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The public value of E-Government in Sri Lanka: A Literature Review

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Abstract: This study aims to investigate the status of the public value of e-government in Sri Lanka, filling the literature gap and offering a deeper understanding. In this context, two questions guided the research: (1) What is the public value of e-government? and (2) What are the key dimensions to consider in assessing public value in Sri Lanka? The study institute lack of public awareness, inadequate research on the public value of e-government, more significantly, a total absence, and public awareness like other developing countries. The public value of e-government needs to be clarified and adequately measured; observed the necessity of in-depth comparative studies at very strategic levels of national, regional, provincial, institutional, and project levels. Furthermore, the study shows the need for existing public value measuring frameworks considering unique socio-political dimensions in the Sri Lankan context. This paper represents an empirical review of gauging the public value of the e-government of Sri Lanka, proposing a new conceptual framework developed based on a comprehensive review of existing literature.

Index Terms **- e-government, public value, public awareness, conceptual framework, ICT, Sri Lanka**

I. INTRODUCTION

The indispensable role of digital technologies holding civil societies together, facilitating communication and collaboration between citizens, policymakers, private sector amplified the significance of e-government. Extending to many sectors and aspects of society by transforming citizens' perceptions of civil and political interactions, the e-government has become the cornerstone of modern-day society, building accountability, resilience, and institutional inclusiveness drives sustainable development [1].

Having diverse definitions, e-government is commonly conceptualized as an adaptation of ICT (Information and Communication Technology) towards delivering efficient and effective government services to citizens and businesses. An emerging trend of assessing e-government performance is based on public value [2]. The collective expectation of citizens concerning government and public services is defined as public value [3]. Castlenovo [4] illustrates citizens as stakeholders, such as customers of public services, users, taxpayers, policymakers, and citizens.

Despite rapid strides made by developed countries in the adaptation of e-government initiatives achieving higher citizen take-up of services, developing countries continue to need better results in delivering public value [5, 6]. Still, a majority of developing countries are falling well behind in reaching the goal of digitalization of public services that would create public convenience and transparency [2, 1] and are at risk of meeting their sustainable development goals as recognized by the United Nations (UN) [1]. Even though the UN survey [1] on EDGI (e-government Development Index) reflects increasing global trends of e-government, many countries transitioning from lower EDGI to higher EDGI (recording a 5.3 percent increase compared to 2020 in this group) Europe ranked highest in averaged EDGI value 0.8305 followed by Asia (0.6493), Americas (0.6438), Oceania (0.5081), and Africa (0.4054) in region terms. Apart from that, more significantly, the South Asian region EDGI value of 0.5300 [7], which is below the world average of 0.6102, further strengthens the case for the urgent necessity of focusing on in-depth comparative studies on the region.

E-Government projects are complex and challenging [8] risk prone to failure [9]. Budgetary constraints, inadequate ICT infrastructure, outsized digital divide, lack of strategic connectivity among G2G (Government to Government) institutions, skills and competency deficiencies in BPR (Business Process Reengineering), weak legal frameworks in large observed as key challenges impeding e-government in developing countries [10, 11, 12, 13, 14]. These impediments, thus not limited to, entailed failures of e-government projects distressing increasingly tight budgets, time, and more significantly, credibility loss of involved actors creating a considerable burden in future projects. Moreover, the project failures increased public resistance toward future and in-progress projects. As a result, the loss of credibility and public trust in e-government distracts the progress of modernization means of the public sector. In addition to the outcomes of these studies, many recent studies [15, 16] also observed factors such as complexity in terms of institutional size, end-user impact, originality, and politics increased higher rate of e-government project failures still in line with initial findings of Heeks [17] suggested only 15% projects in this regard evolved successfully.

Sri Lanka, a developing country currently being researched, has public service apparatus that inherits significant inefficiencies in delivering public services [18]. Sri Lanka's e-government ranked 95 of 193 countries (compared to 2020, 10 points drop), e-government development index is 0.6285, trailing regional leader Japan indexed 1.000 as of the year 2022 [7]. This inspired research into e-government initiatives in Sri Lanka initially through focus group interviews with subject matter experts, public managers, project managers, and selected responsible hierarchy of ICTA (Information and Communication Technology Agency), which is the apex ICT institute of the Sri Lankan Government. Even though the objectives of e-government projects are to deliver value to the public, hence outcomes suggest (1)

term public value is unaware to many in the society, (2) due to the fact uptake of e-governments initiatives is significantly lower, (3) the majority of projects failed or only partially successful due to inadequate funds and lack of BPR approaches and (4) public value of e-government initiatives are not measured. In this context, it could argue a relationship between the success of e-government – public value creation.

In a similar direction related to the success of public value creation associated with the success of e-government, Gil-Garcia and Flores-Zúñiga [19] state success or failure of e-government predominantly depend on citizens' take-up and systems implementations of government organizations. In contrast, Scott et al. [20] also argue that the success of government projects depends on how citizens perceive the value realized from utilizing those systems. Likewise, Neilson's [21] comparative analysis of Danish-Japanese e-governance frameworks further identified the criticality of examining value embedded in perceptions related to e-government projects to gain a deep understanding of public motivation, intergovernmental strategic connectivity, the public trust of e-government services as determinants of success.

This research aims to understand the public value of e-government in Sri Lanka, focusing on existing literature on the public value of e-government.

The research questions are:

(1) What is the status of the public value of e-government? And
(2) What are the key dimensions to consider in assessing the public value of Sri Lanka?

These research questions were answered by reviewing existing literature investigating how e-government is conceptualized and the suitability of adopting existing frameworks to measure public value in e-government in Sri Lanka to develop a conceptual framework that can guide research and practice.

Subsequent sections describe the theoretical background, public value measuring frameworks, the general value of e-government in Sri Lanka, results analysis, discussion, proposed conceptual framework, and conclusion.

II. THEORETICAL BACKGROUND

2.1 Public value of e-government

ICT is both an enabler and an embedder that impact most public service value. Possible actions or activities that are impractical in the absence make it an enabler, while ICT is an embedder in the sense it creates values into systems. Implementation and adaptation of technology are influenced by professed values [22]. At this outset, it's worth attempting to further distinguish between public sector value, public value, and e-government as values defined in many ways from different perspectives. Although both public and private sector organizations exist to serve people, their concerns are various. Private organizations are profit-driven, serve people as customers, and are focused on profit maximization. In contrast, the public sector (government organizations) serves the public with the mindset of service orientation and sees people as constituents, such as citizens, taxpayers, or government stakeholders. As a result, government organizations are also concerned about public value.

The first theoretical concept is a public value derived from the marginal concept of Moore [3], followed by various contributions from Stoker [23, 24]. Next, Kelly et al. [25] proposed a topology of public value as services, outcomes, and trust, later adopted by Castelnovo and Simonetta [26] in their study of local e-government project of Lombardy and Kerns [27] as well as in their discussions related to public value and e-government.

