Thematic Analysis of Determinants for Evaluating Public Value of E-Government

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Abstract: This study aims to investigate the critical determinants of the public value of e-government in Sri Lanka, contributing to the research gap and offering an in-depth understanding. To realize the purpose, two research questions guided the research: (1) What is the status of the public value of e-government? and (2) What are the critical determinants of the public value of e-government in Sri Lanka? The study revealed the public value of e-government needs to be clarified and measured due to inadequate measuring frameworks that factor in the unique socio-political dimensions of the Sri Lankan context. Undertaken study outcomes offer the identification of critical determinants for formulating a new conceptual framework based on performing a thematic analysis of a comprehensive literature review of data. The analysis reveals the availability of ICT infrastructure, user orientation, systems functionality, cost-effectiveness, information quality, public awareness, sufficient project budgets, strategic connectivity of public organizations, business process reengineering, responsiveness, equity, citizens participation, sustainability, security, and privacy, transparency is critical dimensions in assessing the public value of e-government.

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

I. INTRODUCTION

The imperative role of digital technology is rapidly changing the way people live, work, and communicate. These technological advancements interlinked civil societies, facilitating communication and collaboration between communities and private and public institutions. As a result, public administrations and service delivery institutions across the globe have been irreversibly transformed structurally and in terms of government and citizens served. With the rapid expansion to every vertical of modern-day society, the e-government has become the cornerstone of modern-day society, expanding the quality of life, creating a more cohesive society, greater citizen participation in decision-making, strengthening accountability, and institutional inclusiveness towards sustainable economic growth. E-government has reached a critical point as it represents a panacea for government effectiveness and efficiency and is no longer viewed as an adjunct standalone digital tool [1, 2, 3].

Adopting information technology (ICT) unified with government operations and structures towards delivering effective, efficient services to citizens and businesses is commonly conceptualized as e-government. Public value is the emerging trend of assessing e-government [4]. Collective expectations of citizens related to government and public services are defined as public value [5]. Further, citizens are defined as people who represent various stakeholder roles in a society, such as taxpayers, customers of public services, policymakers, or citizens [6, 7].

Digital transformation made rapid strides in developed countries with more outstanding intuitional level commitments for modernization and adaptation of e-government initiatives, achieving higher citizen take-up [4]. In contrast, developing countries continue to render poor results in delivering public value, trailing the goal of public service digitalization and risking meeting sustainable development goals where e-government is recognized by the UN (United Nations) as a cornerstone [1]. In these societies, benefits to communities and vulnerable sections of the population are inconsistent with expected thresholds [1]. Despite the EGDI (e-government development index) of a recent UN survey [8] indicating a slight elevation from 0.5988 in 2020 to 0.6102 in 2022, suggesting an increasing trend, the South Asian region still recorded an EDI value of 0.5300, Oceania 0.5081 and Africa 0.4054 continue to record below the world average of 0.6102 entail the necessity of in-depth regional focused comparative studies.

Despite the benefits of optimal E-government implementations, these projects are often complex [9] and are prone to failure [10]. Mainly, conflicting economic priorities in leased development countries, budgetary constraints, outsized digital divide, ICT infrastructure inadequacy, strategic ambiguity in G2G(Government to Government) connectivity of servicing institutions, inadequate or weak legal and operational frameworks, skills and competency deficiency act as significant impediments thus not limited to. However, these entailed e-government project failures often distressed tighter budgets, more significantly leading to credibility loss with involved actors awarding huge burdens for future projects [11, 12, 13, 14].

Despite various initiatives, Sri Lankan public service delivery apparatuses still inherit significant inefficiencies [15] compared to regional peers. Sri Lanka's government ranked 95 out of 193 countries (dropped 10 points compared to 2020) with an e-government

development index of 0.6285, trailing regional leader Republic of Korea at 0.9529, E-participation index at 0.3523(dropped 41 points compared to 2020) ranked 107 of 193 countries [8]. These actualities inspired research into e-government initiatives in Sri Lanka through subject matter experts, focus group interviews, project managers, and identified key decision makers who are currently responsible at ICTA (Information and Communication Technology Agency), the apex ICT body of the Sri Lankan government responsible for the execution of eSriLanka strategic initiatives. Converse to set strategic objectives to deliver public value to citizens (1) majority of e-government projects ultimately failed or partially achieved due to inadequate funds mainly due to conflicting economic priorities (2) lack of BPR (business process reengineering) approaches (3) term public value is still unaware across the society and (4) more significantly public value of e-government initiatives is not measured. This context led to a clear argument for a correlation between the success of e-movement and public value creation, which is often described as a common good for citizens [2].

In a similar context of the direction of the success of public value creation and the success of e-government, the study of Gil-Garcia and Flores-Zúñiga [16] suggests that the success or failure of e-government mainly determined by the citizen's takeup of e-government initiatives where Scott et al. [17] further argue the success of e-government initiatives depends on how citizens perceive value realized through the utilization of those systems. Similarly, Neilson's [18] in-depth comparative analysis of Danish-Japanese e-government frameworks further suggests that a deep understanding of public motivation, intergovernmental strategic connectivity, and public trust in e-government services are critical determinants of any successive e-government initiative. These factors are also identified as value-embedded.

This research aims to understand the key determinants of the public value of e-government in Sri Lanka, exploring qualitative data of relevant literature by theory-driven thematic analysis of the critical factors towards building a theoretical foundation on identifying the scope of e-government and the sources of public value creation factoring unique socio-economic landscape.

The research questions are:

(1) What are the critical factors in evaluating the public value of e-government? and
(2) What do citizens consider public value? In Sri Lanka.

To answer these research questions, existing literature is being reviewed to investigate how e-government is theorized with the broad aim of developing a conceptual framework that can guide research and practice. Furthermore, to this extent, to understand the public value of e-government.

The remainder of the paper is structured as follows: the next section discusses research on the public value of e-government Deng's [19] and Bai's [20] frameworks to narrate findings in the literature. Subsequent sections describe the research methodology, presenting outcomes, a discussion, and a conclusion.

II. THEORETICAL BACKGROUND

2.1 Public value of e-government

Information and communications technology (ICT) is the agent of enabler and embedder of public service value. Specific actions or activities are impractical in the absence of ICT as an enabler or embedder as it creates values for systems. The adoption of ICT is primarily influenced by the professed values worth understanding, such as the distinction between public sector value, public value, and e-government as values defined in different viewpoints [19]. Even though public and private sector organizations' core focus is to serve the public, concerns often differ. Private organizations are often profit-focused and serve the public as customers. They are primarily focused on profit maximization. In contrast, the public sector mainly focuses on public servicing aspects with the service orientation mindset and sees people as constituents such as taxpayers, citizens, or stakeholders of a government. Therefore, regardless of the nature of the organizations, modes of public value are a critical concern [2].

The theoretical concept of public value-driven service orientation led to a new public approach derived from the marginal concept of Moore [5], followed by various contributions from scholars. Subsequent developments on the concept by Stoker were further extended by Kelly et al. [20], suggesting a topology of public value as services, outcomes, and trust. These topologies were later adopted by Castelnovo and Simonetta [6] in their empirical studies related to local government projects in Lombardy – Italy. Kerns [21] further expands this concept of public value and e-government. Though government organizations' interactions have no direct impact on the public in many aspects, Castelnovo's [7] argument of examining public value based on the public as a stakeholder's group's perspective and public interest cannot be destined to deliver public value. As such, citizens, taxpayers, policymakers, public servicing managers, and participants' interests must be focused on. Bozeman and Jørgensen [22] argue public value creation should be the goal of any public sector organization, meeting the needs and wishes of the public. Socially desirable outcomes such as trust, fairness, and legitimacy based on socio-political context are further recognized through public value measuring frameworks for e-government performance [23]. This study adopted Moore's theory of public value theorization [5] from the perspective of citizens' collective expectations related to government and public services and administration.

The **sources of public value** creation are the second theoretical concept. These sources of public creation are recognized as the Delivery of quality public services, effectiveness of public organizations, and Achievement of socially desirable outcomes in three different ways [24, 25]. Kerns [21] and Kelly et al. [20] argue that quality e-government services create public value that fulfills citizens' expectations by delivering public desire and creating trust, self-development, and equity [25].

The theory of **public value inventories** is the third concept. This includes quality, efficiency, user orientation, openness, responsiveness, confidentiality, equity, self-development, democracy, and environment sustainability, representing public value sources that generate public value, as mentioned earlier. The information quality and user orientation could also be appreciated

through public value delivery [26, 27, 28], while equity, self-development, trust, environmental sustainability, and democracy could be achieved as socially desirable outcomes.

