

Innovation-Centric Organizational Community (IOC): Lessons from the Makerspace Movement

Ronald C. Williams, Coppin State University

Ericka N. Covington, Coppin State University, ecovington@coppin.edu

Online published: July 2026
Print published: July 2026
Editor: Sue Kong

Authorship Roles and Conflict of Interest Statement is on file at the Journal of Leadership and Management offices, available on request. Contact editors@jleadershipmanagement.org

Abstract

The demand for innovative, solutions-oriented approaches to closing learning competency gaps is leading to the recasting of organizations as learning communities that extend beyond traditional organizational boundaries. In addition, the emerging learning communities are focused on the affective learning domain as the new frontier for improving productivity and sustainable growth.

A state-of-the-art, 34,000 square feet, urban community makerspace is the subject of an exploratory case analysis. Results show the value of developing an innovation-centric organizational community (IOC) that demonstrates focused attention on affective learning processes.

Social identity, social belongingness, and process innovation theories are used as frameworks for examining the emerging organizational community in Open Works Baltimore. The article draws on data from multiple sources to discuss a process innovation model for advancing belongingness, acceptance, and relational intelligence. The conclusions serve as a foundation for further research.

Building economic equity in declining urban cities is not only a dire need but also essential in developing communities that foster job-growth, commerce, and opportunities for small businesses. The economic and social disparities between urban areas heavily populated by Black residents and predominantly white residential districts are startling and present challenges that have hindered economic growth, healthy organizational relationships, and workplace cultures that foster high productivity. Failure to address such disparities at a time of accelerating change, heightened global competition, and new work paradigms are detrimental to the sustainability of national economies, national security, and the well-being of citizens who depend on economic opportunities to improve their quality of life.

It is more evident than ever before that economic disparity is deeply grounded in United States (U.S.) history and will require many structural interventions and changes to address related problems. One clear indicator is the 2020 report produced by Citi Global Perspectives & Solutions (GPS) entitled Closing the Racial Inequality Gaps: The Economic Cost of Black Inequality in the U.S. The report placed the lost gross domestic product (GDP) caused systemic and societal racism and discrimination faced by Blacks during the first two decades of the new millennium at \$16 trillion (Citi, 2020). Despite the undeniable advances that have occurred since the end of chattel slavery and the displacement of Indigenous peoples, the psychological and emotional vestiges of racial animus continue to persist in social and organizational experiences.

The lagging impact of equity and inclusion efforts is evident in many public and private organizations and is again driving statistical realities associated with the topic. Pay inequities based on race, gender, and other demographic factors are all too common. The lack of diverse representation in the highest levels of corporate governance and leadership continues to be an issue in many organizations. The lack of diversity in high revenue-generating sectors such as advanced manufacturing all point to systemic inequities that are embedded in structure and attitudinal constructs of organizational members.

Such realities demand continuous solution-oriented examination, intervention, and assessment of relational dynamics and how relational innovations may be achieved. If the assertion made in 1982 by futurist and inventor R. Buckminster Fuller that knowledge is doubling every 12 hours is accurate and the McKinsey Global Institute observation that the pace of technological change (i.e., the creation of tools) is continuously accelerating, the evidence of relational deficits witnessed in social and organizational life are clear indicators that affective competencies have not kept pace with cognitive and psycho-motor epistemological and ontological frameworks and application. Relational innovation is the looming challenge of the emerging mid-21st Century and will significantly influence the actual gains or losses resulting from exponential advances in knowledge and technology.

Establishing healthy organizational community models that are grounded in a sense of belongingness generated through relationally innovative practices is a potential and promising path toward developing more productive, equitable, and inclusive organizations. While there are many examples of organizations as community, one has emerged since the turn of the 21st century that serves as an exemplar for organizational community-building and innovation. Makerspaces are innovation labs that advance the democratization of production by making tools, space, and opportunity more widely available to internal and external stakeholders. The opportunity for the makerspace movement to provide insight into the ability of collaborative, coworking spaces to establish community is in its infancy and worthy of investigatory analysis of its potential.

