

## GREEN SMART INTANGIBLE ASSET : AN EMERGING VIEW OF KEY ROLE-PLAYING ASSET

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### ABSTRACT

Smart cities are gaining traction among policymakers, urban developers, and government officials throughout the world, and are developing as a key solution to urbanization, economic regeneration, and other environmental issues that cities confront around the world. Smart cities are increasingly reliant on the availability and quality of Intangible assets, information communication, and social infrastructure, in addition to the city's hard infrastructure (physical capital) (human and social capital). This new role of cities as intangible asset knowledge reservoirs and information centers is critical for urban competitiveness. The primary aim of this study is to explore the roles of intangible asset in the green smart cities with a view to propose a framework for the green smart cities and the intangible asset and propose a model for the green intangible asset the study employ the exploration and descriptive of the intensive reviewed literature, from the result of the study it was obtained that GHIA meaning green human intangible asset, GSIA means green social intangible asset, GIA green institutional intangible asset, EIA meaning environmental, GPIA, Green processing intangible asset, GRIA, green human intangible assets, the green intangible asset is shown with the sub construct. Are the green intangible asset that plays the greatest role in the green smart cities, secondly, a model and frame worked have been proposed by the study which proposed the framework for the green smart city and intangible asset and also the model for the green smart intangible assets, it was concluded from the study that the identified green intangible asset that plays the greet roles in the green smart city and having a linked relationship between one another.

**Keywords:** Intangible assets, green smart city, model, and framework

### 1.0 Introduction

The perspective of the smart city the term "smart city" refers to a global stream of research and urban policies aiming at enhancing people' quality of life in metropolitan regions by leveraging innovation and high-tech solutions to the difficult challenges that have arisen as a result of increased urbanization (Kashef, et al 2021; Dameri, & Ricciardi 2015; Greco, & Cresta, 2015 Agbali, et al 2019; Adler, & Florida, 2021). Kumar, (2022). Stated that the smart city movement emerged out of a desire to address urbanization's ills and diseases, such as pollution, land utilization, traffic and overcrowding, energy needs, difficulty accessing public services, and, more broadly, the serious urban footprint here on the environment and the challenges that come with high population density. the above

statement of Kumar was strengthened by Alderete, (2020). The smart city concept, on the other hand, is based on the critical role that cities play in the creation of information, culture, innovation, and economic growth. As it was also confirmed by (Caragliu, & Del Bo, 2019; Lim, et al 2019).

According to the United Nations Environment Programme (2011), The concept of smart city development is gaining traction as a key solution to growing urbanization and the socio-economic issues that cities confront across the world it also agrees with the statement put by the following authors in their studies Stimson & Pettit, 2021; Kumar 2019; Roy, & Chatterji, 2020; Bibri, (2021). Bibri, & Krogstie, (2017). Put forward those Smart cities have emerged as a potential solution to the environmental issues that have arisen as a result of increasing urbanization. This was confirmed in the study of Castanho, et al 2019, and that of Lopez, (2020). That they are deemed necessary for a long-term future. Despite their recent prominence, the literature indicates a lack of conceptual clarity surrounding the term "smart city" as a result of the several meanings now in use. This fact has been restrengthened by the study of Kumar, (2020). Gade, (2019). Point out in his study that smart cities are seen as the environment that accommodates all the features of the proper utilization resources, for quality life of activities, etc.

Smart cities, according to Wataya, & Shaw, (2019). And in conformity with the study of Ahmed, & Rani, (2018); Shahidehpour, & Ganji, (2018). rely not just on a city's hard infrastructure (physical capital), but also the supply and accessibility of intangible assets such as "knowledge," "communication," and "social infrastructure" (human and social capital). This new role of cities as information hubs and knowledge bases is critical for both urban competition and improving the quality of life (Penco et al 2020: Appio, et al 2020; Ivaldi, et al 2020; and Kumar et al., 2018).

The smart city concept has grown in popularity over the last decade, allowing residents to better meet their housing, transportation, energy, and other infrastructure needs, as well as serving as a key strategy to combat poverty and inequality, unemployment, and energy management, all of which can be achieved through the utilization of intangible asset knowledge (Raspotnik, et al 2020; Winskowska et al., 2019). Mundoli, et al., (2020) stated that the wide dimension of a green smart city cannot exclude the utilization of the intangible asset generally. The intangible asset has been the asset that plays a vital role in the concept of green smart cities, the green smart cities are emerging new environments that value of intangible assets increases consequently. (Dameri, & Ricciardi, 2015, 2017; Matos, et al 2019; Anthopoulos, 2015). Diana, & Yelena, (2021) agrees that Green smart cities are after exploration and utilization of the intangible asset known as knowledge, these intangible assets knowledge have become the key drivers of the green smart city. Gong with the facts it was postulated by Omar et al (2020). That All the categories of intangible assets started from the market-related, technology-related, contract-related, and art-related the intangible asset has identified and dominated all the sectors of the green smart cities adding value to ensure the full concept have been observed.

