Addressing Wicked Problems (SDGs) Through Community Colleges: Leveraging Entrepreneurial Leadership for Economic Development Post-COVID

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Abstract

This qualitative case study aims to explore community colleges' role in addressing wicked problems of economic development post-COVID through entrepreneurial leadership. The key research question is, "How do entrepreneurial leaders describe the role of community colleges in addressing wicked problems of economic development post-COVID." The study interviewed 28 entrepreneurial leaders regarding the role(s) of community colleges in addressing wicked problems of economic development. The study addresses a critical gap in the literature. Researchers have yet to explore the role of associate degree-granting institutions, namely community colleges. Notably, the over 1200 U.S. community colleges serve nearly 12 million or half of America's students (American Association of Community Colleges, 2011). From a theoretical perspective, the study leverages complexity science, complex adaptive systems, and systemic innovation to address wicked problems of economic development. Future researchers can build on these theoretical insights for future studies across many disciplines.

The results provide ten key roles community colleges can potentially take on as economic development partners, making them ideal institutions to serve as incubators of post-COVID recovery. They include revitalizing communities post-COVID, performing post-COVID business triage, modeling sustainability, creating jobs, championing entrepreneurship-led economic development, increasing tax revenue, pipelining talent, supporting talent retention, supporting main street businesses, and reducing entrepreneurial risks. Researchers recommend that policymakers and other funders allocate funding to help community colleges address wicked problems through systemic innovation labs (I-Labs). Interestingly, the roles identified appear to be moderated by proximity and trust.

Keywords Sustainable development goals · Wicked problems · Entrepreneurship · Community colleges · Complexity science · Economic development

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Introduction

In recent years, concerns about social, environmental, and economic issues have increasingly gained attention (World Economic Forum, 2020). The World Economic Forum (WEF) has been sounding the alarm for years, warning of increased poverty, economic inequality, infectious disease, climate change, and many other wicked problems despite efforts to mitigate their effects (Deming, 1994). Researchers made the predictions before the COVID-19 pandemic, which researchers label as a "super wicked problem" due to the multifaceted and inter-connected nature of the pandemic's challenges (Auld et al., 2021).

What makes this study different is the focus on community colleges, their proximity to communities across the USA, and their ability to leverage trusted relationships within these communities for localized impact. While the findings indicate significant overlap between the roles of universities versus community colleges, the entrepreneurial leaders emphasized that trusted relationships and proximity were vital to maximizing the economic impact. Many scholars believe higher education institutions are well-positioned to serve as incubators of innova-tion for complex social, economic, and environmental challenges. The existing literature surrounding academic institutions addressing wicked problems focuses on the role of universities, businesses, and non-governmental organizations (NGOs) (Mena & Palazzo, 2012; Schouten & Glasbergen, 2011). Researchers have explored the role of baccalaureate-granting institutions in addressing wicked problems (Dentoni & Bitzer, 2015). However, researchers have yet to explore the role of community colleges in addressing wicked problems.

Community colleges play a critical role in the US higher education landscape, enrolling nearly half of all college students, often of socially and economically disadvantaged populations (Kolesnikova, 2009). These associate degree-granting institutions encompass over 1200 entities serving over 12 million students across the USA. With a mission of open access, affordable costs, workforce training, and educating both urban and rural communities, community colleges serve students often left behind by traditional institutions of higher education (Kasper, 2002). Community colleges nationwide also provide an opportunity for significant impact locally since 90% of the US population lives within 25 miles of a com-munity college (American Association of Community Colleges, 2011). While previous researchers identified similar roles from the university's broad impact perspective, community colleges offer a more trusted, relationship-based pathway to addressing wicked problems (Dentoni & Bitzer, 2015). Existing research needs to address the critical role these institutions of higher education could play in addressing wicked problems of economic development. In the next section, the authors describe the need to examine wicked problems from the community col-lege perspective by utilizing broader theoretical frameworks.

Social enterprise literature underscores a need for more literature related to the research question. For example, according to Zivkovic (2017), traditional prob-lem-solving methods need to be revised to address wicked problems and instead require a more comprehensive approach. The literature advises a more holistic

approach, combining systemic innovation and complexity science when addressing wicked problems (Zivkovic, 2017). Complexity science emphasizes interactions and interconnectedness, which offers a deeper understanding of these complex issues (Phelan, 2001; Sturmberg & Narduzzi, 2014; Uhl-Bien et al., 2008). Similarly, complex adaptive systems theory considers interdependencies critical for addressing wicked problems (Australian Public Service Commission, 2007). Systemic innovation aims to maximize the value of social innovation and improve outcomes across domains (Davies et al., 2012). Systemic innovation labs operate across various levels of analysis (Zivkovic, 2018). Collectively, complexity science, complex adaptive systems, systemic innovation, and systemic design offer a theoretical framework for addressing wicked problems, providing a comprehensive and systems-oriented approach (Davies et al., 2012; Jones, 2014; Surie & Hazy, 2006; Zivkovic, 2017). The researchers have employed a qualitative approach to capture the contextual nuances and social complexities of wicked problems.

This research study explores the role of community colleges in addressing wicked problems post-COVID by asking, "How do entrepreneurial leaders describe the role of community colleges in addressing wicked problems of economic development post-COVID." The study provides a literature review surrounding higher education's role(s) in addressing wicked problems of economic development and a theoretical lens to explore this question.

The study is structured as follows: After a brief introduction, the authors introduce the theoretical lens employed and review the literature. The literature review includes (a) sustainability in higher education, (b) the evolution of skills when managing knowledge in the sharing economy, (c) the role of technology in achieving the Sustainable Development Goals (SDGs), (d) The role and challenges of big data in achieving the SDGs, (e) COVID-19's impact on entrepreneurial motivation, and (f) the roles of higher education in addressing wicked problems. Next, the study includes a discussion of the qualitative methodology employed, the sample, the findings and results, the study's limitations, future research, and conclusive remarks.