KEYWORDS

organizational community, innovation, social identity theory, social belongingness theory

Introduction

Building economic equity in declining urban cities is not only a dire need but also essential in developing communities that foster job-growth, commerce, and opportunities for small businesses. The economic and social disparities between urban areas heavily populated by Black residents and predominantly white residential districts are startling and present challenges that have hindered economic growth, healthy organizational relationships, and workplace cultures that foster high productivity. Failure to address such disparities at a time of accelerating change, heightened global competition, and new work paradigms are detrimental to the sustainability of national economies, national security, and the well-being of citizens who depend on economic opportunities to improve their quality of life.

It is more evident than ever before that economic disparity is deeply grounded in United States (U.S.) history and will require many structural interventions and changes to address related problems. One clear indicator is the 2020 report produced by Citi Global Perspectives & Solutions (GPS) entitled Closing the Racial Inequality Gaps: The Economic Cost of Black Inequality in the U.S. The report placed the lost gross domestic product (GDP) caused systemic and societal racism and discrimination faced by Blacks during the first two decades of the new millennium at \$16 trillion (Citi, 2020). Despite the undeniable advances that have occurred since the end of chattel slavery and the displacement of Indigenous peoples, the psychological and emotional vestiges of racial animus continue to persist in social and organizational experiences.

The lagging impact of equity and inclusion efforts is evident in many public and private organizations and is again driving statistical realities associated with the topic. Pay inequities based on race, gender, and other demographic factors are all too common. The lack of diverse representation in the highest levels of corporate governance and leadership continues to be an issue in many organizations. The lack of diversity in high revenue-generating sectors such as advanced manufacturing all point to systemic inequities that are embedded in structure and attitudinal constructs of organizational members.

Such realities demand continuous solution-oriented examination, intervention, and assessment of relational dynamics and how relational innovations may be achieved. If the assertion made in 1982 by futurist and inventor R. Buckminster Fuller that knowledge is doubling every 12 hours is accurate and the McKinsey Global Institute observation that the pace of technological change (i.e., the creation of tools) is continuously accelerating, the evidence of relational deficits witnessed in social and organizational life are clear indicators that affective competencies have not kept pace with cognitive and psycho-motor epistemological and ontological frameworks and application. Relational innovation is the looming challenge of the emerging mid-

21st Century and will significantly influence the actual gains or losses resulting from exponential advances in knowledge and technology.

Establishing healthy organizational community models that are grounded in a sense of belongingness generated through relationally innovative practices is a potential and promising path toward developing more productive, equitable, and inclusive organizations. While there are many examples of organizations as community, one has emerged since the turn of the 21st century that serves as an exemplar for organizational community-building and innovation. Makerspaces are innovation labs that advance the democratization of production by making tools, space, and opportunity more widely available to internal and external stakeholders. The opportunity for the makerspace movement to provide insight into the ability of collaborative, coworking spaces to establish community is in its infancy and worthy of investigatory analysis of its potential.

Literature Review

The Makerspace Movement

Makerspaces began as a movement to revive local, small-scale creativity and design to advance the innovation economy. The facilities are “informal sites for creative production in art, science, and engineering where people of all ages blend digital and physical technologies to explore ideas, learn technical skills, and create new products” (Sheridan, Halverson, Litts, Brahms, Jacobs-Priebe and Owens, 2014: 505). The physical location serves as a meeting space for a “maker community” and houses the community’s design and manufacturing equipment. Such spaces are commonly community-organized with the community determining its structure, function, programming, and funding (Wilczynski, 2015). Makerspaces also provide training, certification on programs, and equipment that may otherwise be too costly for individuals to financially afford.

The makerspace movement was originally viewed as the next iteration of the Do-It-Yourself (DIY) culture (Anderson, 2012). When structured using a membership model, maker members pay membership fees for access to the technology inside, which typically includes a variety of rapid prototyping equipment such as 3D printers, laser cutters, and traditional hand tools (Barrett, et al, 2015). These spaces move well beyond traditional machine shops by providing meeting spaces for student design teams and integrating typical machine shop tools with a wider variety of rapid prototyping and low-tech building approaches (Forrest, et. al., 2014). Allowing quick easy access to expensive equipment provided a community of inspired users the opportunity to thrive and develop products and ideas that, in return, generate business and revenue for the surrounding community (Wilczynski, 2015).