The **dimensions of e-governmen**t are the fourth theoretical perspective. The e-government could be approached in different ways, such as (1) e-services, (2) e-citizens, (3)e-administration, and (4) e-society with the focus of maintaining public organizations – citizens relationship in the direction of engagement, facilitating greater accountability while encouraging participation in democratic decision-making processes. Interconnecting government service delivery entities, cost reductions, empowering employees, and improving transparency and accountability of public organizations focused on e-administration. Building relationships between public servicing organizations and non-profit organizations is focused on the e-society approach [29, 27].

The other perspective is sustainable e-government. The advancement of e-government and good governance have a strong positive correlation with sustainable economic development, leading to sustainable e-government. OSI (Online Service Index), HCI (Human Capital Index), and TII (Telecommunication Infrastructure Index) incorporate the e-government development index (EDGI) to promote access and inclusion of public presents the state of e-government of a country [1, 8, 30].

With the rapid advancements of ICT, Moore's [5] public value theory enabled transformative reforms in the public sector toward new public administration across the globe with e-government initiatives. This further strengthens the evolution of e-government developments measuring public value. Kerns [21] and Deng [31] adopted initial theoretical advancements to theorize public value measurement frameworks further. These studies further suggested the significance of understanding public sector value in the context of ICT impact on potential transformation.

Modern-day government's strategic goals expand well beyond political gains and economic prosperity. Driven by digital advancements, public value focused on quality of life, openness, social well-being, greater accountability, social equity, and society's inclusion is increasingly popular. As a result, achieving public value in e-government can be read as the ability of e-government initiatives to deliver improved services to citizens with greater efficiency through government organizations [16, 9, 32, 33].

Accordingly, the critical sources of public value are synthesized and illustrated below:
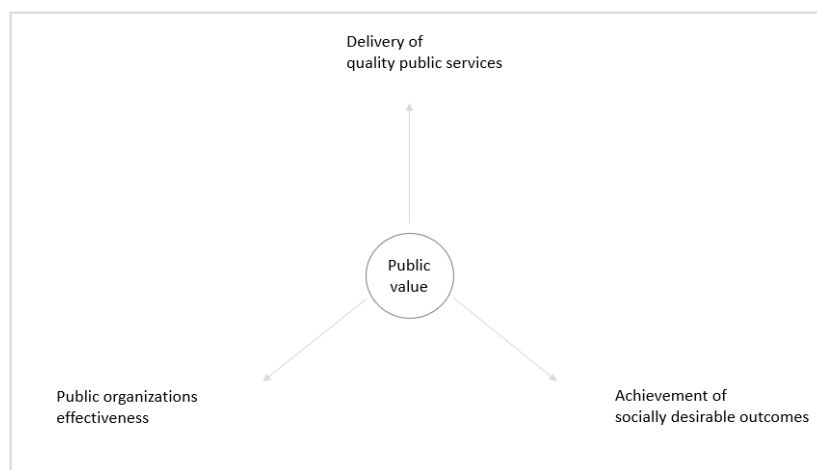

Figure 1: Sources of Public Value

2.2 Public value of e-government measuring frameworks

With the evolution of e-government through various phases, the concept of public value gained popularity across modern-day public administration. Introducing public value frameworks to assess public services as the yardstick of measuring servicing organizations' performances [34] further exemplified society's value-driven service delivery concept [34, 15, 35, 3, 2].

Kelly et al.'s [20] proposed framework consists of trust, quality service delivery, and achieving socially desirable outcomes focused on quality public service. The quality was measured based on (1) e-government usage, (2) user satisfaction, (3) cost-effectiveness, (4) information provision levels, (5) the extent of e-government focus on priorities, (6) the extent of e-government focus on citizens' needs and (7) availability of public choice later adopted by Kern [21].

Kern's [21] framework, further developed by Golubeva [38], proposed a framework to evaluate e-government portals of the Russian Federation with a focus on indicators such as (1) public trust, (2) dimensions, (3) public policy outcomes, and (3) quality of services. Indicators such as usability, openness, and citizen centricity are used to measure public service quality. Interactivity and transparency are used as indicators of measuring public trust.

The advancement of Kern [21] was further explored by Karunasena et al. [25, 39, 34] by proposing a framework including the effectiveness of public organizations as a dimension measured by accountability, efficiency, and public perception. In this framework, public trust is evaluated based on (1) public trust in e-government services, (2) information security and privacy, and (3) transparency. Also, the public value of public service delivery was evaluated based on (1) cost-effectiveness, (2) citizen's makeup, (3) public satisfaction, (4) cost-effectiveness, (5) availability of information, (6) significance of information and (7) accessibility of information through multiple channels.

In contrast to Grimsley and Meehan's [40] framework, which focused on trust, end-user experience, and public service provisions, the European Union (EU) [41] proposed measuring mainly three drivers of public value: efficiency, effectiveness, and democracy in the eGep framework extent to capturing cashable financial gains for public service organizations. These concerns were further fixated by Liu et al. with a proposed framework with an extreme focus on financial, operational, and social value assessing public value in EU states from a G2B (Government to Business) perspective. Similarly, the Agency for the Development of Electronic

Administration in France introduced a framework with greater attention to financial benefits, factoring in (1) finance value, (2) operational and social value, and (3) direct value to customers.

Omar et al. [42]proposed a conceptual framework for measuring public value by focusing on the 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 conceptual framework of Omar et al. [42] suggested focusing on the quality of e-government services, addressing system, service, and information quality from citizens' perspective. Bai [35] adopted Deng's [31]original framework to assess e-government practices in China, and Rawahi et al. [43] argued biases toward efficiency and service effectiveness. Further, they adopted the structuration model to develop a conceptual framework.

Zavattaro's [44] framework encouraged social media-based micro-encounters to utilize the best Delivery of public value through collaboration, transparency, and dialog. Chu et al.'s [45] framework examined operational, social, and political values in delivering public value.

Papi [46] introduced a model of a value pyramid that includes intangible economic and social values on top of its public value. This model addressed practical concerns about existing frameworks, focusing on long-term public satisfaction and public needs.

Talbot [47] introduced a public value scorecard based on three interests: self, public, and procedural interest, which was described as a proven good quality of public service.

Suri and Suhil [48] conceptualized measuring public value based on (1) transparency, (2) efficiency, (3) interactivity, and (4) decision support related to Indian e-government initiatives, while Bhattacharya et al. [49] and Papadomichelaki and Gregoris [50] proposed e-services quality models to measure public value.

Despite many significant efforts and attempts to measure the public value of e-government at various stages with different methodologies, these frameworks still need to be improved for measuring the public value of e-government in Sri Lanka. Kern's [21] framework should have addressed operational efficiency and effectiveness, considered important sources in Moore's public value theory [5]. Both frameworks introduced by Golubeva [38] and Karunasena [34] also inherit limitations of the Kerns [21] framework. These frameworks also lack indicators to measure socially desirable outcomes and quality. The eGep [41] framework introduced by the European Commission is more suitable for already matured e-governments that do not address developing countries' concerns. Public value is primarily defined as the value created by the government to citizens, essential to account for G2C aspects. In this context, Liu et al.'s framework argued bias towards the G2B (Government to Business) perspective of e-government. Omar's [42] framework also needs more focus on socially desirable outcomes, trust, and operational effectiveness. Further, most frameworks need more rigorous testing, and validity and reliability are other significant concerns. These frameworks of Suri and Suhil [48], Bhattacharya et al. [49], Bai [35], and Lindgren and Jansson [51] test and validate methodologies need to be clarified.

The context-specific nature of public value signifies the need to test and validate a framework that uniquely suits the Sri Lankan context. This research gap and inadequacy of existing frameworks underlines the urgent and vital necessity of developing a new conceptual framework to empirically test and validate to evaluate the public value of e-government in Sri Lanka.

III. PUBLIC VALUE OF E-GOVERNMENT IN SRI LANKA

The computers in the public sector of Sri Lanka were introduced back in 1967 with the introduction of IBM (International Business Machines) accounting machine to Insurance Cooperation, followed by the Department of Statistics and Engineering Cooperation computing programs. Succeeding many initiatives introduced to the public sector, the majority failed to yield significant outcomes for developing e-government in Sri Lanka until the e-Sri Lanka initiative was launched in 2002. This was launched as a combined effort of NCC (National Chamber of Commerce) and USAID (United States Agency for International Development) funded local software industry leaders motivated by Indian advancements in the software industry. The funding of the World Bank, donor organizations, social actors, and other consultive groups further expanded the scope of information technology transformation to achieve overall economic growth, promoting equity and democracy in society [52]. Sri Lanka Introduced unique e-government initiatives through process reengineering to improve public services and quality of life and reduce poverty to achieve economic prosperity [31].

Sri Lanka recognized e-government global trends. The National Computer Policy was introduced in 1983. The e-Sri Lanka project was initiated in 2002 with an ICT roadmap to address the digital divide. The GoSL's adaptation of 5 pillar unified e-government strategy under e-government 2020 envisions further strengthening e-government. GoSL's launch of Nenasala (eLibrary) in 2005 rapidly contributed to IT literacy enhancements. ICTA, the apex body of GoSL for Information and Technology, launched various e-government 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 [3, 2].

