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Designing a University Innovation Model through Creative Search Capability (Case Study: Private Universities in Iraqi Kurdistan)

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ABSTRACT

The purpose of this study is to investigate how creative search capability helps to promote innovation in private universities. This study is exploratory in nature, and the thematic analysis method was employed, which was carried out in three stages. First, we conducted an extensive internet search to identify Iraqi private universities that had been operating for more than a decade. From the search results, 28 private universities were identified. Second, we conducted online interviews with 19 private university administrators representing institutions from five regions: South, Northeast, Center, North, and West. Third, we analyzed the factors of creative search capability that can facilitate innovation in private universities, and based on these insights, we identified the main factors of creative search capability in Iraqi private universities: innovation-based learning environment, interdisciplinary teams, innovation platforms, research funding, and access to information resources. These findings provide valuable insights into the literature on innovation in universities. Additionally, it increases our understanding of the effective mechanisms of creative search capability for innovation in private universities. Finally, it offers implications for policymakers in Iraqi higher education regarding constructive engagement with and support for universities.

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1. Introduction

Universities have a significant role to play in fostering creativity and innovation (Huggins & Thompson, 2020). Innovation often arises from curiosity-driven exploration of new solutions (Agarwal et al., 2018). This study aims to investigate the central function of creative inquiry in guiding and sustaining innovation within universities. Creative search involves the original and non-traditional combination of information and ideas (Sutanto, 2017). This approach encourages lateral thinking, the intersection of perspectives, and the synthesis of unrelated elements, all of which contribute to innovative solutions (Galvão et al., 2018). The capability for creative search is key to gaining new insights (MohammedKarimi et al., 2022). By fostering a culture of curiosity, experimentation, and out-of-the-box thinking, universities empower individuals to explore uncharted territory (Mowery & Sampat, 2016). Universities provide rich environments for nurturing curiosity and discovery (Ndonzuau et al., 2006). Encouraging the questioning of assumptions and exploring untapped paths creates an atmosphere for innovative exploration that enhances creative inquiry abilities such as deductive reasoning, interdisciplinary collaboration, and the integration of diverse perspectives (Slaughter & Rhodes, 2019).

Many groundbreaking innovations have occurred because someone was able to look beyond traditional boundaries and combine ideas from multiple areas (Ndonzuau et al., 2006). Creative search helps enable this by making it easier for an engineer to explore new findings in biology, for example, or a sociologist to find inspiration from inventions in materials science (Albors-Garrigos & Hervas-Oliver, 2020). Universities pushing boundaries and exploring new fields leads to novel solutions for big challenges (Geuna, 1999). With creative search, professors and graduate students have a powerful way to hunt for obscure research or spark new hypotheses by exploring related tangents in other disciplines (Ndonzuau et al., 2006). This serendipitous discovery process is difficult to replicate without sophisticated search tools (Bercovitz & Feldman, 2019). Additionally, creative search allows universities to leverage their collective intelligence in new ways (Carayannis & Campbell, 2018). Researchers can build on each other's work more rapidly by accessing the full range of projects happening not just locally but around the world. This fosters even greater cross-pollination of ideas and collaboration between institutions.

The significant role that universities play in promoting socio-economic progress, particularly in developing nations, is well established (Ndonzuau et al., 2006). Indeed, continuous growth and competitiveness necessitate the adoption of a strategic innovative mindset by university leadership and decision-makers (Slaughter & Rhoades, 2019). However, administrators of private higher education institutions in the Kurdistan Region of Iraq still face challenges in fully understanding strategic innovation and its practical applications. Specifically, concepts such as strategic innovation, sustainable competitive advantage, and competitiveness have not been thoroughly examined within the context of local private higher education. Therefore, this is a theoretical gap, and this study suggests that management and higher education researchers should pay close attention to these important factors (Perkman & Walsh, 2018). Moreover, universities and private institutions of higher education in Iraqi Kurdistan continuously use internal resources and competitive strengths to maintain a sustainable competitive advantage (Rothaermel & Thursby, 2015).

Many studies have consistently shown that private higher education systems, particularly in less developed and developing countries, tend to exhibit lower levels of innovation (Baregheh et al., 2022; Link et al., 2020; Mustar & Wright, 2018). Accordingly, the private universities of Iraqi Kurdistan are facing important challenges such as regional and international competition and the need for innovation to address the diverse demands of students. One of the main factors in creating these challenges is the traditional mindset of university administrators who may prefer to maintain fixed processes and work procedures. These challenges can be considered as an operational gap. Thus, this study aims to help universities use innovative strategies to sustainably compete in the regional market and attract students from surrounding areas, as well as compete with foreign universities (such as universities located in Iran and Turkey).

This study aims to provide valuable insights, tools, and strategies based on empirical evidence. The goal is to guide universities in becoming vibrant centers of innovation. "Innovation" serves as a vital resource, offering a roadmap for transforming traditional educational institutions into dynamic hubs

where creativity, exploration, and innovation converge to shape a brighter future. However, the factors influencing innovation promotion in private universities in Iraqi Kurdistan remain unclear.

Several of the universities that have been studied possess the necessary resources to undertake innovative programs. However, they lack the capacity to effectively utilize these resources. Consequently, these universities continue to operate under traditional management approaches, resulting in weaknesses in areas such as the establishment of creative environments and the cultivation of innovative work teams. Therefore, there is a pressing need for studies that examine various university capabilities, particularly the capacity for creative search, and develop a comprehensive and integrated framework that incorporates expert perspectives. Thematic analysis, which facilitates understanding of behavior and fosters social interaction and theory building (Braun & Clarke, 2006), is an appropriate methodology for addressing this research gap. Consequently, this study employs a thematic analysis approach to identify the factors that impact innovation promotion in private universities in Iraqi Kurdistan from the viewpoint of university administrators. It also suggests solutions for university administrators and explores the consequences of these findings. To achieve these objectives, the following research questions (RQs) have been formulated:

RQ1: What is the model for promoting innovation in private universities in Iraqi Kurdistan?
RQ2: What capabilities contribute to the promotion of innovation in private universities?

2. Literature Review

2-1. The Creative Search Capability

Creative search is a vital component of innovation in academic settings (Geuna, 1999). It encompasses the art of unconventional exploration, ideation, and synthesis of information, leading to breakthroughs and paradigm shifts (Li & Acs, 2020). This study delves deeper into the mechanisms, psychology, and methodologies that define and enhance the process of creative search. It goes beyond traditional inquiry methods, embracing divergent thinking, lateral connections, and the ability to navigate multidimensional paths in pursuit of innovative solutions. The essence of creative search lies in the freedom to explore uncharted territories without being limited by predefined boundaries (Ndonzuau et al., 2006).

The cognitive mechanisms driving creative search are revealed through deeper understanding. Creativity flourishes in an environment that promotes risk-taking, curiosity, and associative thinking. Exploring the interplay between conscious and subconscious processes sheds light on the mechanisms underlying creative breakthroughs. Creating an environment conducive to creative search involves nurturing creativity and curiosity. Strategies include mindfulness practices, idea-generation workshops, exposure to diverse perspectives, and fostering an environment that embraces perceived failure as a stepping stone to innovation (Correia et al., 2018).