The first academic makerspace originated at Massachusetts Institute of Technology (MIT) where Neil Gershenfeld, of MIT’s Center for Bits and Atoms, was the originator of the Fab Lab, a university course which significantly influenced the movement (Burke, 2014). Fab Labs were designed to fabricate materials using digital equipment for designing products and the digitally driven tools to create them. This learning environment provided a design space and inspired a collaborative culture for students. (Burke, 2014).

The success of makerspace labs has given rise to an industry magazine bearing its name, Make magazine which originated in 2005 from similar industry magazines like: Popular Mechanics, Popular Science, and Wired, following the community demand for “do it yourself (DIY)” projects. The magazine provided a forum for Makers to have the ability to exchange with other individuals sharing ideas, products, technology and press for the DIY industry. The popularity of this magazine also birthed Maker Faires, “a series of venues for makers to express themselves” and share their creations (Burke, 2014, p. 11).

Learning environments in makerspaces have no defined standard. Each space is specific to the needs of the making community and the external community where the space is located. Spaces also lower the cost barriers to business startup and help address gaps in opportunity for training and development, apprenticeships, and costly industry certifications. The value of makerspaces as incubators for business startups has increased because of the collapse of industrialized cities such as: Dayton, Ohio; Detroit, Michigan; Pittsburg, Pennsylvania (Pallagst, Fleschurz and Said, 2017). As politicians, policy makers, and community leaders struggle to find ways to rebuild declining cities, workers who once relied on factory jobs for stable income and job training are now faced with no opportunities for apprenticeships, or individualized

skills training, that would provide careers for economically challenged communities. Makerspaces are growing throughout the country based on demand for access to workspace and tools for emerging entrepreneurs.

Universities have advanced the makerspace movement by providing hands-on experience to students to support theoretical and real world-based learning (Forrest, et al., 2014). Community makerspaces have become the new think tanks of the future, allowing students and the surrounding university community access to makerspaces enhances broader skills including creativity, team-oriented problem solving, and multidisciplinary collaboration skills (Carlson and Sullivan 2006, Griffin and Cortes 2006).

An area of opportunity in the makerspace movement is the creation of sustainable business products and education. Communities with access to makerspaces receive education and instruction in the development of products/services and will help in the creation of a more sustainable environment (Covington, 2018). The issue of sustainability is one that is pressing in urban communities. Makerspaces will create a continuum of practice that will allow makerspace users to interact with other sustainable business owners and creators, thereby generating a footprint necessary for further business development and idea creation (Covington, 218). Research suggests that individual creativity leads talented people to form enterprises depending on their skill sets and enables them to create intellectual property (Vivant, 2013).

Generating potential for the growth of entrepreneurship, Dougherty (2012) of Make Magazine, views making as being part of all human activities as common as cooking, knitting, and gardening. The economic impact of bringing makerspaces to declining urban areas is still being explored (Van Holm, 2015). However, the literature suggests that the creation of makerspaces have allowed entrepreneurs to explore innovation and development which, in turn, positively impacts inner cities through increased digitization (Mahr and Lievens, 2012). Makerspaces allow users to create and improve products and reduce costs.

Social Identity Theory

There is an abundance of literature that informs each of the pillars of this analysis. Social identity theory was developed during the 1970s by Henri Tajfel and John Turner (Tajfel, 1978, 1981, 1982; Tajfel and Turner, 1979; Turner and Giles, 1981). With a foundation in the social commentary of Marx, Durkheim, and others (James, 1890; LeBon, 1895, translated 1947; Mead, 1934), contributions regarding social classification, categorization, and identity were made in response to human conditions during the era. Sociologists and social psychologists such as Allport, (1954); Blake and Mouton, (1961); Festinger (1954); Lewin, (1948); Sherif, (1951, 1966); Sherif and Sherif, (1953); Sherif, White, and Harvey, (1955); Sherif et al. (1961); Tolman, (1943); Weber, (1946) continued the tradition by studying the ethnic intolerance that was evident in Nazi Germany during World War II.

Social identification is defined in different ways. Ashforth and Mael (1989) define it as "the perception of oneness with or belongingness to some human aggregate" (p.21). This definition focuses on individual cognitive processes and self-conceptualization. The focus on "perception of oneness" is contrary to some definitions which focus on elements such as "desire for affiliation" (e.g. O'Reilly and Chatman, 1986). Perception and acknowledgement of common identity implies that one is openly and willingly accepting of membership and the implications of association. However, social identity is only relevant when one of the categories includes oneself (Abrams and Hogg, 1990, p.3). Therefore, social classification serves two functions: 1. It cognitively segments and orders the social environment, providing the individual with a systematic means of defining others, and 2. It enables individuals to locate or define themselves in the social environment (Ashforth and Mael, 1989, p.20, 21).