However, despite all these efforts, a recent report by the Department of Census and Statistics indicates that computer literacy still stands at 32% and digital literacy at 49.5%. The citizens' take-up of e-government services is 22.3%, which is significantly lower. Most of the population unaware of e-government services stands at 77.7%. Independent studies also found that internet usage is 33.11%, and only 29% of the public is aware of e-government initiatives [3, 2]. These statistics are mainly opposite to outcomes from developed countries, which continue to record higher citizen take-up and awareness. Unlike developed countries, developing countries like Sri Lanka still produce poor results in public value. As a result, Sri Lankan public service delivery apparatuses still inherit significant [15] inefficiencies compared to regional peers. Sri Lanka's government ranked 95 out of 193 countries (dropped 10 points compared to 2020) e-government development index of 0.6285, trailing regional leader the Republic of Korea at 0.9529, E-participation index of 0.3523(dropped 41 points compared to 2020) ranked 107 of 193 countries [1]. Also, despite some noticeable achievements by some countries, such as South Korea, Japan, Singapore, and Malaysia, most e-government projects record a higher failure rate of 60%. These similarities are observed in a unique Sri Lankan context, too. Today's key challenges are conflicting

economic priorities, inadequate funds, lack of focus and transparent strategic enforcement, lower uptake, lower awareness, and no real public value measuring mechanism [2].

Multiple efforts were made to evaluate the performance of Sri Lankan e-government initiatives. Samaratunga and Waddell [53] studied potential concerns related to e-government reforms. Hanna presented a comprehensive overview of e-government implementation, focusing on the tele-center project, while Davidraju attempted to evaluate implementation strategies [3, 2]. Attempts made by Gamage and Halpin [54] to assess the impact of e-government on the digital divide. The challenges faced during the implementation were further studied by Weerakkody et al. [55] compared to the United Kingdom. Apart from these efforts, the ICTA [56, 57] also conducted various surveys since 2011, from the first national ICT survey on ICT usage in the government sector to a literacy-like study by the Department of Statistics. However, Sri Lanka lacks recent studies on the public value of e-government and public perception of e-government initiatives since the e-Sri Lanka initiative launched in 2002 compared to regional countries India [58, 59, 60, 61, 62], Bangladesh [63], Nepal [64], Pakistan [65]. It's further highlighted in recent studies that the public value of e-government in Sri Lanka needs to be measured adequately, and an unclear lack of transparency continues to derive negative public perception towards e-government projects, resulting in lower take-up. The public needs more trust in e-government initiatives, significantly impacting future initiatives.

Therefore, measuring the public value of e-government initiatives is an important priority. Firstly, though decades have passed, launching the e-Sri Lanka initiative still needs to yield in the public sector, resulting in lower uptake and awareness. Secondly, as the Sri Lankan government heavily relies on donor organizations such as the World Bank, USAID funding for e-government initiatives is obliged to account for their investments. Thirdly, no in-depth, rigorous assessment was made recently [64] assessing the public value of e-government initiatives.

3.1 Critical factors of the public value of e-government

Developing ICT infrastructure and readiness is critical to delivering public services in a country. The telecommunication infrastructure index (TII) of Sri Lanka remains at 0.5289, with internet penetration at 34.11, which is comparatively significantly lower than developed countries [1]. Digital divide leased developed ICT infrastructure identified as significant impediments to the development of e-government. Financial constraints with conflicting economic priorities, uneven access to the internet, inadequate legal and regulatory frameworks, rigid public administration procedures driven government organizations with ineffective strategic connectivity, lower uptake, political influence, lower computer literacy, and security vulnerabilities concerns identified as foremost challenges to the development of e-government in Sri Lanka [64]. Moreover, the need for more sound business process reengineering (BPR) practices stalled most e-government initiatives [15]. Analogous studies [65] on the e-Pension initiative also indicated the need for more human resources, weak intra-government organizations' strategic connectivity, bureaucracy, and funding constraints due to social conditions, which delayed the project by four years. The studies [66, 67, 68, 69, 70, 71, 72, 73] on e-government initiatives agree sound BPR approaches to strengthen the flexibility and coordinated cross-functionality management of public organizations would enhance strategic connectivity drivers of delivering standard good "public value" for citizens. These studies further revealed modern BPR practices are essential for organizations' efficiency, cost-effectiveness, and improved performance essentials to deliver public value. Furthermore, public trust deficiency, language barriers, budgetary constraints, policy barriers, underdeveloped ICT infrastructure, security risks, change management, lack of intergovernmental organizations connectivity, and lower IT literacy are essentials to focus on in measuring the public value of e-government [74]. Take-up, service delivery, quality content, efficiency, and user orientation are also identified as critical determinants of the public value of e-government in limited studies conducted in Sri Lanka [75].

IV. RESEARCH METHODOLOGY

To fulfill the aims of the study, theory-driven thematic analysis was performed on available qualitative data of literature towards identifying critical factors to build a theoretical foundation on identifying the scope of e-government and public value creation, factoring unique socio-economic conditions to the Sri Lankan context.

Also, to adequately address the research questions, face-to-face semi-structured interviews conducted from December to January 2023 on identified individuals who were involved in e-government initiatives decision-making hierarchy connected to public servicing organizations, ICTA and Ministry of Technology to understand and explore first-hand experience related to creating, designing, developing, deploying of e-government initiatives in Sri Lanka. A screening process was conducted to identify key personnel involved with these organizations' e-government projects to further narrow down to thirteen interviewees. Interview questions were developed based on a comprehensive review of existing literature and secondary data published on e-government in Sri Lanka, which was extremely useful for understanding the level of e-government maturity in Sri Lanka [55, 34]. Interview questions were developed in the English language and communicated earlier to interviewees. Subject matter experts reviewed these interview questions to avoid unambiguity and ensure comprehensiveness. The questionnaire starts with a section with definitions, research problem, and aim, followed by ten questions.

The thematic analysis technique was used to analyze the transcribed and qualitative data from the comprehensive literature review. Complex qualitative research is grouped systematically into several themes to increase the accuracy in understanding and interpreting events, situations, observations, or people's experiences. This technique is widely utilized due to less demand and fewer data collection constraints, providing a systematic approach to analyzing and synthesizing larger volumes of data into descriptives and meaningful themes, provisioning complex interpretations of qualitative data [76, 77].

The theories derived using preexisting theoretical concerns emerge as theory-driven thematic analysis, and themes derived purely from data are designated as data-driven thematic analysis. The approach of theory-driven thematic analysis is widely used as this technique leads to the development of codes and themes theories [76, 77]. This study deployed theory-driven thematic analysis based on identified theoretical functions discussed in section 2. The qualitative data from the literature review were organized into basic themes as the first step. The lowest-level themes are derived from initial codes attached to data segments. These themes were

further organized as middle-order themes, where basic themes were grouped into representations of similar matters. Further, Global themes derived from these middle-order themes would represent principal metaphors in the data organized to themes answering research questions. Transcribed data is also taken into thematic analysis.

Thematic analysis was performed in a few steps, as suggested by Howitt [76]. As the first step, qualitative data was well-read and familiarized. After that, initial coding was performed in the identified literature and transcribed text. Searching for themes based on initial coding is performed as the next step. These themes were further reviewed, broken down into separate themes, or converged into overlapping themes for creating new themes or discarding themes. Themes definition and labeling were performed as the final step. This study's themes were derived considering theoretical concerns outlined in section 2. Interview audio transcriptions converted to textual data using the Happyscribe online platform. Thematic analysis was performed using ATLAS. ti software version 9.1.3.0.

V. RESULTS ANALYSIS AND DISCUSSION

The research findings are organized around four global themes: Delivery of public services, public organizations' efficiency, Achievement of desirable outcomes, and trusted services. Individual global themes consist of several organizing themes abstracted from several basic themes. Attention is paid to the socio-political characteristics of Sri Lanka at the stage of literature review and shaping basic themes to identify unique characteristics.

5.1 Globel Theme One: Delivery of Public Services

The **Delivery of public services** through e-government enlisted with six organizing themes, including (1) ICT infrastructure availability, (2) User orientation, (3) Systems functionality, (4) Cost-effectiveness, (5) Information quality, and (6) Public awareness. These organizing themes summarize the critical factors for creating public value of e-government for delivering public services. Delivery of public services largely depends on the ICT Infrastructure, where Sri Lanka's TII (Telecommunication Infrastructure Index) currently stands at 0.5483, reflecting the digital divide. User orientation is the user-friendliness of end-user interfaces that promote public interactions, often described as look and feel related to public servicing systems, websites, portals, and online platforms. The cost savings to the public because of the adaptation of digital platforms in contrast to traditional service delivery methods are described as cost-effectiveness. This further enhances social inclusiveness, including the socially disadvantaged. The information quality also significantly impacts public take-up of e-government initiatives that establish trust and confidence. Public awareness focused on citizens' awareness of the availability of e-government initiatives and services offered to public-by-public servicing organizations.