The creative search capability is vital for fostering innovation within university settings (Huyghe et al., 2014). Numerous studies have examined the cognitive processes and strategies individuals use to generate new ideas (Guerrero et al., 2016; Rasmussen & Wright, 2015). Researchers have explored innovative approaches, such as Creativity Theory and Extensions, to enhance the innovative capability of university students (Rothaermel & Thursby, 2015). These findings demonstrate how creativity addresses challenges and positively impacts higher education institutions (Siegel et al., 2017).

Numerous frameworks and approaches augment creative search (Ranga & Etzkowitz, 2013; Xia et al., 2021). Techniques such as design thinking, mind mapping, analogical reasoning, and lateral thinking exercises expand the repertoire of methodologies, empowering individuals to explore unconventional paths in their search for innovative solutions. The culture within academic institutions significantly influences creative search capabilities (Owen-Smith & Powell, 2017). A supportive environment that celebrates diverse perspectives, encourages collaboration and provides freedom for exploration fosters a fertile ground for groundbreaking discoveries (Ndonzuau et al., 2006). Technology also acts as an enabler, amplifying the scope and efficiency of creative search. Advanced tools, AI algorithms, big data analytics, and digital repositories facilitate information retrieval, pattern recognition, and ideation, accelerating the creative search process (Mustar & Wright, 2018).

The purpose of this study is to develop a deep understanding of creative search to realize its transformative power. By recognizing its multifaceted nature and by cultivating an environment that

supports exploration, universities can benefit from a full range of creative search capabilities. This will lead to unprecedented innovation and progress in academic institutions (Geuna, 1999).

2-2. The Creative Search Capability and University Innovation

Education systems worldwide are increasingly focused on nurturing students' creativity and preparing them for an uncertain future, according to Guerrero et al. (2016). While universities have traditionally prioritized disseminating knowledge through teaching and research, many are now exploring new models of hands-on, interdisciplinary learning (Huyghe et al., 2014). Some view this shift as a way to unlock students' innate curiosity and help them develop flexible, transferable skills. An innovative university promotes innovation by embracing diverse perspectives (Li & Acs, 2020). It combines academic rigor with real-world problem solving, guided exploration with mentorship, and intellectual rigor with empathy (Rothaermel & Thursby, 2015). An innovative university sees each student and faculty member as a person worthy of respect, fostering a spirit of cooperation amidst competition (Guerrero et al., 2016).

In academia, innovation is crucial for progress and how higher education evolves over time (Ndonzuau et al., 2006). Universities play a pivotal role where knowledge is not just disseminated but also created, developed, and applied (Bercovitz & Feldman, 2019). To truly understand innovation at these institutions requires examining it from various perspectives, including historical, cultural, and organizational contexts. Universities have traditionally served as places of teaching and research, with the primary focus on transmitting knowledge to students (Clark, 2016). However, their function has expanded considerably in recent decades. They have increasingly become major hubs of innovation, reshaping society through groundbreaking findings, advances in technology, and paradigm shifts across various fields (Albors-Garrigos & Hervas-Oliver, 2020). By cultivating these innovative capabilities, universities can unlock new frontiers of discovery and position themselves as centers of open innovation—generating ideas with transformative societal and economic impacts (Mustar & Wright, 2018). Although this requires adapting beyond traditional academic norms, the potential rewards make it a worthwhile endeavor (Ndonzuau et al., 2006).

In the context of universities, open innovation can take various forms. It can involve partnerships with industry to facilitate technology transfer and the commercialization of research outcomes (Sutanto, 2017). It can also encompass collaborations with other academic institutions, both nationally and internationally, to foster the exchange of knowledge and expertise (Etzkowitz, 2018). Furthermore, universities can engage with the community through initiatives such as public lectures, workshops, and outreach programs, creating opportunities for knowledge sharing and co-creation. The benefits of embracing creative search capability and open innovation in universities are numerous (Figueiredo & Fernandes, 2020). They contribute to the advancement of knowledge and research. By encouraging creative thinking and interdisciplinary collaboration, universities can foster breakthrough discoveries and advancements in various fields (Aghion et al., 2023). This not only enhances the reputation of the institution but also contributes to addressing societal challenges and driving economic growth (Mabotha & Ngcamu, 2025). Creative search capability and open innovation enhance the relevance and impact of universities. By engaging external partners and stakeholders, universities can ensure that their research and educational programs align with real-world needs and challenges. This fosters a sense of purpose and societal impact, making universities integral players in driving innovation and positive change (Zhang et al., 2026).

The relationship between universities and innovation is mutually beneficial (Peng & Liu, 2015). Innovation thrives on research conducted in universities, and universities in turn thrive on innovative work, leading to the constant discovery and sharing of knowledge. This connection has sparked great advances in science, technology, and art, as well as the humanities that have shaped society (Perkmann & Walsh, 2018). Various factors cause the creation of innovative projects in universities (Acs & Audretsch, 1988). These include visionary leaders who foster a culture of discovery, support interdisciplinary collaboration, develop financial and infrastructural support, and foster risk-taking and trial and error.

Universities face various obstacles that hinder their ability to fully realize their innovative potential. Bureaucratic hurdles, limited funding, risk aversion, and institutional inertia often present significant challenges, limiting the speed and scale of innovation initiatives (Correia et al., 2018). Understanding

university innovation necessitates adopting a holistic perspective (Bercovitz & Feldman, 2019). It is not merely about technological breakthroughs or scientific discoveries. It encompasses a wide range of endeavors, including social innovation, entrepreneurial ventures, creative arts, and community engagement. This holistic view amplifies the role of universities as catalysts for comprehensive societal progress (Carayannis & Campbell, 2018).

In today's interconnected world, the ability to generate new ideas, explore possibilities, and turn concepts into reality is essential. This study provides a nuanced examination of the foundations of innovation at universities. It analyzes the essence of creative searching, which is key to making breakthroughs (Etzkowitz et al, 2017). By taking a well-rounded approach, this study not only outlines strategies but also emphasizes how fostering a culture that nurtures innovation is critical to success (Etzkowitz, 2018). This study addresses the different important aspects required to understand and maximize abilities in creative thinking in an academic context. It also explores methods, challenges, ethical issues, and the global landscape of innovation. This study aims to guide educators, policymakers, and other stakeholders toward harnessing innovation's transformative power.

2-3. The Creative Destruction and University Innovation

The concept of "creative destruction" is often applied to the role of universities in driving innovation (Christensen & Eyring, 2022). Creative destruction refers to the process by which new innovations and technologies disrupt and replace existing ones, a dynamic that is seen as essential for economic progress (Aghion et al., 2023). New interdisciplinary fields and research areas are constantly emerging, challenging traditional academic silos and departments. This can lead to the decline of some fields and the rise of others. Innovative pedagogical methods, online/hybrid education, and new learning technologies continuously disrupt traditional lecture-based instruction (Shrivastav & Rao, 2025).