This study adopted the theory **of public value** from Moore's [3] theorization of public value from the perspective of public administration, where public value is citizens' collective expectations concerning government and public services. Actions from government organizations directly have no impact on the public (citizens). Still, in the broader sense, it intends to impact citizens as in the stakeholder groups and their interests [26]. In that sense, Castelonovo [26] argues examining public value from stakeholders' groups' perspectives and their interests must be focused on such citizens as taxpayers, citizens as policymakers, and citizens as participants broadly. Bozeman and Jørgensen [28] supported Moore's theory by further arguing that the creation of public value should be the goal of any public sector organization by meeting the needs and wishes of the public.

Adaptation of ICT in the public sector employing e-government is recognized as a channel that would have a socio-political impact on a society where that is further recognized through public value measuring frameworks that address the outcomes of socially desirable products such as fairness, trust, and legitimacy depend on socio-political context [4, 29]. Castelnovo [26] further argues that public value created for citizens, policymakers, taxpayers, and customers in their stakeholder perspective should also be evaluated based on the increased ability and capacity to deliver public value through sound e-government policies.

The second theoretical concept is sources of public value creation. There are three **sources of public value creation**. Delivery of quality public services, effectiveness of public organizations, and achievement of socially desirable outcomes are recognized as their sources of public value creation and produce public value in three different ways [24, 30]. Kelly et al. [25] and Kerns [25, 27] describe fulfilling citizens' expectations through quality e-government services creates public value. Efficient public organizations deliver public value to citizens by meeting public desires. Also, implementing various public sector projects create public values such as trust, self-development, and equity [30].

The third theoretical concept is inventories of public value. The theory of **inventories of public value** in a society proposes quality, user orientation, efficiency, openness, responsiveness, equity, self-development, confidentiality, democracy, and environmental sustainability are representatives of public values created through earlier mentioned public value sources were information quality. User orientation can be appreciated through public service delivery [31, 32, 33]. At the same time, equity, self-development, trust, democracy, and environmental sustainability can be achieved as socially desirable outcomes.

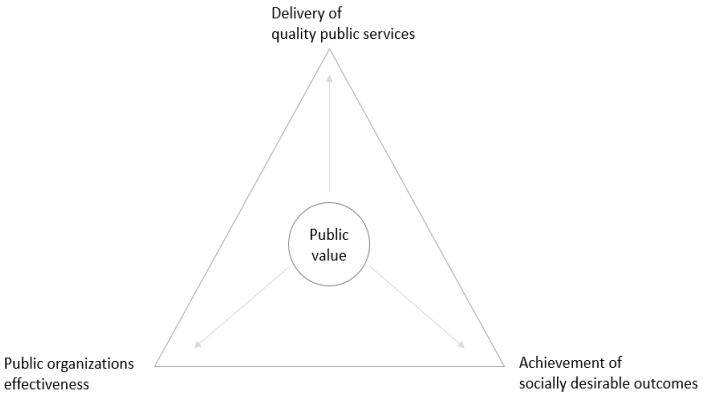
The fourth theoretical perspective is the **dimensions of e-government**. The literature suggests e-government can be approached from different perspectives, such as (1) e-citizens, (2) e-services, (3) e-administration, and (4) e-society, where citizens approach to focusing maintaining relationships between public organizations and citizens by engagement, facilitating accountability, and encouraging participation in democratic decision making and provision of public services. The e-administration approach concentrates on improving

the public process by cutting costs, interconnecting government entities, empowering its employees, and improving the transparency and accountability of public organizations. The E-society approach focuses on building relationships between public servicing organizations, civil societies, and non-profit organizations [17, 31]. The other perspective is dimensions of **sustainable e-government**, which suggests that the development of e-government and good governance has a strong positive correlation with sustainable economic growth and sustainability of e-government. In addition, telecommunication index and online service indexes are identified as determinants of sustainable e-government [34, 35].

In this background, Moore's [3] public value theory, ICT enabled public sector reforms and adaptation increasingly utilized to study the public value of e-government. Many scholars, including Kerns [27] and Deng [36], adopted or theorized to develop public value measuring frameworks based on original theory. These studies further suggested public sector value should be understood in the context of ICT impact factoring potential for transformation.

The government's strategic goals go beyond economic benefits and political gains. Public value or common good for citizens focused on quality of life, social well-being, openness, accountability, transparency, social equity and inclusion, and equal treatment of constituents. At the same time, achieving public value in e-government is understood as the recognition and ability of e-government systems that could cater to improved services to citizens, improved efficiency in delivering public services via government organizations, and democracy [37, 38, 19, 8, 39].

Synthesizing various findings essential sources of public value could be illustrated below:



2.2 Public value of e-government measuring frameworks

As e-government has gone through various phases for further improvements, the concept of public value is becoming increasingly popular worldwide with the introduction of frameworks for assessing the performance of public services [36]. Public administrations looking for means of delivering effective and efficient public services to citizens expect preferences with higher value delivery expectations. With this popularization of public value as the modern driver for e-government, several attempts have been made to develop different approaches to evaluating public value [36, 40, 18].

Kern [27] adopted Kelly et al. [25] and proposed three sources for the measurement of the public value of e-government, namely development of public trust, delivery of quality public service, and socially desirable outcome achievement where in this framework indicators are proposed creating public value through the delivery of quality public service. Quality delivery of public service is measured based on seven (7) arrows, namely: (1) information provision level, (2) e-government usage, (3) availability of choice, (4) user satisfaction level, (5) extent of e-government focus on need (6) extent of e-government focus on priorities and (6) cost-effectiveness. This framework is utilized in assessing the public value of e-health initiatives in the United Kingdom.

The same framework of Kern [27], later extended by Golubeva [41], proposed a framework for evaluating the public value of e-government portals in the Russian Federation based on three (3) dimensions (1) public trust (2) public policy outcomes and (3) public service quality. Openness, usability, and citizen-centricity indicators are used to measure public service quality, and transparency and interactivity are utilized to measure the public trust value.

Karunasena et al. [30] extended Kern's [27] framework by including public organizations' effectiveness as a dimension of evaluating the public value of e-government, where the point of public organizations is measured by efficiency, accountability, and citizens' perception as indicators. At the same time, public trust in public organizations is evaluated via (1) information security and privacy in e-government services, (2) citizen trust in e-government services, and (3) transparency of e-government services. The public value of public service delivery was evaluated based on (1) information availability, (2) the significance of information from the citizen's perspective, (3) the availability of multiple channels for the public to access services, (4) cost-effectiveness (5) service delivery fairness (6) public satisfaction of e-government services and (7) citizen's take-up of e-government services like the approach of Kern's framework.