Tajfel (1972) refers to social identity as "the individual's knowledge that he or she belongs to certain social groups together with one's emotional and value significance to him or her of the group membership" (p.31). As noted by Ashforth and Mael (1989), the idea of social identification also has roots in the concept of group identification; the two terms are used interchangeably. There are a couple of principles from group identification literature that are of significance in the concept of organizational community and relational innovation. First, Foote (1951) states that identification is viewed as a perceptual cognitive construct that is not necessarily associated with any specific behaviors or affective states. The important aspect is the sense of belonging, not based on behaviors such as actively participating as a demonstration of commitment. This is also distinctly different from the concept of "internalization" (O'Reilly and Chatman, 1986) or commitment

(Weiner, 1982). Internalization refers to an acceptance of values. However, it is possible for an individual to identify with an organization and disagree with the prevailing organizational values (Mintzberg, 1983, p.210).

Organizational identification is a specific form of social identification (Ashforth and Mael, 1989, p.22). The relationship between social identification and organizational identification has particular significance as it relates to organizational community. The organization is one social entity from which identity is derived, but identity may also be derived from the work group, lunchtime associates, as well as other groups. Albert and Whetten (1985) distinguished between holographic organizations in which individuals across subgroups share a common identity (or identities) and ideographic organizations in which individuals display subunit-specific identities. This is much the same way identity is derived from the subgroups within an organization. It is noted by Rotundi (1975), Turner (1985), and Van Maanan (1976) that even these nested identities can be at odds with one another.

The discussion of organizational subunits gives rise to the issue of intergroup relations and the way it is addressed in social identity literature. Ashforth and Mael (1989) noted that social identity theory suggests that much intergroup conflict stems from the very fact that groups exist (p.31). Research indicates that intergroup comparisons and the desire for prestige play a critical role in the emergence of social identity (Tajfel, 1978, 1981; Smith, 1983). As a result, the consequences of in-group and out-group bias have received a tremendous amount of attention in social identity literature. Hewstone, Jaspers, and Lalljee (1982) studied British schoolboys from private and secondary schools and noted their tendency toward conflicting perceptions of themselves and others, by each group. Out-group perceptions were generally negative and stereotypic in nature. Most studies in the context of social group comparison focus on the existence and antecedents of in-group favoring biases (Brewer, 1979; Brewer and Kramer, 1985; Hinkle and Schopler, 1986; Messick and Mackie, 1989; Stephan, 1985; Tajfel, 1982; Turner, 1981). There are also many studies that have failed to find in-group favoritism when out-group's psychological prominence is reduced (Brown and Turner, 1979; Deschamps and Doise, 1978; Vanbeslaere, 1987).

It is possible that one's sense of community and belongingness is affected by many of the theoretical issues addressed by social identity theory. For example, as demonstrated by Tajfel (1982), social identity theory establishes that in-group favoritism tends to occur even in the absence of strong leadership or member interdependence, interaction, or cohesion. The presence of in-group favoritism has many implications for the development and implementation of learning innovations in group settings. The existence of in-group favoritism despite other emotional and relational connections is also emphasized in Turner's (1984) discussion of "psychological groups" (p.530). A psychological group member does not need to interact or admirably affiliate with other group members in order to draw their social identity from the group.

There are many applications in organizations for the ideas set forth in social identity theory. Developing a psychological identity of self-definition is a critical element of reaching complete organizational or group membership. A developing sense of "who one is" complements a sense of "where one is" and what is expected (Ashforth and Mael, 1989, p.27). Symbolic interactions become the catalyst and compass for defining "who one is" and "where one is" in any situation (Ashforth, 1985; Coe, 1965). For example, Becker and Carper (1956) interviewed graduate students in physiology, philosophy, and mechanical engineering and found that changes in social participation in the course of graduate work led to the acquisition or maintenance of specific kinds of occupational identities.

