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International Journal of Procurement Management

ISSN online: 1753-8440 - ISSN print: 1753-8432
https://www.inderscience.com/ijpm

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DOI: 10.1504/IJPM.2024.10063970

Article History:

Received:	25 September 2023
Last revised:	27 September 2023
Accepted:	28 September 2023
Published online:	30 May 2024

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Donor-funded procurement determinants and effectiveness of procurement in the public health medical laboratory services: examining the mediating factors

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Abstract: This study examines the role of mediating factors in the relationship between donor-funded procurement determinants and their effectiveness in public health medical laboratory services, specifically targeting operational efficiency improvements. Data for this comprehensive analysis were gathered using a mixed-method approach from 221 participants, including healthcare professionals and administrative personnel within the Ministry of Health and Childcare's laboratory services in a developing African country. Employing advanced statistical tools, including structural equation modelling (SEM), this study clarifies the substantial influence of the donation recipient planning process (DRPP) as a mediating factor that significantly enhances the effectiveness of donor-funded procurement (EDFP). In contrast, the results indicate that the donation implementation process (DIP) does not significantly impact the determinants of donor-funded procurement (DDFP). These findings not only highlight the critical importance of strategic planning in donor-funded procurement but also suggest areas for policy and operational enhancements to sustain essential government health institutions. The implications of this study are particularly relevant to similar healthcare settings in developing countries, offering a pathway to refine and optimise procurement processes for improved operational outcomes.

Keywords: donor-funded procurement; procurement; public health laboratories; operational efficiency; mediating factors; structural equation modelling; SEM.

Reference to this paper should be made as follows: Mayavo, C. and Saruchera, F. (2024) 'Donor-funded procurement determinants and effectiveness of procurement in the public health medical laboratory services: examining the mediating factors', *Int. J. Procurement Management*, Vol. 20, No. 5, pp.1–19.

Biographical notes: Crossman Mayavo holds a PhD in Management from the University of the Witwatersrand and is currently a Postdoctoral Fellow in Management.

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1 Introduction

Global health has become a multi-billion-dollar industry with many actors vested with various interests (Clerici, 2023). This has seen the introduction of various organisations to provide finances to lower and middle-income countries (LMICs) to procure goods and services that improve health systems (Mishra and Singh, 2022). Developed nations brought forward Development Assistance Committee (DAC), which provides guidance, funding, and management to Official Development Assistance (ODA) (OECD, 2021). ODA is defined as government aid that promotes and specifically targets the economic development and welfare of developing countries, and ODA was adopted in the year 1969 and has remained the main source of health funding provided by DAC donors and bilateral and multilateral bodies. It is said that ODA accounts for over 1.5 trillion The USA Dollars for the lower to middle-income countries which qualify for ODA assistance (OECD, 2021). This was meant to advance healthcare globally, mainly in Africa, which has been behind in meeting the healthcare goals and outcomes. The leading DAC funders as of the year 2020 are illustrated in Table 1.

Table 1 Leading DAC funders of global health

DAC country	*Amount contributed in 2020 in USD*
The USA of America	35.5 billion
Germany	28.4 billion
The UK	18.6 billion
Japan	16.3 billion
France	14.1 billion

Source: OECD (2021)

As of 2021, the total global health funding has hit 8.8 trillion USA Dollars, it is estimated that by 2022, it will increase by 1% to 10.059 trillion USA Dollars. Health funding has grown in the last decade, and the available data on the global scale in USD terms of global health spending as global GDP is shown in Table 2. However, it is worth noting that all these efforts are being made to alleviate the world's health burden, but as noted below, the larger chunk of the funding will go to Africa. These have made the SSA relax in terms of funding their health sectors (OECD, 2021).

Despite ODA disbursing such funding to health in developing countries, global fund, on the other hand, has been playing a critical role in the health sector by mobilising and funding low and middle-income countries to fight AIDS/HIV, Malaria, and TB (Global Fund, 2021) and in 2017 and 2018 alone a total of 4.3 billion and 3.1 billion USA Dollars respectively (Global Fund, 2021; OECD, 2021) was used to fund the health sector worldwide. As shown by the statistics above, donor funds contribute to and support the African continent. However, the effects of donor funding are seen as most of these SSA

countries destroy economies for the health sector at a large scale. The countries are creating a culture of dependency syndrome and laziness within their territories, affecting the general populace (Moyo, 2009). The other downsise of the donor funds in the African continent is that the governments neglect to provide services to the people they lead and concentrate on themselves, as witnessed by poor service delivery in various African countries (Hangulu and Ankitola, 2017). Moyo (2009) concedes that Africa is failing to take note of the aid given due to corruption within the high ranks and files of the leaders of these countries and bureaucracy which makes approval so difficult for programmes to take place. One has to move from pole to window without success. With the high figures of monies making their way to Africa from Europe and other continents, nothing seems to change in deliverables (Baporikar and Randa, 2020).