The smart city movement is gaining traction throughout the world (Chauhan et al 2021; van Gils et al 2021), and it relies on well-targeted financing and support mechanisms (EU Parliament, 2014). Thereby, the smart city concept is going to result in a sort of global natural experiment, revealing how technology-enabled innovation by cities has given recognition to the entities involved in the innovation process, with the result that their intangible assets to become valuable, and key institutions may stimulate virtuous transformation for the greater good (Gumzej, 2021; Davide, 2021). Again, Smart city programs and research are focused on improving city systems' long-term viability, resilience, quality of life, and competitiveness (Ramirez et al., 2021; Obringer, & Nateghi, 2021). The smart city community is convinced that intangible asset knowledge is the key to the future, and that technical innovation, collaborative networking, and participatory social interactions are essential tactics in the creation of 'smart' knowledge (Schaffers et al., 2011).

These ideas are in line with intangible asset research in technology, notably in the intellectual capital tradition, and especially with the fourth stage of intangible asset component research. The relationship has been established between the intangible asset and the smart city research communities to our knowledge. (Omar et al 2020) Neirrotti, et al (2014) stated that it is widely accepted that there are a variety of assets in the smart city, which may include tangible or intangible assets, with this component of green smart cities. The broad gap intangible asset generated in green smart cities has raised the consideration of the topic of intangible assets in every aspect of green smart cities. (Bhushan, et al 2020; Nitoslowski, et al 2019)

Green smart city activities are linked to many forms of resources, with intangible assets becoming an increasingly significant incentive for the green smart city to function. The growing interest in intangible assets and its influence on green smart cities at the end of the twentieth century spurred innovation and development to expand their investment in intangible assets such as human resources, research and development, technological advances, and so on. (Neirrotti, et al 2014) The green smart city Given its connections to the literature on public value (Cronemberger, & Gil-Garcia, 2019) and its well-established focus on larger-good goals like sustainability, resilience, and quality of life, the smart city approach may provide very useful insights to help broaden the horizon of intangible asset "knowledge" outcomes. Therefore, going with the background this study will holistically explore the role of valuable intangible assets in the green smart cities with the view of proposing a framework for the green smart cities and intangible assets and also to propose a model to the green smart intangible asset.

## 2.0 Literature Review

## Smart City

According to extant research, the smart city idea encompasses a wide range of social, economic, urban, institutional, technical, and environmental issues in a broad sense (Bibri,&Krogstie, 2020).The concept of a smart city is constantly developing, and there have been several working definitions presented by smart city specialists so far. The definition of a smart city varies, however, there are certain common elements in each description. Because many cities are recognizing their city as smart by using ICTs in delivering municipal services, one of the common components in the definition is technology (Shamsuzzoha, et al., 2021; Gonçalves, et al 2020).The concept of a smart city is constantly developing, and there have been several working definitions presented by smart city specialists so far. The definition of a smart city varies, however, there are certain common elements in each description. Because many cities are recognizing their city as smart by using ICTs in delivering municipal services, one of the common components in the definition is technology (Linde, et al., 2020; Orłowski, 2021). The Integration of systems and connectivity of infrastructure is a key aspect of a smart city (Noori, et al 2020; Dameri&Benevolo, 2016; Lee et al., 2014). The usage of networked infrastructure is mentioned in various definitions as a way to cater to social, environmental, economic, and cultural growth (Zygiaris, 2013).Several authors define a smart city as a forward-thinking, high-performing metropolis that inspires others (Dameri&Benevolo, 2016). The inhabitants are the most essential component of a smart city. In smart city definitions, meeting the demands of citizens is a critical component (Ji, et al., 2021;Patrão, et al 2020). Furthermore, while technology deployment is an enabling component for smart city implementation, it does not ensure smart city implementation success (Singh, et al., 2020). Importantly, it is necessary to solve the major ecological, socioeconomic, and demographic issues that contemporary societies are confronted with. As a result, knowledge-based management techniques are being used to contribute to the sustainability and liveability of social ecosystems.

Dimensions of smart cities The smart city dimensions are a collection of viewpoints that contribute to the development of smart cities (Ahad,et al., 2020). A city's smartness will be enhanced by combining several characteristics of a smart city (Keshavarzi, et al 2020). Smart Government, Smart Mobility, Smart Living, Smart People, Smart Environment, and Smart Economy (Kumar (2020).) are six aspects that are frequently mentioned in literary research. Smart governance is the use of ICTs to link services in the city.This aims to connect public, private, and civil organizations so that the city may execute and manage smart city projects more efficiently using a single paradigm. The next level of smart mobility is a city-wide transportation system that is safe, sustainable, and linked. Smart Living promotes a pleasant, healthy, and safe lifestyle in an ICT-enabled city, therefore raising the standard of living. Citizens with appropriate computer expertise, the ability to adapt to technological progress, access to education, and the ability to operate in an ICT-enabled setting make up the Smart People dimension. Smart energy, smart grid, pollution management, and monitoring, green infrastructure, and creating a healthy environment for humans are all part of the smart environment. The smart economy caters to e-business

and e-commerce, as well as increasing efficiency through the use of smart computing in production to develop new products and services. Most of the elements in smart cities are putting in a lot of work. As stated in Ali, et al (2020)'s concept of a green intangible asset, the effort, and function of intangible assets cannot be overlooked. Intangible assets in general are part of green cities.