Many universities now actively foster entrepreneurship, startups, and research commercialization, which can upend conventional academic norms and incentive structures (Ramirez & Wotipka, 2022). Solving complex, real-world problems requires cross-pollination between disciplines, leading to the breakdown of silos and the creation of new hybrid fields. This process of creative destruction is deemed vital for universities to remain relevant and responsive to societal needs (Benner & Sandström, 2000). Creative destruction encourages innovation through exposing faculty and students to new ideas and ways of thinking, encouraging risk-taking and experimentation, allowing resources to flow to the most promising areas, and fostering collaboration and knowledge-sharing. Overall, the relationship between creative destruction and innovation is a core part of the modern university experience, shaping research, teaching, and the very structure of academic institutions themselves (Rothaermel & Thursby, 2015).

Creative destruction also has significant implications for faculty and students. Faculty must be adaptable, staying current with new developments and willing to reinvent their work. Students need to be comfortable with uncertainty and equipped to thrive in rapidly changing environments. Both groups must develop interdisciplinary mindsets and the ability to synthesize knowledge from diverse sources (Aghion et al., 2023). Ultimately, the creative destruction within universities serves a vital societal function. By constantly challenging the status quo and generating new ideas, universities foster the innovation necessary for economic progress, technological advancement, and addressing complex global challenges (Carayannis & Campbell, 2018). The ability of universities to harness creative destruction is thus crucial not just for the institutions themselves, but for the wider world that depends on the knowledge, skills, and innovations they produce (Shrivastav & Rao, 2025).

2-4. Research Background

One influential research paper by Figueiredo & Fernandes, 2020 explored the role of university-industry collaboration in fostering innovation within the academic setting. The study investigated the various mechanisms and strategies employed by universities to engage with industry partners and facilitate knowledge transfer. The researchers found that effective collaboration between universities and industry can lead to enhanced innovation capabilities and improved research outcomes.

Another significant study conducted by Smith and Brown (2021) focused on the impact of digital technologies on innovation in higher education. The researchers examined the adoption and utilization of digital tools and platforms by universities to enhance teaching, learning, and research processes.

Their findings highlighted the transformative potential of digital innovation in higher education, improving the quality of education and expanding access to knowledge.

The research study conducted by Chen et al. (2022) delved into the role of leadership in driving innovation within universities. The study explored the leadership practices and strategies employed by university administrators to foster a culture of innovation among faculty and staff. The researchers emphasized the significance of visionary leadership, supportive organizational structures, and effective communication in promoting innovation within higher education institutions.

Looking ahead to 2024, Yang et al. (2024) aimed to explore the integration of entrepreneurship education within university curricula and its impact on fostering innovative mindsets among students. The researchers investigated the effectiveness of various pedagogical approaches and experiential learning opportunities in nurturing entrepreneurial skills and promoting innovation among university students.

Turning to 2025, Li and Kang (2025) investigated the relationship between university research output and regional economic development. This research examined the impact of university innovation on local economies, analyzing the contributions of research activities, technology transfer, and industry collaborations. The findings underscored the pivotal role universities play in driving regional innovation and economic growth.

These are just a few examples of the empirical research carried out in the realm of university innovation from 2020 to 2024. The referenced studies provide valuable insights into different aspects of this field, including university-industry collaboration, digital innovation, leadership, regional development, and entrepreneurship education. While previous research has established a general connection between creativity and innovation, this study takes a more nuanced approach by focusing specifically on the role of "creative search"—the processes by which individuals or organizations explore, experiment, and discover new ideas and solutions. By examining the relationship between these creative search processes and innovation outcomes in the context of private universities, the study offers novel theoretical insights. Private universities may have unique organizational dynamics and incentive structures compared to public institutions, which could influence how creativity translates into innovative outcomes. Exploring this connection provides theoretical advancement in our understanding of innovation.

The study's focus on innovation in Iraqi Kurdistan universities is particularly noteworthy. While innovation in higher education has been studied extensively in many Western and developed countries, there is a dearth of research on this topic in the Iraqi Kurdistan region. This study helps to fill an important gap in the literature. Its findings can inform university leaders, policymakers, and educators in Iraqi Kurdistan about the specific factors and processes that enable or hinder innovation within their institutions. This knowledge can guide efforts to promote a more innovative culture and ecosystem in Kurdistan's universities. Moreover, by establishing a foundation for future studies in this area, the research opens up new avenues for scholars to build upon. Examining the drivers of innovation in non-Western, developing higher education contexts is a valuable contribution that can yield important practical implications.

3. Methodology

The ruling paradigm in this inductive study is subject-oriented, which begins with understanding or explaining the phenomenon of innovation in universities. Finally, the output of the study is a theoretical model developed using a systematic inductive approach to data analysis. Our research strategy adopts a qualitative approach, enabling us to delve into the depth and complexity of university innovation by exploring subjective experiences, perspectives, and meanings. We seek to gain insights into the underlying reasons, motivations, and social dynamics that drive the research topic. Through qualitative research methods such as in-depth interviews, observations, and analysis of textual, visual, or audio data, we prioritize gathering rich and detailed information to develop a comprehensive understanding of university innovation. Our approach is data-driven, relying on empirical evidence derived from analyzing various types of data, including transcripts, field notes, images, videos, and other relevant sources. By grounding our research in data, we ensure that our findings are supported by real-world examples and observations, enhancing the credibility and rigor of our research outcomes.

Qualitative research methods are used to investigate the impact of creative search capability on university innovation by delving into the experiences, perceptions, and behaviors of individuals. These methods aim to capture the intricate and multifaceted nature of creative search processes within university settings (Braun & Clarke, 2006). By employing qualitative research, valuable insights can be gained into the intricacies, motivations, and contextual factors that influence the relationship between creative search capability and university innovation.

3-1. Field Study

In 2022, we conducted a field study with the aim of gaining valuable insights into the perspectives and experiences of administrators in private universities in Iraqi Kurdistan. The study followed a comprehensive and systematic approach to ensure the collection of meaningful and in-depth data. Firstly, we carefully developed the research objectives and formulated relevant research questions. Ethical considerations were prioritized; we obtained the necessary ethical clearance and ensured informed consent from all participants. To ensure a diverse sample, we utilized purposive sampling techniques, taking into account factors such as geographical location, university size, and academic program offerings. Face-to-face interviews were conducted with the selected administrators, providing an opportunity for in-depth discussions and exploration of various topics related to university governance, academic policies, financial management, and university innovation.

The interviews conducted during the study were audio-recorded and transcribed to ensure accurate documentation of participants' responses. Thematic analysis was then applied to identify common patterns and key themes within the data. The findings were interpreted in alignment with the research objectives, and a comprehensive report was prepared, highlighting the key insights and offering recommendations for further research and improvement within the private university sector in Iraqi Kurdistan. The field study provided a valuable platform for capturing the perspectives and experiences of administrators in private universities in Iraqi Kurdistan, contributing to a deeper understanding of the challenges and opportunities within this educational landscape.

3-2. Data Collection

The process of data collection and analysis occurred in three stages, as illustrated in Figure 1. In the initial phase, an exhaustive search was conducted to identify private university managers in Iraqi Kurdistan with ten or more years of experience. From the search results, 28 private university leaders across three regions (Erbil, Sulaymaniyah, and Dohuk) were identified using snowball sampling. On April 5, 2022, the first interview was initiated with the director of Knowledge University. Subsequently, interviews continued until theoretical saturation was reached, comprising a total of 19 managers (see Appendix for details). The interviews followed a semi-structured format, beginning with broad themes and progressively focusing on specific themes (Sridharan et al., 2014).