Background Literature and Theoretical Framework

Zivkovic (2017) advocated for a holistic, blended approach of systemic innovation and complexity science when addressing wicked problems. Complexity science involves the interactions between small actions that lead to large-scale effects within a given situation due to complex and multi-dimensional interconnectedness (Phelan, 2001). The theory of complexity science is well-documented throughout the literature (Cohen & Stewart, 1994; Ewing Kauffman Foundation, 1993, 1995, 2007; Gell-Mann & Tsallis, 2004). Researchers define complexity as "the formation and reformation of patterns and structures whether in companies, research and development teams, communities, or cities and nations" (Brett, 2019, p. 19). The most basic unit of analysis in complexity science is the complex adaptive systems (CASs) (Uhl-Bien et al., 2008). CASs are individuals, agents, or groups (Lichtenstein & Plowman, 2009; Uhl-Bien et al., 2008) that are open,

non-linear systems and often adapt or evolve as needed (Merali, 2006) and show emergent behavior (Sturmberg et al., 2014, p. 66). This emergent behavior can utilize self-organization in recombining new patterns, thus impacting performance (Lichtenstein & Plowman, 2009). Researchers highly recommend employing the complex adaptive systems theory when addressing wicked problems (Elia & Margherita, 2018), considering the interdependencies and the ever-changing nature of wicked problems (Australian Public Service Commission, 2007).

Building on this argument, Davies et al. (2012) asserted that systemic innovation is the preferred style of social innovation when addressing wicked problems, as the approach incorporates concepts surrounding complexity science, including complex adaptive systems. Systemic innovation is "a set of interconnected innovations where each depends on the other, with innovation both in the parts of the system and in the way they interact" (Davies et al., 2012, p. 4). Systemic innovation aims to maximize the value of social innovation by improving outcomes, such as higher graduation rates or lower unemployment (Davies et al., 2012).

According to Davies et al. (2012), wicked problems can be better addressed through systems innovation when practitioners understand the concepts surrounding complexity and complex adaptive systems. When addressing wicked problems within complex adaptive systems, Zivkovic (2018) advocates using a systemic innovation lab, a complexity-science-informed solution ecosystem. Systemic innovation labs possess certain key features, including (a) focusing on addressing complex problems, (b) emphasizing place-based local approaches, (c) enabling coherent action by diverse actors, (d) involving users as co-creators, (e) supporting a networked governance approach, and (f) recognizing government as an enabler of change. Additionally, systemic innovation labs often shift between macro, meso, and micro levels of analysis and action due to the systemic design nature of the work. In this context, design is imagining something that does not yet exist and bringing it to life (Nelson & Stolterman, 2012).

Systemic innovation labs embrace core principles of systemic design like purpose-finding, boundary framing, and feedback coordination to compel collective action on wicked problems. Systemic design is governed by a set of core principles, including (1) compelling collective action toward a desirable outcome, (2) appreciating complexity, (3) purpose-finding, (4) boundary framing, (5) feedback coordination, (6) system ordering, (7) generative emergence, (8) continuous adaptation, (9) self-organizing, and (10) requisite variety (Jones, 2014). Finally, leaders within systemic innovation labs often adopt the complex systems leadership style of "generative leadership," which emphasizes the need for aligning and understanding collective goals before advancing action to stay aligned (Surie & Hazy, 2006, p. 17). Complexity science, complex adaptive systems, and systemic design collectively provide the ideal theoretical frameworks for addressing wicked problems.

Researchers define entrepreneurial leadership as influencing and directing the performance of group members toward achieving organizational goals that involve recognizing and exploiting entrepreneurial opportunities (Renko et al., 2015). Research indicates that wicked problems are best addressed collaboratively alongside entrepreneurial leaders in today's rapidly changing volatile, uncertain, complex,

and ambiguous (VUCA) environments (Iordanoglou, 2018). This assertion was made before the COVID-19 pandemic and is arguably more relevant today.

Research suggests many of today's problems are far too complex to be solved by an individual and points out the importance of a collective leadership model, which is critical for success (Iordanoglou, 2018). Hence, future organizations will not be as hierarchical, so future leaders will need to be less authoritative and more participative to engage their teams.

Wicked problems like poverty, hunger, and climate change are shared throughout society and demand entrepreneurial leadership skills (United Nations Assembly, 2015). For this reason, wicked problems have become prominent in academic conversations (Dentoni & Bitzer, 2015). Rittel and Webber (1973) expressed concern about the approach to public planning when dealing with problems of various wickedness dimensions.

Wicked problems have three similarities: they change over time (Weber & Khademian, 2008), social scientists are uncertain about their root causes due to social complexity (Lazarus, 2009), and stakeholders hold different values regarding the challenges, which often cause conflict (Conklin, 2006). In addition, the properties of wicked problems often demand collective action across several sectors to create transformative and impactful change throughout the system (Waddock, 2013). Furthermore, the effort of individuals to combat wicked problems has minimal impact without collective and coordinated action with others, which is why these collaborative initiatives play an essential role (Batie, 2008; Conklin, 2006; Weber & Khademian, 2008). In addition, the nature of wicked problems requires the acceptance that there are no absolute solutions or definite answers (Rittel & Webber, 1973), rather a need for goals that are on a scale of improvement.

Wicked problems have no solution, resist linear-logic models, and are not comprehensible based solely on quantitative and objective data. Researchers emphasized that wicked problems cannot be "solved" because they are unsolvable (Rittel & Webber, 1973). Conklin (2006) asserted, "You don't so much solve a wicked problem as you help stakeholders negotiate shared understanding and shared meaning about the problem and its possible solution" (p. 4). The objective of the work is coherent action, not the final solution. While wicked problems are dynamic and complex, Sustainable Development Goals offer a shared framework to drive coherent action and create an understanding between stakeholders seeking substantial improvement rather than a set of shared objective solutions.