Table 2 Global health spending as global GDP

Year	*Amount in USD*	*% of global GDP*
2018	8.45T	10%
2019	8.5T	9.8%
2020	8.3T	10.0%
2021	8.8T	10.3%
2022	10.059T	10.4%

Source: Deloitte Insights (2021)

Bilateral, Multilateral, and private Foundations contributed to the SSA health sector in 2020, and they are tabled in Table 3.

Table 3 Bilateral, multilateral, and private foundations

Donors	*Amount contributed (USD)*
United States of America	6.5 billion
Global Fund	3.6 billion
Bill and Melinda Gates	2.8 billion
Global alliance for Vaccines and Immunisation	1.9 billion
UK	1.8 billion

Source: UNICEF (2021)

In 2001, African states met in Abuja, Nigeria, known today as the Abuja Declaration, to deliberate on health funding. The African Union states members agreed to 15% of the national budget for health sector funding (Abuja Declaration Report, 2001). Unfortunately, most of these African states have failed to meet the agreed targets, and still, they are failing to meet and have no further discussions concerning this matter. For me, this was just a talk show of African leaders and only benefitted from the allowances given, but no implementation was given priority, although the idea was for the good of Africa as one. According to WHO (2019), only four countries managed to meet the target, and others only managed to increase their national budget funding towards the health sector. Today, no African country managed to surpass the 15% threshold. However, those other countries that had managed to meet the 15% have decreased their health sector budget for reasons known to them.

Adding on to the Abuja Declaration Report (2001), the nations called on the donors to scale up their support to African countries to enable them to procure the much-needed health equipment and other requirements and combat HIV/AIDS pandemic since it was the main focus. However, as the African nations failed to meet their 15% of the national budget towards health, donors heeded the call, and they are supporting the health sectors of the same SSA states while the SSA countries fail to meet their end of the bargain. To further bring together the relationship between donors and African governments, global leaders also met in Accra, Ghana, in 2008 to discuss the Paris Declaration on Aid Effectiveness of 2005 and named it Agenda for Action. Over 80 developing nations, all OECD countries, and over 3000 civil society organisations worldwide joined the emerging economies, United Nations, multilateral institutions, and global funds for negotiations (OECD, 2021).

It seems like all these efforts were in vain since all the efforts of these meetings did not translate into any meaningful, productive from the leaders. According to Gatome-Munyua and Olalere (2020), the African countries' failure to meet such conditions to improve their health systems is because of low inefficiencies in African countries in the collection of taxes and low GDP associated with other competing priorities which impound on health budget allocation. The researcher supports the notion of the scholars. However, the failure of African government leaders at times to provide guidance, trust, and inspire confidence in the running of the affairs of their countries are some of the reasons for the failure to meet the much talked about 15% health budget. Research has shown that from 2001 to 2015, 21 countries' health spending decreased, and it could be worse after the COVID-19 era (Gatome-Munyua and Olalere, 2020). However, since countries' spending is decreasing, the ministries of health should advocate for health systems to be adequately resourced and the resources to be used optimally. Increasing health spending and giving health priorities are some of the key feasible approaches African countries can use to increase resources for health.

The governments of African countries should know that well-resourced health provides key benefits to the nation, such as building good human capital, safeguarding the health system security from health pandemics, increasing workforce productivity, reducing poverty and inequality as well as providing employment to their citizens (Gatome-Munyua and Olalere, 2020; Tukuta and Saruchera, 2015). Resourcing the health sectors is the best way to advance Africa's healthcare sectors.

1.1 Zimbabwe's socio-economic elements

The country made significant progress in its early first decade of independence (UNICEF, 2021). However, regrettably, Zimbabwe has registered a decline in social and economic indicators (UNICEF, 2021; United Nations Report, 2021). The challenges that have affected the country's socio-economic are prolonged economic recession, climate-induced humanitarian crisis, and political challenges, and these challenges will impede Zimbabwe from meeting the UN Agenda 2030, SDGs, and worse off, threatening to reverse the past gains of health development (United Nations Report, 2021). Zimbabwe remains the highest country to achieve social development in the continent, but unfortunately, it has remained stagnant or regressed over the years. Poverty was at 70.5% in 2017 and is higher in rural areas, while the urban vulnerability is increasing due to formalisation, and unemployment is said to be above 90% (Zimbabwe National Statistical Agency, 2017). To curtail the damages, the donors have increased their focus

on providing support to keep the social sectors operational, most support outside direct government. The country faces barriers to a functioning market economy based on private sector-led growth. The level of inflation, the effects of the multi-currency system on the competitiveness of exports and investments, and the unsustainable high level of external debt (World Bank, 2021).

The informal sector lacks financial support to spur growth limiting the capacity to progress and contribute significantly to economic growth. Zimbabwe has peace, but political polarisation remains high due to historical or past conflicts not being resolved, disputed elections since the turn of the millennium, human rights abuse, lack of the rule of law, and corruption, among other issues (United Nations Report, 2021). The health sector remains fragmented despite donor-funded procurements mushroom and no proper government support, which eventually affects public service delivery.