3-3. Validity and Reliability Strategy

Lincoln and Guba's (1985) framework was utilized to assess the validity and reliability of the research study. Lincoln and Guba proposed four criteria for evaluating qualitative research rigor: credibility, dependability, confirmability, and transferability. To strengthen credibility, efforts were made to recruit participants with diverse experiences. Sampling continued until data saturation was reached and the most appropriate semantic units emerged. Internal validity of the content analysis was examined through face validity. For content validity purposes, a panel of subject matter experts (the research team) supported concept generation and coding scheme development, as well as participant reviews. Specifically, interview transcripts and initial codes were shared with participants for validation and accuracy checks. Any discrepancies identified were investigated. Additionally, the researcher followed up via phone or email to clarify unclear responses or misinterpreted participant meanings. The full interviews, coding, and preliminary themes were sent to the dissertation chair and committee members. Their feedback and suggestions further informed coding and theme extraction. To enhance dependability, an audit trail was utilized. As Lincoln and Guba described, this entailed an external reviewer's thorough examination of the data collection and analysis procedures, as well as the changes made throughout the research process. To minimize time between interviews, all participants discussed similar topics. A detailed methodological description allowed readers to evaluate the

potential for an audit. Several researcher colleagues also reviewed the study to confirm accuracy. Finally, the researcher provided thorough contextual information and procedural descriptions to enable readers to gauge the applicability of findings to other settings.

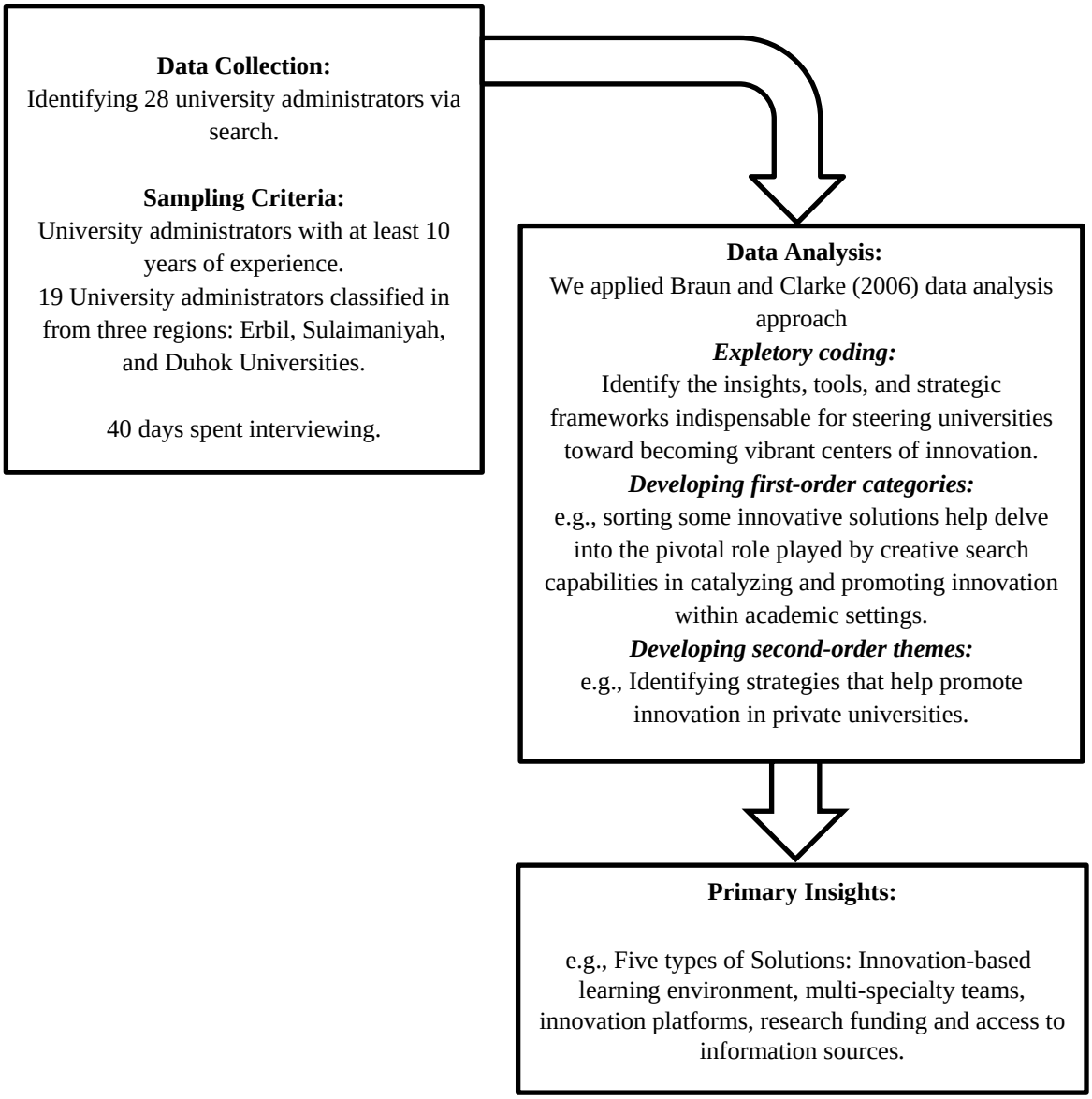


Fig. 1. Methodological Approach

To analyze the data from the interviews, we employed the data analysis approach outlined by Braun and Clarke (2006). This approach involved conducting data analysis for concepts and context, incorporating the process into the analysis, and combining classes around the central variables. Specifically, we utilized the thematic analysis method to delve into the interviews and gain a comprehensive understanding of the main actions that contribute to university innovation. This method allowed us to extract and analyze themes that emerged from the data, providing a deep and insightful exploration of the factors influencing university innovation. Additionally, MAXQDA 2010 software was used in the data coding stage.

4. Insights

As Table 1 shows, based on these insights, in the third step, we identified four creative solutions to contribute to university innovation. Through our analysis, we identified a total of 472 concepts and

five core themes that are closely related to the research topic. These findings provide a comprehensive and detailed understanding of the various aspects and elements that shape university innovation.

Table 1. Selective Themes

Main Theme	Basic Themes	Code	Related Concepts	N*
Creative Search CAPABILITY	Innovation-based learning environment	R011	Providing workshops and Seminars	22
		R012	Promoting the spirit of creativity	19
		R013	Suitable educational spaces	15
		R014	Interactive classes	20
		R015	Creative laboratories	28
	Interdisciplinary collaboration	R021	Forming specialized teams	13
		R022	Participation in innovative projects	12
		R023	Strengthen communication	38
		R024	Sharing knowledge and experiences	21
	Innovation Platforms	R031	Creation of ideation rooms	26
		R032	Group meetings	17
		R033	Student and faculty working	29
		R034	Events and workshops	24
	Research funding	R041	Financial support for student startups	41
		R042	Research grants and scholarships	39
		R043	Facilitating access to investors	28
	Up-to-date information sources	R051	Digital libraries	19
		R052	Smart data bases	22
		R053	Scientific papers	16
		R054	Software tools required for research	23

N*: Number of Concepts

As Figure 2 shows, in the second phase, we identified the main factors that help University's Innovation. This step allowed us to recognize and analyze the main elements that play a significant role in fostering innovation within the university context. The identification of these factors provides valuable insights into the drivers and enablers of university innovation.