The United Nations Assembly (2015) captured the systemic nature of global challenges in the Transforming our World: The 2030 Agenda for Sustainable Development report. The report highlights the importance of addressing wicked problems. In response to the global challenges outlined in the report, the United Nations launched the 2030 Agenda for Sustainable Development. The initiative is a universal agenda outlining a plan of action to stimulate systems change between 2015 and 2030 in five areas of crucial importance: people, planet, prosperity, peace, and partnership (United Nations Assembly, 2015). The report outlined 27 principles, 17 goals, and 169 actions to impact societal change's economic, social, and environmental aspects. The effort aims to tackle systemic challenges, local needs, interests, and resources for transformative change using innovative approaches and long-term investments

(United Nations Assembly, 2015). The 2030 Sustainable Development Goals are considered a "blueprint for global development, which represents a fundamental shift in thinking, explicitly acknowledging the interconnectedness of prosperous business, a thriving society, and a healthy environment" (Stibbe et al., 2019, para. 2). Due to the interconnected nature of the goals, researchers advocate for addressing the challenges holistically, rather than individually in isolation (Catalyst, 2030a, 2020). The SDGs most directly aligned with the current research question relate to SDGs no. 4 and no.8.

SDG no. 8 represents good jobs and economic growth. Target 8.3 promotes decent job creation, entrepreneurship, creativity, and innovation, emphasizing individuals aged 15–24. Additionally, the target encourages micro, small, and medium businesses to formalize and grow their enterprises through increasing access to financial services and support (Sustainable Development Solutions Network [SDSN], 2023).

SDG no. 4 represents quality education. Target 4.7 of the Sustainable Development Goals is also relevant to community colleges addressing wicked problems of economic development through the SDG framework. Target 4.7 encourages inclusive and equitable quality education and lifelong learning opportunities for all students. According to the target, by 2030, all learners should be able to acquire sustainable development skills and knowledge through educational opportunities. The indicator suggests an achievement of the target be measured based on the extent of (a) educating for global citizenship, (b) mainstreaming education for sustainable development, (c) promoting national education policies, (d) incorporating sustainability into the curricula, (e) providing teacher education, and (f) assessing the students (United Nations Statistics Division, 2023). The following section provides a review of the role(s) of higher education in addressing wicked problems.

The Role(s) of Higher Education in Addressing Wicked Problems

Within the broader discourse on the roles of educational institutions in addressing societal challenges, it is essential to consider the multifaceted responsibilities of academic institutions and their potential to contribute to solving wicked problems (Ferrer-Balas et al., 2010; Manring, 2014; Trencher et al., 2014). Researchers have called for academics to reflect on their responsibility in society (Ferrer-Balas et al., 2010) and the university's role in addressing wicked problems (Manring, 2014), both of which often fit the objectives of the institution (Trencher et al., 2014). While some researchers have asserted that higher education institutions serve a public purpose and should contribute to solving societal problems (Shapiro, 2005), the issue has been debated for years. The literature reveals six themes regarding the role(s) of baccalaureate-granting institutions in addressing wicked problems. The roles include planning, convening (Innes & Booher, 2016; Morrison et al., 2019), learning (Lozano et al., 2013; Peer & Stoeglehner, 2013; Senge, 2006), implementation (Lozano et al., 2013; Stoeglehner et al., 2009), catalyzing, leading, facilitating (Boone, 1992), communicating (Adomßent et al., 2007; Burritt & Tingey-Holyoak, 2012), and as an interlocutor (Fowler, 2014; Fowler & Biekart, 2016; Fowler & Biekart, 2017; Turner et al., 2012).

Building upon this discourse, the review examines how community colleges, mainly through entrepreneurial leadership, can contribute to addressing wicked problems in economic development post-COVID. Specific topics included the importance of entrepreneurial leadership skills, such as creativity and innovation when tackling wicked problems, and how technology, big data, and higher education institutions contribute to achieving the SDGs. Finally, the study considered the impact of COVID-19 on entrepreneurial motivation and how intrapreneurial leaders also contribute. The literature review addresses many aspects of addressing wicked problems in this rapidly changing world. To provide an adequate review of the literature within the context of this changing world, the researchers include topics surrounding modern issues of sustainability, the sharing economy, technology, big data, and COVID-19's impact on entrepreneurial motivation.

Sustainability in Higher Education

The concept of sustainability catalyzed higher education institutions to consider themselves as drivers of innovation through public-private partnerships with stakeholders (Chatterton & Goddard, 2000). According to the literature, European academic institutions are leading this movement thanks to the supra-national European Policy outlining sustainable development frameworks to abide by (Kommission der Europäischen Gemeinschaft, 2001). The purpose of the sustainable policy mandates is to encourage the creation of regions across Europe that are competitive, knowledge-based, and innovative (Kommission der Europäischen Gemeinschaft, 2001). In the context of higher education institutions, sustainability processes focus on empowering local populations by providing broad access to education (ÖROK, 2002), opportunities to overcome spatial barriers (Schnell & Held, 2005), and reframing institutions of education as incubators of learning and innovation (Schnell & Held, 2005; Streich, 2005). By nature, wicked problems have no absolute solutions or definite answers (Rittel & Webber, 1973) and no formula for resolving them. While similar studies have explored addressing wicked problems, existing studies have primarily focused on the role of 4-year universities and non-governmental organizations. To date, no published research has focused on the role(s) of community colleges in addressing wicked problems of economic development.

The Evolution of Skills—Managing Knowledge in the Sharing Economy

According to a systematic literature review by Ben Slimane et al. (2022), specific skills are crucial when managing knowledge in the sharing economy. They include strong collaboration, communication, data analytics, communication technology, and networking capabilities (Ben Slimane et al., 2022). Additionally, an understanding of knowledge management systems will allow for managing the sharing economy efficiently, allowing for better understanding across all platforms. The COVID-19 pandemic only accelerated digital transformation in the sharing economy, increasing the need for skills for managing knowledge such as remote collaboration, cybersecurity, digital marketing, resilience, and adaptability (Ben Slimane et al.,

2022). Likewise, Pizzi et al. (2020) identified technological innovation, non-financial reporting, education, and developing countries as crucial categories in extant literature when examining the relationship between SDGs and business entities. This information creates opportunities for researching the future impact of SDGs, as well as helps identify education and policy gaps that may exist.