2 Objective of the study

The primary objective of this paper is to examine the donor-funded procurement determinants and their mediating effects between expected procurement functions and effective donor-funded procurement (EDFP) for public health medical laboratories in Zimbabwe

3 Literature review

3.1 The determinants of an effective donor procurement

Determinants are factors, conditions, or characteristics that significantly impact the system or project work when properly managed, sustained, and maintained. The determinants are considered key ways to improve the effectiveness of projects. The literature has identified some of the determinants of effective donor-funded procurement as follows.

3.1.1 Lead donor identification and collaboration

Over recent years, there has been an increasing call to identify a lead donor who will guide and coordinate the efforts of all other donors involved in the medical laboratory field (Tsai et al., 2022). The lead donor will collaborate with other donors and work with the laboratory services logistics and the directorate to support procuring all the medical laboratory equipment, reagents, and other related consumables (Berenguer and Rashkova, 2021). It means no procurement and donation will be done without the knowledge of the lead donor, who will, in turn, communicate with the MoHCC's laboratory services. According to JICA (2023) report, there should be a collaboration between the MoHCC's laboratory services and the donors who support the laboratory services for better service delivery. Collaboration between the two institutions will give an upper hand for the provision of quality healthcare as well as quality testing of patients' samples.

3.1.2 Visibility of spending

The laboratory's procurement process has to allow the visibility of individual and procurement unit spending within the laboratory's suggested strategies (Watkins and Wulaningsih, 2020). The donor and the laboratory's visibility bring transparency, knowing who is spending, how much is being spent, and on what (Varadaraj and Al Wadi, 2021). Ownership and responsibilities have to be assigned to spend whether to individuals or units. According to Williams et al. (2020), the laboratory needs to have visibility on spending, which brings on the benefits which are: audit trail in the system, planning, and budget optimisation; the laboratory will understand the spending patterns, maximise buying power, informed sourcing and supplier management decisions and raise supplier performance.

3.1.3 Need for top management support

Top management is defined as the degree to which the top management understands the importance of laboratory function and is personally involved in laboratory activities. Top management consistently emphasises the importance of their support for the success of the laboratory or any activity in the organisation, and the distance between the staff and the top management should be short for system improvement. The top management's responsibility is to support and instil organisational culture, values, and principles, creating synergies and compatibility between them (Sanhokwe et al., 2023). Accordingly, disengaged employees cost an organisation money per se per year; for example, Osborne and Hammoud (2017) researched this subject matter and discovered that US corporations alone are losing over $350billion per year due to disengaged employees who end up not motivated to work for the corporations. Unfortunately, this cannot be said about Zimbabwe since no such research has been done to determine the cost in monetary form. However, the brain drain speaks more to the failure of employees to be motivated in the workplace in the health sector.

According to Deci and Ryan (1985) self-determination theory is used to measure workers' motivational factors and relate to employee engagement, and it is noted that human behaviour and employee engagement are connected to this theory and work engagement. The leaders are expected to engage the employees to have their views and see where they have their weaknesses and support them (Fernández-Habas et al., 2022; Witter et al., 2019). As such, worker engagement and disengagement are key drivers of employee motivation that demonstrate professional and personal behaviour (Higgisson, 2023; Osborne and Hammoud, 2017). The MoHCC should engage employees at all levels for them to realise maximum employee performance, and in turn, this will motivate the workers so that there is more production. This view was supported by Blattner and Walter (2015) pointed out that the more the employee's motivation is provided, the more the employee is satisfied with the job and gives their all for the organisation, hence more productivity for the organisation. Leaders in the laboratory system and health at large should be able to leverage and successfully engage with the employees to achieve much-needed goals. However, leaders should empower, reward, and recognise employees and build bonds within their organisational systems (Osborne and Hammoud, 2017).

3.1.4 Personnel recruitment and selection

Recruitment helps to create a pool of suitable experienced, qualified, and fit-for-purpose employees to ensure the selection of suitable candidates for the job, while the selection process' purpose is choosing the correct candidate to fill the vacant position in an organisation (Gamage, 2014). Additionally, the human resources issue has taken centre stage recently, and special attention is given to any organisation. People are very important as they give a valuable, different perspective and rare attributes to the organisational existence, and when effectively managed, a human can be a considerable asset to the institutions they serve (Cho et al., 2023). The National University of Ireland (2006) experiences that recruitment and selection of employees in an organisation provides a good opportunity for the organisation to represent itself in a good and favourable light. In some organisations, like in developing countries, shortcuts are done in recruitment and selection, which bring the name of an organisation into disrepute. Ekwoaba et al. (2015) brought forward the notion that hiring the wrong people for the organisation is very costly, and there is a need to constantly review the human resources policy and planning. Gamage (2014) added that there is a positive relationship between recruitment and selection and the organisation's performance. However, implementing effective recruitment and a proper selection process positively affects organisational performance (Ekwoaba et al., 2015; Susanto et al., 2023).

