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# Incubators and technical valleys in gifted education in Saudi universities: Feasibility of employment and perceptions of digital support

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## Abstract

This study investigates the extent to which gifted students at Saudi universities benefit from incubators and technology valleys, using a descriptive-analytical approach to define the conceptual framework and analyze indicators of their utilization in gifted education. The analysis focuses on three key dimensions: the availability of information and logistical services connecting students with these facilities, the quality of support provided, and the provision of diverse assistance services, including technical, financial, administrative, advisory, and marketing support. Statistical analysis of faculty responses reveals a moderate level of utilization. The research recommends establishing clear performance measurement criteria and improving communication mechanisms between students and these entities. Additionally, it proposes a digital and network-based support framework to enhance students' capabilities and create an integrated learning environment.

**Keywords:** Digital support for the gifted, gifted education, technical valleys, university business incubators.

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## 1. Introduction

Universities are regarded as pivotal educational institutions with multifaceted responsibilities and duties. Beyond imparting education and community service, they also shoulder the vital responsibility of scientific research, which is deemed a crucial and indispensable element for societal advancement. Developed nations accord special emphasis to universities and research and development programs by creating conducive scientific environments that foster the growth and thriving of scientific research. Scientific research stands as one of the most paramount functions of universities. In its absence, a university transforms into a mere educational establishment, lacking the role of a hub for scientific innovation, knowledge enrichment, and its application to address diverse community challenges.

In the current landscape, universities are tasked with embracing innovative approaches and structures to foster research and development thinking while actively engaging with society's production sectors. This collaboration is pivotal for achieving sustainable development in human societies. Indeed, the extent of cooperation between universities and productive sectors serves as a key determinant of a university's global reputation and ranking [1-3]. Various mechanisms and models have emerged to establish connections between universities and productive sectors. These include technology cities, research parks, centers of research excellence, industrial clusters centered on high technology, technology corridors, and technology incubators. It is worth noting that in some countries around the world, the adoption of these mechanisms to bridge the gap between universities and these institutions has transformed certain universities into self-sustaining entities. These universities have started generating significant profits akin to companies, factories, and banks, thus benefiting their stakeholders [1].

Numerous countries worldwide, including the United States of America, China, South Korea, Canada, Japan, the United Kingdom, Saudi Arabia, and Jordan, have embraced the concept of technological incubators. The primary objective is to foster innovation by supporting the creative ideas of visionaries, whether individuals or groups of scientific and academic researchers, and subsequently transforming these ideas into successful projects. This is achieved through the provision of a comprehensive array of services, encompassing technical, administrative, production, marketing, financial, legal, and technical advisory support for nascent projects. The ultimate goal is to facilitate the launch phase and mitigate the risks of failure [4, 5].

McAdam and Marlow [6] observe that university incubators typically pursue three primary objectives: facilitating technology transfer, promoting entrepreneurship, and advancing research commercialization. Secondary goals encompass the cultivation of entrepreneurship, fostering civic responsibility, enhancing the institution's image, and securing financial support. An essential function of incubators lies in nurturing and expanding business and social networks, which serve as critical avenues for accessing many of these benefits. Incubators often prominently feature these networking opportunities in their promotional materials and brochures for potential participants. Research into relationship building within incubator networks suggests that both formal and informal connections play a vital role in incubation success [7, 8].

Incubators and technology hubs, which leverage digital and networked support mechanisms, aim to integrate and strengthen partnerships between the incubator and external stakeholders. This approach facilitates the exchange of knowledge and experience, laying the groundwork for productive relationships Hansen, et al. [7]. Siddiqui, et al. [9] underscore the existence of a set of critical success factors for university business incubators, which culminate in five major elements: (a) comprehensive support services, (b) robust network support, (c) financial backing, (d) contributions to economic development, and (e) the achievements of incubator graduates. These factors are particularly significant given the presence of two primary groups: (a) the "staff" of the incubators and (b) the "incubatees."

Despite the efforts of business incubators to cultivate robust business and social networks, aimed at delivering value in the form of intellectual and material resources to their resident companies, there remains a scarcity of information regarding the motivations driving resident firms to engage in networking activities and the challenges they encounter in establishing effective networks [10]. Moreover, there is an urgent imperative for further research to identify, analyze, and systematize best practices in business incubation. These practices should serve to bridge and leverage the digital, knowledge, and cultural divides both between and within developed countries, countries in transition, and developing nations [11].

The utilization of incubators and technology hubs for the education of gifted individuals is a pressing matter demanding ongoing attention and enhancement. Collaborative efforts between educational institutions, governments, and communities are essential to endorse these programs and ensure the effective integration of incubators and technology hubs in gifted education. Within the Saudi scientific landscape, numerous incubators and technology hubs exist, with the primary goal of creating nurturing environments that transform theoretical knowledge into tangible scientific contributions that benefit society. In the Kingdom of Saudi Arabia, incubators and technology hubs hold a pivotal role in the education and development of talented individuals. Notwithstanding the strides made in employing incubators and technology hubs for gifted education in the Kingdom of Saudi Arabia, there are notable challenges that must be addressed. Some of these challenges are elucidated below [12, 13]:

1. Public Awareness and Outreach: There might be a lack of public awareness and understanding regarding the pivotal role played by incubators and technology hubs in the education of gifted individuals.
2. Accessibility and Expansion: Ensuring the widespread availability of incubators and technology hubs across all regions of the Kingdom of Saudi Arabia could pose a significant challenge.
3. Financial Sustainability: The continued operation of incubators and technology hubs hinges on sustainable funding to support ongoing educational programs and resources.
4. Evaluation and Monitoring: The effective assessment and monitoring of the performance of incubators and technology hubs present a noteworthy challenge. The development of standardized and cohesive mechanisms is imperative for evaluating the quality of educational programs and activities, as well as their efficacy in nurturing gifted skills.

The Kingdom of Saudi Arabia has implemented robust initiatives aimed at enhancing and advancing the local entrepreneurship ecosystem. This endeavor primarily involves the establishment and nurturing of business incubators, with a particular focus on university-based business incubators. In a relatively brief span of time, Saudi business incubators have yielded numerous innovative solutions addressing technology, economic, and societal challenges. Given the multifaceted nature of their roles and the absence of standardized evaluation criteria, assessing the performance of these business incubators has emerged as a crucial and prominent subject of concern in Saudi Arabia [9].

Bukhari [14] examination of various studies and reports concerning pioneers in incubators, technology valleys, and emerging companies affiliated with Japanese universities reveals that their success is contingent upon 14 key factors. These factors encompass the capacity to establish an extensive network of external relationships that guarantees the provision of logistical support services. Additionally, they include the ability to attract capital, a consideration for the individual differences among service seekers, the aptitude to foster collaboration with governmental and non-governmental entities dedicated to industrial development, adaptability in the information infrastructure, and ultimately, the ability to garner social support.

Based on the premise that the pivotal factor influencing the success of technology incubators, specifically those assisting innovators in the information, communication, and technology sector in materializing their ideas, is the imperative need to elevate the quality of services offered. These services encompass financial, administrative, technical, accounting, consulting, information technology, legal, and logistical support. The process of diagnosing and analyzing the current state of technology incubators serves as a vital tool for enhancing the services rendered to their beneficiaries. This involves identifying the obstacles and challenges encountered by technology incubators [15].

Building upon the aforementioned context, the present research endeavors to assess the utilization of incubators and technology hubs for the education of gifted individuals within Saudi universities. This assessment revolves around three primary dimensions:

- The first dimension: Examining the availability of information and logistical services for talented individuals to establish connections with incubators and technology hubs.
- The second dimension: Evaluating the support and care services extended to gifted individuals by incubators and technology hubs.
- The third dimension: Analyzing the range of support services encompassing technical, financial, administrative, advisory, and marketing support offered to gifted individuals by incubators and technology hubs.

Based on the findings and analyses of these dimensions, it becomes apparent that several critical factors underpin the successful and effective operation of incubators and technology hubs in gifted education. As a contribution towards harnessing these critical factors, the current research introduces a vision centered around digital and network support to enhance the role of incubators and technology hubs in gifted education. This vision aims to facilitate remote registration and communication opportunities for gifted and creative students while leveraging digital mediation to empower these students, offering them diverse educational opportunities across various fields.