Much of the reviewed literature regarding social identity theory presents a clear argument that such interactions need not be interpersonal to stimulate the emergence of self-identity, which leaves the spectrum of interactions open as possibilities (e.g., human-machine). This becomes important in discussions regarding homogeneity, social identity, and computer-based information systems technology. The reification of the organization or group as a conceptual construct, and the affiliation with "the group", has taken on a different dimension in the past twenty years because of the introduction of information systems.

Social Belongingness Theory & Organizational Community

Research regarding the need for connectedness or belongingness is not new in organizational and human relations theory. In fact, the body of knowledge has historical roots in John Bowlby's (1907 - 1990) theory of attachment developed while attempting to understand the distress of infants who were separated from their parents (1969). The psychological and emotional implication is that the need to experience connectedness and

belongingness begins early in the human experience and is supported by the belongingness theory (Baumeister, DeWall, Ciarocco, & Twenge, 2005; Baumeister & Leary, 1995; Twenge, Baumeister, DeWall, Ciarocco, & Bartels, 2007). The lack of belongingness is linked to several emotional disabilities and psychological conditions, including depression (Cockshaw, et.al, 2014). Another example is Valcke et.al. (2018) findings that “inclusion (belongingness) needs and discomfort with exclusion are positively related but clearly distinct” (p.593). People with a need to have social relationships and who want to be included in groups show better psychological health than other social groups. Also noted is the reality that many definitions of belongingness focus on an individual’s perception of relational value in the eyes of others. Hagerty and Patusk (1995) identified two key characteristics: “valued involvement or the experience of feeling valued, needed, or accepted” and “fit, the perception that the individual’s characteristics articulate with the system or environment” (p. 9).

Brown and McClure (2008) conducted a phenomenological study of 12 adults, aged 20 to 80, and their reported experiences ranging from their first jobs up to working for one company for over 39 years. The researchers found that belongingness at work was composed of six themes: “1. being invited and learning to be a part of a workplace, 2. connecting with colleagues and wanting to be included, 3. doing work and being recognized, 4. natural selection at work, competing and being excluded, 5. being needed and finding myself deeply involved in my profession, and 6. Reflecting on time, work and people passing” (p. 10-13). Each of the six themes represent a level of engagement over the course of multiple work experiences that reflect the building of affiliation and acceptance, important components of organizational communities.

Studies during recent decades have focused on the need to examine the relationship between belongingness and positive workplace outcomes (Andersson & Pearson, 1999; Gkorezis, et.al. 2013; Pearson et al., 2000). This shift in research was in response to several studies that addressed relationships between negative experiences such as ostracism and the importance of belongingness (O'Reilly & Robinson, 2009; Van den Broeck et al., 2010). While the prevailing theme of literature may have been in direct response to diminishing workplace loyalty, corporate downsizing, rising workplace violence and incivility, and other factors that reflect a decline in belongingness and a sense of organizational community, there is an escalating need to engage in learning and academic artifactual production that addressing the need for new learning paradigms in the context of relational deficits.

Organizations as communities is a concept with theoretical origins in social belonging theory. As described in the 2009 July-August issue of Harvard Business Review by Henry Mintzberg, “Community means caring about our work, our colleagues, and our place in the world, geographic and otherwise, and in turn being inspired by this caring” (Mintzberg, 2009). In the same publication, Mintzberg states that, “Beneath the current economic crisis lies another crisis of far greater proportions: the depreciation in companies of community—people’s sense of belonging to and caring for something larger than themselves.” The theorist’s perspective on organizational community is grounded in the seminal work of sociological theorists such as Max Weber and his late 19th century publication entitled *Gemeinschaft and Gesellschaft* or Community and Society. Having first appeared in 1887, the classical work was later translated and published by Ferdinand Tonnies and Charles Loomis (Tonnies & Loomis, 1957). Of all the definitions of community (e.g. Talcott Parsons, 1966; Kingsley Davis, 1949), Tonnies and Loomis provide a more relevant definition for current and future organizational realities because of their examination of the tension between “small-scale neighborhood-based communities and the large-scale competitive market society.” The researchers define community as “an organic natural kind of social group whose members are bound together by the sense of belonging, created out of everyday contacts covering the whole range of human activities,” focusing on the pillars of affiliation and acceptance.