Specific skills in collaboration, communication, technology, and knowledge management systems are critical for knowledge sharing and can strengthen businesses' economic performance and progress in emerging markets (Girón et al. (2021). Girón et al. (2021) examined 366 large Asian and African companies that addressed SDGs in their sustainability reports to determine the relationship between sustainability reporting and a firm's performance. The findings suggested that understanding and reporting on sustainability is an essential practice for companies in emerging markets, and it can positively impact their economic performance.

Similarly, Huang (2023) examined how removing barriers to the sharing economy can promote sustainable development goals (SDGs), specifically in the ASEAN region. The study identifies the specific economic, social, and technical barriers that hinder SDG achievement and suggests that a supportive organizational climate can help mediate this relationship. The authors also offer policy recommendations for regulators looking to promote SDG achievement through the sharing economy.

Building on the previous study's findings, Tu et al. (2023) empirically examined the impact of sharing economy platforms on achieving sustainable development goals (SDGs) in the manufacturing industry of developing economies. Results of the study show that sharing economy activities such as corporate social responsibility, eco-design, and supplier management positively impact sustainable development. The article concludes by presenting solutions to these countries' social and environmental issues that restrict sustainable development. Thus, technology is critical in enabling sharing platforms to achieve the SDGs.

The Role of Technology in Achieving the SDGs

Digital innovation is changing the way we do business. Not only does it require new skills and competencies, but it can change how and where people work. Entrepreneurial leaders must ensure employees have the correct skills to succeed in such an environment. Educators can ensure that the curriculum exposes students to an entrepreneurial and innovative mindset. More specifically, Ben Slimane et al. (2022) suggest that data collection, analysis, communication, and collaboration skills are necessary components. Likewise, understanding technologies such as blockchain, artificial intelligence, and the Internet of Things (IoT) can promote sustainable agriculture, renewable energy, and responsible consumption and production. These technologies can play a crucial role when addressing SDGs. For example, digital innovation has the potential to accelerate progress toward the SDGs; it also draws attention to the challenges of equitable access and the vulnerability of small and medium enterprises (SMEs). While digital innovation and technologies like AI may accelerate progress on Sustainable Development Goals, the pandemic underscored

inequitable access and structural vulnerabilities many SMEs face in leveraging these technologies.

The pandemic has proliferated the need for new business models. It caused a massive acceleration of the digital transformation of businesses in all industries in achieving the SDGs, particularly in areas such as healthcare, education, and digital connectivity (Ben Slimane et al., 2022). Likewise, Pizzi et al. (2020) suggest a need for studies conducted on single organizations that could benefit from case studies and content analysis in extending the richness of qualitative research. However, the pandemic also highlighted the need for equitable access to technology and the importance of reducing the structural vulnerability of SMEs from a lack of financial resources or specialized knowledge (Klein & Todesco, 2021). Considering the critical role of technology, the next logical question is, what are the role(s) and challenges of big data in achieving the SDGs?

The Role and Challenges of Big Data in Achieving the SDGs

Big data can be used to achieve the SDGs by offering statistical insights regarding sustainability. Chopra et al. (2022) delineated multiple ways big data can provide crucial insights into poverty reduction, healthcare access, and environmental sustainability. Big data can also support efforts to monitor progress toward achieving the SDGs. During the COVID-19 pandemic and possible future pandemics, these statistical insights can help researchers identify trends related to the virus's spread, most affected regions, and predicted trajectory. Policymakers and other stakeholders can take more targeted actions to accelerate progress toward achieving the SDGs and mitigating the pandemic's impact. Overcoming significant data challenges better inform stakeholder decisions to accelerate Sustainable Development Goals.

Research indicates that the challenges of using big data for sustainable development include solidifying statistical volume, developing data literacy within every stage of the decision-making process, and ensuring the quality, timeliness, and relevance of the data (Chopra et al., 2022). Along with these challenges, data creators must collaborate with other data creators for more efficient use (Gupta et al., 2022). When used efficiently, SDG indicators like age, gender, and location will allow for more accurate results to be presented (Chopra et al., 2022). Capitalizing on big data will allow policymakers and stakeholders to make informed decisions and target actions to reduce the impact of the pandemic on sustainable development and instead further the process of achieving the SDGs.

Another related consideration is COVID-19's impact on entrepreneurial motivation. After all, the mindset of entrepreneurial leaders and students is central to their ability to contribute to addressing wicked problems.

COVID-19's Impact on Entrepreneurial Motivation

During COVID-19, both entrepreneurial and intrapreneurial leadership were highly valued qualities to possess (Ratten, 2021). These leaders bring distinctive value to business organizations (González-Tejero et al., 2022), contributing skills like

creativity, entrepreneurial thinking, and an entrepreneurial mindset. In the context of the COVID-19 pandemic, both entrepreneurial and intrapreneurial leadership qualities gained significant recognition. Next, the following section provides an overview of the methodology and sample.

Model and Sample

The study builds on prior research by Dentoni and Bitzer (2015) titled "The role(s) of universities in dealing with global wicked problems through multi-stakeholder initiatives." While Dentoni and Bitzer (2015) focused on the role(s) of universities, this article focuses on the role(s) of community colleges. The researchers employed a single case study method to understand the role of US community colleges in addressing wicked problems through entrepreneurial leadership and entrepreneurial programs. Using a qualitative, interview-based case study method, researchers aimed to explore how entrepreneurial leaders describe community colleges' role in addressing wicked economic development problems.

The researchers employed a single case-study design with semi-structured interviews between August 1, 2020 and January 31, 2021, so that the data collected from the entrepreneurial leaders could better focus on their experiences, opinions, and knowledge related to the research question. The researchers supplemented the interviews by retrieving artifacts from research studies, government reports, and related websites. The qualitative research design was chosen for the case study, as it offered an opportunity to explore a topic from the perspective of participant experiences. The design offers several benefits, such as providing a more profound perspective than quantitative research surrounding complex real-life issues (Eisenhardt & Graebner, 2007; Yin, 2009) and providing methods that enable researchers to explore how individuals make sense of the world around them (Bogdan & Biklen, 2007).