Therefore, the present investigation endeavors to address the following two research inquiries:

1. To what extent do faculty members in Saudi universities perceive the employment of incubators and technology hubs in educating gifted individuals?
2. Is there a statistically significant difference in the mean responses of faculty members to the questionnaire on the utilization of incubators and technical valleys in gifted education, based on the variables of gender, specialization, and academic rank?
3. What are the perceptions of digital and network support in activating the role of incubators and technical valleys in educating the gifted?

### *1.1. The significance of This Study*

The significance of this study is underscored by the following points:

#### *1.1.1. First: Theoretical Significance*

1. This study stands out as one of the qualitative inquiries conducted in the Arab and Saudi contexts that delve into assessing the extent to which incubators and technology hubs are utilized in the education of gifted individuals.
2. It aligns with both global and national trends in Saudi Arabia, emphasizing the imperative to enhance the efficacy of incubators and technology hubs while broadening the scope of innovation, invention, and entrepreneurship.
3. It underscores the necessity of focusing on the societal cohort comprising innovators, inventors, and entrepreneurs, and providing them with comprehensive support services encompassing technical, financial, administrative, advisory, and marketing assistance. These individuals represent the nation's intellectual assets, capable of devising solutions to address various human development challenges within the Kingdom of Saudi Arabia.

#### *1.1.2. Second: Practical Significance*

1. Perceptions regarding digital and network support hold the potential to actively bolster incubator programs and technology hubs in fortifying their roles and capabilities. This, in turn, aids in the identification of talented individuals and the cultivation of innovative and entrepreneurial competencies among young individuals.
2. The translation and implementation of diverse digital support mechanisms and strategies within incubator programs and technology hubs serve as catalysts for expanding the pool of innovators, inventors, and entrepreneurs in society.

3. Furthermore, the expansion of digital and network connectivity across various sectors and institutions within incubators and local, regional, and international technology hubs contribute significantly to realizing the objectives of digital mediation. This fosters meaningful connections between talented and creative individuals, academic experts spanning diverse domains, and the institutions that nurture and support them.

*1.2. Previous Studies*

Numerous works and research studies have explored the realm of business incubators and technology hubs, spanning local, regional, Arab, and international perspectives. At the global level, Cooper, et al. [10] conducted a study with the aim of identifying the motivations and impediments associated with networking in university business incubators. Their findings underscored the prevalence of face-to-face interactions within these incubators. The primary obstacles encountered by residents in fostering communication and relationships included a dearth of ongoing information and concerns about the confidentiality of innovation-related data and funding sources. Additionally, Carayannis and Von Zedtwitz [11] presented a proposed conceptual framework for a gloCal (global-local) architecture, emphasizing real-world virtual incubator networks (G-RVINs) as catalysts and accelerators for entrepreneurship within transition economies and developing nations. Their model featured a comprehensive incubator approach amalgamating elements and best practices. They also outlined an architectural blueprint for crafting a global, real, and virtual network of incubators (G-RVIN) intended as an infrastructure facilitating knowledge, innovation, and technology. This network aimed to connect entrepreneurs and small business owners to local, regional, and global networks of customers, suppliers, and collaborators, thereby assisting in bridging and capitalizing on diverse gaps, including those of a digital, cognitive, cultural, and socio-political nature.

A critical analysis, conducted in a study by Vanderstraeten and Matthyssens [16] focused on evaluating the effectiveness of various approaches and systems for assessing the performance of incubators. The study's conclusion emphasized the absence of a single model suitable for measuring incubator performance. Instead, it underscored the necessity for multiple measurement models, highlighting the importance of four essential evaluation components: goals, partners, system resources, and internal processes. Additionally, a study by Somsuk and Laosirihongthong [17] identified key priorities and facilitators in the strategic management of university business incubators (UBIs). These UBIs are organizations designed with the aim of accelerating national economic development by supporting startup ventures.

At the regional Arab level, a study conducted by Sharif and Al-Ula [13] aimed to identify opportunities and challenges associated with the adoption of technology incubators as a tool to combat unemployment in the Arab world. The research highlighted several notable challenges, including those related to legal frameworks, institutional structures, and financial considerations. In another study by Selim and Metwally [18] foreign countries' experiences with productive universities, their relationships with incubators, and research chairs were monitored. The study explored ways to leverage these experiences for the benefit of Egyptian universities. Ahmed [19] developed a proposed future plan for establishing technological incubators within advanced industrial technical secondary education. Al-Moayad [20] affirmed the significant role of technological incubators in Yemeni universities as they transition towards a knowledge-based society, as indicated by expert responses. Salama [21] presented a vision for the role of technological incubators in the management of scientific research within Egyptian universities. This vision emphasized the creation of suitable material and human conditions, the enactment of necessary legislation, the cultivation of talents, ideas, innovations, and creativity, and the provision of comprehensive support encompassing administrative, financial, legal, advisory, technological, and artistic dimensions.

At the local level, Meamar [22] in set out to assess the state of innovation management in Saudi universities. The research revealed that Saudi universities engage in various forms of innovation, facilitated through technology transfer offices, innovation and business incubators, business accelerators, innovation and entrepreneurship centers, and technology and innovation valleys. These innovative efforts within universities are influenced by three key factors: personal, social, and organizational dynamics. In another local study by Siddiqui, et al. [9] critical success factors for university business incubators in the Kingdom of Saudi Arabia were identified. Descriptive analysis pointed to three paramount critical factors: (a) the provision of comprehensive training and guidance, (b) the abundance of support services offered, and (c) access to funds, with a focus on total investment attraction. Additionally, Othman and Rania's research in Othman, et al. [15] aimed to assess the status of technology incubators affiliated with the "Badir" program. The study gauged the level of services rendered by the program's incubators, revealing that consulting and information services emerged as the most vital offerings. Concurrently, notable obstacles included the absence of budget preparation and financial forecasting for project work, as well as a shortage of funding commensurate with project needs. Consequently, several significant recommendations were made to enhance the quality of services provided by technology incubators. These recommendations encompass fostering connections between innovators and project financiers, emphasizing strategies for marketing technological products, enhancing the qualifications of incubator managers, and promoting community awareness about incubator programs, along with the necessity of establishing international research center linkages.

Abdullah Al-Bash [23] provided insights into the factors contributing to students' reluctance to participate in business incubator projects at Saudi universities. The research revealed the most prevalent reasons behind students' hesitance, with academic concerns topping the list at 83.9%. Following closely were incubator-related issues at 83.75%, economic considerations at 80.5%, and personal factors at 74.66%. In 2020, Al-Harbi's study extended its focus to ascertain the varying inclinations of Saudi innovators, inventors, and entrepreneurs regarding the development of their innovative concepts, inventive products, and entrepreneurial endeavors within the frameworks of business incubator programs and Saudi university technology hubs. The findings underscored disparities in the preferences of Saudi innovators, inventors, and entrepreneurs concerning the advancement of their innovative ideas, inventive products, and pioneering projects. These differences corresponded with variations in the primary domains that contribute to the transformation of the Saudi economy

towards a knowledge-based economy. Lastly, Daradkeh [24] concluded that the effective application of competitive advantage strategies enhances the efficacy of business incubators.

When examining prior research endeavors, it becomes evident that they primarily aimed to uncover the motivations, challenges, and networking models within incubators and technology hubs. Additionally, they delved into identifying the critical success factors for these incubators and investigated the factors influencing students' reluctance to engage in incubator projects. The distinctive characteristic of the present study lies in its pursuit of assessing the utilization of incubators and technology hubs. It also aims to gauge the extent of beneficiaries' familiarity with the diverse logistical services, care, and support provided by these incubators and technology hubs. Furthermore, the study endeavors to present a vision for digital and network support, with the goal of invigorating the role of incubators and technology hubs in the education of gifted individuals.

## 2. Theoretical Framework

Globally, there are approximately 5,000 business incubators, as reported by the National Business Incubation Association (NBIA) [25]. Among these, 39% fall under the category of technology incubators, with 20% receiving sponsorship from research universities, as per the same NBIA report. According to Jamil, et al. [26] many developed nations, notably the United States and Europe, regard business incubators, technology valleys, and science and technology parks as pivotal elements in the success of their economic reforms. These entities play a vital role in fostering global competitiveness by facilitating the generation, incubation, and provision of fresh, innovative, and inventive ideas, products, and services.