The reasons above point to the fact that laboratory services must recruit the right personnel with the right qualifications who understand how to operate the donated or procured equipment and reagents (Rout, 2010; Suleman et al., 2022). The personnel is a key element of the equation since, without the right people for the job, the matrix becomes incomplete, and the effectiveness of the laboratory system will never be witnessed. Lack of the right personnel is one of the reasons why it is believed that there is over 40% of donated or procured equipment in the Sub-Saharan Africa is laid idle because there are no proper people to use the equipment (Ardebili et al., 2021). However, hiring the right people for laboratory services is key for the organisation to achieve its intended goals. The selected employees must work well with others, and the laboratory services must ensure that the hiring process follows procedures to avoid hunching.

3.1.5 Logistics management of the laboratory commodities

Logistics operations' reliability and supply chain predictability are becoming increasingly important and are now of major concern (OECD, 2021). The laboratory logistics department should provide quality service as it has become a driving force for logistics performance, including investment in planning and coordination between the agencies and the government (Yemeke et al., 2023). Logistics activities include procurement, transportation, warehousing, storage, inventory management, communication, materials handling, packaging, forecasting and handling of returned goods (Kruger and Pisa, 2017; Mishra and Singh, 2022) and customs clearance and freight forwarding.

4 Theoretical background and hypotheses framework

This study made use of the transaction cost economic theory (TCE), person-situation interaction (PSI) theory, and agent theory

4.1 Transaction cost economic (TCE) theory

This research is anchored on TCE by Coarse, who introduced this theory (Coase, 1937) to address organisational structures and the key assumptions being human behaviour which are opportunism and bounded rationality (BR) (as well as environment-related factors which asserted specificity and uncertainty. TCE has been one of the most influential theories in the study of procurement and supply chain and makes a valuable contribution to understanding sourcing and predicting the success of supply chain arrangements both in theory and in practice, although it cannot alone fully explain the complexities of sourcing (Mclvor, 2009).

This theory addresses issues, including how corporations determine their boundaries, how they should manage operations, and why they exist in the first place (which is to reduce transaction costs) (Coase, 1937; Williamson, 1975). Key assumptions BR and opportunism) and key constructs (asset specificity and uncertainty) (Grover and Malhotra, 2003) state that BR is limited to individuals (Simon, 1957) and the decision-makers may desire to act rationally inside the organisation, but their capacity to acquire, retain, retrieve, and share knowledge without error is constrained (Williamson, 1975) and only limit to the extent to which rational behaviour can be conducted. BR must be examined in the context of donor funds in laboratory procurement in Zimbabwe since individuals act and do according to their rationale as they represent their organisations. The literature suggests that bounded rationality (BR) does not imply that individuals intentionally act irrationally. Instead, it indicates that within the constraints of their limited cognitive capacities and the incomplete information available to them, people strive to make the most rational decisions possible.

4.2 Person-situation interaction theory

The study adopted the theory by Trevino (1986). The concept emphasises how person interaction and situational factors explain how ethical decisions are made in an organisation. This theory is about trying to understand why people do what they do. An individual's moral cognitive development stage will impact how they respond to ethical situations regarding cognitions. Task-directed and goal-directed behaviour, traits such as extraversion and conscientiousness, are seen as affecting behaviour across an extremely broad range of situations, and behaviour is determined more by the properties of the situation than that of people (Kihlstrom, 2013). Procurement employees' cognitive moral development stage affects how they approach work-related ethical dilemmas involving corruption and decide what is right and wrong in each situation (Trevino, 1986).

In addition, the manager's decision-making process in a procurement-related issue is frequently influenced by individual-related factors, situational milieu, and organisational culture. In procurement situations, people behave in various ways that may affect the performance of their duties as situations are an important variable, as supported by Kihlstrom (2013), who pointed out that PSI is more powerful than either person or situations are taken in isolation. Situations are as much a function of the person as the person's behaviour is a function of the situation (Bowers, 1973). Furthermore, these personal aspects include ego strength, field dependency, and span of control, whereas the situational milieu includes things like reinforcement and pressure from the job. Persons are part of the situation to which they respond, or persons and situations together constitute a unified field in which behaviour occurs (Kihlstrom, 2013). This theory is

used in the study because it addresses the pre-donation strategy, donation requirements, donation recipient preparedness, and donation implementation, which are the first four independent variables. The three theories assisted in shaping the proposed study.