The smart city's point of view The phrase "smart city" refers to a global stream of research and policy aimed at improving people's quality of life in urban areas by leveraging creativity and high-tech solutions to the challenging issues that have developed as a result of growing urbanization (Dameri, 2015). The smart city situation arose from a desire to address the ills and diseases of urbanization, such as pollution, land consumption, traffic and congestion, energy needs, difficulty accessing public services, and, more broadly, the serious urban footprint on the environment and the challenges that come with high population density. On the other hand, the smart city idea is founded on the essential role that cities play in the development of knowledge, culture, innovation, and economic growth. (Stanley al. 2017). According to a recent OECD study, metropolitan areas in OECD countries contributed more than half of overall OECD growth from 2001 to 2011, and in some cases, more than 70%. The Organization for Economic Cooperation and Development (OECD) published a report in 2013 that Furthermore, cities are critical to the European Union's economic and social development, according to EU (2013), but they must address threats like demographic change, income disparities, urban sprawl, and other issues by transforming challenges into opportunities through a sustainable urban development model.

After 2010, the smart city movement exploded as a result of several important global developments, including technological improvement, the proliferation of smart devices, environmental pressure, and political support from supranational organizations like the United Nations, European Union, and OECD (Rouvroy, et al 20219). Furthermore, cities are becoming more significant in terms of territorial government and development. In the recent decade, all of the world's most industrialized countries have restructured their administrative systems, embracing decentralization and more focused municipal government at the city level (Zhang, et al, 2020). Metropolitan areas acquire political strength and the capacity to administer their territory in a more independent way than the national government, even if they are never fully resourced. As a result of this decentralization, the city has emerged as one of the most important political players in the development and implementation of innovative and high-quality urban plans aimed at enhancing the urban quality of life. Even though it appears to be a recent phenomenon, the smart city has ancient roots.

The Amsterdam Digital Municipal was the first attempt to use technology, namely ICT, to unite people, institutions, and social agents in a single platform meant to open up municipal government to public participation, according to the smart city community (Mann et al 2020). The 43 smart city definitions discovered in this thorough literature review were assessed based on the elements of sustainability they address, such as

environmental, economic, and social sustainability, as well as the significance they place on the concept of sustainability. The study emphasized common and opposing aspects of the definitions, as well as the role of intangible assets in green smart cities they give, based on the sustainability factors they evaluate. Accessibility of citizens, misrepresentation, and the distinctiveness of existing urban fabrics all seem to be important. A new updated definition is proposed, which takes into account these challenges as well as the disconnect between the smart city's aim and its actual implementation. The findings of this study contribute to knowledge and practice by helping to clarify concepts and, in particular, by revealing underlying assumptions about the role of intangible assets in smart city development and sustainability.

Wey, & Peng, (2021). The current idea of a smart city is the outcome of converging streams of study and actual implementation of urban strategies addressing a fairly broad collection of issues and aims that we can collect in three main streams, according to an examination of the international literature on city innovation. As a result of a physical or virtual ICT infrastructure (Schuler, 2002; Dameri and Cocchia, 2013), the digital city, or "an arena where people may connect and share knowledge and information in a digital format" (Ishida, 2002). The green city, or "a city pursuing economic development while reducing greenhouse gas emissions and pollution, safeguarding the environment and biodiversity" (OECD, 2010; Batagan, 2011). The knowledge city, or "a city that aims at a knowledge-based development" (Ergazakins et al., 2004), resulting from knowledge creation and sharing at both the individual and institutional level (OECD, 2010; Batagan, 2011); (Edvinsson, 2006; Yigitcanlar et al., 2008). These three techniques have been carefully examined in a variety of publications (Dameri, 2015). Even while ICT, information, and environmental preservation are all viewed as intricately connected drivers for more inventive city implementation, Distinct city labels may be distinguished, each focused on a different set of concerns, as illustrated in.