The framework of Grimsley and Meehan [42]evaluated the public value of e-government, focusing on (1) services, (2) user satisfaction (3) trust and outcomes, where this framework was validated based on survey data collected on e-government projects in the United Kingdom given, emphasizes to the end-user experience, provision of public services, service outcomes towards public trust.

With a different perspective of measuring public value, the European Commission proposed the eGep framework [43] to gauge the public value of e-government based on financial, political, and constituency values. Three public value drivers, namely effectiveness, efficiency, and democracy considered in the framework. Efficiency is evaluated by examining (1) cashable financial gains for public organizations, (2) the extent to of public organizations empower public employees, and (3) IT infrastructure improvements in public organizations. Democracy is evaluated based on (1) considering the extent to of public organizations demonstrate transparency, openness, and citizen participation. Finally, effectiveness is measured by examining (1) the reduction of administrative burden on citizens, (2) improved citizen satisfaction with e-government services, and (3) the inclusiveness of public services.

Considering the multidimensional nature of projects, Liu et. Al [44] proposed a public value measuring framework for EU (European Union) member states suggesting focusing on financial, social, and operational values, which were considered to assess public value from a G2B perspective. As a result, this framework was developed, focusing IT investments on the public sector.

Omar et al. [45]proposed a conceptual framework for measuring public value by focusing quality of e-government services where service quality is measured considering system quality, service quality, and information quality from citizens' perspectives in the context of how citizens perceive public value.

The agency for the development of Electronic Administration in France [46, 47]proposed a public value measuring framework with the focus of evaluating financial benefits to the public sector and citizens by examining (1) direct customer value, (2) operational and social value (3) and finance value of e-government initiatives in France. Finance value is determined based on government revenue by NPV (net present value) and monetary gain or loss of the project by assessing IRR (Internal rate of return). The social and operational value measured based on improved service delivery aspects and employee satisfaction based on the results of e-government projects. Direct customer value is calculated by assessing the benefits received by citizens, such as service quality, social impacts, cost savings, time-saving, etc.

Bai [40] proposed a framework measuring the public value of e-government initiatives considering a specific focus on Chinese government practices adopting Deng's [36] original framework examining (1) the delivery of public services, (2) the effectiveness of public organizations and (3) development of trust where. Delivery of public services is measured based on choice, fairness, service availability, citizen satisfaction, and cost-effectiveness. The effectiveness of public organizations is estimated based on interactive communication, citizen's perspective, and efficiency. And the development of trust is measured based on the security and privacy of systems, transparency, and public participation.

Rawahi et al. [48] argue the biases towards the realization of efficiency and service effectiveness proposed focusing on delivery aspects creating public value indicated a lack of public value generation in non-democratic and emerging democracies. Based on the observations offered, a framework adopted structuration theory further developing Moore's [3] conceptual work examining citizen's response towards r-government initiatives identifying factors influencing government organizations delivering public services. Accordingly, their study proposed a public value framework factoring key determinants as (1) e-technology, (2) operational capability, and (3) authorizing environment aligning Moore's strategic triangle and Orlikwoski's [49] structuration model.

Inversely to earlier studies of generating public value, Zavattaro [50]introduced a public value measuring framework based on millennial social media usage that can change public managers' and administrators' way of delivering ethos, achieving meaningful micro-encounters adopting the best utilization of social media in providing public services through collaboration, transparency, and dialog. The framework encourages the government to conceptualize a social media strategy based on millennial preferences and expectations that drive towards a content strategy delivery of public value examination based on (1) trust, (2) openness, (3) public engagement, (4) user preference, (5) democratic exchange and (6) accountability.

Chu et al. [51] proposed a public value measurement framework based on open government data in Taiwan, suggesting the public value of e-government shall be measured by examining (1) operational value, (2) social value, and (3) political value. Operational value is estimated based on effectivity and user-oriented service determinants. The social value is measured by examining public trust, quality of life, self-development, and environmental sustainability. Finally, the political value is estimated based on transparency and accountability of public services, citizen participation, and equity in accessibility.

Papi et al. [52] proposed a public value measurement model arguing the practical applicability of existing frameworks. This model stresses the public administrators (PA) ability to achieve long-term symmetry of public satisfaction and PA's functional needs. Accordingly, the model consists of a value pyramid of intangible, economic, social, and public value on top of the pyramid based on the assumption that the benefits of individual layers should be greater than sacrifices to create value in separate value-creation layers. Intangible value is measured using five domains: structural, human, relational, empathetic, and evolutionary. The economic value is calculated by comparing financial equilibrium and financial efficiency. Finally, temporal, quantitative, qualitative, and monitory subdomains are measured to obtain social value.

According to Talbot [53], public value creation balances and realizes three interests: self-interest, public interest, and procedural interest. This proposed framework it's emphasized the significance of the scorecard approach. Self-interest is described as providing good quality public service that is cost-effective and affordable to citizens. Public interest stresses the social outcomes aspects of public services—providing taxes and legitimacy for 'common good' activities that improve the welfare of all citizens. Finally, even individual services, due processes in people's participation in public decision-making, fairness, and equity are factored as procedural interest.

The framework proposed by Suri and Suhil [54] conceptualized measuring the public value of e-government in Indian e-government initiatives focusing on (1) efficiency, (2) transparency, (3) interactivity, and (4) decision support. Efficiency is measured based on improved service delivery, reduced paperwork, effective communication, and simplification of procedures. Transparency is measured by factoring reliability of information delivery, easy access, fairness, and comprehensiveness of information delivery. Interactivity is estimated based on improved interactions of actors. Finally, decision support is measured based on enhanced planning and decision-making, better monitoring, and control.

Bhattacharya et al. [55]proposed an e-services quality model based on Indian government portals to measure the public value of e-government from the citizen's perspective. This framework measures e-services quality based on citizen centricity, technical adequacy, information usefulness, comprehensiveness, transactions transparency, usability, interactions, privacy, and security dimensions. In the same context, Papadomichelaki and Gregoris [56] proposed measuring public value based on e-government quality (1) trust, (2) reliability, (3) ease of use, (4) content and appearance of information, and (5) interaction functionality.

Efforts made by Lindgren and Jansson [57] to understand the public value of e-government through hermeneutic analysis discussing various combinations of three (1) service (2) electronic and (3) public dimensions further proposed conceptual framework that would contribute to theory building by taking a multidimensional approach of on public services argued to be adopted to capture the complexity of e-government.

The frameworks mentioned above suggested measuring e-government adopting various assessment methodologies from different perspectives [72] have multiple shortcomings [34, 50]. Hence, more is needed to calculate the public value of e-government in Sri Lanka.