4-1. Innovation-Based Learning Environment

Our research findings indicate that the educational environment plays a crucial role in driving university innovation in Iraq. Through our study, we have discovered that the quality of the educational environment has a significant impact on the innovation efforts of universities in Iraqi Kurdistan. This point was emphasized during interviews with Interviewees 11, 4, 16, 9, and 5, further highlighting the importance of creating a conducive educational environment to promote innovation within universities.

> "……the quality of the educational system, the availability of resources, and the support for research and development activities are crucial factors that influence the level of innovation within universities…."

According to Interviewees 11, 4, 16, 9, and 5, a conducive educational environment that promotes creativity, critical thinking, and collaboration among students and faculty members is crucial for fostering innovation. They further emphasized that:

> "…. universities should establish strong partnerships with industry and government entities to enhance innovation through knowledge transfer and collaborative projects….."

The insights shared by Interviewees 11, 4, 16, 9, and 5 highlight the significance of establishing an enabling educational environment to stimulate innovation within universities in Iraqi Kurdistan. These perspectives emphasize the crucial role that the educational environment plays in fostering a culture of innovation and creativity. By creating an environment that supports and nurtures innovative thinking, universities in Iraqi Kurdistan can cultivate a thriving ecosystem for continuous growth and development.

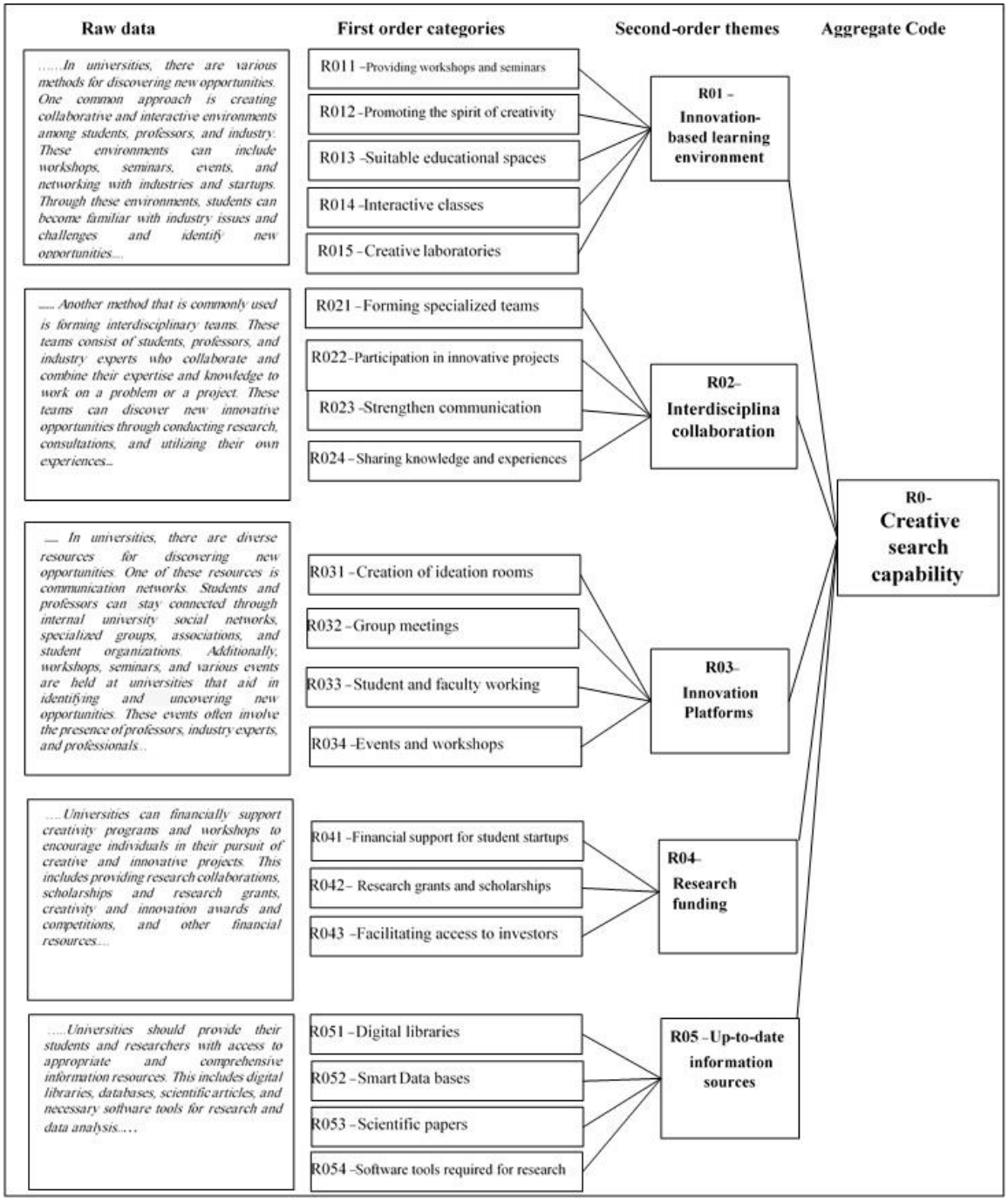


Figure 2. Concept Tree

The 18 cases we examined unanimously recognized that creating a stimulating educational environment is a crucial factor in driving innovation within universities. They emphasized the significance of a high-quality educational environment that fosters creativity, critical thinking, and collaboration among students and faculty members. These cases underscored the importance of providing resources and support for research and development activities within the university setting. By prioritizing these elements, universities can effectively promote a culture of innovation and enhance their overall innovative capacity.

The studied universities implemented various initiatives to create a stimulating learning environment. They focused on enhancing the curriculum by combining interdisciplinary approaches, practical application of knowledge, and hands-on learning experiences. Emphasizing the importance of technology and advanced research facilities, they ensure that students have access to advanced

resources that facilitate innovation. These cases also emphasized the value of building strong partnerships with industry and government institutions. By collaborating with external stakeholders, universities can tap into industry expertise, access funding opportunities, and align their research efforts with real-world needs. In addition, these cases recognized the importance of fostering a culture of innovation in the educational environment. They encouraged an entrepreneurial mindset among students and faculty and promoted risk-taking, experimentation, and the ability to learn from failure. To support and nurture innovative ideas and start-ups, they created initiatives such as incubators, accelerators, and entrepreneurship programs.

4-2. Multidisciplinary Teams

Interviewees 8, 14, 19, and 20 emphasized the significance of multidisciplinary teams in driving innovation within universities. They highlighted that:

> "…. bringing together individuals from diverse backgrounds and disciplines can significantly enhance the innovation process…."