The value of assessing ICT infrastructure availability is described through several themes, such as (a) internet users, (b) mobile cellular subscriptions, (c) active mobile broadband subscriptions, and (d) fixed mobile broadband subscriptions. Internet users refer to individuals from any location using the internet. Mobile cellular subscriptions are described as post-paid and pre-paid users' subscriptions for mobile services. Active mobile broadband subscriptions refer to data and voice mobile broadband and data-only subscriptions to the public internet. Fixed mobile broadband subscriptions refer to fixed subscriptions to high-speed internet access. The UN's [1] e-government development index also incorporates TII (Telecommunications Infrastructure Index) as one of the access characteristics in accessing the development of e-government.

Another critical theme identified in assessing the public value of the Delivery of public services is user orientation. This is assessed through several basic themes such as (a) user-friendliness of websites, (b) uniformity of look and feel, (c) simple website links, (d) one-stop-shop kind of portals for all services and the availability of (e) FAQs or online assistance. The user-friendliness of online platforms that satisfy end-user needs reflects the citizens' centricity of e-government service delivery. To deliver effective e-government services, the adaptation of a citizens-centric approach is required. Simple website links with government websites' everyday look and feel, incorporating FAQs and online service assistance features further enhance user experience. One-stop shop portal addresses linking government servicing organizations in a single website or portal, including all necessary information for citizens' convenience. Refer to e-government service delivery.

The system functionality theme is assessed through six primary themes: (a) information searching options, (b) downloadable forms, (c) downloadable archives, (e) buy online, (f) pay online, and (g) access from any device. Information searching options include searching public and government information databases readily available on e-government servicing platforms. These platforms also need to facilitate digital content, such as downloadable forms related to government servicing organizations that are required to be completed by citizens to obtain services over physical counters. Digitally available information archives such as government information, yearly publications, and public sharable statistics further enhance public take-up of e-government services, which will prevent physically visiting servicing organizations. Buying services online and paying for those services requires online access from any device anytime, which saves time, creates convenience, and further strengthens public confidence in e-government initiatives.

Cost-effectiveness will be assessed through three basic themes, namely (a) low data cost, (b) affordable internet connectivity, (c) paperless transactions (d) low-cost training for citizens. The cost of data connectivity in leased developing countries is one of the major concerns for the public, having a direct impact on the take up of e-government services. Compared to developed countries, internet connectivity costs are still high, impacting the utilization of online digital services. One of the critical expectations of the availability of digital services is to eliminate visiting government offices physically to obtain services that create convenience for the public. This reduces time spent in queues to obtain public services, which is one of the significant concerns in public servicing in developing countries due to inherited government servicing mechanism deficiencies. The cost-effectiveness of using e-government services is a critical issue in the Sri Lankan context, where major e-government projects are yet to be fully realized and are still unable to deliver a significant impact on cost saving for citizens.

Information quality is assessed through five basic themes: (a) accurate information, (b) up-to-date information, (c) information relevance, (d) the right level of information in detail, and (e) Simple, understandable information. Error freeness of information posted

on online websites refers to accurate information. The information available to the public must be updated just in time. The timeliness of information is also referred to as the currency of information. The public service delivery websites are also required to provide the right level of information in a simple, understandable manner with sufficient details to address the information requirements of the searcher.

Public awareness is measured through two primary themes, namely (a) take up and (b) awareness of available e-government services. Citizen's take-up is significantly lower in the Sri Lankan context. Obtaining information through websites, utilizing call center services, making email inquiries, and using online applications stands very low. Awareness of the availability of e-government services, websites, and government servicing portals and initiatives was also low among Sri Lankans. Recent studies also indicate that most e-government initiatives need to be known to the public, impeding the Delivery of public value.

5.2 Globel Theme Two: Public Organizations Efficiency

The public value of the e-government initiatives is also to be assessed through **public organizations' efficiency** with five organizing themes: (1) budgets, (2) organizations efficiency, (3) strategic connectivity, and (4) sound BPR approaches and responsiveness. Delivery of public services depends on the availability of budgets for e-government projects where least developed countries still need help with competing socio-economic priorities. Lack of necessary legal and regulatory frameworks with inherited structural deficiencies often curtail public servicing organizations' efficiency and impede strategic connectivity. Also, it acts as a significant barrier to public service provision in these countries. The study further revealed that most projects failed or only partially achieved desired objectives due to business processes reengineering approach gaps. The public servicing organizations' responsiveness was also significant in encouraging public confidence in e-government initiatives.

Budgets are assessed through sufficient project funds basic theme. To implement successful e-government initiatives, governments should have targeted policies, necessary budgets, and necessary support resources. Conflicting economic priorities often curtail e-government initiatives in developing countries that fail to deliver expected results. Most of these projects in leased developed countries partially delivered or frequently failed because of inadequate funding. These concerns were expressed extensively during one-to-one discussions with subject matter experts.

The organization's efficiency was assessed with three primary themes: (a) digitalized services, (b) empowering public sector staff, and (e) removing excess staff. Sri Lanka's public service apparatus significantly inherits deficiency due to outdated, phased labor and extensive manual processes. Public servicing organizations need a digital transformation approach that is more robust in supporting public servicing delivery aspects [15]. One of the key objectives of any e-government initiative is to deliver services via digital platforms, discouraging the public from visiting government offices. These digitalized servicing platforms reduce operational costs and are vital to delivering convenience to citizens. It could widely observe more matured e-governments in developed countries fully strategized raid conversion of public sector services to increasingly digitalized versions utilizing technological advances. Running effective and efficient organizations delivers public value through establishing and operating public organizations that meet citizens' expectations. Improved ICT infrastructure and public service staff empowerment through leadership and support are crucial to realizing the vision of e-government as public sector staff is the driving force in delivering successful e-government projects. E-administration is focused on reducing administrative expenses and enhancing and managing organizational performance. Removing excess staff in the public sector also reduces administration costs, which could eventually benefit the public by lowering service delivery costs [3, 2].

A few recent studies in Sri Lanka highlighted that most government servicing organizations need to share information in real time. Modern servicing organizations augment strategic connectivity by adopting the extended enterprises concept, described as interconnected networks of organizations to exchange critical resources [78, 79, 80]. IT (Information Technology) is critical in managing and binding inter-organizational dependencies towards functional efficiency and process optimization. These public service organizations must focus on improving public relationship management and value-adding processes tightly coupled with strategic plans and knowledge.

Supplemented functions, sometimes duplicated, and other public service delivery organizations are still a significant challenge—the expected demand for structural reforms and regulatory overhaul with a sound BPR regime. Public-serving organizations demand a fundamental rethinking and radical redesign of business processes to achieve dramatic performance improvements. BPR approaches are critical to delivering simplified, redesigned processes to the public. Therefore, strategic connectivity is assessed through one basic theme, namely (a) extended organizations. Also, the BPR (Business Process Reengineering) theme is reflected through several basic themes: (a) redesigned processes and (b) simplified processes.

With the implementation of e-government systems, the responsiveness of public organizations can be improved [3, 2]. Process automation and digital platforms enable quicker tasks that would assist public servicing officials in attending to citizens' inquiries faster. Responsiveness is about how the public interacts with the public organization through e-government, which is determined by the public perception of the value of public organizations' timely responses to public inquiries, automated Responses to queries and submissions, follow-up queries, SMSs, virtual servicing platforms with real-time responses, 24/7 hotline lines to answer public queries and service level driven servicing approaches. Further valued to the level where to extent citizens charters displayed online. It's revealed from various studies that realizing the actual public value of e-government public servicing organizations' responsiveness is critical. Negative responsiveness of public staff working in an e-government environment leads to lower uptake of e-government services. The responsiveness is described with six basic themes, namely (a) the ability to make online queries, (b) automated responses to queries/submissions, (c) SLA-driven responses, (d) follow-up queries via emails or SMS, (e) virtual service agents, and (f) 24/7 customer care hotlines.

5.3 Globel Theme Three: Achievement of Desirable Outcomes

Achievement of desirable outcomes described and conceptualized with a broader focus on socially desirable outcomes from e-government initiatives. This is assessed by organizing it into three themes: (1) equity, (2) citizen participation, and (3) sustainability.

Equity is described as the availability of digital services in the native language, accessibility of e-government services to the socially disadvantaged, and appropriateness of digital platforms and services to citizens. The ability to initiate public discussions, set agendas related to society through online digital servicing platforms that encourage active citizen participation, and disseminate public policies and facilities to educate the public focused on citizen participation. Elimination of labor-intensive redundant tasks cross-sectional – cross-platform data sharing, green information technology, and energy saving facilitations focused on Sustainability where UN recognized e-government as the cornerstone of sustainable economic growth of a society that leads to overall quality of life.