4.3 Agency theory

This theory is defined as a contract under which one or more people (principal) engage another person (agent), and there is now a division of labour between the agent and the principal (Shukla et al., 2023). The MoHCC laboratory is the 'principal', and the 'agents' are the donors acting on behalf of the MoHCC's laboratory. The MoHCC prescribes and monitors the donors' work, including approving the procurement of commodities. The principal has difficulties monitoring hidden agendas, characteristics, actions, and the agent's knowledge; it will be expensive if he (the principal) monitors (Bosse and Phillip, 2016). The Monitoring mechanism and alignment of interests always create problems for the agent and the principal. In the context of this study, it has been noted that the monitoring mechanism between the MoHCC laboratory services and the donors has been a challenge that has affected their relationship. Furthermore, the relationship further affects the community since the donors are now the major funders of the health systems in Zimbabwe. The communities are the major beneficiaries of good health, and if the health system is in shambles, they bear the brunt of such, and decisions have to be made to protect the general populace, who are the major stakeholders.

The divergent interest's further strain the relationship between the agent and the principal, and the principal always has imperfect information about the agent's performance or contribution (Bosse and Phillip, 2016). The divergent interest in the context of this study is seen when the agents (donors) are withholding information about their funding activities; the donors would do their work without updating the MoHCC laboratory services since their agenda is not clear to the MoHCC laboratory services but clear from their principals in the country they come from. Additionally, the donors' funds go towards their administrative costs rather than supporting the services they purport to support, meaning the agents serve their interests and maximise their self-interest. Moreover, the problem of corporate governance choices of MoHCC and the behaviour of the donors (agent) where the donors increase their utility at the expense of the MoHCC (principal) increasing their funding through self-support (Wang and Guan, 2022) instead of increasing the funding for the medical laboratory services.

4.4 Integration of the three theories

In this study, three key theories, that is the economic transaction cost (TCE) and PSI theories and agency theory, are considered to integrate and seek to understand the relationship that exists in the donor-funded procurements and the Ministry of Health and Child Care participation in such processes. It is not an easy task, though, since there are more other theories left out of this study, and no one theory can apply to answer the challenges faced in this complex relationship in procuring public medical laboratory commodities. The TCE talks of the structure that exists for the proper organisational management and operations as well as outlining the causes of transaction costs (Coase, 1937; Williamson, 1975), putting forward key assumptions, which are BR and opportunism as major challenges, with key constructs asset specificity and uncertainty

(Grover and Malhotra, 2003) that may affect the procurement of public medical laboratory commodities. BR is said to be limited to individuals.

PSI theory is based on individual behaviours which affect the performance of donor-funded procurements and activities. For donor procurements to succeed, individuals must be goal-orientated and task-oriented. People's behaviour is affected more by the situations around the procurement than by the people around, as mentioned by Kihlstrom (2013). The Agency theory discusses the relationship between the donor and the MoHCC's laboratory services. MoHCC's laboratory services are the 'principal', and the donors are the 'Agency' since they are procuring on behalf of the MoHCC. This study proposes integrating the three theories as a theoretical contribution to the study. These theoretical factors will assist in improving laboratory performance since the organisational structures are manned by people who are self-aware of their obligations to improve the health welfare of the general populace of Zimbabwe through well-supported/functioning medical laboratories.

4.5 Determinants of donor-funded procurement as a mediator

Determinants of donor-funded procurements (DDFP) are absolutely for the success of public health medical laboratory services. Berenguer and Rashkova (2021) alluded that the donor community should have a lead donor who coordinates the laboratory's activities and that of the other supporting donors. Communication channels must be opened between the laboratory services and the donor community. For laboratory services systems to be successful, top management support is essential. There is no success without a proper recruitment policy that allows one to be employed based on merit and supplier consolidation to easily procure laboratory services (Ardebili et al., 2021). The DDFP are discovered that they are good mediators between procurement expectation and procurement effectiveness. However, the following hypotheses are brought forward

H1a DDFP positively mediate the relationship between the pre-donation Planning process (PDPP) and EDFP.

H1b The relationship between the donation requirement process (DRP) and EDFP is mediated by the determinant of donor-funded procurement.

H1c DDFP positively mediate the relationship between the donation recipient preparation process and EDFP.

H1d The relationship between the donation implementation process (DIP) and EDFP is mediated by the DDFP.

4.6 Determinants of donor-funded procurement and expected procurement function

The DDFP play a crucial role in support of the procurement function since there is a need to have qualified employees who are employed on merit, top management support is key, and the lead donor is very much needed to provide guidance and discuss with the laboratory leadership the available funding (Aluttis et al., 2013; Church and Naugler, 2019; Sadabadi and Mirzamani, 2023) and discuss the requirements that carry the laboratory forward. Additionally, the DDFP support the procurement function in that

where the right skills are deployed, there is no waste of goods or services in the laboratory setup. Proper planning makes sure that the right personnel is recruited for the right job, such as using the equipment, maintenance and service contracts are in place; equipment is operated by qualified employees (Dza et al., 2013; Ezenduka et al., 2022; Hamel et al., 2015; Hogfeldt, et al., 2023; Mazikana, 2019). Right personnel knows which part of the laboratory equipment is replaced by them and which is replaced by the engineers, and no forced donation comes into the system without proper channels followed. Furthermore, the electricity and water are available for use as expected in the laboratory, and the equipment works according to the manufacturer's specifications (Mani and Gunasekaran, 2018; Micheni et al., 2023; Mouschoutzi and Ponis, 2022). However, top management support is always needed to support the employees, and sustainability issues are considered. From the issues discussed, the following hypotheses are generated;

H2a DDFP directly affect the PDPP.