The smart city is the result of combining these various city concepts, and it differentiates itself from other innovative city models by providing an integrated, complete perspective of all aspects of urban life, from the economy to government, social to cultural aspects, transportation to green areas (Dameri, 2017). Among the most referenced writers are Giffinger (2007), Nam and Pardo (2011), and Chourabi et al. (2012), who propose a smart city framework that incorporates all of these components into a distinctive and strategic vision of the city of the future. The three fundamental concepts of ICT, environmental protection, and knowledge production emerge as key aspects of a smart city, intimately intertwined with one another, according to the most often used smart city definitions (Hollands, 2008; Caragliu et al., 2011; Schaffers et al., 2011). A smart city's creative nature is impossible to achieve without technology, knowledge production, and its integration with urban infrastructures, government, culture, and people. Knowledge is frequently seen as the most important component of a smart city, with terms such as intelligent city, information city, knowledge city, and learning city all derived from the concept of a smart city. and as a distinct smart city characteristic consisting of the creation and consolidation of knowledge and invention into a real intellectual capital helpful for

triggering additional and better creative processes in the city All of the listed city labels (intelligent city, information city, knowledge city, learning city) have some characteristics, but they also differ in that they each focus on one or a few components of the city rather than a holistic picture. The information city, for example, is intimately related to the notion of a digital city; it highlights the critical role of information and communication technology (ICT) in gathering, processing, and distributing data and information to all inhabitants (Ishida, 2002; Rosvall et al., 2005). These processes not only produce intellectual capital in the form of databases, websites, and free apps, but they also produce a smart community of people who are connected thanks to broadband connections and flexible online services that connect individuals, institutions, and businesses. The excelling city in terms of beauty, inventiveness, and liveability is referred to as an intelligent city (Hollands, 2008). The adoption of smart projects improves the city's quality of life, making it a better place to live. Urban technologies provide a knowledge platform for generating public and economic value by producing, sharing, utilizing, and exploiting both individual and communal information.

When technology policies are combined with cultural policies that promote excellence in museums, theatres, schools, and universities, the intelligent city transforms into a knowledge city, with knowledge serving as the primary resource for social and economic growth. All of these elements are absorbed by the smart city concept, but they are somewhat changed when they are integrated with bigger ideals such as environmental protection, energy generation, and good governance. In the city platform, knowledge is regarded as a resource that can be collected and exploited both materially and immaterially. Several authors explicitly reference the concept of urban intellectual capital when defining a smart city as a comprehensive urban strategy that focuses on some basic parts such as technology, a self-sustaining economy, and environmental safeguards, digitization of daily life, a government reform style, and intellectual capital. Intellectual capital,

According to Nam and Pardo (2011), is an intangible, social infrastructure of the smart city, comprised of people and their interactions, in addition to tangible amenities. They regard it as a necessary asset for reaping the advantages of sound tactics. Lombardi et al. (2012) explain the importance of intangible assets in smart cities, focusing on the triple helix model and the function of universities and research centers in creating innovation and patents that support smart projects. In addition, Leydesdorff and Deakin (2011) link the triple helix to the smart city's knowledge base, defining intellectual capital as a combination of university patents, industrial riches, and municipal government, where information is critical to regional innovation systems. The role of smart cities, according to Neirotti et al. (2014), is to optimize the use and exploitation of both tangible and intangible assets, such as human and intellectual resources.

An intangible asset is identified by Komninos (2011) in four distinct designs of spatial intelligence:

- (i) orchestration intelligence, which is based on community collaboration and the integration of people's skills, know-how, and collective and machine intelligence;
- (ii) amplification intelligence, which is based on learning, up-skilling, and talent cultivation using open technology platforms and the city's ICT infrastructure; and
- (iii) augmentation intelligence, which is based on learning, up-skilling, and talent cultivation using open technology platforms and the city's ICT infrastructure.
- (iv) instrumentation intelligence, which is based on streams of data generated by municipal activities and helps citizens and businesses to make better decisions. As a result, he views the smart city to be an intelligent city built on all of these diverse architectures of intellectual capital linked to a city's geographical intelligence.

Dameri et al. (2014) investigate how a smart city strategy may generate intellectual capital, experimentally supporting their theoretical work by looking at a big Italian city's smart city project portfolio. Several writers place intellectual capital at the heart of the smart city, but no one has looked at the particular links between the nature of a smart city, its fundamental management procedures, and the nature of territorial intellectual capital, according to this survey. The specialized knowledge flows and processes emerging from the execution of smart city initiatives and their distinct, particular governance are also not explored.

### **Concept of Intangible Assets**

Because intangible assets are knowledge-based and capable of providing uniqueness to a business, they are unique assets. Intangible assets, according to Nijun (2017), are a company's competitive edge that is difficult to duplicate. To compete successfully, intangible assets as a factor of production play a vital part in the value generation process of a corporation. Intangible assets reflect a firm's essential competitive capability, according to Husnalet al (2013). Intangible assets, according to Appelbaum et al (2017), also affect flexibility and organizational performance. Intangible assets are defined by IAS38 as identifiable noneconomic assets with no physical existence. Past transactions or occurrences that have no physical form but are perceived as future economic rewards controlled by the entity are known as intangible assets. Patented technology, computer software, licensing, franchise agreements, trademarks, and other intangible assets are designated and classified as intangible assets by IAS38. Intangible assets should be valued at cost, with any amounts written off from year to year is deducted from the balance sheet. If certain conditions are met, such as comprehensive income and intangible asset disclosures in financial statements, intangible assets should be recognized.