The Global Entrepreneurship Monitor (GEM) [27] revealed a positive and statistically significant correlation between entrepreneurial activity and the presence of incubators and technology valleys, showcasing their contribution to national economic growth. Incubators have thrived primarily in economically advanced countries like the United States and Europe, which already boast robust industrial economies. Ecosystems comprising business incubators and technology valleys, underpinned by knowledge and supported by a blend of real and virtual, global, and local infrastructures—referred to as incubator networks (or "glocal" networks)—are poised to be the foremost catalysts for innovation in the 21st century. This vision gains particular significance and allure within the context of e-development initiatives geared toward nurturing a knowledge-based economy, as elucidated by Carayannis and Von Zedtwitz [11].

Undoubtedly, the insights garnered from electronic development interventions in several countries, including those that have experimented with models like the G-RVIN in Poland, which expounds upon fundamental concepts related to the essence and function of business incubators and technology valleys as drivers and facilitators of economic progress. These models have illuminated the path toward bridging the gap between developing and transitioning economies and the attainment of more advanced economies, specifically within the realm of e-development for nations in the process of transitioning toward knowledge-based economies. It is increasingly evident that this concept offers a potent avenue for amplifying the scope and reach of business incubation, facilitated through ICT (Information and Communication Technology) support. It also underscores the importance of striking a strategic equilibrium between local and global challenges and opportunities.

While numerous researchers concur that the twenty-first century will pivot on knowledge, innovation, and the role of business incubators, McAdam and Marlow [6] contend that many universities worldwide are yet to make a meaningful contribution to economic growth. This is evident through the observable consequences of the stark division between industrial and technical sectors and the disconnect between educational and research institutions.

The Kingdom of Saudi Arabia now boasts over 30 business incubators, each offering a diverse array of services. These services encompass growth programs, business accelerators, training initiatives, collaborative meeting spaces, and virtual office solutions. Additionally, these incubators extend their support to various specialized fields including marketing, finance, legal matters, technical aspects, administration, and more. Notably, several of these incubators are affiliated with universities, where their mission revolves around nurturing and equipping students with knowledge, practical experience, and skills to enhance their talents and foster their innovative ideas [28].

The Saudi scientific landscape has also seen the establishment of numerous technology valleys closely affiliated with universities. Examples include the Riyadh Valley under King Saud University, the Mecca Valley associated with Umm Al-Qura University, and the Dhahran Valley linked to King Fahd University of Petroleum. These initiatives are driven by the goal of transforming theoretical knowledge outputs into practical applications that benefit society, aligning with the broader aim of reducing technology imports and fostering domestic technological capabilities. Additionally, these valleys have opened up significant opportunities for the private sector to engage in sustainable development, investment, and collaborative problem-solving, ultimately moving beyond mere patent registration to focus on converting innovations into economically viable products. This expanded role of knowledge incubators within universities transcends their traditional missions of teaching, research, and community service, positioning them as key contributors to the national strategy for economic diversification and securing future generations' economic prospects, akin to leading international universities' achievements in this critical domain [29].

One of the standout services offered by incubators and technology valleys in the Kingdom of Saudi Arabia is their role in "nurturing" creators and innovators, guiding their ideas and projects from a laboratory prototype to actual production and investment. They achieve this by providing a comprehensive range of services, support, and practical assistance to innovators, enabling them to transform their concepts into market-ready products that contribute tangible value to the economy [30, 31]. The success factors for these incubators can be categorized into several key dimensions. The human factor involves the presence of entrepreneurial individuals, inventors, researchers, and knowledgeable consultants. The organizational factor emphasizes the importance of having skilled management, particularly in the realms of technology and strategic planning. On the legislative front, having supportive systems for technology development and transfer, along with streamlined

government procedures, plays a critical role. Finally, the financial factor encompasses accessibility to various funding sources such as venture capital, investment funds, loans, and bank financing, all of which are crucial for businesses, inventors, and innovators [32].

The effectiveness of utilizing incubators and technology valleys for educating gifted individuals in Saudi universities relies on three fundamental dimensions:

1. Information and Logistical Services: This dimension involves the availability of essential resources and services to facilitate the connection between talented individuals and incubators or technology valleys. It encompasses databases, publications, periodicals, communication channels, and similar resources.
2. Caring Services: The second dimension pertains to the supportive and nurturing services offered to talented individuals within incubators and technology valleys. These services encompass incubation, skill development, mentorship, and the establishment of connections with external stakeholders, such as business leaders and institutional owners.
3. Support Services: The third dimension involves a comprehensive range of support services provided to gifted individuals, including technical, financial, administrative, advisory, and marketing support. These services are geared towards helping talented individuals bring their ideas to fruition and excel in their educational journeys.

Figure 1 illustrates the key dimensions underpinning the success of incubators and technology valleys in the education of gifted individuals:

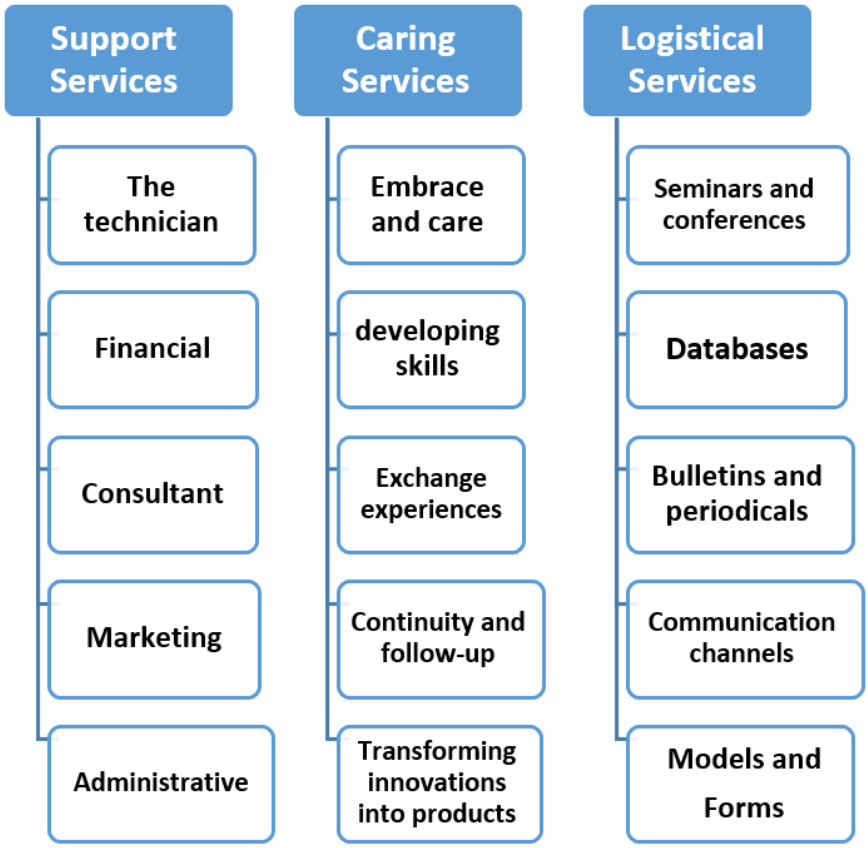


**Figure 1.**
Key Dimensions and Pillars of Success for Incubators and Technology Valleys.

In spite of the considerable efforts invested by the Kingdom of Saudi Arabia in the realm of technological incubators, a substantial scientific gap persists between the kingdom and some developed nations, necessitating efforts to bridge this disparity. Numerous studies have identified obstacles and challenges faced by incubators and technical valleys within educational institutions and universities in Saudi Arabia. Therefore, there is an immediate imperative to embark on further research endeavors within the domain of university-based incubators and technical valleys in Saudi Arabia's educational sector [28]. This urgency arises in light of the Saudi government's commitment to expanding the establishment of incubators and technical valleys, aiming to transition its economy towards a knowledge- and technology-based model, thereby reducing its dependence on oil revenues. Ensuring the viability of employing incubators and technical valleys in nurturing gifted individuals is paramount. It is essential to assess the degree of familiarity among gifted students with the logistical, care, and support services (technical, financial, administrative, advisory, and marketing) provided. Furthermore, introducing innovative concepts for digital and network support has the potential to significantly enhance the role of incubators and technical valleys in gifted education.