For example, Kerns's [27] framework focused on evaluating public value based on the delivery of public services without considering e-government service quality attributes such as information quality and functionalities of service usability. The same framework should have focused on public organizations' operational efficiency and effectiveness when measuring public value, which Moore considered an essential source in public value theory [24]. Further, it lacks dimensions measuring trust and achievement of outcomes of e-government

which are recognized as two primary sources of public value creation. Factoring public value in society is extremely important to capture the accurate picture related to the public value of e-government. The other shortcomings of the framework are such perspectives referring to values in a society like an efficiency, responsiveness, openness, user orientation, self-development, democracy, and sustainability of the environment not accounted for. Golubeva [41] focused on public value created by Russian Government portals; hence limitation is that the portals are not representing e-government performance. Both frameworks of Golubeva [41] and Karunasena et al. [30] inherit limitations of the Kerns [27] framework. These frameworks also failed to recognize measuring public value in society and lack indicators measuring socially desirable outcomes and service quality. Focusing only on secondary data is also a limitation of Karunasena et al.'s [30]framework, which is essential to obtain direct feedback from citizens. The framework of Heeks [17] was critiqued for needing to fully address the service aspects, outcomes, and trust focus [58]. The framework introduced by the European Commission [44] was designed for the unique characteristics of e-government in European countries that is mature compared to developing countries. Therefore, it is inappropriate to measure public value in developing countries such as Sri Lanka yet to reach expected maturity levels. This framework was further criticized for the e-administration business failing to include the e-enabling aspect of society [17]. At the same time, the framework encourages researchers to utilize secondary data such as official stats, third-party web assessments, and standard cost model estimates rather than considering citizens' direct perceptions. The approach of Liu et al. [44] was biased towards the G2B perspective of e-government, where public value is primarily defined as the value created by the government for its citizens. Therefore, in any public value measuring framework, it's essential to account G2C perspective of e-government. Non consideration of achievement of socially desirable outcomes, trust, and operating effectiveness are fundamental shortcomings of Omar's [45] framework. Omar's framework only focused on the quality of public services. Unlike the private sector, the public sector must create value [31]. Therefore, in measuring the value of e-government initiatives, only factoring economic benefits is not desirable as in a complex public service environment, citizens play a critical role in different stakeholders' perspectives. In this context framework, the social and democratic values of a society also need to be considered to examine the actual public value of e-government. Therefore, the frameworks [47, 46, 43] more focused on economic values using NPV, IRR, and cost-benefit analysis calculations are also not feasible in Sri Lankan context. Bai [40] conducted a rigorous review of e-government performance and public value based on the original framework of Deng [30]. Even a challenging framework considering both government and citizen perspective in measuring the public value of e-government lack validity and reliability due to a lack of rigorous empirical testing.

At the same time, specific frameworks [48, 50] ignored considering the critical public values of a society. The frameworks of Suri and Suhil [54] and Bhattacharya et al. [55] focused on Indian Government portals with a narrow focus that lacks validity and reliability. Lindgren and Jansson [57] framework ignored trust and socially desirable outcomes. Moreover, these frameworks' tested and validated methodologies need to be clarified. The context-specific nature of public value and the dynamic nature of value changes [28, 31] further signify the need to test and validate a framework related to the unique Sri Lankan context.

To adequately address the above issues, it is essential to develop a new conceptual framework and empirically test and validate it to evaluate the public value of e-government in Sri Lanka.

III. PUBLIC VALUE OF E-GOVERNMENT IN SRI LANKA

Sri Lanka introduced computers to the public sector by introducing the IBM (International Business m Machines) accounting machine to the Insurance corporation back in 1967, followed by computers to the Department of Statistics and Engineering Cooperation. After that, many computation programs were introduced in the public sector. However, most initiatives only yielded a significant outcome toward e-government development in Sri Lanka when e-Sri Lanka was launched in 2002. The initiative originated from the private sector with the collocations of NCC (National Chamber of Commerce), the local software industry leaders funded by USAID (United States Agency for International Development) motivated by the Indian software industry achievements. Even though initially e-Sri Lanka initiative mainly focused on the software industry, with the involvement of the world bank, other donor organizations, consultative groups, and social actors, the e-Sri Lanka initiative further expanded by recognizing IT transformation as a way of achieving growth, equity, and peace in society. The development of e-government is intended to improve public services, bridge the digital divide, enhance citizens' quality of life and achieve economic growth by reducing poverty [59]. As a result, Sri Lanka introduced a unique e-government initiative by launching a reengineering government program [36].

Sri Lanka recognized global e-government trends by setting up National Computer Policy in 1983, followed by the e-Sri Lanka project in 2002 through an ICT roadmap to address the digital divide [5]. It is further strengthened by GOSL's adaptation of a unified e-government strategy with five (05) strategic thrust areas under the e-government 2020 envision [60]. With the launch of Nenasala (eLibirary) in 2005, the GOSL made strides in the rapid enhancement of IT literacy across Sri Lankan society [61]. To strengthen the GOSL e-government strategy, ICTA launched impressive digital initiatives such as NSDI (National Spatial Data Infrastructure), e-Parliament, e-Motoring, e-Divisional Secretariat (eDS), BDM (digitalization of Birth, Death, Marriage certificates), e-Pension, e-SLIMS (State Land Information Management System), Online Revenue License Issuance, e-Samurdi, e-populations register, e-Local Government and National Fuel Pass more recently [62].

Despite all efforts, a recently published report by the Department of Census and Statistics of Sri Lanka [54] indicated computer literacy stands at 32% and digital literate at 49.5%. Take up the rate of e-government services by Sri Lankan citizens was observed as 22.3% [30, 63]. Furthermore, according to a recent UN study, 77.7% of the population needs to be aware of e-government services [1]. A similar study [64] finds citizens' take-up on eSriLanka initiatives also highlighted only 29% of aware of e-government services, where still internet usage stands at 33.11% [7]. Compared to developed countries in the adaptation of e-government initiatives achieving higher citizens take-up of services in developed countries, developing countries like Sri Lanka continue to render poor results in delivering public value [14, 50, 51, 18, 5]. Sri Lankan public service apparatus, inherits significant inefficiencies in providing public services [18]. While noticeable achievements were made by some countries in the Asian region like Japan, Korea, Malaysia, and Singapore; still the majority of e-government initiatives failed at a rate of 60% similarities observed citing unique socio-political context. Today's challenge is the need for solid temptation and a clear focus on citizens' needs in ICT implementations resulting in a need for more awareness and lower take-up [65].