Intangible assets are non-monetary assets with no physical substance, according to IAS38, which was published in 1998 and updated in 2008. However, Mausuri (2016) pointed out that some intangible assets, such as computer software on a compact disk, legal documents in the case of a license or patent, or film in the case of photographs, may be contained in a physical substance. Although tangible, the cost of such a physical item holding intangible assets is generally recognized as part of the intangible asset. Intangible



assets are assets that can't be seen, touched, or measured, but have the right to future rewards. However, not all assets with no physical substance are considered intangible assets. For example, account receivables and quick prepayments are classed as current assets and are not considered intangible. One common feature of intangible assets, according to IAS38, is their ability to benefit the company beyond its current operational cycle. Some intangibles, such as patents and copyrights, are related to the generation of product demand, while others, such as trademarks and trade names, are related to the maintenance of product demand. Goodwill, on the other hand, could pertain to either. Some intangible assets are valued at the time of acquisition. The following factors should be considered when accounting for intangible assets: how to assess the acquisition cost of an intangible asset and how to allocate the disposal of such an asset to a future accounting cycle. Furthermore, Mansuri (2016) highlighted issues to consider when calculating the purchase price of an intangible asset if it is to be taken into account and established within a business; it is measured as the cost of labor and material absorbed in production, as well as legal costs associated with securing and defending the exclusive right to the assets. If the intangible asset is obtained by purchase, it is recorded at the purchase price. Mansuri (2016) pointed out that expenditures paid in generating intangible assets are typically not recognized as assets, but only intangible assets purchased through the market exchange from other enterprises are recognized as assets.

### **Classification of Intangible Assets**

Beyond this accounting definition, much literature has been produced to identify and classify intangible assets. According to Petkov, IAS 3 added the following

#### ➤ **Marketing-Related Intangible Assets**

Primarily seen in the marketing and advertising of goods and services, including Trade Marks, advertising, corporate logos, jingles, and brand names that were recognized with the government and are used to distinguish specific businesses and products, Collective marks, Service marks Certification marks, Trade Names, Internet domain names, Trade dress (Package or shape, design Unique Color), Newspaper mastheads, Noncompete agreements, Noncompetition agreements, and Internet domain names.

#### ➤ **Customer-Related Intangible Assets**

Intangible assets associated with customers or suppliers they are: Order books, Service or supply agreements, Customer relationships, order to production backlog, Customer Lists, customer contracts, and the related customer relationships, non-contractual customer relationships.

#### ➤ **Artistic-Related Intangible Assets**

These assets, which arise from the right to royalties from artworks, give its owner its exclusive right to duplicate and sell artistic works. such as literary works, songs or movies, Books, Films, Drawings, Photographs, Plays, non-contractual copyright protection, Magazines, Newspapers, Operas and ballets other literary works, Musical works such as compositions, lyrics.

➤ **Contract-Based Intangible Assets**

This includes licensing; royalty; standstill agreements; advertising; construction management; service or supply contracts; lease agreements; construction permits; franchise agreements; broadcast rights; use rights such as water, air, and timber cutting; servicing contracts such as mortgage servicing contracts; employment contracts.

➤ **Technology-Based Intangible Assets**

Specifically, intangible assets may be defined as Patents that provide exclusive rights to produce or sell new inventions Patented technology, unpatented technology, Computer software and mask works, Databases, including title plants, and Trade secrets, such as secret formulas, processes, recipes.

➤ **Goodwill**

The amount spent to purchase a company in surplus of its net assets at fair market value is known as goodwill. While goodwill is essentially an intangible asset, it is frequently shown as a separate line item on a company's balance sheet.

## **Intangible Asset And Green Smart Cities**

Omar, et al (2020) Chen was the first to propose the notion of a green intangible asset in (2008). (GIA). Claver-Cortés et al. (2007) proposed that environmental capital is a component of IC. Intangible assets have been given a green twist by Maditinos et al. (2011). Later, Mohd Yusoff et al. (2019) proposed the perspective of a green intangible asset as a minor subject in management literature, with few definitions. Among the few definitions available, "The entire stocks of all sorts of intangible assets, knowledge, talents, and relationships, etc. concerning environmental protection or green innovation at the personal level and at the organizational level inside a company," according to Chen (2008). Green intangible asset, according to Liu (2010), is "the integration of green and environmental information sources and firms' knowing capabilities to increase their competitive advantage." Lopez-Gamero et al. (2011), another addition to the subject, defined green intangible asset as "the total of all knowledge that an organization can use in the process of performing environmental management to achieve a competitive advantage."