Equity is the availability of resources for all, promoting cultural diversity, especially among minorities. To assess equity, seven basic themes such as (a) online platforms in local languages, (b) availability of kiosks, (c) content for minorities, (d) content for the disadvantaged, (e) online platforms address cultural and religious sensitivities, (f) websites accessibility to any citizen and availability of (g) IT resources for public identified. Online platforms in the local language addressing minorities' concerns in e-government initiatives will encourage greater participation and lead to social inclusiveness. Any government's core responsibility is to ensure accessibility of these initiatives from anywhere, with any device facilitating necessary IT resources. The value of equity created through e-government will be examined, focusing on these areas arranged thematically.

Ensuring the willingness to listen to the public and facilitating citizens in decision-making by public organizations is valued as citizens' participation focusing on six primary themes: (a) the ability to post citizens' views for public discussions, (b) the government take citizens' feedback (c) government policies kept citizens informed online (d) facilities for self-development (e) online educational content for students (f) distance learning resources. The citizens participating in e-government initiatives are critical for success. The rapid development of ICT (Information and communication technologies) increased globalization worldwide and improved public participation in decision-making using e-government, which is now increasingly popular [34, 25, 25, 3, 2].

The value of sustainability is another crucial theme identified in the study. This was abstracted from four primary themes: (a) paperless processing, (b) limiting/eliminating redundant tasks, (c) recycling consumables, and (d) phasing off energy-inefficient systems. Environmental sustainability focuses on preserving a clean environment and resources for future generations. E-government approaches can bring many environmental benefits towards saving energy, recycling consumables, and automating redundant and labor-intensive work. Thematic analysis also observed two contrasting observations related to. Firstly, the initiatives introduced by the government saved paper with electronic data storage. Tightly integrating servicing organizations with these initiatives limits or eliminates government servicing organizations' redundant work. However, the growing number of computers, electronic devices, and air-conditioned rooms increases energy demand. This also led to increased CO_2 emissions. Therefore, recycling consumables such as CDs, floppy disks, magnetic tapes, and ink cartridges is essential for environmental sustainability. Using computers in the public service sector is unavoidable in modern public administration. Therefore, modern public administration services need green IT plans to eliminate or phase off energy-inefficient systems.

5.4 Globel Theme Four: Trusted Services

Trusted services are assessed through two organizing themes: (1) security and privacy and (2) transparency. It's the heart of the relationship between government organizations and citizens. However, online space threatens the privacy and security of citizens' sensitive information. Therefore, it's essential to address privacy and security concerns related to e-government initiatives like any other online application. It's a challenge to any e-government initiative to address security and privacy concerns related to data protection, identity thefts, and secure storage of public data to establish public trust and confidence. Public perception of trust can be examined through citizens' perception of online transactions utilizing e-government digital platforms. It's also widely recognized as the government's responsibility to ensure transparency of online transactions in the systems, adding privacy statements and performing frequent audits with published reports that are available to the public. Likewise, to ensure transparency, it's essential to have legal and regulatory frameworks to protect citizens and maintain the reliability of information disseminated through e-government channels.

Trust is the core of the relationship between government and citizens [27, 2, 3, 34]. The public expects their information to be secure and protected by the government. As online space brings many threats to privacy and security concerns for the users' misuse of personal data, identity theft concerns may prevent the public from utilizing e-government systems without secured systems, data privacy, and protection with the right legal and regulatory frameworks. Public trust in e-government systems relies on the citizen's perception of e-government systems, whether these organizations are trustworthy, and whether data is protected with secured systems. To ensure the privacy and security of citizens' information, it's necessary to have secure systems online, provisioning privacy statements on websites, and have supportive legal and regulatory frameworks. The development of legal and regulatory frameworks to support e-government initiatives, including laws on privacy, cyber security, ICT crimes, data protection, electronic transactions, and intellectual property rights protection, is essential. Also, conducting ICT training and awareness programs is vital for enforcement officers, including lawyers and judges. Secured and privacy organizing themes are described in three basic themes accordingly: (a) secured systems, (b) data and privacy protection, and (c) availability of legal and regulatory frameworks.

Transparency on e-government initiatives is critical to establishing public trust in e-government initiatives as these projects utilize public funds. Transparency of public organization is another organizing theme focused on six primary themes: (a) public policy drafts and laws online, (b) disclosing budget details, (c) organizations' contact details, charts, and duties, (e) citizens' feedback, (f) public project plans and progress online and (g) government procurement details online. Availability of public policy drafts, laws online by the government for public consultation, disclosure of public service delivery organizations' budgets, and online expenses showing greater openness and accountability. The availability of public organizations' contact details and organizational charts with duties and designated responsibilities also increases transparency since citizens can easily navigate information online related to servicing organizations' functional arrangements. The ability to capture public feedback on e-government services online is critical to establish trust.

Online feedback could further enhance the public engagement experience. The presence of public project plans and funded projects' progress is also critical to building public trust identified as a theme. The presence of online published content related to government procurement and public tender details leads to further enhanced trust between public servicing organizations and citizens.

Moreover, the thematic analysis further reveals access to electricity, carbon reduction, and virtual service agents, which were not considered critical factors for evaluating the public value of e-government due to underrepresentation in the literature.

After performing the thematic analysis of qualitative data, the indicators identified were summarized to develop a conceptual framework, as illustrated below. These themes are synthesized as global themes (main dimensions), organizing themes (sub-dimensions), and basic themes (attributes) of the proposed framework.
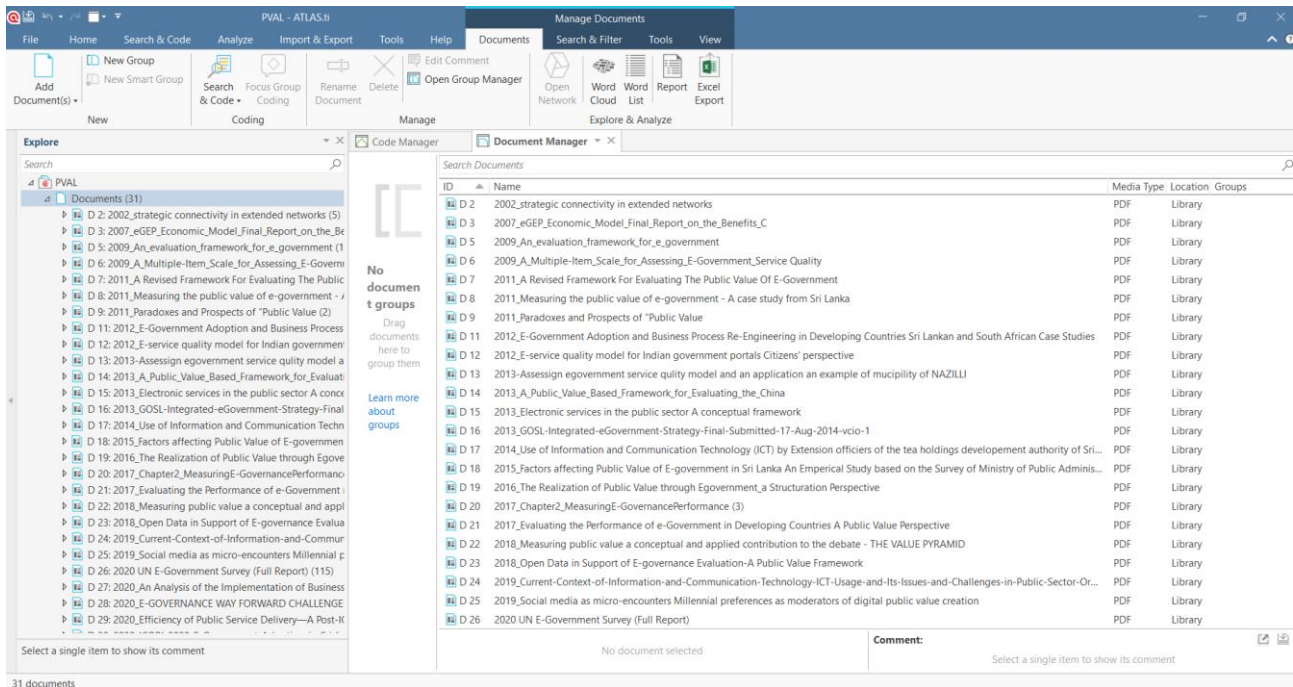