Several attempts were made to evaluate the performance of e-government in Sri Lanka. Samaratunga and Waddell [66] investigated potential problems related to e-government-based reforms, while Davidraju [67]attempted to examine e-government implementation strategies. Focusing on a telecenter development project, Gamage and Halpin [68] examined the impact of e-government initiatives

addressing the digital divide. Weerakkody et al. [69] further discussed the challenges faced in developing and implementing e-government initiatives. Weerakkody et al. [69] also attempted to examine national culture's influence on e-government implementations compared to the United Kingdom. ICTA [70]also conducted various surveys dated back to the 2011 first national survey on ICT usage to examine government sector ICT usage, government visitors' literacy, and level of use of ICT partnering with a local consulting firm similar to the Department of Statistics [71]. However, more significantly, Sri Lanka lacks recent attempts evaluating of public value yield from e-government initiatives [5]since the launch of the e-Sri Lanka initiative in 2002 compared to other South Asian regional countries such as India [72, 73, 74, 75, 76], Bangladesh [77], Nepal [78], Pakistan [79]. However, like highlighted in recent fewer studies public value of e-government initiatives in Sri Lanka is not measured adequately, is unclear, lacked transparency. As a result, public perception towards e-government projects increasingly varied, resulting in lower take-up [30, 18, 36, 63, 5]. Adequately measuring the performance to date of the e-Sri Lanka initiative is urgent as the ICT road map towards e-government was introduced way back two decades ago (in November 2002) [5, 63, 36].

Therefore, assessing the public value of e-government is an urgent, important priority in Sri Lanka due to the: Firstly, despite two decades passed launching e-Sri Lanka still expected results yet to yield in the public sector resulting in lower awareness and uptake. Secondly, Sri Lanka heavily relies on donor organizations such as world bank funding for e-government initiatives obliging the government to account for their investments in a timely. Thirdly, rigorous assessment and in-depth studies have yet to be done so far [5, 30] examining the public value of e-government initiatives.

3.1 Key determinants of the public value of e-government

The readiness of ICT infrastructure is a critical enabler in reaching the public and delivering public services. Sri Lanka's telecommunication is 0.5289, and internet penetration remains at 34.11, significantly lower, similar to developing countries [1]. Less developed telecommunication infrastructure and the digital divide substantially impact the development of e-government [1]. Tennakoon [5] discusses uneven access to the internet, legal and regulatory constraints, lack of strategic interconnectivity between government organizations due to rigid administrative procedures, political influence, lower computer literacy, security vulnerabilities, and financial controls identified as challenges to e-government in Sri Lanka acting as significant barriers. The same study also indicated that lack of ICT infrastructure, network bandwidth issues, ICT education and awareness, cost of devices, risks of failures, and lack of security impede the development of e-government.

Furthermore, the need for business process reengineering (BPR) efforts results installed government projects preventing delivering e-government services [18]. A similar study [14] on the e-Pensions initiative was delayed for four years due to a Lack of human resources, inter-government organizations conflicts (group dynamics), inadequate funding, bureaucratic constraints, lack of BPR approach, and due to restrictive social conditions. One of the critical failure reasons was virtually no strategic connectivity between the pension department and the rest of the related government organizations. Major recent studies [80, 81, 82, 83, 84, 85, 86, 87] agree implementation of BPR toward the innovative application of systems delivers flexibility, team-oriented cross functionally coordinated management across public organizations towards strategic connectivity that would ultimately create public value; the common good for taxpayers and citizens. These studies further established that adapting modern BPR practices leads to organizational efficiency, cost-effectiveness, and improved performance, providing a holistic view of public service delivery performances necessary to deliver public value. Language barriers, resistance to change, lack of public trust, policy barriers, financial constraints, inadequate infrastructure, lack of integration across government systems and organizations, change management, security risks, trust issues, and low IT literacy dimensions need to be focused in measuring the public value of e-government based on the e-government architecture study [88]. The recent survey [63] also suggests that Take up, Service delivery, efficiency, User-friendliness, and Quality content are the most significant determinants of the public value of e-government in Sri Lanka.

IV. Results Analysis and Discussion

The current review aimed at theory building by organizing existing research related to the public value of e-government. The aim was to develop a descriptive conceptual framework that improves understanding of the public value of e-government, filling the research gap related to the Sri Lankan context.

Accordingly, the idea of concept-centric by Webster and Watson [89] was adopted to investigate the current state of the public value of e-government and the suitability of existing frameworks to the Sri Lankan perspective. For academic journals, conference proceedings from the year 2012 to the year 2022 were reviewed. For this purpose, articles are categorized on their thesis, orientations, and emphasis. These are referred to as concept-centric views and artifacts created, referred to as concept-matrix, which were indexed existing studies assisted in identifying areas where a plethora of research exists [89] research gaps related to the public value of e-government. Furthermore, to address the status of the public value of e-government, content analysis of narratives [90] focusing public value of e-government on existing studies also utilized reading each article with careful attention.

Finally, overarching dimensions of the public value of e-government and overarching dimensions of existing frameworks are generalized considering the unique socio-economic context related to Sri Lanka.

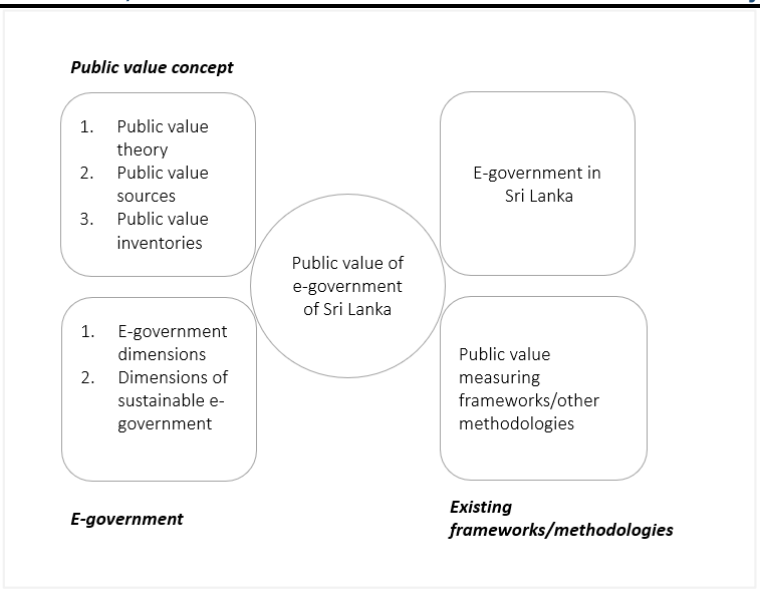


Figure 1: Generalization of main dimensions to assess the public value of e-government in Sri Lanka - a graphical representation.

Analysis of articles identified four main overlapping dimensions for assessing the public value of e-government. They are the public value concept, e-government, nature of e-government, and existing frameworks/methodologies as generalized, illustrated in Figure 1. Public value theory, public value sources, and public value inventories are categories in the public value concept. Also, the Dimensions of e-government and sustainable e-government are further categorized into the E-government dimension. As the aim of the research is to build a conceptual framework to assess the public value of e-government in Sri Lanka, it is essential to consider the nature of e-government, which includes existing country-specific policy frameworks and a thorough assessment of the suitability of existing frameworks, methodologies after broadly summing up reviewed relevant articles.