## **Intangible Asset In Green Smart Cities**

### **i. Green Human Intangible asset**

All of the City intangible asset (CIA) models recognize the knowledge and learning potential contained in individuals as a major knowledge resource (Omar, et al 2020) In the context of green human intangible assets, citizens' knowledge, skills, capacities, experience, dedication, attitude, and motivation to solve environmental challenges across the city might be considered.

### **ii. Green Social Intangible asset**

The knowledge and learning potential embedded in the relationship among citizens organizations and networks (Omar, et al, 2020) was strengthened in the studies of the author

### **iii. Green Institutional Intangible asset**

Green institutional intangible asset, which relates to knowledge management and generation in successfully resolving environmental challenges and promoting citizen productivity. This construct focuses on the founding of environmental systems and procedures to improve environmental operations through a system that plans, schedules, implements, and checks daily activities, as well as promotes the codification and retention of the most relevant knowledge based on employees' cumulative experience.

### **iv. Environmental intangible asset**

All that forms the physical environment, including both natural and manmade items such as bridges, trees, and phones, according to Omar et al (2020) the knowledge operating managing and the patent to all man-made features of the above-mentioned environmental factor is seen as a green intangible asset for a green smart city.

### **v. Green process intangible asset**

Companies may develop and attain better levels of knowledge and technical advancement by allocating funds for research and development costs. Another key metric is the number of intangible assets, such as patents and trademarks, that have been granted as a result of green manufacturing or processes. The intellectual properties rights acquired by a corporation can limit the extent of imitation, allowing patented technology owners to keep prices unreasonably high and preserve long-term competitiveness. Other indications include the number of patents issued, scientific articles published in top-tier journals, and creative start-ups, among others. is a venture capital firm that focuses on the knowledge and learning potential contained in processes, practices, and procedures, which of course includes software, databases, archives, repositories, and so on, is a critical component of all City intangible assets models. Digital storage per capita, availability and extent of software usage, and volumes in libraries per capita are examples of indicators.

#### **vi. Green Renewal intangible asset**

The learning and research potential ingrained in advanced designs and organizations is comprehended to extend far beyond patents, licenses, and intellectual property rights; these elements are included in a much broader concept expressing the territory's innovativeness, which is noted in two of the city intangible asset models under consideration (Omar, et al 2020; Edvinsson and Malone, 1997; Viedma, 2005). In the context of a green viewpoint, the capacity of a firm to produce new information, new products, and other creative ideas targeted at addressing environmental concerns is referred to as the green perspective. The allocated amount of research and development expenditures expended in developing the green product or green process may be used to represent this dimension. Companies may develop and attain better levels of knowledge and technical advancement by allocating funds for research and development costs. Another key metric is the number of intangible assets, such as patents and trademarks, that have been granted as a result of green manufacturing or processes. The Intellectual property right acquired by a corporation can limit the extent of imitation, allowing patented technology owners to keep prices unreasonably high and preserve long-term competitiveness. Other indications include the number of patents issued, scientific articles published in top-tier journals, and creative start-ups, among others.

### **3.0 Methodology**

This study will use the descriptive and explorative method to achieve the primary aim of the study the intensive literature review as it has been chosen as the most appropriate for our goals. A wide-range, in-depth literature review was conducted on how intangible asset plays roles in green smart city and how it has evolved in several different and representative contexts, to point out the emerging role of intangible asset knowledge in the world of smart city practice. This research will build a proposed model for the green intangible asset and also propose a framework of smart city and intangible asset the used will used integrations mode of developing the framework and the model from the previous literature reviewed achieving this. It will, therefore, give room for large empirical knowledge gathered

### **4.0 Result and Discussion**

from the reviewed literature it was obtained that intangible has great role-playing in the green smart city, different studies come with a different view about the intangible asset some of the studies see intangible assets as intellectual capital. It was also found that (GHIA), green human intangible asset, Green Social Intangible Asset (GSIA), Green Institutional Intangible Asset (GIIA), Environmental Intangible Asset (EIA), Green Processing Intangible Asset (GPIA), are the categories of the intangible asset to have the greatest role-playing the context of a green smart city.

In the context of a green human intangible asset (GHIA) it was seen to cover Individuals' knowledge and learning potential are recognized as a key knowledge resource in all of the City intangible asset (CIA) models (Omar, et al 2020) Citizens' knowledge, skills, capabilities, experience, commitment, attitude, and willingness to tackle environmental issues across the city may be regarded in the context of green human intangible assets.

Green social intangible asset (GSIA) represents the intangible asset in the smart cities that intangible assets that fall in this category are seen in the author's investigations, as the knowledge and learning capacity inherent in relationships among citizens organizations and networks (Omar, et al, 2020) was strengthened.