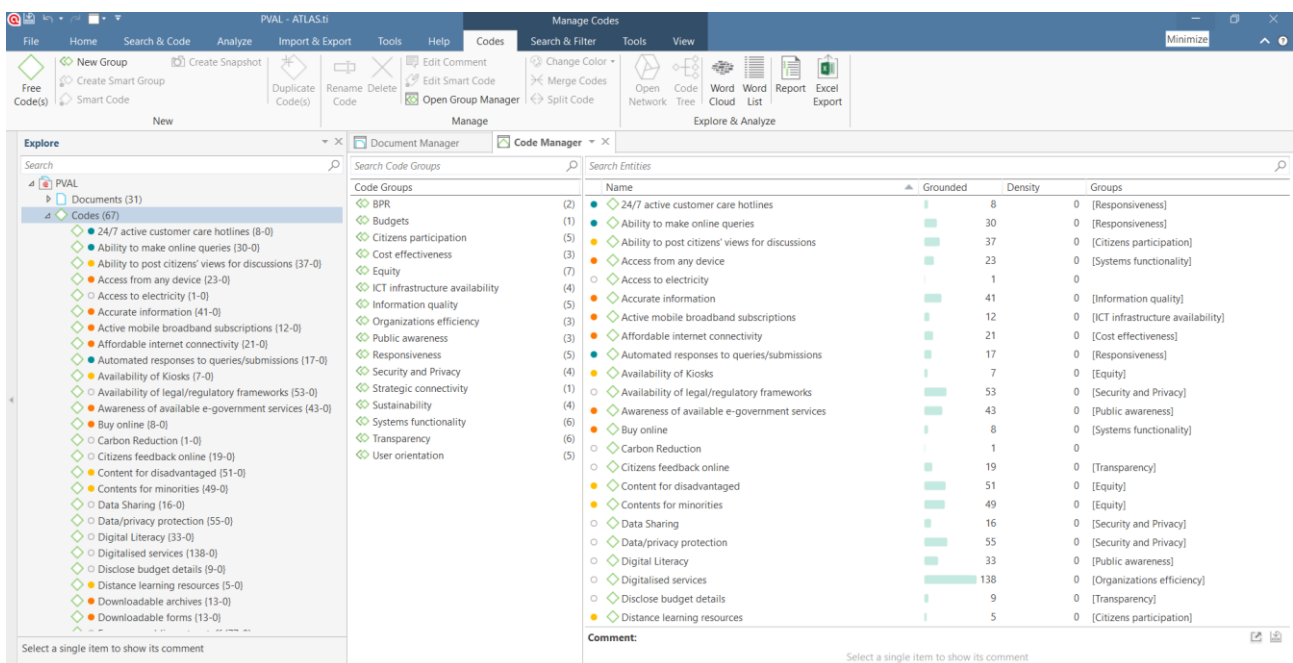*Figure 2: Arrangement of literature for thematic analysis*

Figure 3: Coding of literature for thematic arrangement

Table 1: Codes and code grouping

Code	Grounded	Density	Code Groups
24/7 active customer care hotlines	8	0	Responsiveness
Ability to make online queries	30	0	Responsiveness
Ability to post citizens' views for discussions	37	0	Citizen's participation
Access from any device	23	0	Systems functionality
Access to electricity	1	0	
Accurate information	41	0	Information quality
Active mobile broadband subscriptions	12	0	ICT infrastructure availability
Affordable internet connectivity	21	0	Cost effectiveness
Automated responses to queries/submissions	17	0	Responsiveness
Availability of Kiosks	7	0	Equity
Availability of legal/regulatory frameworks	53	0	Security and Privacy
Awareness of available e-government services	43	0	Public awareness
Buy online	8	0	Systems functionality
Carbon Reduction	1	0	
Citizens feedback online	19	0	Transparency
Content for disadvantaged	51	0	Equity
Contents for minorities	49	0	Equity
Data Sharing	16	0	Security and Privacy
Data/privacy protection	55	0	Security and Privacy
Digital Literacy	33	0	Public awareness
Digitalized services	138	0	Organizations efficiency
Disclose budget details	9	0	Transparency
Distance learning resources	5	0	Citizen's participation
Downloadable archives	13	0	Systems functionality
Downloadable forms	13	0	Systems functionality
Empower public sector staff	77	0	Organizations efficiency
Extended organizations	133	0	Strategic connectivity
FAQs/Online assistance	11	0	User orientation
Fixed mobile broadband subscriptions	22	0	ICT infrastructure availability
Follow-up queries via emails or SMS	8	0	Responsiveness
Government policies kept citizens informed online	42	0	Citizen's participation
Government procurement details online	20	0	Transparency
Information relevance	51	0	Information quality
Information searching options	12	0	Systems functionality
Internet users	47	0	ICT infrastructure availability
IT resources for public access	46	0	Equity
Limit/eliminate redundant tasks	15	0	Sustainability
Low data cost	8	0	Cost effectiveness
Mobile cellular subscriptions	22	0	ICT infrastructure availability
One-stop shop kind of portal for all services	37	0	User orientation
Online educational content for students	8	0	Citizen's participation

Code	Grounded	Density	Code Groups
Online platforms address cultural and religious sensitivities	8	0	Equity
Online platforms in local language	26	0	Equity
Organizations contact details/charts/ duties online	12	0	Transparency
Paperless processing	63	0	Sustainability
Paperless transactions	65	0	Cost effectiveness
Pay online	8	0	Systems functionality
Phase off energy-inefficient systems	11	0	Sustainability
Public policy drafts, laws online	11	0	Transparency
Public project plans and progress online	7	0	Transparency
Recycling consumables	8	0	Sustainability
Re-designed processes	45	0	BPR
Remove excess public sector staff	11	0	Organizations efficiency
Right level of information in details	55	0	Information quality
Secured systems	64	0	Security and Privacy
Simple website links	35	0	User orientation
Simple, understandable information	54	0	Information quality
Simplified processes	60	0	BPR
SLA driven responses	22	0	Responsiveness
Sufficient project funds	28	0	Budgets
Take-up	59	0	Public awareness
The government takes citizens feedback	20	0	Citizen's participation
Uniformity in look and feel	30	0	User orientation
Up-to-date information	44	0	Information quality
User-friendliness of websites/portals	34	0	User orientation
Virtual service agents	1	0	
Websites accessible to any citizen	53	0	Equity

Identified codes arranged to code groups further arranged as basic themes, organizing themes and global themes as illustrated in Table 2.

Table 2: Thematic arrangement of codes and coding groups

Global themes	Organizing themes	Basic themes	Indicators	Indicator variables for the measurement model
Delivery of public services	ICT infrastructure availability	Internet users Mobile cellular subscriptions Active mobile broadband subscriptions Fixed mobile broadband subscriptions	Readiness and availability of Information Communication Technology Infrastructure	*Q1: Public value of ICT Infrastructure Availability* ICT_1a - Internet users ICT_1b - Mobile cellular subscriptions ICT_1c - Active mobile broadband subscriptions ICT_1d - Fixed mobile broadband subscriptions
	User orientation	User-friendliness of websites/portals Uniformity in look and feel. Simple website links One-stop shop kind of portal for all services. FAQs/Online assistance	User-friendliness, support for novice users, everyday look and feel of public websites	*Q2: Public value of User Orientation* USO_2a - User-friendliness of websites/portals USO_2b - Uniformity in look and feel. USO_2c - Simple website links USO_2d - One-stop shop kind of portal for all services. USO_2e - FAQs/Online assistance
	Systems functionality	Information searching options Downloadable forms Downloadable archives Buy online Pay online Access from any device	Functionalities of e-services	*Q3: Public value of Systems Functionality* SYF_3a - Information searching options. SYF_3b - Downloadable forms SYF_3c - Downloadable archives SYF_3d - Buy online. SYF_3e - Pay online. SYF_3f - Access from any device
	Cost-effectiveness	Low data cost Affordable internet connectivity Paperless transactions	Cost-effectiveness of e-services to citizens	*Q4: Public Value of Cost Effectiveness* CSE_4a - Low data cost CSE_4b - Affordable Internet connectivity CSE_4c - Paperless transactions
	Information quality	Accurate information Up-to-date information Information relevance The right level of information in details Simple, understandable information	Quality of information	*Q5: Public value of Information Quality* INQ_5a - Accurate information INQ_5b - Up-to-date information INQ_5c - Information relevance INQ_5d - Right level of information in details INQ_5e - Simple, understandable information
	Public awareness	Take-up Awareness of available e-government services	Citizens' awareness of e-services	*Q6: Public Value of Public Awareness* PBA_6a - Take-up PBA_6b - Awareness of available e-government services
Public organizations efficiency	Budgets	Sufficient project funds	Availability of sufficient funds for e-government projects	*Q7: Public Value of Budgets* PBD_7a - Sufficient project funds
	Digital literacy	Digital literacy	Ability to access, manage, understand, integrate, communicate, evaluate, and create information safely and appropriately through digital technologies	*Q8: Public value of Digital Literacy* PBD_8a - Digital literacy
	Organizations efficiency	Digitalized services Empower public sector staff Remove excess public sector staff	Public servicing organizations' efficiency	*Q9: Public Value of Organizational Efficiency* OGE_9a - Digitalized services OGE_9b - Empower public sector staff. OGE_9c - Remove excess public sector staff
	Strategic connectivity	Extended organizations	Inter-organizational connectivity/operability of public service organizations	*Q10: Public value of Strategic Connectivity* STC_10a - Extended organizations
	BPR	Redesigned processes Simplified processes	Redesigned government processes, integrated services	*Q11: Public value of BPR* BPR_11a - Redesigned processes BPR_11b - Simplified processes
	Responsiveness	Ability to make online queries. Automated responses to queries/submissions SLA driven responses Follow-up queries via emails or SMS Virtual service agents 24/7 active customer care hotlines	Responses to citizens' inquiries, automatic responses to online submissions, and the ability to make inquiries online	*Q12: Public Value of Responsiveness* RPS_12a - Ability to make online queries. RPS_12b - Automated responses to queries/submissions RPS_12c - SLA-driven responses RPS_12d - Follow-up queries via emails or SMS RPS_12e - Virtual service agents RPS_12f - 24/7 active customer care hotlines