This qualitative case study explores how entrepreneurial leadership addresses wicked problems of economic development. The study brought together the collective wisdom of 28 entrepreneurial leaders for programs that have (a) addressed social, economic, and environmental wicked problems, (b) included community colleges as stakeholders, (c) yielded impressive measurable outcomes that are documented, and (d) incorporated entrepreneurial leadership and entrepreneurial problem-solving. The study concluded with recommendations to help inform policymakers how community colleges can help address wicked problems of economic development post-COVID through entrepreneurial leadership.

Answering the research question required a top-down approach, with the initial entrepreneurial leaders acting as gatekeepers. Entrepreneurial leaders typically hold systemic knowledge about the efforts and impact generated through their programs. This level provided visibility, knowledge, and awareness about the initiatives that have been most successful in addressing wicked problems through entrepreneurial leadership. The interviewee's deep exploration of personal experiences and perspectives provides insight into how we can collectively apply these strategies to address wicked problems across higher education. The entrepreneurial leaders recommended

an additional 18 interviewees informed at a national level for a total sample of 28 interviewees across the USA with experience working with community colleges.

The appropriate sample size in quantitative research is more precisely defined than in qualitative research, where the goal is "saturation." According to Smith (2015), saturation results when collecting more data will result in no new insights. Additionally, qualitative research typically results in smaller sample sizes. While 28 interviews might be considered minimal for a quantitative study, 28 is often considered appropriate for this qualitative case study, which met saturation.

The study's goal was not generalizability but rather to provide replication logic (Johnson, 1997) and increase transferability through persistent observation, providing a thick description of the research and answering descriptive questions. Transferability is similar to external validity in quantitative research (Lincoln & Guba, 1985). The study was IRB-approved with written consent of all participants as required by data protection law.

Discussion of Results

This qualitative study explored the roles of community colleges in addressing wicked problems of economic development post-COVID through entrepreneurial leadership. Based on the participant interviews, ten roles emerged, including revitalizing communities post-COVID, performing post-COVID business triage, modeling sustainability, creating jobs, championing entrepreneurship-led economic development, increasing tax revenue, pipelining talent, supporting talent retention, supporting main street businesses, and reducing entrepreneurial risks. This section explains the activities of serving as an economic development partner when addressing wicked problems.

Revitalizing Communities Post-COVID

Participants described re-vitalizing communities as an important activity the community colleges play when addressing post-COVID challenges. Ms. Flaherty, the National Director of Engagement and Partnerships for an economic development-focused program, asserted:

> Right now, we're seeing a lot of conversation and heightened awareness of the importance and value of job creation and community vitality. And it's really become apparent because of your main street businesses. For instance, when you're driving down a corridor and you see vacancy signs and all of a sudden, your dry-cleaning service and your favorite pizza place no longer exist.

Post-COVID Business Triage

Businesses have been devastated by COVID-19 due to closures, restrictions, and new technological requirements. Participants emphasized business triage as crucial

to community colleges when addressing complex post-COVID challenges. Ms. Flaherty maintained:

> It's really important to have a network in place that can support the increase and activities associated with the startup space. [During post-COVID,] we're seeing an increased need for education, training, coaching, and mentoring around reopening and everything from growing the customer base to how to keep your employees safe. So, how can you create an environment where you have an understanding of what your small businesses need, and you're able to quickly act on those needs? The communities that were organized to do this type of thing before COVID could accelerate their conversations.

Modeling Sustainability

The literature identifies three primary components for sustainability within the context of the Sustainable Development Goals (SDGs). They include environmental, social, and economic sustainability. During the interviews, these components were highlighted by participants as a role the community colleges play in addressing wicked problems. For example, Mr. Nelms, the Director of a community college program with 6 years of experience, pointed out:

> When it comes to the environment, every roof of every building [is solar]... and all the money from that solar provides scholarships to students to go to college. So, modeling these behaviors as an institution is one of the things that we need to do as well…

Ms. Clark, a program instructor at the same community college, described why environmental sustainability is essential to their rural community college.

> The climate affects our air quality, soil, and water systems. The ag system is completely dependent on the quality of the environment- the air, soil, and water. Without a healthy environment for [farmers] to grow their goods… that will truly be the death of our rural economies.

Finally, Mr. Brand mentioned economic sustainability, stating:

> Our job [as community colleges] is mostly the first pillar… the economic, and then secondarily the social piece as a community convener. When you have a land grant, there's an emphasis on community more than it is on college.

Creating Jobs

The participants often referenced the activities related to creating jobs when addressing wicked problems. For example, Dr. Mattox recently met the program's goal of training 10,000 small businesses. He explained:

Even though we didn't set out on a social mission… We've provided a tremendous social impact for groups that would not typically have access.

Ms. Flaherty added:

If you look at the trends and headlines about jobs…. they talk about how we're going to create 250 new jobs for your community over time. With the exception of a few, like Amazon, they're [actually] shedding jobs. They're not creating new jobs. It's your startups and small businesses that are creating the net new jobs… In one city we've worked with, over the last five or six years, young and new firms are creating between 14,000 and 15,000 net new jobs every year.

According to a jobs report, the same organization in a different county but comparable in size found that in 2018, over 25,000 new jobs were created by firms less than 1 year old, with an average wage of $34,000. This accounted for 10% of the total new jobs. The report emphasizes that "startups play a significant role in job creation".

Entrepreneurship-Led Economic Development

The entrepreneurial leaders emphasized the value of entrepreneurship-led economic development. Ms. Flaherty contended:

The thing with COVID that has really captured the attention of economic developers… All you have to do is drive up and down your main streets and see shuttered businesses and vacancies. And they start to really understand the importance of these small businesses.

Tax Revenue

Many participants went further, connecting education to job creation and increased tax revenue. Ms. Clark, a community college program instructor, explained:

I think the community college plays a vital role in providing an affordable education so that people can either create jobs or find a better job in the community, so that their tax base stays here. Keeping people here is a really big issue for us.

Ms. Flaherty agreed, stating:

[Communities] are seeing a significant drop in sales tax revenue and in those kinds of things.