H2b DDFP have a positive relationship with the DRP.

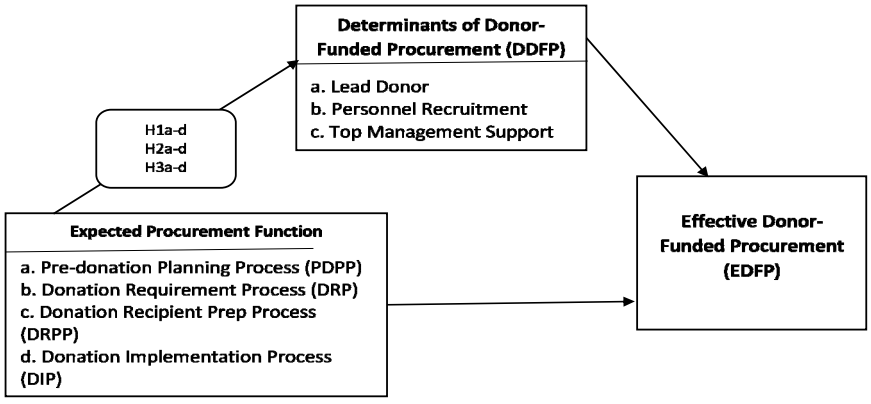
H2c There is a direct relationship between the DRPP and DDFP.

H2d DDFP and DIP are directly related.

5 Conceptual framework

Figure 2 shows a proposed conceptual framework based on the hypotheses discussed above and that all the constructs have existing relationships, as shown by the direction of the arrow.

Figure 1 Conceptual framework



Source: Author's (2023)

The conceptual framework (Figure 1) envisages the PDPP, DRP, donation recipient preparation process, and DIP and lead donor denoted by hypotheses H1a (H1a–d). Additionally, H2 (H2a–d) indicates the relationship between DRPs, DRP, donation recipient preparation, DIP and personnel recruitment. Furthermore, the expected procurement functions and top management support relationships are denoted by

hypotheses H (H3a–d). The DDFP (lead donor, personnel recruitment and top management support) mediate the relationship between expected procurement functions (pre-donations, DRP, donation recipient and donation implementation) with EDFP.

6 Methodology

In the study, a pragmatist philosophy underpinned the mixed methods research approach, facilitating the integration of both quantitative and qualitative data. This approach leveraged the strengths and addressed the weaknesses inherent in each method. The research design was both descriptive and exploratory, which effectively supported the quantitative aspects and facilitated qualitative data collection. This methodological framework was essential for exploring the experiences of medical laboratory scientists, procurement officers, and SCMLTs.

The research's sample was 214 questionnaires returned by the Scientists, Procurement Officers and State Certified Medical Laboratory Technologists from the Ministry of Health and Child Care. Data were analysed for quantitative and seven interviews were conducted with the provincial medical scientist or their representatives. These were well-informed of the developments in their provincial and national medical laboratory territories, they are aware of the subject matter under study, and they meet the inclusion and exclusion criteria for participating in this study. The participants could communicate their experiences articulative and expressively and were willing to participate. The data were analysed using STATA version 17 and made use of structural equation modelling to identify the causal relationships that exist between and among variables.

7 Discussion of results

The occupation of the participants in the quantitative research of this study is portrayed in the bar chart shown.

The graph shows the bar chart with participants which are scientists (n = 95; 44.4%), procurement officers (n = 60; 28%) and the State Certified Medical Laboratory Technologist (SCMLT) (n = 59; 27.6%) and their total numbers in each group are shown as well.

7.1 Instrument reliability and validity

Table 4 shows the average reliability measured by Cronbach alpha, Kaiser-Meyer-Olkin (KMO), determinant correlation matrix, and the Bartlette test of sphericity for all the constructs considered in this study.

As shown in the results, all the constructs have an average reliability above 0.7, which shows that the instrument used to collect the data had acceptable internal reliability. The internal reliability coefficient for the PDPP construct is 0.8668, DRP has a reliability coefficient of 0.8210, the donation recipient planning process (DRPP) has a reliability coefficient of 0.7859, the DIP has a reliability coefficient of 0.8039, DDFP has a reliability coefficient of 0.7951, GP has a reliability coefficient of 0.8133 and EDFP has a reliability coefficient of 0.8475.