Global themes	Organizing themes	Basic themes	Indicators	Indicator variables for the measurement model
Achievement of desirable outcomes	Equity	Online platforms in local language Availability of Kiosks Content for disadvantaged Contents for minorities Online platforms address cultural and religious sensitivities. Websites accessible to any citizen IT resources for public access	The ability of e-government services to provision appropriate content, Online initiatives comply with standards, and No one left behind to address the digital divide	*Q13: Public Value of Equity* EQY_13a - Online platforms in the local language EQY_13b - Availability of Kiosks EQY_13c - Content for disadvantaged EQY_13d - Contents for minorities EQY_13e - Online platforms address cultural and religious sensitivities. EQY_13f - Websites accessible to any citizen EQY_13g - IT resources for public access
	Citizen's participation	Ability to post citizens' views for discussions. The government takes citizens' feedback. Government policies kept citizens informed online. Online educational content for students Distance learning resources	Public engagement toward participatory democracy	*Q14: Public Value of Citizens Participation* CTP_14a - Ability to post citizens' views for discussions. CTP_14b - The government takes citizens' feedback. CTP_14c - Government policies kept citizens informed online. CTP_14d - Online educational content for students CTP_14e - Distance learning resources
	Sustainability	Paperless processing Limit/eliminate redundant tasks. Recycling consumables Phase off energy-inefficient systems	Energy saving, limiting the duplication of efforts and resources, sharing data and resources, reducing paper use, recycling equipment	*Q15: Public Value of Sustainability* SUS_15a - Paperless processing SUS_15b - Limit/eliminate redundant tasks. SUS_15c -Recycling consumables SUS-15d - Phase off energy-inefficient systems
Trusted services	Security and privacy	Secured systems. Data/privacy protection Availability of legal/regulatory frameworks	Secured systems, data protection, privacy protection	*Q16: Public value of Security and Privacy* SEC_16a - Secured systems SEC_16b - Data/privacy protection SEC_16c - Availability of legal/regulatory frameworks
	Transparency	Public policy drafts, laws online Disclose budget details. Organizations contact details/charts/ duties online. Citizen's feedback online Public project plans and progress online Government procurement details online	Transparency in digital transformation efforts, public funding in e-government initiatives	Q17: Public Value of Transparency TRP_17a - Public policy drafts, laws online TRP_17b - Disclose budget details. TRP_17c - Organizations contact details/charts/ duties online. TRP_17d - Citizens' feedback online. TRP_17e - Public project plans and progress online TRP_17f - Government procurement details online

The operationalization of identified indicators toward building the proposed conceptual framework is illustrated in Table 3 as follows.

Table 3: Operationalization of identified indicators

Type	Variable	References	Indicator	Category of data	Measure	Question Number
Independent Variable	ICT infrastructure availability		1. Internet users 2. Mobile cellular subscriptions 3. Active mobile broadband subscriptions 4. Fixed mobile broadband subscriptions	Ordinal	Likert Scale (1-5)	*Q1: Public value of ICT Infrastructure Availability* ICT_1a - Internet users ICT_1b - Mobile cellular subscriptions ICT_1c - Active mobile broadband subscriptions ICT_1d - Fixed mobile broadband subscriptions
Independent Variable	User orientation		1. User-friendliness of websites/portals 2. Uniformity in look and feel 3. Simple website links 4. One-stop shop kind of portal for all services 5. FAQs/Online assistance	Ordinal	Likert Scale (1-5)	*Q2: Public value of User Orientation* USO_2a - User-friendliness of websites/portals USO_2b - Uniformity in look and feel. USO_2c - Simple website links USO_2d - One-stop shop kind of portal for all services. USO_2e - FAQs/Online assistance
Independent Variable	Systems functionality		1. Information searching options 2. Downloadable forms 3. Downloadable archives 4. Buy online 5. Pay online 6. Access from any device	Ordinal	Likert Scale (1-5)	*Q3: Public value of Systems Functionality* SYF_3a - Information searching options. SYF_3b - Downloadable forms SYF_3c - Downloadable archives SYF_3d - Buy online. SYF_3e - Pay online. SYF_3f - Access from any device
Independent Variable	Cost-effectiveness		1. Low data cost 2. Affordable internet connectivity 3. Paperless transactions	Ordinal	Likert Scale (1-5)	*Q4: Public Value of Cost Effectiveness* CSE_4a - Low data cost CSE_4b - Affordable Internet connectivity CSE_4c - Paperless transactions
Independent Variable	Information quality		1. Accurate information 2. Up-to-date information 3. Information relevance 4. Right level of information in details 5. Simple, understandable information	Ordinal	Likert Scale (1-5)	*Q5: Public value of Information Quality* INQ_5a - Accurate information INQ_5b - Up-to-date information INQ_5c - Information relevance INQ_5d - Right level of information in details INQ_5e - Simple, understandable information
Independent Variable	Public awareness		1. Takeup 2. Awareness of available e-government services	Ordinal	Likert Scale (1-5)	*Q6: Public Value of Public Awareness* PBA_6a - Take-up PBA_6b - Awareness of available e-government services
Independent Variable	Budgets		1. Sufficient project funds	Ordinal	Likert Scale (1-5)	*Q7: Public Value of Budgets* PBD_7a - Sufficient project funds
Independent Variable	Digital Literacy		1. Digital Literacy	Ordinal	Likert Scale (1-5)	*Q8: Public value of Digital Literacy* PBD_8a - Digital literacy
Independent Variable	Organizations efficiency		1. Digitalized services 2. Empower public sector staff 3. Remove excess public sector staff	Ordinal	Likert Scale (1-5)	*Q9: Public Value of Organizational Efficiency* OGE_9a - Digitalized services OGE_9b - Empower public sector staff. OGE_9c - Remove excess public sector staff
Independent Variable	Strategic connectivity		1. Extended organizations	Ordinal	Likert Scale (1-5)	*Q10: Public value of Strategic Connectivity* STC_10a - Extended organizations
Independent Variable	BPR		1. Redesigned processes 2. Simplified processes	Ordinal	Likert Scale (1-5)	*Q11: Public value of BPR* BPR_11a - Redesigned processes BPR_11b - Simplified processes
Independent Variable	Responsiveness		1. Ability to make online queries 2. Automated responses to queries/submissions 3. SLA driven responses 4. Follow-up queries via emails or SMS 5. Virtual service agents 6. 24/7 active customer care hotlines	Ordinal	Likert Scale (1-5)	*Q12: Public Value of Responsiveness* RPS_12a - Ability to make online queries. RPS_12b - Automated responses to queries/submissions RPS_12c - SLA-driven responses RPS_12d - Follow-up queries via emails or SMS RPS_12e - Virtual service agents RPS_12f - 24/7 active customer care hotlines