## 3. Research Methodology

The present study employs a descriptive analytical approach to establish the conceptual framework of incubators and technology valleys. It further examines indicators that gauge the utilization of incubators and technology valleys in fostering gifted education within Saudi universities. Additionally, the research investigates perceptions regarding digital and network support to enhance the effectiveness of incubators and technology valleys in promoting gifted education.

### *3.1. Study Population*

For the academic year 2022/2023 AD, a sample of faculty members from the colleges of King Faisal University was purposively selected. The study sample consisted of 50 faculty members, comprising 25 males and 25 females.

### *3.2. Study Tool*

To facilitate data collection aligned with the research questions and problem, a questionnaire was developed as the study instrument. The questionnaire was designed based on a comprehensive review of relevant literature exploring the utilization of incubators and technology valleys in gifted education. The questionnaire consisted of three dimensions, each with a set of items. The first dimension focused on information and logistical services and comprised 13 items. The second dimension focused on care services and included 14 items. The third dimension encompassed support services, including technical, financial, administrative, advisory, and marketing aspects, and consisted of 10 items. To measure respondents' perceptions, the questionnaire utilized a three-point Likert scale, with response options of "agree," "neutral," and "disagree." The items in the questionnaire were assigned weights as follows: three degrees for "agree," two degrees for "neutral," and one degree for "disagree."

### *3.3. Validity of the Study Tool*

In order to ensure the tool's ability to measure the intended constructs, the internal consistency validity was examined. This validity was determined by assessing the relationship between the score of each item and the total score of its corresponding dimension using the Pearson correlation coefficient.

**Table 1.**
Internal consistency validity using the Pearson correlation coefficient

| **Information and logistical services dimension** | | **Care services dimension** | | **Support services (technical, financial, administrative, advisory, and marketing)** | |
|---|---|---|---|---|---|
| **Item** | **Correlation coefficient** | **Item** | **Correlation coefficient** | **Item** | **Correlation coefficient** |
| 1 | 0.811** | 1 | 0.734** | 1 | 0.784** |
| 2 | 0.700** | 2 | 0.650** | 2 | 0.746** |
| 3 | 0.698** | 3 | 0.774** | 3 | 0.534** |
| 4 | 0.819** | 4 | 0.655** | 4 | 0.797** |
| 5 | 0.753** | 5 | 0.839** | 5 | 0.501** |
| 6 | 0.633** | 6 | 0.743** | 6 | 0.683** |
| 7 | 0.773** | 7 | 0.815** | 7 | 0.792** |
| 8 | 0.768** | 8 | 0.756** | 8 | 0.822** |
| 9 | 0.807** | 9 | 0.882** | 9 | 0.504** |
| 10 | 0.761** | 10 | 0.801** | 10 | 0.740** |
| 11 | 0.644** | 11 | 0.902** | | |
| 12 | 0.727** | 12 | 0.852** | | |
| 13 | 0.444** | 13 | 0.861** | | |
| First dimension correlation coefficient | | Second dimension correlation coefficient | | Third dimension correlation coefficient | |
| 0.957** | | 0.961** | | 0.942** | |

**Note:** Significant at the 0.01 level (**).

The findings presented in Table 1 demonstrate that the Pearson correlation coefficients between each item's score and the total score of its respective dimension are statistically significant at a significance level of 0.01. These results indicate the validity of all study items, affirming their alignment with the intended dimensions.

### *3.4. Reliability of the Study Tool*

Reliability refers to the consistency and stability of a scale's measurements across different administrations. In order to ensure the reliability of the study tool, Cronbach's Alpha coefficient was utilized to assess its internal consistency. The reliability coefficients obtained were as follows: For the information and logistical services dimension, the reliability coefficient was found to be .932, indicating a high level of reliability. Similarly, for the care services dimension, the reliability coefficient was .957, signifying a high level of reliability. For the technical-financial-administrative-consulting-marketing support services dimension, the reliability coefficient was .901, indicating a high level of reliability. The overall reliability coefficient for the entire study tool, including all questionnaire items (36), was calculated as .974, which demonstrates a very

high level of reliability. These high reliability coefficients affirm the strong reliability of the tool and its suitability for application in the study.

*3.5. Estimating the Responses of the Study Sample*

The study employed a 3-point Likert scale, which was classified using the equation: (highest value of the alternative - minimum alternative) / number of levels; in this case, (3 - 1) / 3 = 0.66. The objective was to categorize the students' responses based on the following criteria: Scores ranging from 1 to 1.66 were classified as a weak level. Scores ranging from 1.67 to 2.33 were classified as an moderate level. Scores ranging from 2.34 to 3 were classified as a high level.

## 4. Results

The analysis of the data involved the use of frequencies, percentages, arithmetic means, and standard deviation. The arithmetic means were then organized in descending order to identify items with higher averages compared to others, based on the study variables.

To address the first research question, which pertains to the extent of utilization of incubators and technology valleys in gifted education according to faculty members in Saudi universities, the following analysis was conducted.

*4.1. First: Information and Logistical Services Dimension*

**Table 2.**
Means and standard deviation for the information and logistics dimension.

| No. | Information and logistical services dimension | Mean | standard deviation | Quality level | Rank |
|---|---|---|---|---|---|
| 1 | The university possesses resources dedicated to maintaining a database of incubators and technical valleys. | 1.9600 | 0.75485 | Medium | 9 |
| 2 | Incubators and technical valleys provide easily accessible periodic bulletins that are user-friendly. | 2.0800 | 0.92229 | Medium | 7 |
| 3 | Well-established and specific communication channels exist between the university and incubators/technical valleys. | 1.7000 | 0.64681 | Medium | 12 |
| 4 | Current and future plans related to incubators and technical valleys are regularly available for review. | 1.9200 | 0.85332 | Medium | 10 |
| 5 | Incubators and technical valleys have established standards, readily accessible to users, for project acceptance. | 2.1600 | 0.79179 | Medium | 5 |
| 6 | Universities and educational institutions have dedicated departments responsible for communication and collaboration with incubators and technical valleys. | 2.3400 | 0.74533 | High | 3 |
| 7 | Various departments and institutions, both governmental and private, act as intermediaries to facilitate connections between universities, institutions, research centers, and incubators/technical valleys. | 2.3400 | 0.77222 | High | 2 |
| 8 | Incubators and technical valleys regularly organize seminars and conferences to introduce their objectives and goals. | 2.1200 | 0.79898 | Medium | 6 |
| 9 | Incubators and technical valleys provide information on accessing external funding from international organizations and donors. | 1.7000 | 0.78895 | Medium | 11 |
| 10 | Efforts are made by incubators and technical valleys to establish agreements with local and international patent offices, simplifying the process of registering inventions and innovations. | 2.2000 | 0.75593 | Medium | 4 |
| 11 | Application forms and registration materials for enrollment in incubators and technical valleys are readily available. | 2.0800 | 0.72393 | Medium | 8 |
| 12 | Incubators and technical valleys have a clear future vision and mission aligned with their goals. | 1.6200 | 0.66670 | Low | 13 |
| 13 | Clear and specific mechanisms and channels of communication are in place to facilitate interaction with incubators and technical valleys. | 2.4000 | 0.78246 | High | 1 |
| Overall Average | | 2.0474 | Medium | | |

Table 2 presents the results indicating the overall arithmetic mean for items related to information and logistical services provided by incubators and technical valleys, which is calculated as 2.0474. This suggests that the level of benefit derived from these services is considered average. Furthermore, the table highlights item 13, "Clear and specific mechanisms and methods are available for communication with incubators and technical valleys," which received a high score. Its arithmetic average was recorded as 2.4000, making it the item with the highest average within the information and logistical services dimension. Conversely, item 12, "Incubators and technical valleys have a clear future vision and mission that is consistent

with your goals," obtained a weak score. Its arithmetic average was calculated as 1.6200, making it the lowest-scoring item within the dimension.