Table 1:Strengths and weaknesses of existing public value measuring frameworks

Study/Framework	Strengths	Weaknesses	Validity and reliability
Kern [27]	1.Quality of public service delivery, outcomes, and trust considered 2. The quality of public value service delivery evaluated focusing usage, availability of choice, user satisfaction, priorities, fairness, cost savings and level of information availability	1.Improtant public values in a society such as user orientation, efficiency, self-development, democracy, responsiveness, and openness not considered 2. Quality of information, service and usability not considered	Validity and reliability issues exists
Golubeva [41]	Public service quality, trust and outcomes considered. The quality of public service is measured focusing usability, openness, and citizen centricity. Trust is measured through transparency and interactivity.	The public value in a society is not considered. Limited to focus on portals.	Validity and reliability issues exists
Karunasena et al. [30]	1. Extended from Kern's [27] framework. Delivery of public services, development of trust, achievement of socially desirable outcomes and delivery of public services considered. 2. Trust is measured focusing security, privacy, transparency, citizens participation and trust in e-services 3. Accountability, efficiency, citizens perception considered in measuring effectiveness	1. Based on secondary data 2. Service quality of e-government, important public values in a society not considered 3.No indicators proposed to measure outcomes.	Validity and reliability issues exists
Grimsley and Meehan [42]	1. Based on Moore's theory of public value focusing services, user satisfaction, trust and outcomes. 2. Trust is evaluated based on availability of information	1. Based on two case studies 2. Service quality of e-government, important public values in a society not considered	Validity and reliability issues exists
eGep[43]	1. Evaluated through efficiency, democracy, and effectiveness. 2. Designed to assess in developed countries. 3. Effectiveness assessed based on financial gains, employee empowerment and improved ICT infrastructure.	1. Focused on government projects in developed countries. Not suitable for developing countries. 2. Evaluated based on secondary data such as internal data from administrations, third party assessments, defect cost calculations models and end user satisfaction surveys. 3. Indicators are e-administration biased and no indicators to measure values in a society 4. Critical values such as trust, transparency, user orientation, environmental sustainability were not considered	Validity and reliability issues exists
Liu et. al [44]	1. Focused on G2B perspective 2. Based on financial, social, operational values	1. G2C , G2G and G2E perspectives of public value ignored 2. Public value creation sources not considered, and also important public values of a society was not factored	Validity and reliability issues exists. Narrowly focused on a case study

Study/Framework	Strengths	Weaknesses	Validity and reliability
Omar et. al [45]	1. Public value of quality public services considered. 2. Service quality, systems quality and system quality dimensions focused	1. The framework is conceptual. 2. Important public values of a society is not considered	Validity and reliability issues exists. Narrowly focused on a case study
ADEA [46, 47]	Social, operational and financial values considered	1. Public value creation sources ignored 2. Important public values of a society is ignored	Validity and reliability issues exists
Bai [40]	1. Based on Karunasena et al. [30] original framework 2. Delivery of public services, development of trust and delivery of public services focused in assessing public value	1. Based on Chinese government portals 2. Important value in a society is not considered 3.Service quality is not considered	Validity and reliability issues exists
Rawahi et. al [48]	1. Based on original theory of Moore's [3] and Orlowski's [49] structuration model 2. Focused on delivery aspects	1. The framework if conceptual 2. Important public values in society is ignored 3.Service quality is not considered 4. Lacks measuring indicators	Validity and reliability issues exists
Zavattaro [50]	1. Framework based on millennial social media usage	1. Conceptual framework only considered social media behavior of millennials 2. Not considered important dimensions such as delivery of public services, important public values of a society 3. Ignored important dimensions related to public organizations effectiveness	Validity and reliability issues exists
Chu et. al [51]	1. Based on open government data of Taiwan 2.Public value examined considering social, operational, and political values	1. Important dimensions such as information quality, systems functionality not considered 2.Foused on secondary data	Validity and reliability issues exists
Papi et. al [52]	1. The model considered ability of public administrations delivering long term public satisfaction 2. Value pyramid concept to measure public value 3.Consist of measuring grid to measure dimensions	1. Model practical testing limited to single case study in Italy. 2. Focused on secondary data	Validity and reliability issues exists
Talbot [53]	1. Considered scorecard method in measuring public value in new public administration in UK. 2. Self-interest, public interest and procedural interest dimensions focused	1.Improtant public values in public services such as cost savings, systems functioning not considered 2. Quality of information, service and usability not considered 3. Approach to model development lacks clarity	Validity and reliability issues exists

Study/Framework	Strengths	Weaknesses	Validity and reliability
Suri and Suhil [54]	1. Focused on efficiency, transparency, interactivity, and decision support in the framework	1. Limited to Indian government portals 2. Not considered important dimensions such as delivery of public services, important public values of a society 3. Ignored important dimensions related to public organizations effectiveness	Validity and reliability issues exists
Bhattacharya et. al [55]	1. The model framework considered e services quality. 2. Quality of information assessed focusing privacy and security, citizen centricity, technical adequacy, information usefulness, comprehensiveness, transaction transparency, interaction, usability	1. Focused on Indian government portals 2. Not considered important dimensions of socially desirable outcomes and dimensions related to public organizations effectiveness. 3. Also cost saving aspects related to public services not considered	Validity and reliability issues exists
Papadomichelaki and Gregoris [56]	1. Considered with exclusive focus on measuring service quality	1.. Not considered important dimensions of socially desirable outcomes and dimensions related to public organizations effectiveness. 2. Also cost saving aspects relied to public services not considered	Validity and reliability issues exists
Lindgren and Jansson [57]	1. Based on hermeneutic analysis discussing various combinations of service, electronic and public dimensions	1. Not considered important dimensions related to service delivery quality such as information quality, systems functionality, and cost savings. 2. Also, important dimensions related to a society also not considered in the framework	Validity and reliability issues exists

The summary of strengths and limitations of existing frameworks, as presented in Table 1, suggests these frameworks lack validity and reliability. Furthermore, the tested methodologies could be more explicit. Finally, the context-specific nature, variations of public value interpretations, dynamic nature of social need reflections, and different interpretations further create the necessity of testing and validating existing frameworks before any adaptation in public value measuring.

This signifies developing a new conceptual framework, empirically testing and validating that would effectively address the above shortfalls. Guided by the same focus, the public value measuring dimensions of existing frameworks are summarized in Table 2 below. Abstracted dimensions are segmented as main dimensions and sub-dimensions that explain main dimensions. This indicates user orientation, trust, efficiency, and information quality factored and focused extensively in evaluating public value. Apart from those dimensions' systems functionality and openness, equity, and cost savings dimension also received further attention. However, it could further observe evaluated frameworks given less focus on citizen participation and environmental concerns. Least attention made to considering financial gains and quality of life.