Type	Variable	References	Indicator	Category of data	Measure	Question Number
Independent Variable	Equity		1. Online platforms in the local language 2. Availability of Kiosks 3. Content for disadvantaged 4. Contents for minorities 5. Online platforms address cultural and religious sensitivities 6. Websites accessible to any citizen 7. IT resources for public access	Ordinal	Likert Scale (1-5)	*Q13: Public Value of Equity* EQY_13a - Online platforms in the local language EQY_13b - Availability of Kiosks EQY_13c - Content for disadvantaged EQY_13d - Contents for minorities EQY_13e - Online platforms address cultural and religious sensitivities. EQY_13f - Websites accessible to any citizen EQY_13g - IT resources for public access
Independent Variable	Citizen's participation		1. Ability to post citizens' views for discussions 2. The government takes citizens' feedback 3. Government policies kept citizens informed online 4. Online educational content for students 5. Distance learning resources	Ordinal	Likert Scale (1-5)	*Q14: Public Value of Citizens Participation* CTP_14a - Ability to post citizens' views for discussions. CTP_14b - The government takes citizens' feedback. CTP_14c - Government policies kept citizens informed online. CTP_14d - Online educational content for students CTP_14e - Distance learning resources
Independent Variable	Sustainability		1. Paperless processing 2. Limit/eliminate redundant tasks 3. Recycling consumables 4. Phase off energy-inefficient systems	Ordinal	Likert Scale (1-5)	*Q15: Public Value of Sustainability* SUS_15a - Paperless processing SUS_15b - Limit/eliminate redundant tasks. SUS_15c -Recycling consumables SUS-15d - Phase off energy-inefficient systems
Independent Variable	Security and privacy		1. Secured systems 2. Data/privacy protection 3. Availability of legal/regulatory frameworks	Ordinal	Likert Scale (1-5)	*Q16: Public value of Security and Privacy* SEC_16a - Secured systems SEC_16b - Data/privacy protection SEC_16c - Availability of legal/regulatory frameworks
Independent Variable	Transparency		1. Public policy drafts, laws online 2. Disclose budget details 3. Organizations contact details/charts/ duties online 4. Citizen's feedback online 5. Public project plans and progress online 6. Government procurement details online	Ordinal	Likert Scale (1-5)	Q17: Public Value of Transparency TRP_17a - Public policy drafts, laws online TRP_17b - Disclose budget details. TRP_17c - Organizations contact details/charts/ duties online. TRP_17d - Citizens' feedback online. TRP_17e - Public project plans and progress online TRP_17f - Government procurement details online

5.5 A Conceptual framework to evaluate the public value of e-government initiatives in Sri Lanka

The literature suggests that the majority of existing public value measuring frameworks largely ignored unique soc-political dimensions of developing countries derived based on the Technology Acceptance Model (TAM), Unified Acceptance of the Theory of Use of Technology (UTAUT), and Diffusion of Innovation (DO) These models further focused on ease of use and perceived usefulness of e-government initiatives, measuring public value as a limitation. As a result, most frameworks are much suited to mature, technologically developed economies [3, 2].

Thus, it must facilitate the unique socio-political and economic dimensions of developing countries such as Sri Lanka to measure public value, which has yet to be largely ignored. Based on this qualitative assessment of existing literature, it's proposed to adopt a new conceptual framework based on the initial theoretical study outcomes of Karunasena and Deng [37, 25] and Bai [35], incorporating unique dimensions related to leased developed economies. Figure 4 illustrates a graphical representation of the proposed new conceptual framework.
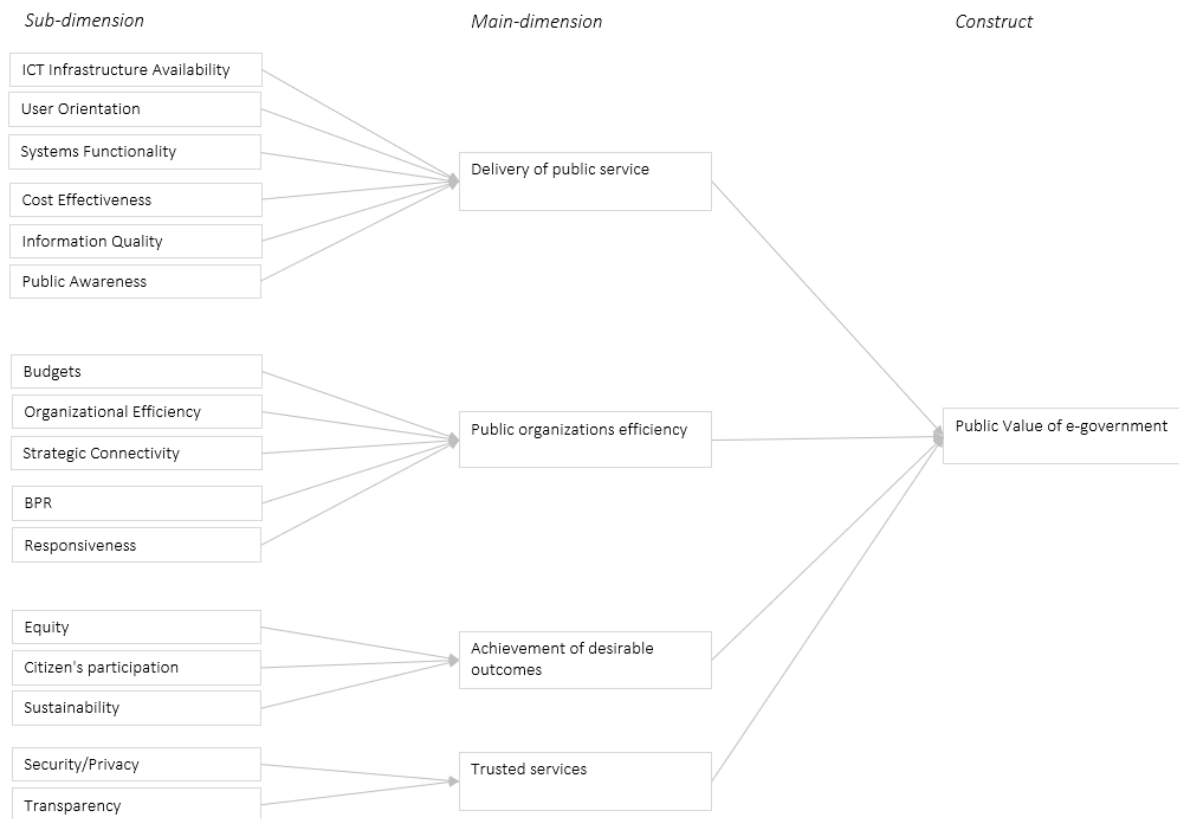

Figure 4: Proposed conceptual framework to evaluate the public value of e-government

The proposed framework hypothesizes the public value of e-government could be created by the Delivery of public service, Public organization's efficiency, Achievement of desirable outcomes, and Trusted services. It's further hypothesized these main dimensions create public value reflected in multiple subdimensions. Public service delivery is reflected by six attributes: ICT Infrastructure Availability, User orientation, Systems functionality, End-user satisfaction, Cost-effectiveness, Information Quality, and Public awareness. Further, a Public organization's efficiency is replicated by five attributes, Achievement of desirable outcomes is replicated by three attributes, and two attributes reflect Trusted Services.

Based on the thematic analysis performed, a structured questionnaire consists of 64 items to use as measurement instruments to validate the proposed framework. Each item consists of a 5-point Likert scale with a value of 5 representing the "highly valuable" and "not valuable at all" scale, a pilot study with 25 participants to assess the instrument's relevance before deployment. The citizens who consume e-government services in urban and suburban areas across Sri Lanka would be focused as the target population, with a sample size of 2000. Simple random sampling technique to adopt in sampling. IBM SPSS 25.0 statistical software will be utilized to screen the collected data. The data will analyze the adoption of structural equation modeling (SEM) to evaluate the critical attributes by analyzing structural relationships of the proposed new framework and testing relationships between measured variables and unobserved model constructs. Additional statistical techniques, such as confirmatory factor analysis (CFA) and analysis of moment structures (AMOS), were performed to assess the constructs. The model best fit to assess utilizing Chi-square (x^2) and the ratio of x^2 to degree of freedom (x^2/df). Root mean square error of approximation (RMSEA) and standardized root mean residual (SRMR) statistical techniques were deployed to assess the absolute fit measures of the framework. Comparative fit indexes (CFI), Goodness of fit index (GIF), Adjusted goodness of fit (AGIF), and Tucker-Lewis index (TLI) statistical methods to array to assess the hypothesized model discrepancy. Model maximum likelihood statistical technique to use to estimate parameters of the model. To assess the convergent validity of hypothesized constructs through the significance of factor loading of all items utilizing average

variance extracted (AVE) and the reliability of constructs. Also, the significance of factor loading of the model items is assessed through SFL for each observed item, whereas the rule of thumb SFL for each item should be at least 0.5 or higher.

Validity and reliability are two of the significant concerns of existing frameworks. To address this, the author wishes to test the conceptual framework at the Sri Lankan Local Government Network (LGN 2.0) network with 348 local government agencies for validity, reliability, and generalizability. Qualitatively assessed and empirically tested this new conceptual framework to measure the public value of e-government in Sri Lanka.

VI. CONCLUSION

This study organized existing literature on the public value of e-government, adopting thematic analysis to explore the state of the public value of e-government in Sri Lanka. Attempts were made to analyze and organize qualitative data in the literature to develop a new conceptual framework for the public value of Sri Lankan e-government initiatives addressing the research gap. Also, further attempts were made to identify unique socio-political dimensions necessary to measure public value in the Sri Lankan context. **Overall, 67 basic themes and sixteen organizing themes were categorized into four global themes describing the public value of e-government**. Literature suggest **public value of e-government in Sri Lanka is unclear, not measured**. E-Government initiatives are **unknown to most of the public**. This suggests the necessity of developing a new conceptual framework that factor unique socio-political environment in Sri Lankan context.

VII. ACKNOWLEDGMENT

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