*4.2. Second: Care Services Dimension*

**Table 3.**
Means and standard deviation for the care services dimension

| No. | Care services dimension | Mean | standard deviation | Quality level | Rank |
|---|---|---|---|---|---|
| 1 | Incubators and technical valleys actively support and nurture project owners in the field of information and communications technology. | 1.8200 | 0.84973 | Medium | 5 |
| 2 | They facilitate the exchange of experiences between universities, research centers, and production sectors. | 2.1800 | 0.87342 | Medium | 3 |
| 3 | Efforts are made to enhance skills in organizing new projects within incubators and technical valleys. | 1.5600 | 0.73290 | Low | 13 |
| 4 | Researchers and faculty members are encouraged to focus on applied research by incubators and technical valleys. | 2.2200 | 0.73651 | Medium | 2 |
| 5 | Incubators and technical valleys demonstrate a commitment to follow up with creative university graduates even after their graduation. | 2.0200 | 0.89191 | Medium | 4 |
| 6 | Assistance is provided by incubators and technical valleys in accessing suitable funding sources for projects. | 2.3200 | 0.79385 | Medium | 1 |
| 7 | Tailored business plans that align with individual project objectives are developed with the support of incubators and technical valleys. | 1.7400 | 0.80331 | Medium | 10 |
| 8 | Various workshops are organized to enhance the individual skills of the incubatees. | 1.7400 | 0.66425 | Medium | 11 |
| 9 | Incubators and technical valleys actively contribute to the implementation of project ideas on the ground. | 1.8000 | 0.80812 | Medium | 7 |
| 10 | Efforts are made to establish connections with the external environment, including businessmen and institution owners. | 1.6600 | 0.77222 | Medium | 12 |
| 11 | Unexplored research projects are identified and transformed into practical applications through the involvement of incubators and technical valleys. | 1.7800 | 0.84007 | Medium | 9 |
| 12 | Incubators and technical valleys aim to activate the roles of scientific research and community service within universities. | 1.8000 | 0.83299 | Medium | 6 |
| 13 | Successful projects are promoted in society by incubators and technical valleys to maximize their benefits. | 1.7800 | 0.86402 | Medium | 8 |
| | Overall Average | 1.8776 | | | Medium |

Based on the findings presented in Table 3, it is evident that the overall arithmetic mean for items related to care services provided by incubators and technical valleys is 1.8776. This indicates an average level of utilization of these services. Within the care services dimension, item 6, "Incubators and technical valleys seek to provide assistance in accessing appropriate funding sources for projects," received an average score. Its arithmetic average was calculated as 2.3200, making it the item with the highest average within the dimension. On the other hand, item 3, "Incubators and technical valleys work to develop and improve skills in the field of organizing new projects," obtained a low score. Its arithmetic average was recorded as 1.5600, making it the lowest-scoring item within the dimension.

Third: Support services (technical, financial, administrative, advisory, and marketing) dimension

**Table 4.**
Means and standard deviation for the Support services (technical, financial, administrative, advisory, and marketing) dimension.

| No. | Support services (technical, financial, administrative, advisory, and marketing) dimension | Mean | standard deviation | Quality level | Rank |
|---|---|---|---|---|---|
| 1 | Incubators and technical valleys prioritize providing comprehensive infrastructure facilities, including laboratories, halls, and workspaces. | 1.9200 | 0.87691 | Medium | 7 |
| 2 | They actively develop marketing plans to promote the outputs of your project. | 2.0600 | 0.86685 | Medium | 6 |
| 3 | Efforts are made to establish connections between your project and financing institutions. | 2.7200 | 0.60744 | High | 1 |
| 4 | Incubators and technical valleys are dedicated to assisting you in overcoming challenges encountered during project development. | 2.0800 | 0.80407 | Medium | 5 |
| 5 | Incubators and technical valleys offer consultations to productive institutions and aspiring individuals, leveraging the expertise of faculty members or external specialists. | 2.1800 | 0.77433 | Medium | 3 |
| 6 | Platforms for electronic promotion of your project are provided by incubators and technical valleys. | 1.5000 | 0.67763 | Low | 10 |
| 7 | Economic feasibility consultations specific to your projects are offered. | 1.7600 | 0.79693 | Medium | 8 |
| 8 | Legal and administrative consultations necessary for project implementation are provided by incubators and technical valleys. | 1.7600 | 0.65652 | Medium | 9 |
| 9 | Consulting and accounting services are made available to support your project. | 2.4600 | 0.70595 | High | 2 |
| 10 | Information about projects operating in the same field as your specialization is shared by incubators and technical valleys. | 2.1000 | 0.86307 | Medium | 4 |
| Overall Average | | 2.0540 | Medium | | |

Based on the data presented in Table 4, it is evident that the overall arithmetic mean for items related to support services (technical, financial, administrative, consulting, and marketing) provided by incubators and technical valleys is 2.0540. This indicates an average level of benefit derived from these support services. Within the support services dimension, item 3, "Incubators and technical valleys are keen on linking your project with financing institutions," received a high score. Its arithmetic average was calculated as 2.7200, making it the item with the highest average within the dimension. Conversely, item 6, "Incubators and technical valleys are keen to provide platforms for electronic promotion of your project," obtained a weak score. Its arithmetic average was recorded as 1.5000, making it the lowest-scoring item within the dimension.

In order to address the second research question; Is there a statistically significant difference in the mean responses of faculty members to the questionnaire on the utilization of incubators and technical valleys in gifted education, based on the variables of gender, specialization, and academic rank?

Table 5 presents the calculated arithmetic means and standard deviations for faculty members' responses to the comprehensive tool assessing the extent of employing incubators and technical valleys in gifted education. These calculations were performed considering the variables of gender, specialization, and academic rank.

**Table 5.**
Arithmetic Means and Standard Deviations of Faculty Members' Responses to the Comprehensive Tool on the Utilization of Incubators and Technical Valleys in Gifted Education, Stratified by Gender, Specialization, and Academic Rank.

| Variable | Category/level | Number of responses | Mean | standard deviation |
|---|---|---|---|---|
| Gender | Males | 25 | 1.9876 | 0.61715 |
| | Females | 25 | 1.9988 | 0.48006 |
| Specialization | scientific | 27 | 1.969 | 0.68546 |
| | literary | 23 | 1.7126 | 0.42173 |
| Academic Rank | professor | 13 | 2.2567 | 0.4899 |
| | Associate Professor | 15 | 1.7173 | 0.57725 |
| | Assistant Professor | 22 | 1.9168 | 0.52137 |

To ascertain the statistical significance of differences in the arithmetic means of faculty members' ratings on the whole tool assessing the degree of employing incubators and technical valleys in gifted education, statistical analysis utilizing a "Three-Way ANOVA" was conducted. Table 6 presents the results of this analysis, considering the variables of gender, specialization, and academic rank.

**Table 6.**
Results of Three-Way Analysis of Variance for Faculty Members' Ratings on the Whole Tool Assessing the Degree of Employing Incubators and Technical Valleys in Gifted Education, Stratified by Gender, Specialization, and Academic Rank.

| Source of variance | Sum of squares | df | Mean square | F | Sig. | Statistical significance |
|---|---|---|---|---|---|---|
| Gender | 0.002 | 1 | 0.002 | 0.005 | 0.943 | Not sig. |
| Specialization | 4.653[d] | 1 | 4.653 | 14.143 | 0.000 | Sig. |
| Academic rank | 2.836[d] | 2 | 0.709 | 2.696 | 0.043 | Sig. |

Table 6 provides the following findings: First, no statistically significant differences were observed, at a significance level of "$\alpha \leq 0.05$," in the average ratings of faculty members on the comprehensive tool assessing the degree of employing incubators and technical valleys in teaching gifted students, based on the gender variable (p-value = 0.943). Second, statistically significant differences were identified, at a significance level of "$\alpha \leq 0.01$," in the average ratings of faculty members on the comprehensive tool concerning the degree of employing incubators and technical valleys in gifted education, based on the specialization variable (p-value = 0.000). Third, statistically significant differences were found, at a significance level of "$\alpha \leq 0.05$," in the average ratings of faculty members on the comprehensive tool regarding the degree of employing incubators and technical valleys in gifted education, based on the academic rank variable (p-value = 0.043).

To answer the third research question: What are the perceptions of digital and network support in activating the role of incubators and technical valleys in educating the gifted?

Building upon the aforementioned findings, the present study introduces a proposed vision for activating the role of incubators and technical valleys in gifted education. This vision revolves around the adoption of a digital and network support model, which aims to address the demands of transitioning towards a knowledge- and technology-based economy.