Table 2: Abstracted dimensions to evaluate the public value

Study/ Framework	***Main dimensions***	***Delivery of quality public services***				***Public organizations effectiveness***			***Achievement of socially desirable outcomes***						
	Sub dimensions	Information quality	Systems functioning	User orientation	Cost savings	Efficiency	Openness	Responsiveness	Trust	Self-development	Equity	Citizen's participation	Environment concerns	Quality of Life	Financial Gains
Kern [27]		√	X	√	√	X	X	X	√	X	X	X	X	X	X
Golubeva [41]		√	X	√	X	√	√	X	X	X	X	X	X	X	X
Karunasena et al. [30]		√	√	√	X	√	√	√	√	√	√	X	X	X	X
Grimsley and Meehan [42]		X	X	√	X	X	X	X	√	X	X	X	X	X	X
eGep[43]		X	X	√	X	√	X	X	X	X	√	√	X	X	√
Liu et. al [44]		√	√	√	X	X	X	√	√	X	X	X	X	X	X
Omar et. al [45]		√	√	√	X	X	X	X	X	X	X	X	X	X	X
ADEA [46, 47]		X	X	√	√	√	X	X	X	X	X	X	X	X	√
Bai [40]		X	√	X	√	X	X	X	X	X	X	X	X	X	X
Rawahi et. al [48]		√	√	X	X	√	X	X	X	X	X	X	X	X	X
Zavattaro [50]		X	X	X	X	X	√	X	√	X	√	√	X	X	X
Chu et. al [51]		X	X	√	√	√	√	X	√	√	√	√	√	√	X
Papi et. al [52]		X	X	X	√	√	X	X	X	X	X	X	√	X	X
Talbot [53]		X	X	X	X	X	√	√	√	X	√	X	X	X	X
Suri and Suhil [54]		√	X	X	X	√	X	X	X	X	X	X	√	X	X
Bhattacharya et. al [55]		√	√	√	X	X	X	X	√	X	X	X	X	X	X
Papadomichelaki and Gregoris [56]		√	√	√	X	√	√	√	√	X	X	X	X	X	X
Lindgren and Jansson [57]		X	X	√	X	X	√	X	X	X	√	X	X	X	X

Table 3: Unique dimensions to consider in evaluating the public value of e-government in Sri Lanka

Study	ICT Infrastructure	End User Satisfaction	Cost Effectiveness	Information Quality	Take-up	Organization Efficiency	Strategic Connectivity	Performance Management	Security/Privacy	Transparency	BPR	Internet Accessibility	Computer Literacy	Legal/Regulatory Constraints	Political Influence/Bureaucracy	Public Awareness	Finance/Budgets	Language Barriers	Change Management
UN [1]	√	X	X	X	X	X	X	X	X	X	X	√	X	X	X	X	X	X	X
Tennakoon [5]	√	X	X	X	X	X	√	X	√	X	X	√	√	√	√	√	√	X	X
Elapatha et al. [18]	X	X	X	X	X	X	X	X	X	X	√	X	X	X	X	X	X	X	X
Vyver and Rajapaksha [14]	X	X	X	X	X	X	X	X	X	X	√	X	X	X	X	X	X	X	X
Liyanage et al. [89]	√	X	X	X	√	X	√	X	√	X	X	X	X	X	X	√	√	√	√
Sufna and Fernando [63]	X	√	X	√	X	√	X	X	X	X	X	X	X	X	X	X	X	X	X

In addition to abstracted dimensions from existing public value measuring frameworks, recent limited studies on public service delivery in Sri Lankan context indicates the significance of factoring the above-identified dimensions in any new approach to evaluate public value considering unique socio-economic conditions attributed in developing countries.

Table 3 summarizes these unique dimensions indicating the availability of ICT infrastructure, strategic connectivity between public service delivery organizations, security, and privacy, business process reengineering approaches (BPR), internet accessibility, public awareness, and budgets are critical dimensions to consider evaluating public value in Sri Lanka.

V. A CONCEPTUAL FRAMEWORK TO EVALUATE THE PUBLIC VALUE OF E-GOVERNMENT INITIATIVES IN SRI LANKA

The majority of e-government studies are based on technological determinants with the application of theories such as the Technology Acceptance Model (TAM), Diffusion of Innovation (DOI), and Unified Acceptance of Theory and Use of Technology (UTAUT) [91]. Researchers determined the common contributors such as perceived usefulness and ease of use; hence no detailed design or guidance related to public value measurement of e-government [92, 93] contradicts socio-technological phenomenon aspects [94] limited to developed countries [95].

Considering the socio-political characteristics of Sri Lanka and the implications from the literature review on public value measurements of e-government, it's proposed to adopt a new conceptual framework based on the original framework of Karunasena and Deng [30], the study outcomes of Bai [40], unique dimensions identified in recent studies and abstracted measurements from existing frameworks illustrated as Figure 2.