Pipelining Talent

One of the programs, through the community college, actively served as a talent pipeline for public service jobs across the state. Dr. Delgado, a Systemwide Dean for Workforce Development, described the wicked workforce challenge the program aimed to solve.

There are 2.1 million students in the state, which had occupational openings to fill. If we could create alignments, we could identify a local supply chain or pathway for students to find occupations in need and in demand across the state.

Talent Retention

Talent attraction and retention were also suggested by several participants to be an activity within the community college's role as an economic development partner. Mr. Brand suggested that economic developers specialize in business retention and attraction. He believes their strength is in business attraction but lacks talent retention strategies. This [entrepreneurship program] is a business retention strategy.

Main Street Business Support

Several participants mentioned activities where the community college supported main street small entrepreneurs. Ms. Love, a business counselor with 10 years of experience with the community college, pointed out:

> Some community colleges have incubators to which the Small Business Development Centers (SBDCs) are tied. That's an opportunity we could fulfill, especially with a commercial kitchen.

> Similarly, Mr. Brand mentioned:

> One of the groups I'm leading right now is an effort to bring together all of the entrepreneurial services for main street businesses and startups in a region to increase access and quality of service and the number of businesses served.

Reducing Entrepreneurial Risk

Community colleges can help reduce the risk of entrepreneurship thanks to entrepreneurial partnerships. Dr. Sampson explained:

> One of my favorite ventures is the Everyday Entrepreneur Venture Fund (EEVF), which was started by two people who put up a million dollars of their own money to test a proof of concept [in partnership with community colleges across the United States]. What we found through the EEVF's proof of concept is, if you give a would-be entrepreneur, maybe someone from skilled trades or someone with a barbershop idea, between $7,000-$8,000 of capital, they can buy a barber chair, they can get a license, they can buy some tools and in six months, they can be cash positive. We've seen that with the proof of concept with [over] 50 businesses. We profile some of the entrepreneurs in the [2020] book, Impact ED. I think almost all of them are still in operation. Why? Because they got [entrepreneurial] mentorship and support through the community college.

Discussion—Role of Economic Development Partner

Past literature and the current study indicate that academic institutions act as economic development partners when addressing wicked problems (Batie, 2008; Mars, 2013; Weber & Khademian, 2008). Revitalizing the local community was referenced throughout the literature and during the interviews. For example, community colleges are described as "the nation's overlooked asset" based on their ability to "retain displaced workers and serve the community during turbulent times" (College Board's National Commission on Community Colleges, 2008, p. 5). Ms. Flaherty explained, "We are seeing a lot of conversation and heightened awareness of the importance and the value of job creation and community vitality." She added, "Economic developers have started to take note that when you are driving down a corridor, and you see vacancy signs and all of a sudden, your dry-cleaning service and your favorite pizza place no longer exists," entrepreneurial vitality becomes a priority. Ms. Flaherty noted, this is a "great opportunity to rebuild better and differently" alongside economic development partners.

Modeling sustainability is particularly aligned with the mission of community colleges. Academic institutions face increasing pressure to lead change by adopting sustainable strategies (American Association of Community Colleges, 2011; White & Cohen, 2014). Over 700 college and university presidents, representing six million students, have committed to addressing global climate change by signing the American College and University Presidents' Climate Commitment (Sustainable Development Goals, 2020). Researchers proposed four roles in academic and regional sustainability initiatives. Mr. Nelms explained, "We don't always rally many people around [sustainability]; we often do it through modeling." Ms. Henderson contended

> Our job [as community colleges] is mostly that first pillar… the economic, and then secondarily the social piece as a community convener. We try to be present at everything, and when it's not happening, we convene and facilitate it or model it.

Mr. Nelms offered specific examples of modeling sustainability, stating, "Every roof of every building we have and all of our extra land in the back is now solar. All the money from that solar provides scholarships to students to go to college". During another interview, the researcher asked the interviewee to dive deeper into why issues like climate change matter to the community college. Ms. Clark explained how the climate affects the air, soil, and water, which can negatively impact the agriculture system and farmers as they are central to healthy rural economies. So, the community college invests in solar. Ms. Henderson added that the local community college is modeling wicked problems surrounding workforce and racial inequities, in addition to the environmental issues.

Job creation was mentioned several times during the interviews. In fact, one of the program websites stated that out of the 10,000 small businesses participating in the program, "47% of the businesses created jobs after 6 months, 53% of the businesses created jobs after 18 months, and 56% of the businesses created jobs after 30 months." Additionally, Ms. Flaherty specified that "over the last 5 or 6

years, young and new firms are creating between 14,000 and 15,000 net new jobs every year" in just one city they work with. In a separate county, the same organization touted 25,000 new jobs created by firms less than 1 year old, with an average wage of $34,000. According to the founder of the Center for American Entrepreneurship, John Dearie (2021), this is critical. He explained, "If it were not for businesses younger than five years old, the job base in this country would actually shrink. New businesses are the principal source of innovation, which drives economic growth and job creation."

Triaging businesses post-COVID was also an activity Ms. Flaherty described, stating,

> "We are seeing an increased need for education, training, coaching, and mentoring around reopening and everything from growing the customer base to how to keep your employees safe" and "[community colleges] act as that neutral party. Their role is to help entrepreneurs' triage where they are at and what type of assistance they need."

The interviewees emphasized the value of entrepreneurship-led economic development. Ms. Flaherty explained what seemed to motivate economic developers to support small businesses after COVID, "all you have to do is drive up and down your main streets and see shuttered businesses and vacancies. They start to really understand the importance of these small businesses." Community colleges often partner with these economic developers to promote entrepreneurship-led economic development.

Increasing and retaining tax revenue was an activity mentioned during the interviews. For example, Ms. Clark stated, "Community colleges play a vital role in providing an affordable education so that people can either create jobs or find a better job in the community so that their tax base stays here." Ms. Flaherty explained, "[communities] are seeing a significant drop in revenues and sales tax. Those are all measurable things [connecting back to the programming]."