### *4.1. First: The Philosophy of the Proposed Perception*

In the contemporary era, the advancement of nations and societies is evaluated based on their capacity to generate, acquire, and localize knowledge. Countries strive to excel in knowledge production and ownership by actively participating in competitiveness and aiming to secure top positions in global rankings for university education and scientific research. Among the prominent mechanisms driving this progress are incubators and technical valleys, which have emerged as modern frameworks for fostering successful collaborations and partnerships between universities, scientific research centers, and knowledge application institutions. These frameworks facilitate the transformation of knowledge into tangible material products, and have been pioneered by universities in advanced industrial nations.

The underlying philosophy of the proposed perception revolves around establishing an enabling and enriching educational environment that harnesses the potential of digital and network technology to empower gifted individuals and foster their holistic development. The philosophy of digital support concepts in gifted education aims to enhance scientific and educational opportunities by offering a comprehensive and diverse learning environment that leverages digital technology as a powerful tool. This objective is realized through the utilization of modern technical programs, which facilitate digital mediation and network support among various stakeholders, including talented individuals across different domains, incubators, and technical valleys. The philosophy emphasizes personalized learning, fostering interactive and collaborative engagement, providing immersive and hands-on learning experiences, promoting interaction with peers and subject matter experts, and ensuring continuous evaluation and adjustment of the learning process.

### *4.2. Second: Postulates of the Proposed Perception*

The proposed perception is grounded in the following principles and postulates:

1. Achieving a competitive advantage for universities and research centers in the Kingdom of Saudi Arabia is a national and strategic objective that necessitates the collaboration of all supporting, sponsoring, and benefiting institutions and sectors.
2. The growing digital divide between universities, technological incubators, and various productive institutions in society can have adverse effects, such as impaired communication, limited interaction, and missed opportunities.
3. The quality of university education, global leadership attainment, and advanced rankings in international university classifications are closely linked to the cognitive and skill-based learning outcomes contributed by incubators and technical valleys.
4. The limited connection between university education and labor/production institutions necessitates the enhancement and refinement of the outputs and expertise of incubators and technical valleys. This can be achieved through the adoption of modern technologies in their operations and scientific research programs.
5. The development of support systems for gifted individuals requires the implementation of contemporary mechanisms and partnerships that facilitate improvement and advancement.

### *4.3. Third: Objectives of the Proposed Perception*

The proposed perception, centered around digital and network support, aims to accomplish the following goals:

1. Establishing educational networks and virtual communities that foster enhanced communication, collaboration, and scientific exchange among gifted individuals, their peers, and teachers.
2. Contributing to the continuous evaluation process and offering immediate feedback to talented individuals regarding their performance and progress.

3. Developing research, analysis, and innovation skills by providing participation tools and access to scientific and specialized resources.
4. Encouraging gifted individuals to engage in self-exploration and independent learning, allowing them to delve deeper into their areas of interest with flexibility and freedom. This approach enhances their inquisitive nature and curiosity.
5. Facilitating access to modern technological resources and advanced facilities for students and researchers, ensuring they can leverage the latest tools and technologies available to support their educational and research endeavors.

*4.4. Fourth: Methods and Procedures for Implementing the Proposed Perception*

In light of the proposed vision outlined in the study, it is possible to present certain procedures and methods that facilitate its practical implementation, transitioning it from a theoretical concept to real-world application. This perspective is grounded in the fact that all sectors of university education, research centers, institutions for gifted individuals, business incubators, and technology valleys each possess their own websites and electronic platforms. Nevertheless, a potential shortcoming in these sectors and institutions is their insufficient mechanisms for digital and network connectivity, both among themselves and with gifted students seeking care and incubation. This issue is exacerbated by the growing digital divide between universities, technology incubators, and various productive institutions. Consequently, the study's proposed vision hinges on establishing digital and network connections among these diverse stakeholders, streamlining the processes of care and incubation for gifted students.

The idea of the proposed digital and network support perception draws inspiration from the Uber Works: Business & Revenue Model project, associated with Uber Technologies, an American multinational technology company headquartered in San Francisco, California. Uber operates in various markets through its mobile application, enabling smartphone users to request transportation services provided by drivers using the same application. It's worth noting that Uber charges drivers fees for using the application on each trip. Drawing a parallel, the concept of digital and networked support for nurturing gifted individuals can be likened to the approach used in the previous transportation service project. By leveraging mechanisms for connecting and coordinating among various stakeholders, we can enhance the effectiveness of incubators and technology valleys in supporting and nurturing gifted individuals. The following figure illustrates the concept of the digital and networked system for nurturing and supporting gifted individuals.

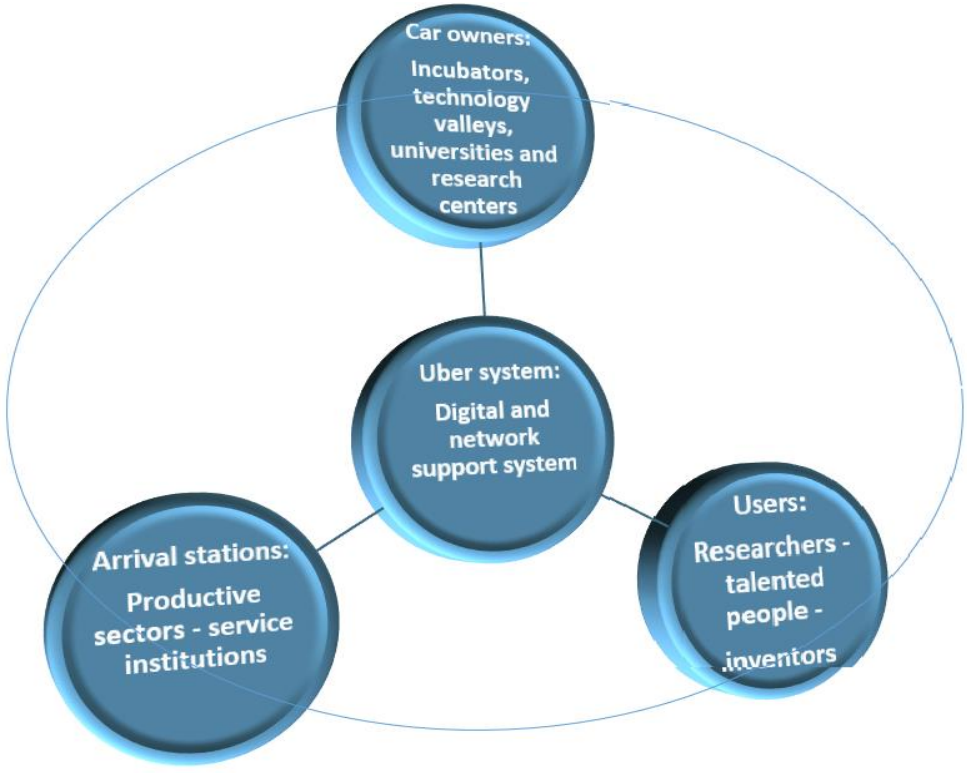


**Figure 2.**
Digital and network support model for the gifted care and support system.

Figure 2 illustrates how the concept of Uber's passenger transportation system can be adapted to support and nurture talented individuals. This depiction emphasizes that the core of this system is the digital and network support infrastructure. In this adapted scenario, the vehicle owners become the incubators, technical valleys, universities, and research centers, while the users of the system are the researchers, the gifted individuals, and the inventors. The primary aim of this envisioned digital and network support system is to facilitate connections between providers (the "drivers") and beneficiaries, guiding the beneficiaries toward specific destinations. Within this system, these destinations represent various productive sectors and service institutions that aspire to translate research and experimental findings into tangible products. It's essential to

acknowledge that establishing and managing such a networked system involves financial costs, which can be covered by subscription fees paid by the involved parties in the system. These may include institutions, research centers, universities, production sectors, and service providers benefiting from this network. The implementation of the proposed vision for digital and network support can be divided into three distinct stages: the small-scale digital and network support model, the medium-scale model, and the large-scale model for digital and network support.