Figure 2 Respondents' occupations (see online version for colours)

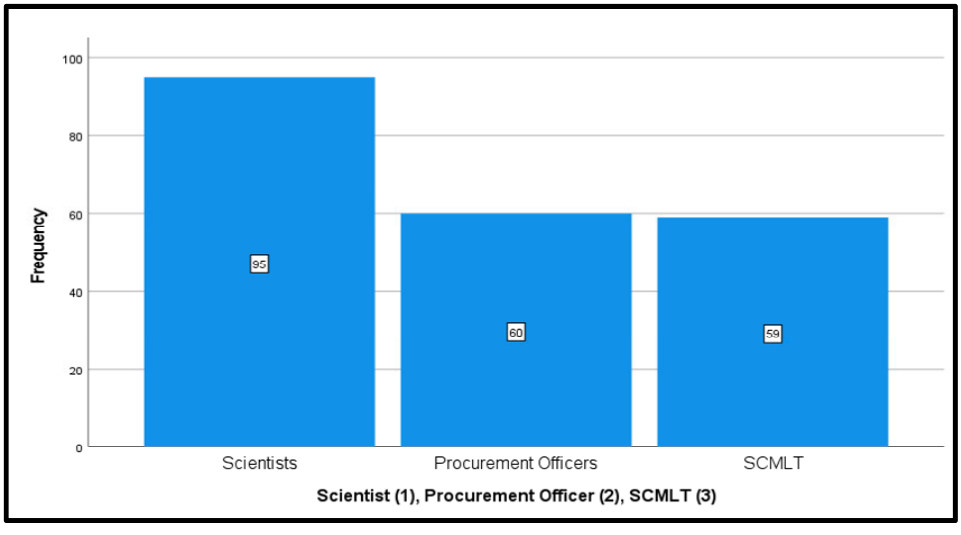


Table 4 Validity, reliability, and sampling adequacy of the patient satisfaction sub-scales

Factors	*Average Cronbach alpha (α)*	*KMO*	*Determinant of the correlation matrix*	*Bartlette test of sphericity*
PDPP	0.8668	0.863	0.006	Chi-square = 068.617 Degrees of freedom = 45 p-value = < 0.0001
DRP	0.8210	0.779	0.031	Chi-square = 726.778 Degrees of freedom = 45 p-value = < 0.0001
DRPP	0.7859	0.758	0.068	Chi-square = 560.937 Degrees of freedom = 45 p-value = < 0.0001
DIP	0.8039	0.784	0.039	Chi-square = 670.471 Degrees of freedom = 45 p-value = < 0.0001
DDFP	0.7951	0.804	0.050	Chi-square = 619.736 Degrees of freedom = 45 p-value = < 0.0001
GP	0.8133	0.765	0.024	Chi-square = 783.198 Degrees of freedom = 45 p-value = < 0.0001
EDFP	0.8475	0.797	0.009	Chi-square = 991.226 Degrees of freedom = 45 p-value = < 0.0001

The results show that all the constructs have sufficient average KMO values acceptable for factor analysis. The KMO coefficient for the PDPP construct is 0.863, DRP has a KMO coefficient of 0.779, DRPP has a KMO coefficient of 0.758, DIP has a KMO coefficient of 0.784, DDFP has a KMO coefficient of 0.804, GP has a KMO coefficient of 0.765 and EDFP has a KMO coefficient of 0.797.

Table 4 shows the determinant of the correlation matrix for all constructs were statistically significant (PDPP p-value=0.006; DRP p-value=0.031; DRPP p-value = 0.068; DIP p-value = 0.039; DDFP p-value = 0.050; GP p-value = 0.024 and EDFP p-value = 0.009). Additionally, Bartlett's test of Sphericity test was performed, and the results are shown in Table 4. The results for each construct were statistically significant with a p-value < 0.0001. The results further confirmed that factor analysis is worthwhile for the dataset.

7.2 Indirect/mediated effects

The results show the indirect effects of PDPP on EDFP. As the PDPP increases by one score, there is a –0.013 (95%CI: –0.041–0.014) statistically insignificant indirect effect on the EDFP score (p-value = 0.348). The indirect effect of DRP on EDFP. As the DRP increases by one score, there is a 0.057 (95%CI: 0.008–0.105) statistically significant indirect effect on the EDFP score (p-value = 0.020). As the DRPP increases by one score, there is a 0.057 (95%CI: 0.008-0.107) statistically significant indirect effect on the EDFP score (p-value =0.023). As the DIP increases by one score, there is a 0.031 (95%CI: –0.003–0.067) statistically insignificant indirect effect on the EDFP score (p-value = 0.080).