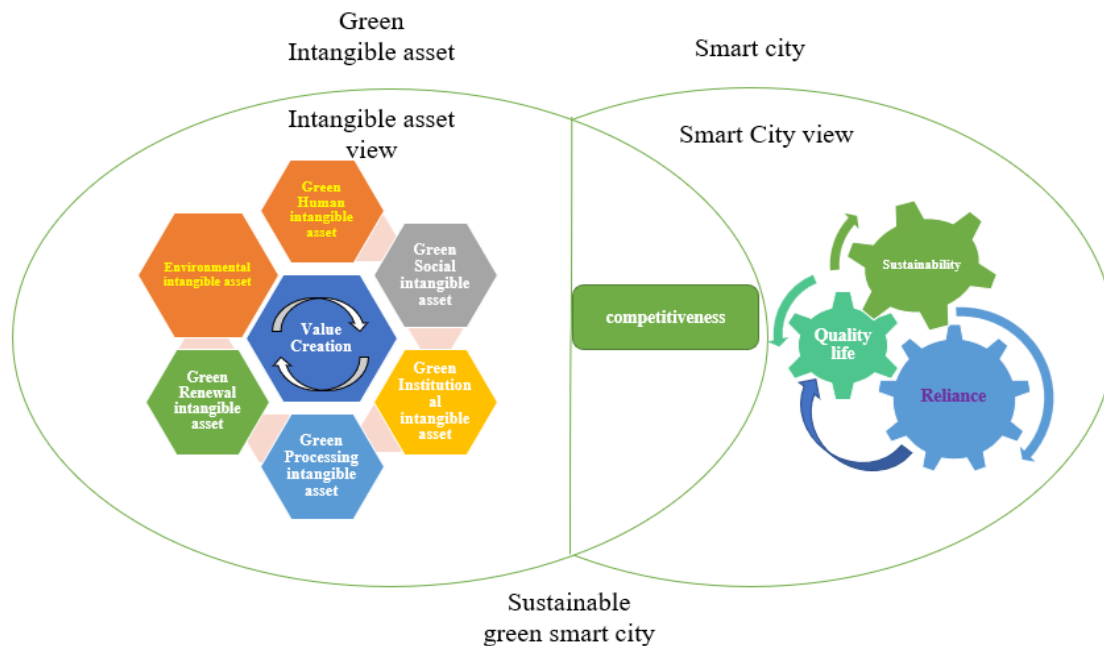
Green institutional intangible assets (GIIA) are intangible assets sent as knowledge management and creation as an intangible asset in effectively managing environmental issues and enhancing citizen productivity This construct focuses on the establishment of environmental systems and procedures to improve environmental operations through a system that plans, schedules, implements, and checks daily activities, as well as encourages the codification and retention of the most pertinent knowledge based on employees' cumulative experience.

Environmental Intangible Asset (EIA), these are types of intangible assets that include the knowledge operating managing and the patent to all man-made features of the environmental elements is seen as a green intangible asset for a green smart city.

And last, the green process intangible asset (GPJA) is the intangible asset in the green smart city which include The learning and research potential ingrained in advanced designs and organizations is comprehended to extend far beyond patents, licenses, and intellectual property rights; these elements are included in a much broader concept expressing the territory's innovativeness, which is noted in two of the city intangible asset models under consideration (as also strengthen by the study of Omar, et al 2020; Edvinsson and Malone, 1997; Viedma, 2005).