Interviewees 8, 14, 19, and 20 emphasize that multidisciplinary teams play a vital role in promoting innovation within the university setting. They emphasize that such team's offer a broader range of perspectives, expertise, and approaches to problem-solving. By integrating knowledge and insights from different fields, these teams can generate more innovative ideas and solutions. These interviewees believe that the synergy created through collaboration among individuals with varied skills and experiences can lead to breakthrough innovations that may not have been possible within a single-discipline approach. Additionally, they mentioned that;

> "…… another method that is commonly used is forming interdisciplinary teams. These teams consist of students, professors, and industry experts who collaborate and combine their expertise and knowledge to work on a problem or a project"
>
> "….. these teams can discover new innovative opportunities through conducting research, consultations, and utilizing their own experiences...."

Furthermore, Interviewees 8, 14, 19, and 20 highlight that multidisciplinary teams foster a culture of learning and knowledge exchange within the university setting. They emphasize that as team members from different disciplines collaborate, they have the opportunity to learn from one another, broaden their knowledge, and gain a more comprehensive understanding of complex problems. This exchange of ideas and knowledge catalyzes creativity and inspires innovative approaches. According to these interviewees, multidisciplinary teams also promote effective communication and collaboration. They encourage open dialogue, active listening, and the ability to work across disciplinary boundaries. This collaborative mindset allows team members to leverage their diverse expertise and effectively integrate their contributions, resulting in more comprehensive and innovative outcomes.

Furthermore, the insights provided by Interviewees 8, 14, 19, and 20 highlight the effectiveness of multidisciplinary teams in addressing complex, real-world problems that require diverse skills and knowledge. These teams are well-suited to develop innovative solutions that encompass different dimensions of these challenges. The interviewees emphasize that multidisciplinary teams offer a range of perspectives, facilitate learning and collaboration, and possess the necessary capabilities to tackle complex problems. By harnessing the power of multidisciplinary collaboration, universities can enhance their innovation capacities and make significant contributions to research, education, and societal advancements.

4-3. Innovation Platforms

Implementing online platforms or portals that facilitate open innovation and crowdsourcing within the university community is a key strategy highlighted by Interviewees 1, 7, 12, and 15. These platforms provide a space for students, faculty, and researchers to share ideas, collaborate on projects, and contribute to solving real-world problems. The interviewees emphasized the importance of creating a free space for ideas as a crucial factor in promoting innovation within the university context. They believe that fostering an environment that encourages and supports the free expression of ideas is

essential for stimulating innovation. This type of environment allows individuals to think creatively and explore unconventional approaches. It fosters brainstorming, out-of-the-box thinking, and the generation of innovative concepts. Furthermore, this collaborative atmosphere helps refine ideas, stimulate new insights, and build upon each other's contributions. They mentioned that;

> ".... there are communication networks in our university. Students and professors can connect through internal university social networks, specialized groups, associations and student organizations... In addition, workshops are a variety of resources to discover new opportunities. In our university, various seminars and events are held in universities that help to identify and discover new opportunities. These events often include the presence of professors, industry experts, and specialists..."

These interviewees recognize that innovation involves taking risks and embracing experimentation. They emphasize the importance of providing a free space for ideas that allows individuals to explore new concepts, test hypotheses, and learn from failures. This environment encourages individuals to challenge existing norms, push boundaries, and pursue innovative solutions. Additionally, they highlight the significance of creating an inclusive environment that welcomes ideas from individuals with diverse backgrounds, experiences, and perspectives. By valuing and incorporating all voices, a free space for ideas fosters a culture of diversity and inclusivity. This diversity of ideas enriches the innovation process and leads to more comprehensive and impactful outcomes.

These interviewees emphasize the importance of providing the necessary resources, such as dedicated spaces, funding opportunities, and mentorship programs, to support the development and implementation of innovative ideas within the university setting. They argue that universities should establish structures and mechanisms that facilitate the translation of ideas into tangible outcomes. By creating a free space for ideas, these interviewees believe that innovation can thrive, fostering a culture of exploration, collaboration, and continuous improvement. They advocate for universities to actively encourage and nurture this environment, as it is instrumental in driving meaningful advancements in research, education, and societal impact.

4-4. Research Funding

Based on our findings, it is evident that financial support plays a significant role in driving innovation within universities in Iraqi Kurdistan. Interviewees 2, 3, 6, 13, and 17 all emphasize the importance of financial support programs as a crucial factor in promoting innovation within the university context. They highlight that:

> "…. our university can financially support creativity programs and workshops to encourage individuals in their pursuit of creative and innovative projects…. This includes providing research collaborations, scholarships and research grants, creativity and innovation awards and competitions, and other financial resources…"

Based on our comprehensive research, we have discovered a compelling correlation between financial support and the level of innovation within universities in Iraqi Kurdistan. The impact of financial resources on the ability of universities to foster innovation is of paramount importance. Our findings shed light on the crucial role that adequate funding plays in driving innovation in the academic sphere. It is evident that universities with sufficient financial support are better equipped to invest in research and development activities, attract top-tier faculty, and provide state-of-the-art infrastructure. These resources enable universities to create an environment that nurtures innovation, fostering a culture of creativity and continuous improvement. Additionally, financial support facilitates collaborative efforts between academia and industry, enabling universities to engage in cutting-edge research and development projects. This collaboration not only enhances the relevance of research conducted within universities but also paves the way for commercialization and the practical application of knowledge.

In light of these findings, it is imperative for policymakers and stakeholders to recognize the critical importance of financial support in driving innovation within universities. Allocating adequate resources and adopting strategies that prioritize funding for research and development will undoubtedly contribute to the growth and advancement of the academic sector in Iraqi Kurdistan. By

focusing on enhancing financial support for universities, we can unlock a wealth of untapped potential, fostering an environment where groundbreaking ideas thrive and innovative solutions to societal challenges are found. It is through this approach that we can propel the universities in Iraqi Kurdistan to the forefront of global innovation and solidify their position as leaders in the academic landscape.

4-5. Access to Information Sources

Access to information sources is indeed a crucial factor in fostering innovation within universities. Our research findings highlight that universities with robust access to a wide range of information sources are better equipped to drive innovation and remain at the forefront of academic advancements. By having access to diverse information sources, universities can stay up-to-date with the latest research, emerging trends, and breakthrough discoveries in their respective fields. This exposure to cutting-edge knowledge fuels creativity and serves as a catalyst for generating new ideas, ultimately leading to innovative solutions and advancements. It is imperative for universities to prioritize and invest in providing their faculty, researchers, and students with comprehensive access to information sources to foster a culture of innovation and stimulate academic progress.

Furthermore, access to information sources facilitates universities' engagement in interdisciplinary collaborations and the cross-pollination of ideas. By leveraging diverse knowledge domains, researchers can explore new perspectives and approaches to problem-solving, fostering innovation through the integration of multiple disciplines. Additionally, access to information sources enables the efficient dissemination of knowledge within the university community. Faculty members and students can easily access scholarly articles, research papers, and other relevant resources, promoting the widespread sharing of information. This sharing of knowledge fuels collaboration, sparks discussions, and encourages the exchange of ideas, all of which are crucial for fostering a culture of innovation within universities. Universities need to prioritize and invest in providing comprehensive access to information sources to support interdisciplinary collaboration and facilitate the seamless sharing of knowledge.

