the government use such large quantities of data in the public sector accounting or budgeting to create policies and make quality services to the public? Please comment.
5. If so, can you please explain the process briefly please?
6. Have you heard about using ‘Big Data’ (such as national level data, data coming from facebook, twitter, etc) in the public sector of Sri Lanka?
7. Finally, as there were reports to praise the government of Sri Lanka regarding the way they managed the Covid 19 pandemic in Sri Lanka, do you think public sector accounting and budgeting had any impact on that at all? Please comment.

Thank you very much for sharing your opinion.

Appendix 2:

Online sample

YouTube:

- Role of Data Science in Digital Transformation of Public Sector
<https://www.youtube.com/watch?v=mUNoUNtxbwg>
- TV Dearana (2020), ‘360 with Army Commander’, available at
https://www.youtube.com/watch?v=Vz_u6KG_wlE
- Improving National Budget Practices: Solutions for a Professional Government
<https://www.youtube.com/watch?v=dzgkwV15kiw>

Webinar:

- The Sri Lankan Economy Challenges and Prospects
<https://www.youtube.com/watch?v=kElYxjLSi3Q>