7.3 Mediating effects of determinants of donor-funded procurement

The DDFP (β = 0.19, st/e = 0.59) is an endogenous variable and directly affects the exogenous variable. The DDFP has become the mediating variable for exogenous variables and plays an important role. Hypotheses (H1a–H3d) are paramount in this study as they mediate between the independent and dependent variables. PDPP has a mediated effect EDFP (β = 0.19, p-value = 0.348) and also shows the standardised indirect effect was 0.013(0.092–0.014) and the estimated range of the confidence interval measured at 95% and the results reject (H1a) for the alternative. The results further noted that DRPP (β = 0.097, p-value = 0.020) has an indirect/mediated effect on EDFP and also shows the unstandardised indirect effect was 0.057 and 0.008–0.105 was the estimated range of the confidence interval measured at 95% and results were positive and rejected the alternative in support of (H1b).

It has been further established that DRPP (β = 0.27, p-value =0.023) has an indirect effect on EDFP and the standardised indirect effect was 0.057, and the estimated range of the confidence interval measured at 95% was 0.008–0.107, and the results show that the mediated effect was positive and support (H1c). Furthermore, the results further revealed that the indirect effect of DIP (β = 0.15, p-value = 0.080) through DDFP was 0.031, and an estimated range of the confidence interval measured at 95% was –0.003–0.067 and the p-value= 0.080, though the result was positive but insignificant. Hence the result rejects (H1d) for the alternative.

8 Conclusions, recommendations and implications

The study established that the DDFP are important and that identifying a lead donor and collaborating with stakeholders, visibility of donor funds spending, needs for top laboratory leadership support, personnel recruitment, and logistics management are some key DDFP. The determinants have shown that they are good mediators between the expected procurement function and EDFP. If taken seriously, these determinants would provide the most wanted impetus to laboratory services. Top leadership support is one of the keys needed to support both the employees and the donor-funded activities. This was supported by the study results showing that DDFP positively influences EDFPs. The research has found that all determinants improve the laboratory services systems and are taken forward. The study results further noted that DDFP is a mediating variable in this study which means that these variables further influence the DDFP. In light of the findings of this study, the researchers added that Zimbabwe's government should foster a climate that will allow donor-funded procurement to thrive. The following results substantiate the above

- DDFP mediate DRP – EDFP relationship ($\beta = 0.097$, p-value = 0.020).
- DDFP mediate donation recipient preparation process – EDFP relationship ($\beta = 0.27$, p-value = 0.023).

The researchers can conclude that the laboratory services should train the laboratory and donors on their roles in support of the laboratory system, and select lead donors from the donors who support the laboratory services who will work with the laboratory management. The laboratory services should encourage collaboration and coordination of funding and ideas when implementing laboratory-related activities. This eventually avoids duplication of duties and the DDFPs found by this study are a catalyst for EDFP. Create a conducive environment that supports donor support to flourish for the general populace's good and provides a strong monitoring mechanism. Government should provide favourable policies for employees to flourish and pay market-value salaries to avoid shortcuts in testing people's specimens and visibility of laboratory services on social media platforms (Twitter, Facebook) to create demand for the services they offer, as this is done in other countries.

The study sought to examine the donor-funded procurement determinants and their mediating effects between the expected procurement function and the EDFP for the public health medical laboratory. The study found that the determinants are of paramount importance for the laboratory to achieve its operational efficiency (Aluttis et al., 2013; Jarvis et al., 2020; Olmsted et al., 2010; Robert et al., 2022) as they have shown a positive influence, of which the laboratory services should implement and make use of the lead donor, personnel recruitment, top leadership support and other key variables. The research has shown that the DDFP are considered full mediators between the expected procurement function and EDFP.

The theoretical contribution is that the DDFP have shown that they are key in this study as they provide a full mediation between the expected procurement function and the effectiveness of donor-funded procurement. They further contribute as they are pillars where the laboratory services and procurement of goods and services are anchored upon them as they reduce waste of scarce resources, qualified personnel are recruited, and

collaboration between the donors and the laboratory services also takes place (Holterman et al., 2021; Mothupi et al., 2022; Okeagu et al., 2021). Staff is motivated to work hard as they have the laboratory's top management support, which in turn motivates the staff. The study further contributes that the procurement of goods and services is done with the right quantities at the right time.

The value of procurement can be realised through top management support and collaborations, which in turn may inform the procurement process. The study contributes as the determinants provide a platform where the duplication of activities may be avoided since no donors will procure the same things unless it's a shared agreement. The determinants of procurement's mediation contribute in that if they are taken into account there is a possibility of integration of theory and practice which enables the beneficiaries of laboratory services to get maximum value from the laboratory services and the donors.

The study's limitations are that the researchers used the mixed method approach which may be qualitative or quantitative in a single form could produce different results, although the mixed method research has the complementarity effect. From the results of the study, it has been found that the DDFP have a great deal in supporting the mediation process between the expected procurement function and the effectiveness of donor-funded procurement. The other limitation of this study is that the researchers only focused on a few determinants of donor-funded funded procurement, of which they are many and if well studied they can provide more insights. Additionally, this research focused on laboratory alone but this can be expanded to other areas of concern in the health sector across the region.

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