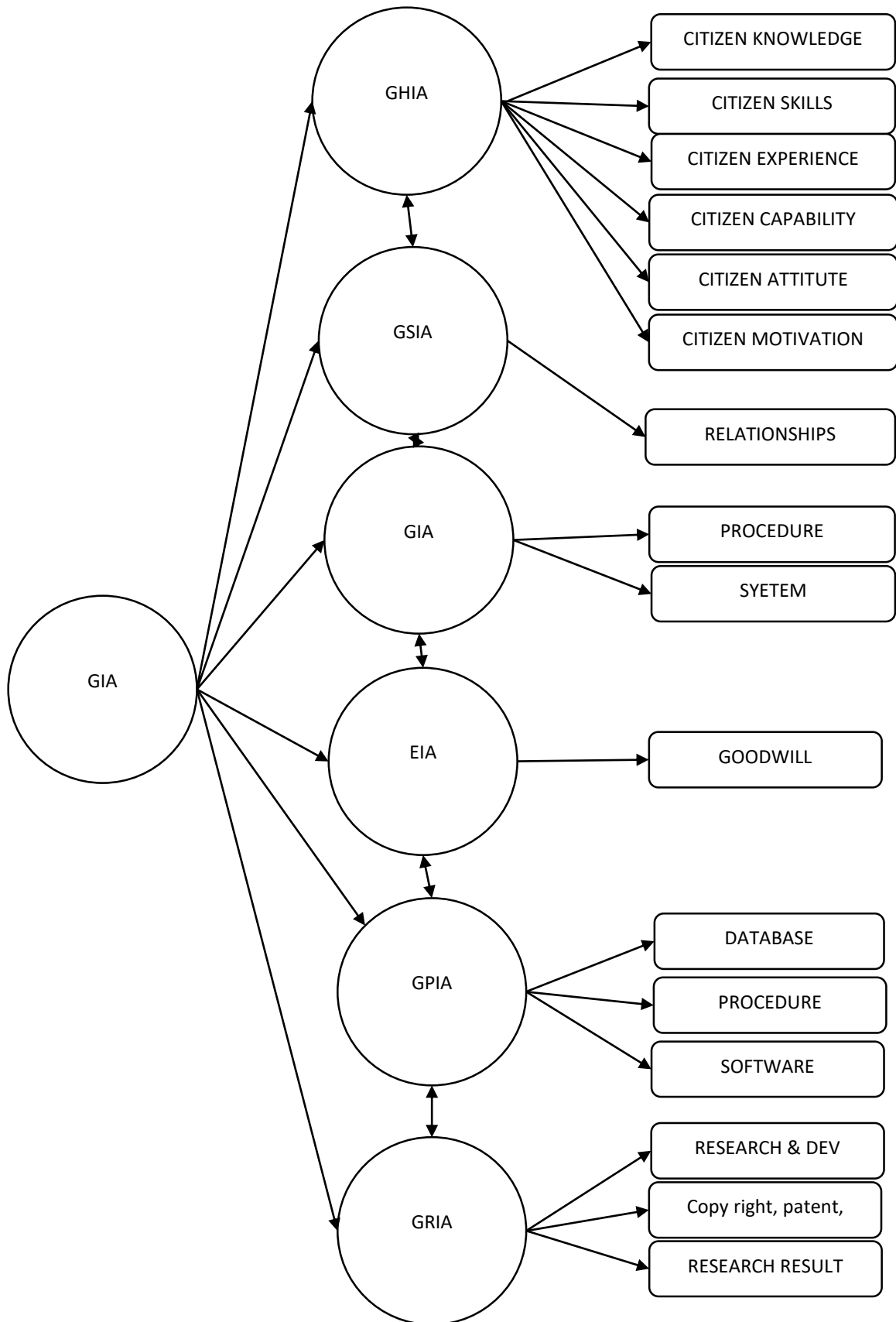
### **Proposed framework and Model**

According to the current study, the green intangible asset (GIA) of smart cities should include six main constructs, as shown in Figures I and II, Green human intangible asset (GHIA), Green Social Intangible Asset (GSIA), Green Institutional Intangible Asset (GIIA), Environmental Intangible Asset (EIA), Green Processing Intangible Asset (GPJA), and green renewal intangible asset GRIA)



**Fig 1.** Propose framework of Smart city and green intangible asset integrated from SC-GIC Proposed Framework of Omar, et al (2020)and Dameri, (2015).

The above-proposed framework is integrated from the proposed framework of smart city and green intellectual property of Omar et al (2020) from his study title Smart City - Green Intellectual Capital Model for Sustainability and a Higher Quality of Life, the integration took dimension as thus; in their studies, they are considering the intellectual property at large on the other hand look at intangible at border concept while this study is only considering knowledge as the subject intangible asset, from the concept green intangible asset and in the intangible asset view they are generally all the class of the intangible asset that is involved in the process of the enhancing the environmental ability to reliance quality life and sustainability. There the green intangible asset touches the green human knowledge, including the knowledge, skill experience that is utilized in constructing the green human in the environment of green smart city, green social knowledge that creates atmospheric relation among the people, organization, and networks in this dimension is considered the green social knowledge intangible asset in the study of Omar et al 2020, he includes commitment attitude and motivational. Then the green institutional intangible asset is in the dimension of the knowledge of the system, procedure and formulas use in the process and management of green cities, also same to the green processing intangible asset, green renewal intangible asset, and environmental intangible asset.



**Fig II.** The proposed green intangible asset integrated from the proposed framework of the proposed green intellectual capital constructs and their sub-constructs (Omar, et al 2020)

The above fig shows the proposed framework and there are above abbreviated words such as GHIA meaning green human intangible asset, GSIA means green social intangible asset, GIA green institutional intangible asset, EIA meaning environmental, GPIA, Green processing intangible asset, GRIA, green human intangible assets, the green intangible asset is shown with the sub construct. The model shows every category of intangible asset and their sub construct that are existing in the context of green smart cities.

## 5.0 Conclusion

With the result extracted from the intensive review of literature of this study to explore the role of intangible assets in the context of green smart cities with the view of exploring the values, proposing framework, and mode for the green smart city and intangible asset and green smart intangible asset respectively, as they are the linkage between the green smart cities and the intangible asset it may be concluded that this is the categories of the intangible asset in the context of green smart cities which are a Green human intangible asset (GHIA), Green Social Intangible Asset (GSIA), Green Institutional Intangible Asset (GIIA), Environmental Intangible Asset (EIA), Green Processing Intangible Asset (GPIA), and green renewal intangible asset GRIA) and it was seen that there is a relationship between each category.

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