Participants described talent recruitment and pipelining as an activity community colleges played when addressing wicked problems, especially economic growth and jobs. Dr. Delgado emphasized the state's challenge in filling public sector jobs:

> There are 2.1 million students in the state, which had occupational openings to fill. If we could create alignments, we could identify a local supply chain or pathway for students to find occupations in need and in demand across the state. So that somewhat [addressed] the state's problem.

Talent attraction and retention were also cited as community colleges' activities when addressing wicked problems surrounding economic growth. Several entrepreneurial leaders viewed their programs at the community college as "retention strategies" that were a powerful support mechanism for economic developers. Mr. Brand explained, "[economic developers] don't have a business retention strategy. This is a business retention strategy [for them]." Mr. Nelms stated, "[This program, in partnership with the community college] works very well for retaining, helping business and industry be innovative and grow from new products and innovations."

Supporting main street businesses was an activity mentioned by the participants. For example, Mr. Brand said the college brought "together entrepreneurial services for main street businesses and startups in the region to be able to increase access and quality of service and number of businesses served." Ms. Love also mentioned that in addition to partnering to offer incubator and accelerator services, some colleges launched commercial kitchens designed to help culinary entrepreneurs launch businesses. Helping to reduce the risk of entrepreneurship through entrepreneurial programming and mentorship was also emphasized during the interviews.

Key Point: Community Colleges Can be Engines of Recovery Post-COVID

For the study, researchers aimed to explore the role of community colleges in addressing wicked problems of economic development post-COVID. However, as the research progressed, it became clear: (a) the entrepreneurial leaders were a critical component for community colleges addressing wicked problems, (b) technology and big data may potentially level the playing field, and (c) community colleges are located within a short drive of most American households increasing their potential for localized impact, compared to universities.

Conclusions and Limitations

In conclusion, the study contributes to the existing literature both from an empirical and theoretical perspective by providing insights into how community colleges address wicked problems of economic development. The entrepreneurial leaders interviewed provide insights into the ten roles community colleges take on when addressing wicked problems of economic development. The roles identified include revitalizing communities post-COVID, performing post-COVID business triage, modeling sustainability, creating jobs, championing entrepreneurship-led economic development, increasing tax revenue, pipelining talent, supporting talent retention, supporting main street businesses, and reducing entrepreneurial risks.

What makes this study different is the focus on community colleges, their proximity to communities across the USA, and their ability to leverage trusted relationships within these communities for localized impact. With over 1200 U.S. community colleges educating nearly 12 million students, or half of America's college students (American Association of Community Colleges, 2011), these institutions are critical economic development partners to consider. While the findings indicate significant overlap between the roles of universities versus community colleges, the entrepreneurial leaders emphasized that trusted relationships and proximity were vital to maximizing the economic impact. Future researchers can build on the theoretical application for future studies across many disciplines. Collectively, these implications offer both value and originality.

The evidence presented in this paper contributes to the emerging body of knowledge surrounding the role(s) of academic institutions in addressing wicked problems in a post-COVID context. The study highlighted the importance of leveraging

entrepreneurial leadership, systems innovation, and complexity science when addressing these interconnected, complex issues. Additionally, an overview of the characteristics of wicked problems and the role(s) universities play in addressing them was provided.

The researchers have created a table to compare the role of community colleges with similar higher educational bound, baccalaureate-granting (BG) institutions, as well as the opposing research on non-educational bound entities, namely innovation labs. The table presents several clear themes. For example, innovation labs or I-Labs can be seen as a conduit from which many roles can be leveraged to improve economic outcomes. Innovation and entrepreneurs, specifically, can be supported to enhance intellectual capital for economic development. While BGs focus on general knowledge and career preparation, community colleges can provide workforce training and skills development better aligned with local labor market needs.

Another difference identified in the leading role comes from BGs having limited local stakeholder engagement, while I-Labs have a more natural link with community colleges in facilitating collaborations based on trust between local stakeholders. This supports and increases multi-stakeholder engagement which is critical to addressing wicked problems. Similarly, in the roles of connecting and change-making, community colleges appear best suited to leverage the benefits through their strong connections to local high schools and the local workforce. Thus, the researchers argue that community colleges are better catalysts for fostering social mobility and economic development in local communities. While stand-alone innovation labs can certainly add to economic development, this research suggests that benefits can be leveraged with the advantageous strengths of community colleges (Table 1).

Following the literature review, excerpts from the qualitative interviews were synthesized and summarized. Ultimately, the researchers assert that community colleges can play a critical role in addressing wicked problems of economic development through entrepreneurial leadership. In other words, they can and should serve as engines of recovery post-COVID.

These findings align with scholarly recommendations that global challenges are best addressed at local levels (Hanson, 2008). In summary, community colleges are well suited for serving as engines of recovery post-COVID through entrepreneurial leadership incorporating the SDGs. The study's participants overwhelmingly agreed that community colleges could be engines of recovery post-COVID through entrepreneurial thinking, programs, and processes. Policymakers and funders are well-positioned to support these economic development efforts through community colleges.

Recommendations for Policymakers

Entrepreneurial leaders from programs and community colleges provided insights into the role of community colleges in addressing wicked problems of economic development. The researcher recommends that policymakers allocate pilot funding for creating an innovation lab (I-Lab) to address these complex challenges.