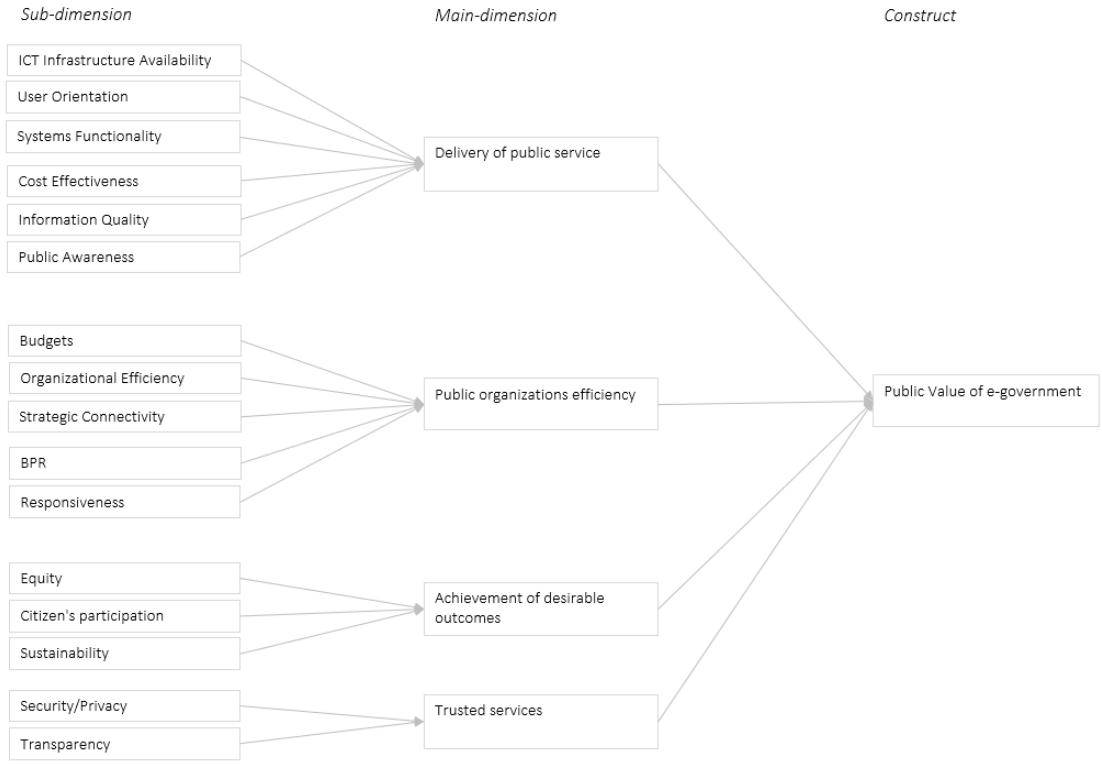


Figure 2: A proposed conceptual framework for evaluating the public value of e-government

The proposed framework hypothesizes that public value can be created by the Delivery of public service, Public organization's efficiency, Achievement of desirable outcomes, and Trusted services. It also hypothesizes public value created by delivering public service reflected by six attributes: ICT Infrastructure Availability, User orientation, Systems functionality, End-user satisfaction, Cost-effectiveness, Information Quality, and Public awareness. Similarly, a Public organization's efficiency is reflected by five attributes, achievement of desirable outcomes is reflected by three characteristics, and two trusted aspects reflect Services.

Public service delivery largely depends on ICT Infrastructure's availability, where Sri Lanka's telecommunication infrastructure index stands at 0.5483 [1, 7, 88, 5], further reflecting the digital divide. User orientation is described as the user-friendly end-user interfaces, links to other public servicing websites, familiar look, feel, and simplicity [27, 41, 96, 95, 42, 43, 44, 45, 47, 51] [55, 56, 57]. Systems functionality refers to the operational features of public servicing systems and online platforms [96, 30, 44, 45, 40, 48, 55, 56]. Cost-effectiveness is described as the cost saving to citizens due to the adaptation of online e-government services in contrast to traditional methods, including the socially disadvantaged [27, 47, 40, 51, 52]. Information quality significantly impacts public take-up of e-government initiatives and contributes to establishing trust and confidence [27, 41, 96, 95, 44, 45, 55, 48, 56]. Finally, public awareness describes the citizen's understanding of e-government services offered to public-by-public organizations that significantly contribute to take-up [88, 5].

Public organization's efficiency is a crucial indicator of pubic value originator of e-government services [98, 99], mainly determined by the availability of budgets [88, 5], organizational efficiency [41, 96, 95, 47, 43, 48, 59, 51, 52, 54] [56], strategic connectivity [5, 88], effective business process reengineering approaches [18, 14] and responsiveness [96, 100, 95, 44, 53, 56].

The achievement of socially desirable outcomes described here as **the achievement of desirable outcomes** of creating public value of e-government services reflects the impact of designed public service delivery platforms accomplishing sensual objectives and goals of a society [99]. Socially desirable outcomes are described as equity, citizen participation, and sustainability. Availability of services in native languages, accessibility to e-government services by the socially disadvantaged, and appropriateness of service content are further described as equity [96, 30, 59, 47, 84, 50, 53, 57]. The ability to initiate a public discussion on public services or set an agenda on online platforms, active citizen participation in e-government servicing platforms, and the ability of general servicing organizations to dissemination of public policies and educate the public are described as citizens participation [46, 50, 95, 51] defined as equity. Sustainability, the other related attribute, describes eliminating redundant labor-intensive work, sharing data resources across servicing platforms, energy saving, and green information technology [52, 51, 54].

Trusted services are the single most crucial factor that directly impacts the public value of e-government services [101]. Trusted services are based on the security and privacy of available public service delivery platforms and information transparency [27, 96, 100, 30, 42, 44, 50, 51, 53, 55] [56, 5, 88].

A structured questionnaire consists of 60 items to utilize as a measurement instrument to validate the new framework. Each item is to use a 5-point Likert- scale where value 5 represents "treasured" and weight one means "not valuable at all ."Before deployment of the instrument, a pilot study to conduct with 25 participants to assess the relevance. The citizens who utilize e-government services in urban and suburban areas are to be focused on as the target population across Sri Lanka, with a sample size of 2000. Simple random sampling technique to adopt. Collected data to be screened using IBM SPSS 25.0 statistical tool. To evaluate critical attributes in assessing the public value of Sri Lanka, the data to analyze using structural equation modeling (SEM) is necessary to study structural relationships in the proposed new framework by testing relationships between measured variables and unobserved constructs.

Further, statistical techniques of confirmatory factor analysis (CFA) and analysis of moment structures (AMOS) to perform to assess the constructs. Chi-square (x2) and the ratio of x2 to the degree of freedom (x2/pdf) to utilize for the model's overall fit assessment. To analyze absolute appropriate measures of the new conceptual framework, root means square error of approximation (RMSEA) and standardized root mean residual (SRMR) statistical techniques to deploy. To analyze the discrepancy between hypothesized model [102],

Comparative fit indexes (CFI), Goodness of fit index (GIF), Adjusted goodness of fit (AGIF), and Tucker-Lewis index (TLI) statistical methods to the array. To estimate the parameters of the model's maximum likelihood, estimate the technique to utilize.

One of the significant limitations among existing frameworks is the need for more validity and reliability. Therefore, the author wishes to test the conceptualized framework before utilization as a tool at the Sri Lankan local government network (LGN 2.0) consisting of 348 local government public service delivery agencies for validity, reliability, and generalizability. Subsequently, quantitatively assessed and empirically tested the new conceptual framework to measure the general value of Sri Lankan e-government initiatives.

VI. Conclusion

The current study organized existing literature related to the public value of e-government to examine the current state of research to identify the public value of e-government in Sri Lanka. Additional attempts were made to compare existing frameworks to investigate their suitability and adaptability in measuring public importance in a unique Sri Lankan context to develop a new conceptual framework addressing existing frameworks' strengths and limitations. According to the literature, for over a decade, despite efforts, the public value of Sri Lankan e-government initiatives needed to be adequately measured and clarified. No recent studies with the same focus stress the urgent, essential need for a deep-rooted focus on addressing the research gap. Further, it could also observe a need for more public awareness, inadequate ICT infrastructure, non-affluent BPR approaches, availability of budgets, and interconnectivity of public servicing organizations key in delivering successful e-government initiatives uniquely need to factor in assessing public value.

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