*4.4.1. The first Phase: Mini-Model for Digital and Network Support (Currently in Development at King Faisal University):*

Due to the growing number of male and female students seeking recognition for their talents across diverse domains and to address the challenges associated with nurturing and managing gifted individuals within the university setting, the National Center for Giftedness and Creativity Research has developed the "Institutional Project for Digital Care for the Gifted and Creative at King Faisal University." Here, we present a concise outline of the project proposal:

**Table 7.**
Summary of the Institutional Project Proposal for Digital Care of Gifted and Creative Individuals.

| **Proposal name** | **Digital care project for gifted and creative people at King Faisal University** |
|---|---|
| Overall goal | Creating a database for gifted and creative people and people with special needs in all fields and at all educational levels at King Faisal University |
| Target group | Male and female students and young researchers with special talents and abilities at King Faisal University |
| Importance | • The project aids in data collection and the creation of profiles for the substantial population of gifted students at King Faisal University.<br>• The project offers remote registration options for gifted and creative students at King Faisal University.<br>• The project facilitates the organization of records for gifted individuals following digital standards.<br>• The project promotes digital facilitation to enhance talent development at King Faisal University. |
| Implementation requirements | • Establishment of a comprehensive database for gifted and creative students, including those with special needs, at the National Center for Giftedness and Creativity Research.<br>• Implementation of specialized programs for efficient management of gifted individuals' records at King Faisal University.<br>• Utilization of the university's communication platforms to cater to the needs of talented and creative students at King Faisal University. |
| Implementation procedures | In collaboration between the National Center for Giftedness and Creativity Research and the Deanship of Information Technology and Distance Education, we will undertake the following initiatives:<br>• Establishment of a comprehensive database containing information about gifted, creative individuals, and those with special needs.<br>• Development of software programs specifically designed to efficiently manage the records of gifted and creative students.<br>• Utilization of existing university resources, such as the "Blackboard" program, in educational and training endeavors, as well as promoting a culture of talent and creativity. |

Based on the information above, a comprehensive project programming plan was formulated. Following deliberations, discussions, and a thorough review of the plan's components, an initial framework for the programming of the Digital Care System Project for Gifted and Creative Students has been established. Below, we present some screen captures of the entry portals for the Digital Care Program for the Gifted and Creative:

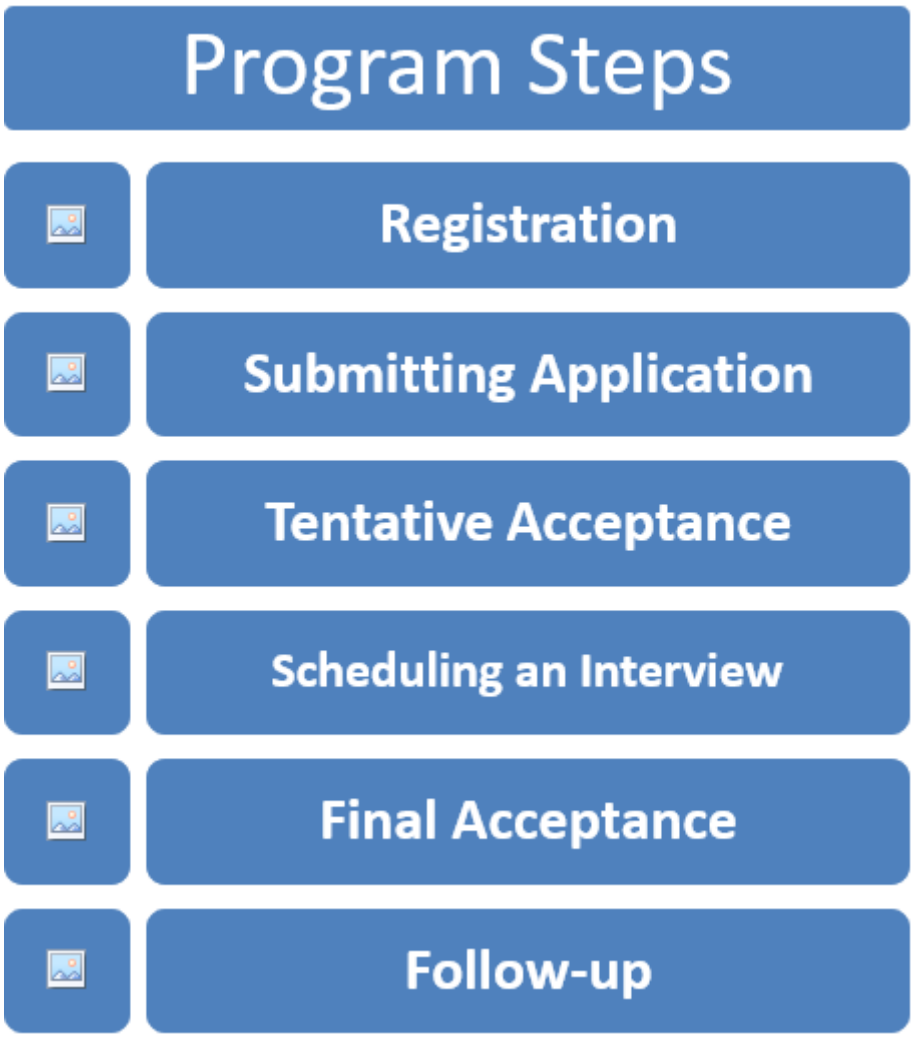


**Figure 3.**
Screenshots of the Digital Care Program Portals.

It is evident from the above description, in accordance with the concepts of the mini-model of digital and network support, that King Faisal University plays a central role in organizing and overseeing this system, with students and researchers being the primary beneficiaries. The university's experts, laboratories, and technological resources serve as the foundational assets for nurturing and supporting gifted individuals. The institutions and sectors affiliated with the university are responsible for financing and benefiting from the diverse outcomes of this system. The following figure illustrates the structure and components of this mini-model:

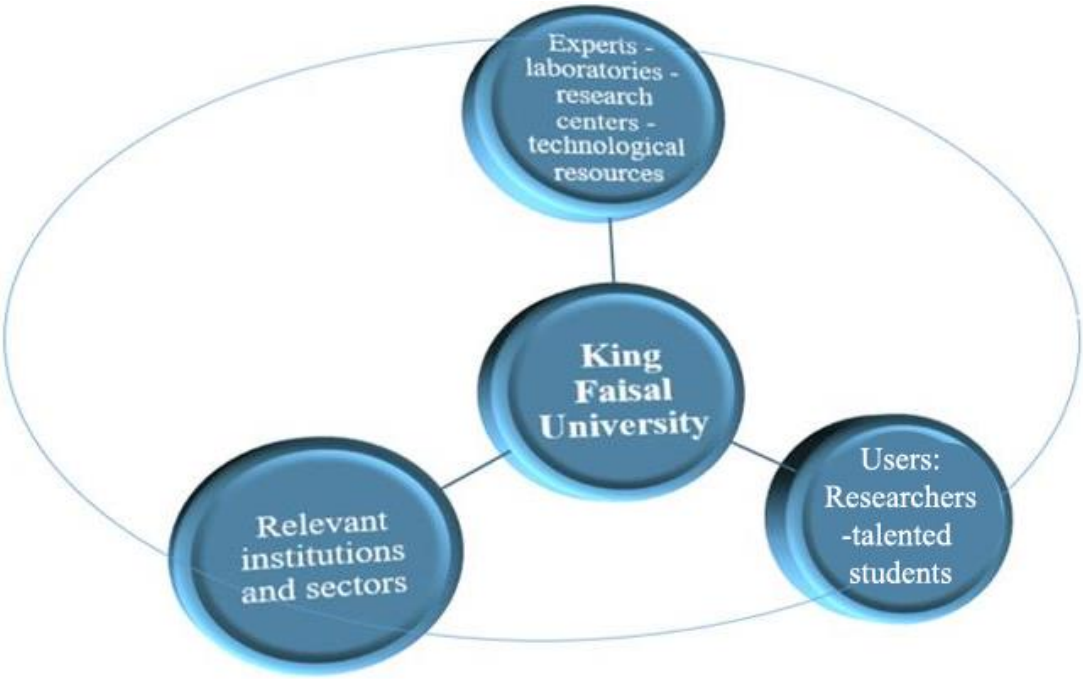


**Figure 4.**
Miniature Model of Digital and Network Support.

*4.4.2. The Second Phase: Intermediate Model of Digital and Network Support*

In this intermediate model of digital and network support, the system can be effectively managed by a local or regional institution such as King Abdulaziz and His Companions Foundation for Giftedness and Creativity (Mawhiba), Bahrain Center for Studies and Research in Gifted Education and Excellence, Arab Forum for Giftedness and Creativity, or Sharjah Foundation for Education and Excellence. These institutions can assume such roles, provided that they adapt their mechanisms and policies for networking and digital support operations in alignment with the proposed vision. This adaptation should facilitate talented individuals in the Arab world to explore these nurturing and supportive institutions, join their networks, benefit from available support and resources, and connect with peers in the field. The following figure illustrates the mechanisms and dimensions of managing and organizing the intermediate model of digital and network support.