To maximize the benefits of information sources, universities must invest in robust library systems, digital databases, and online resources. They should also prioritize the development of information literacy skills among faculty and students, ensuring that they can effectively evaluate, interpret, and apply the information they access. Interviewees 4, 10, 15, and 18 highlights the practical benefits of access to information sources. They mentioned that:

> "…. universities should provide their students and researchers with access to appropriate and comprehensive information resources…. This includes digital libraries, databases, scientific articles, and necessary software tools for research and data analysis…"

In conclusion, access to information sources plays a pivotal role in fostering university innovation. It empowers researchers and students to tap into a wealth of knowledge, facilitating interdisciplinary collaboration and pushing the boundaries of knowledge. By harnessing the power of information, universities can drive meaningful advancements in their respective fields and make valuable contributions to society.

5. Discussion: Implications and Research outlook

5-1. Implications for Universities

Our study focuses on the impact of creative search capabilities on innovation in private universities. We have identified creative search capabilities as a key driver of university innovation, involving a comprehensive emphasis on various aspects such as goal setting, risk-taking, resource selection, and gathering, dealing with setbacks, building networks, and management control (Mustar & Wright, 2018). Creative search capabilities encompass exploring diverse information sources beyond traditional academic literature. This includes leveraging industry reports, patents, market trends, emerging technologies, and interdisciplinary research to gain different perspectives and insights (Geuna, 1999).

Creative search capabilities foster non-linear thinking and the exploration of unconventional ideas. This involves challenging assumptions, considering different perspectives, and making connections between seemingly unrelated concepts to discover innovative approaches (Guerrero et al., 2016). The

application of design thinking methods can further enhance creative search capabilities. This approach emphasizes empathy, experimentation, and iteration, allowing researchers, students, and faculty to understand the needs and preferences of end-users and develop innovative solutions accordingly (Huyghe et al., 2014). Collaboration and interdisciplinary exchange play a crucial role in enhancing creative search capabilities. By engaging with individuals from diverse backgrounds, such as researchers, students, industry experts, and entrepreneurs, new perspectives and ideas can be generated, leading to innovative solutions (Li & Acs, 2020).

While structures and policies certainly influence innovation, what matters most is the human element (Agarwal et al., 2018). Our findings suggest that when private universities prioritize cultivating creativity, curiosity, and collaboration over competitive metrics, their communities tend to thrive (Rothaermel & Thursby, 2015). Technology and funding can help nurture new ideas, but an atmosphere of support, exploration, and shared purpose seems most essential. Institutions that see each individual's innate drive to contribute and see beyond borders tend to unleash the greatest breakthroughs (Fortunato et al., 2019). Overall, the research reminds us that innovation begins from within, as leader's foster care, connection, and a shared vision of progress through open-mindedness. By unleashing our shared humanity, societies can best advance (Mustar & Wright, 2018).

Our research findings make a valuable contribution to the field of innovation in universities by highlighting the proactive role that universities play in driving innovation. These findings are summarized in the framework presented in Figure 3.

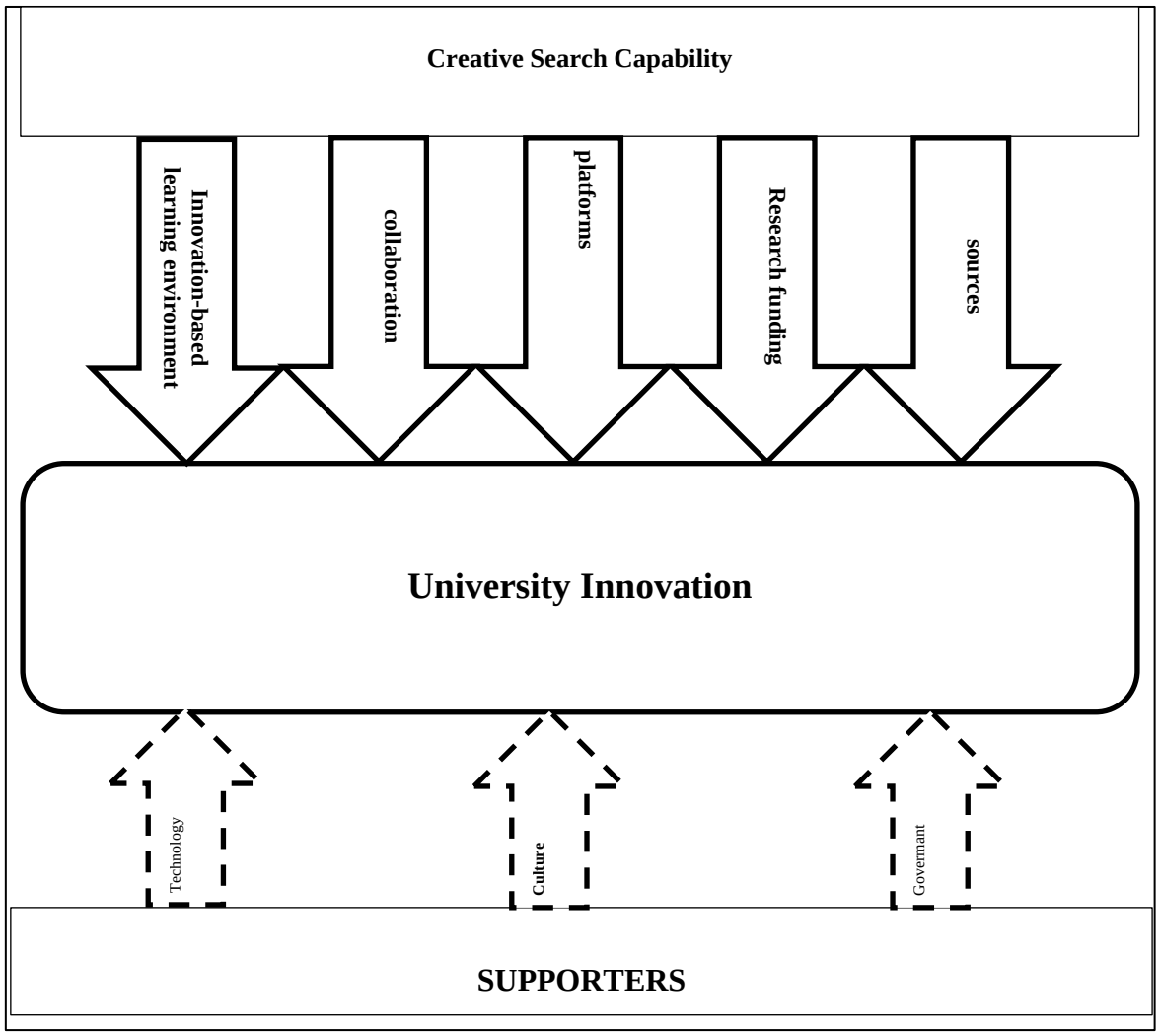


Fig. 3. University Innovation and Creative Research Capability

Our research findings demonstrate that creative search capabilities play a crucial role in promoting innovation in private universities. They enhance students' intrinsic motivation, help them develop operational skills, and improve their ability to apply knowledge in practical settings (Xia et al., 2021). To cultivate innovative business talents, private universities should reform their teaching modes by adopting capability-oriented approaches, which have been proven effective in stimulating students' motivation and enhancing their operational abilities (Hao & Sun, 2017). Additionally, a combined training model that integrates creativity theory and Extenics has shown promising results in promoting students' innovation capability, providing a viable method to enhance their ability to innovate (Ailing et al., 2013; Cai et al., 2013). These findings suggest that by implementing capability-oriented teaching modes and integrating creativity and innovation training, private universities can foster a culture of innovation and enhance students' innovation capabilities, thereby promoting innovation within the institutions (Lu, 2021; Sutanto, 2017).