Table 1 Comparing the roles of community colleges, universities, and innovation labs

Role	Community college	Baccalaureate-granting institution (BG)	Innovation labs
Educating	Offers workforce development training to meet local employer needs (American Association of Community Colleges, 2011)	Provides education based on general knowledge and liberal arts (Galvin, 2022; Trencher et al., 2014).	Creates human capital through education and research (Westley et al., 2014; Zivkovic, 2018)
Researching	Research is not a primary concern (Arbo & Bennworth, 2007)	Provides significant contribution through research output and increased capacity (Stefanucci, 2019; Trencher et al., 2014)	Creates intellectual capital through education and research (Zivkovic, S. 2018; Westley et al., 2014)
Leading	Acts as convener and facilitator for the purposes of collaboration between stakeholders, both locally and regionally (Mars, 2013)	Provides some limited local stakeholder engagement (Trencher et al., 2014)	Supports and convenes multi-stakeholder engagements related to prototyping and scaling solutions (Westley et al., 2014; Zivkovic, 2018)
Planning	Plans and engages in economic development initiatives (Arbo & Bennworth, 2007)	Acts as the master planner for campus-involved initiatives (Trencher et al., 2014)	Supports experimentation (Westley et al., 2014; Zivkovic, 2018)
Connecting	Cultivates relationships with high schools for workforce recruitment (College Board's National Commission on Community Colleges, 2008, p. 5; Calder & Clugston, 2003)	Provides support and partnership through alumni networks, foundations, and major corporations (David & Coenen, 2014; Rozier & Scharff, 2013)	Disseminates stories of success and impact (Zivkovic, S. 2018; Westley et al., 2014)
Change-making	Catalyzes economic development and social mobility locally (Chatterton & Goddard, 2000)	Provides research and career prep for students in the realm of societal impact (Pascarella et al., 2005; Trencher et al., 2014)	Supports innovators and entrepreneurs directly to address wicked problems. (Westley et al., 2014; Zivkovic, 2018)

The overarching goal of the I-Lab would be to address wicked problems in partnership with community colleges through scalable, localized, complexity-informed strategies.

Recommendations for Funders

Researchers also recommend that funders provide funding for an innovation lab. Policymakers allocate pilot funding for creating an innovation lab (I-Lab) to address these complex challenges. The overarching goal of the I-Lab would be to address wicked problems in partnership with community colleges through scalable, localized, complexity-informed strategies.

Launching an Innovation Lab (I-Lab) to Address Wicked Problems

America experienced a plethora of interconnected challenges in 2020, including a global pandemic, inequality, poverty, hunger, racism, climate change, and economic growth, to name a few. Academic institutions have the potential to support America's post-COVID while also aligning with the mission of community colleges, becoming engines of scalable post-COVID recovery. Ultimately, the I-Lab would serve as an ecosystem of entrepreneurial partners committed to collaboratively tackling wicked problems locally with trusted networks. Addressing these challenges will require adequate funding.

However, funders must determine how to allocate post-COVID relief funding and donations for maximum societal return on investment. The researcher recommends that pilot funding be allocated to an academic institution for building a scalable Innovation Lab (I-Lab) model, which, after validation, can expand the open-access model throughout the nation in partnership with a national community college association. A publicly funded principal-investigator framework may be ideal for leading the initiative. According to Cunningham et al. (2019), principal investigators (PI) are "influential ecosystem agents whose behaviors shape and influence" economic and social change through complex research projects. Cunningham et al. (2016) studied the allocation of time for publicly funded principal investigators supporting public-sector entrepreneurship activities. In the study, the researcher identified ten roles and responsibilities PIs take on in academia, focusing on problem-based activities and value creation (p. 546).

By allocating funding to support academic institutions acting intentionally and entrepreneurially in this capacity at a state and nationwide level, the funding will holistically address post-COVID challenges through open access, streamlined, scalable, and complexity-informed pathways through localization. Additionally, the budget would ensure that entrepreneurship educators are trained on the ideal evidence-based programming for their local needs. Finally, the funding could prioritize rural and urban underserved institutions, which were already stretched thin before the pandemic. The efforts are less likely to achieve broad adoption without the appropriate funding incentives.

The recommended I-Lab represents an opportunity to promote positive societal impact by addressing wicked problems of economic development. The study outlined the activities under the role of economic development, which include (1) revitalizing communities post-COVID, (2) post-COVID business triage, (3) modeling sustainability, (4) creating jobs, (5) generating tax revenue, (6) pipelining talent, (7) talent retention, (8) main street business support, and (9) reducing entrepreneurial risk. These activities could be the basis for more profound impact measurement efforts related to various grant opportunities to address wicked problems in a solution ecosystem.

While many community colleges struggle with budgetary issues, the alignment and opportunity are clear. Community colleges could partner with bachelorette-granting institutions for win-win economic development outcomes. This collaborative approach could create a more significant collective impact for the SDGs. Alternatively, if funding for the I-Lab cannot be found, educators can incorporate technology and innovation competencies for sustainability and the sharing economy into entrepreneurial courses.

The study's limitations are based on a need for more stakeholder feedback. For example, the study did not include the perspectives of academic business leaders regarding (1) the pedagogical role(s) of higher education in addressing wicked problems post-COVID, (2) the strategic value of accelerators to address wicked problems in business post-COVID, and (3) the perspectives of how entrepreneurial faculty influencers in the USA view societal impact, and (4) entrepreneurial faculty influencers regarding the ecosystem network of wicked problems for business leaders post-COVID? The representative sample may only apply to some countries, cultures, and less developed entrepreneurial ecosystems. Additionally, incorporating quantitative research using the role variables identified in the current study can strengthen future findings and recommendations.

The findings suggest that entrepreneurial leadership addressing wicked problems (i.e., SDGs), such as quality education, decent work, gender equality, and economic growth, may provide significant value for students, community colleges, and society. The study's findings provide the groundwork for future research.

Future research related to this study would benefit from exploring the following research questions: How do business leaders describe higher education's pedagogical role(s) in addressing wicked problems post-COVID? How do business leaders explain the strategic value of accelerators in addressing wicked problems? How do entrepreneurial faculty influencers in the USA view societal impact? What is the ecosystem network of wicked problems for business leaders post-COVID?

Policy experts, scientists, entrepreneurs, and business leaders have warned of global social, economic, and environmental risks for years (World Economic Forum, 2020). Specific risks include poverty, inequality, climate change, and infectious disease, to name a few (Deming, 1994). While academic researchers have debated the role of universities in addressing wicked problems (Dentoni & Bitzer, 2015), the role of community colleges was largely unknown due to a gap in the research. With over 1200 community colleges across America, the institutions are well-suited to serve as incubators of post-COVID recovery to help communities build back better

and more equitable. Together, we can better tackle these wicked problems, positively impacting local communities across America.

Declarations

Conflict of Interest The authors declare no competing interests.

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