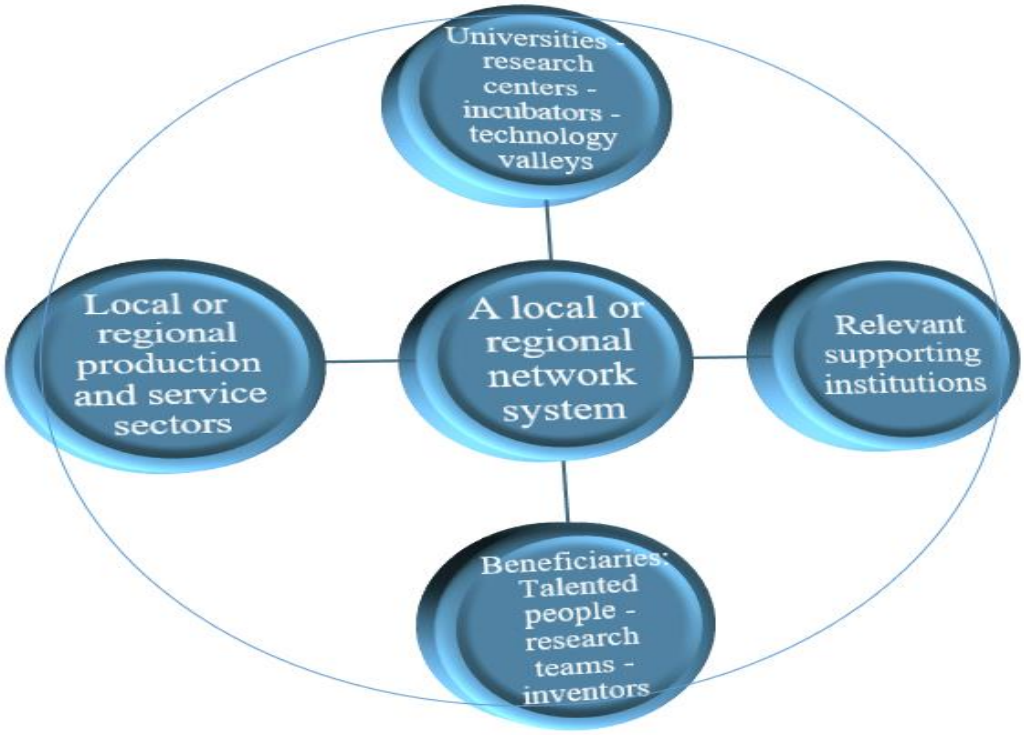


**Figure 5.**
The Intermediate Model of Digital and Network Support.

*4.4.3. The Third Phase: The Extensive Model of Digital and Network Support*

At the international level, and following the extensive model of digital and network support, this system can be overseen by an international institution such as the National Association for Gifted Children (NAGC), the International Research Association for Talent Development and Excellence (IRATDE), Mensa (the High IQ Society), or any of the previously mentioned local or regional institutions. However, for these organizations to play such roles, they need to expand and adapt their mechanisms and objectives. The primary focus should be on enhancing global communication, learning, and collaboration, providing essential support and resources to individuals and institutions worldwide, and leveraging technology and electronic networks to nurture talent. Furthermore, these institutions should base their digital and network policies and mechanisms on connecting three key parties: those seeking (talented individuals, researchers, and inventors), those owning (universities, research centers, incubators, and technical valleys), and those wanting to benefit from knowledge and skill outputs, transforming them into products for institutional, production, and service sectors. The following figure illustrates the mechanisms, management, and organization of international digital and network support.

**Figure 6.**
The Extensive Model of Digital and Network Support.

## 5. Discussion of the Study Results

The statistical analysis of faculty members' responses regarding the utilization of incubators and technical valleys in gifted education, from the perspective of faculty members in Saudi universities, indicated a moderate level of achievement. The study examined various dimensions of employing incubators and technical valleys, namely logistics services, care services, and technical support, all of which were found to be moderately achieved. This finding suggests that there may be a lack of awareness regarding the benefits and significance of employing incubators and technical valleys in educating gifted students. Additionally, the mechanisms for establishing a supportive and nurturing environment, which includes providing personal, social, and psychological care services to students, may not be adequately available. Furthermore, the feedback and guidance provided by incubators and technical valleys, which rely on open, transparent, and continuous communication among all stakeholders, including incubators, technical valleys, students, parents, higher education institutions, and other relevant parties, appear to be insufficient in promoting improved performance and continuous development. Addressing these issues requires urgent attention to provide more appropriate training and guidance for faculty members and students on effective utilization of incubators and technology valleys. Moreover, there are challenges in securing sufficient financial, logistical, and technical support to effectively implement incubator and technology valley programs. These findings align with previous studies conducted by Ali Al-Harbi [33]; Daradkeh [24] and Bukhari [14].

In order to address the aforementioned challenges, this study aims to propose a vision for digital and online support for gifted students. The underlying philosophy of this vision is to enhance scientific and educational opportunities for the gifted by creating a comprehensive and diverse learning environment that effectively utilizes digital technological tools. This vision entails establishing connections between talented individuals and their respective areas of specialization through digital and network communication with incubators and technical valleys. Modern technical programs are employed to facilitate digital communication and provide network support among all participants. The provision of digital support to gifted students within incubators and technical valleys is crucial for enhancing their capabilities and expanding their scientific and educational horizons. Digital support plays a pivotal role in creating an integrated learning environment for gifted students by leveraging digital technology. Through digital support, they gain access to a wide range of educational resources and innovative content that caters to their individual needs and skill levels. It also contributes to expanding their opportunities in the fields of science and education. Digital technology enables them to access advanced knowledge resources, explore diverse subject areas, and develop new skills. Furthermore, digital support enhances communication and interaction among gifted students, incubators, and technical valleys. This fosters knowledge exchange, facilitates the sharing of experiences, and provides valuable support and guidance to gifted students. Overall, embracing digital support as part of the educational framework for gifted students holds great potential in enriching their educational journey and maximizing their potential.

## 6. Suggestions and Recommendations

1. Foster an inclusive and welcoming environment in technical incubators and valleys that encourages open participation. It is crucial for these entities to actively listen to students, understand their needs, fears, and interests, and respond appropriately and effectively.
2. Utilize diverse communication channels, such as email, text messages, social platforms, and dedicated applications for incubators and technical valleys, to facilitate quick and effective communication and information exchange with students.
3. Organize workshops and regular guidance sessions aimed at improving communication, fostering experience and idea sharing, and addressing common challenges between incubators, technical valleys, and students.
4. Provide continuous feedback and evaluations to students. Technical incubators and valleys should offer regular and constructive feedback on students' performance and development. Written assessments or individual assessment sessions can guide students in improving their performance.
5. Establish clear and specific standards and indicators to measure the performance of incubators and technical valleys. These criteria may include the level of collaboration between the incubator and the academic institution, achievement of educational goals, and satisfaction levels of students and parents.
6. Employ various evaluation tools, such as satisfaction surveys, performance reviews, ongoing monitoring of student progress, to assess the performance of incubators and technical valleys.
7. Implement effective mechanisms and approaches to collect data related to the performance of incubators and technical valleys. Periodic reports, field observations, interviews, and statistical analysis can provide necessary data for evaluation.
8. Analyze the collected data and evaluate the performance of incubators and technical valleys based on predefined criteria and indicators. Utilize statistical analysis and critical interpretation techniques to conduct comprehensive and detailed evaluations.
9. Provide feedback and guidance to incubators and technical valleys based on the evaluation results report. This feedback should be utilized to enhance performance, improve the educational process, and address areas that require development.
10. Enhance communication and interaction mechanisms between talented individuals, incubators, and technical valleys by leveraging digital technology tools. Innovate new and diverse methods that utilize digital support to enhance educational opportunities and provide comprehensive digital assistance to gifted students.

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