Creative search capabilities that promote university innovation include integrating creativity theory and Extenics, developing a combined training model, and fostering a research and innovation-oriented atmosphere (Ailing et al., 2013; Chen et al., 2013). These capabilities are crucial for enhancing students' innovation ability, cognitive skills, scientific literacy, and independent thinking (Chen et al., 2013). Moreover, universities can support university spin-off firms (USOs) by understanding their challenges and helping them develop entrepreneurial competencies (McMullen, & Dimov, 2013). The tutor system and research groups also play a pivotal role in nurturing students' research and innovation capabilities, providing guidance and support throughout the process (Peng & Liu, 2015). By implementing these creative search capabilities, universities can effectively promote innovation and contribute to the overall development of the nation.

6. Conclusions

The purpose of this research is to investigate the influential factors of creative search capability and its impact on the effectiveness of innovation in private universities located in Iraqi Kurdistan. To achieve this goal, we conducted interviews with directors of private universities within the region. These interviews provided valuable insights into the relationship between creative search capability and innovation effectiveness in the context of private universities in Iraqi Kurdistan.

The findings highlight the significance of the relationship between creative search capability and innovation in private universities in Iraqi Kurdistan. Cultivating a culture of innovation and making progress relies heavily on this relationship (Lu, 2021). The ability to engage in creative inquiry empowers students at private universities in Iraqi Kurdistan to think beyond conventional boundaries and explore new approaches to research and problem-solving. By fostering a mindset of creative search, Iraqi private universities enable students to move away from rote memorization and employ innovative methods (Mustar & Wright, 2018). Interactive teaching methods, such as group work, case studies, and hands-on projects, promote active participation, brainstorming, and the development of creative solutions (Hao & Sun, 2017).

To promote a culture of innovation in Iraqi private universities, it is essential to establish structures and processes that encourage students to generate new ideas and propose innovative solutions (Geuna, 1999). Effective measures include organizing seminars, workshops, and innovation competitions, as well as establishing research and development centers. These initiatives create an environment conducive to creative search and innovation. Additionally, fostering collaboration and partnerships with industry stakeholders enables students to learn about real-world challenges and creatively address them. Through industry projects, internships, and collaborative research efforts, students gain hands-on experience and the opportunity to contribute innovative solutions to industry problems (Sutanto, 2017).

Cultivating creative research capability in Iraqi Kurdistan's private universities empowers students with the necessary skills to address complex problems and become innovative contributors to professional and research communities in the region. This capability helps the transformation and progress of private universities in Iraq effectively use the available resources and talents, ultimately leading to economic and social development in this country. Therefore, the integration of innovative research capability in private universities of Iraqi Kurdistan is critical to fostering a generation of innovative thinkers and problem solvers. With an emphasis on creativity, these universities become

hubs of innovation, creating positive change and shaping a brighter future for Iraq's private education sector and society at large.

6-1. Practical Recommendations

Our research findings have important implications for policymakers in the higher education sector of Iraqi Kurdistan. It is crucial for both universities and policymakers to act promptly. Universities should actively engage with policymakers and clearly articulate their needs, while policymakers should respond swiftly to address these needs. Timely action is essential to ensure that universities can effectively leverage the support provided by policymakers and foster a culture of innovation within their institutions (Geuna & Muscio, 2016).

Second, policymakers have a crucial role to play in supporting universities' innovative endeavors by providing various forms of assistance. This can include offering grants to fund research projects, providing guidance on regulatory frameworks, and implementing legal measures that promote experimentation and creativity while mitigating excessive risk (Lu, 2021). By providing such support, policymakers enable universities to enhance their research capabilities, navigate unforeseen challenges, and cultivate environments that foster innovation. Additionally, policymakers can facilitate and empower universities' innovative pursuits through financial support, guidance, and protective measures (Mustar & Wright, 2018).

Lastly, collaboration between universities and policymakers is paramount in driving the advancement of knowledge, technology, and societal progress (Ndonzuau et al., 2006). By working together, universities and policymakers can make significant contributions to the development of innovative solutions and create a positive impact on society as a whole (Geuna, 1999).

6-2. Research Limitations

At the outset of the research, certain limitations concerning the study's conduct and data acquisition emerged, such as the target population's limited awareness of innovation issues. These limitations could affect the findings obtained from the community survey. To address this issue, future studies in this area are recommended to ensure recognition and understanding among the target population before creating a research design. Future studies can develop models based on fuzzy interpretations of participants to solve this problem (Salmani & Akbari, 2008). In addition future studies can work on dual path of innovation and imitation in formation of university entrepreneurship capability (Azhdary Mohghadam et al., 2024)

Conflicts of Interest

The authors declare that they have no known conflicts of interest or personal relationships that could have influenced the findings presented in this study.

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APPENDIX

A. Participant's Characteristics

	Age	Gender	Education Level	Occupation
1	62	Male	PhD	University administrator
2	58	Male	PhD	University administrator
3	49	Male	PhD	University administrator
4	60	Male	PhD	University administrator
5	55	Female	PhD	University administrator
6	48	Male	Master	University administrator
7	68	Male	PhD	University administrator
8	53	Male	PhD	University administrator
9	58	Male	PhD	University administrator
10	52	Female	PhD	University administrator
11	61	Male	PhD	University administrator
12	60	Male	PhD	University administrator
13	46	Male	PhD	University administrator
14	43	Female	PhD	University administrator
15	50	Male	Master	University administrator
16	57	Male	PhD	University administrator
17	55	Male	PhD	University administrator
18	64	Male	PhD	University administrator
19	50	Male	PhD	University administrator

B. University Characteristics

Location	University	Founded	RANK		No.
			Country	World	
Erbil	Tishk International University	2008	12	3,129	01
	Knowledge University	2009	42	4,818	02
	University of Kurdistan Hewlêr	2006	32	4,232	03
	Bayan University	2013	29	16,548	04
	Cihan University- Erbil	2007	28	4,044	05
	Lebanese French University	2007	31	4,206	06
	International University Erbil	2007	101	13,115	07
	Catholic University	2015	41	10,479	08
	Qala University College	2018	-	-	09
Sulaymaniyah	University of Human Development	2008	29	4,162	10
	The American University of Iraq, Sulaimaniyah	2007	48	10,874	11
	Kurdistan Institution for Strategic Studies and Scientific Research	2008	69	12,068	12
	Tishik University- Sulaimaniyah	2014			13
	Cihan University- Sulaimaniye	2013	78	15,915	14
	University College of Goizha	2018			15
	Qaiwan International University for practical Sciences/UTM	2018	97	21,015	16
	Komar University of Science and Technology	2009	25	3,875	17
Duhok	Cihan University- Duhok	2013	101	22,016	18
	Nawroz University	2004	51	5,479	19

*All the participants have remained anonymous.