Communities are often described as having several essential elements such as locality, feeling of belonging, shared customs, permanency, common interests, and rules. Some frameworks offer more. However, Etzioni suggests three elements of community as aligned with his concept of “communitarianism.” (Etzioni, 1996) The concept of “communitarianism” has relevance to how communities may provide safer environments within organizations by being responsive to the needs of community members. He suggests that communities are defined by: “1. A web of affect-laden relations among a group of individuals; 2. A required commitment to a set of shared values, norms, and meanings, and a shared identity and history—in short, a shared culture; and 3. A relatively high level of responsiveness.” Communitarianism is a fundamental part of Mintzberg’s

“communityship” framework. To counter what may be perceived as a “depreciation of community” in organizations, there is a need to establish authenticity and responsiveness as described by Etzioni (1996) and a sense of safety in shared spaces based on relational trust and common concern for the collective wellbeing of organizational members.

The “sharing of safe spaces” is an intentional design incorporating the following five lessons learned by Mintzberg about developing “communityship” among managers and in organizations:

1. Community building in an organization may best begin with small groups of committed managers,
2. The sense of community takes root as the managers in these groups reflect on the experiences they have shared in the organization,
3. The insights generated by these reflections naturally trigger small initiatives that can grow into big strategies,
4. As these initial teams promote change, they become examples for other groups that spread “communityship” throughout the organization, and
5. An organization knows that “communityship” is firmly established when its members reach out in socially active, responsible, and mutually beneficial ways to the broader community (Mintzberg, 2009).

Process and Organizational Innovation

The Organisation for Economic Co-operation and Development (OECD) is one of the quintessential international authorities on innovation. According to their 2019 publication, *Raising the Bar: Better Policies for Better Lives*, the 60-year-old organization has been responsible for developing over 450 international standards, including conventions, recommendations, decisions, and declarations with more than 250 legal instruments in force in multiple sectoral areas (p. 4). The OECD 2018 Oslo Manual is the organization's fourth edition of the 1992 publication written as an international reference guide for collecting and using data on innovation. The latest edition identifies and defines four types of innovation: The Oslo Manual for measuring innovation defines four types of innovation: 1. product innovation, a good or service that is new or significantly improved, 2. process innovation, a new or significantly improved production or delivery method, 3. marketing innovation, a new marketing method involving significant changes in product design or packaging, product placement, product promotion or pricing, and 4. organizational innovation, a new organizational method in business practices, workplace organization, or external relations. Our focus for the purpose is this study on process and organizational innovation as defined by the 2018 Oslo Manual.

Recognizing the organizational definitions that are as broad as the number of theories and disciplines that address the topic, Li-Min Chuang (2007) conducted a study of organizational innovation to modify Amabile's (1988) organizational model of creativity and innovation. The study yielded three groups of factors (i.e., individual, organizational, and environmental) that influence five stages of innovations (i.e., task presentation, preparation, stage three idea generation, stage four idea generation, and outcomes assessment). It is the intersection of social levels from individual to the external environment and the stages of process innovation that inform the IOC model development. The researcher's efforts to develop a social psychology model on innovation demonstrates the intersectionality of the two disciplines as well as the broad definitional constructs in both. Fløysand and Jakobsen (2011) take somewhat the same approach to integrating organizational and process innovation theory. The colleagues developed a framework for innovation studies as a relational phenomenon. They assert, “innovation systems theory defines learning knowledge creation as a key driver for entrepreneurship and innovation” (p. 341), giving credence to the convergence of disciplines.

There is also a particular linkage between social enterprise organizations and innovation (Chell et al., 2010; Dees, 1998; Light, 2006). While research regarding merging the two subject areas is described as “anemic” (p. 506), founders of innovation theory and entrepreneurial thought such as Joseph Schumpeter also incorporate similar ideas into the emerging stream of knowledge (Godin, 2008). Joshi et. al. (2016) extends the boundaries of inquiry to describe exchanges and interpersonal relationships embedded in grassroots innovations. They state that “experiences of innovation are largely trust based reciprocal, co-operative and collaborative relational commercial exchanges” in which “grassroots innovators' exchange relationship experiences” (p.407). The trust-based, relational nature of innovation is also transcultural as determined by Reaiche et.al. (2016). The colleagues asserted that “a country's culture may have an impact in defining

innovation and as a consequence in the final outputs,” (p.57) further support the socio-cultural, relational dynamics of innovation and organizational development.

The organizational network that constitutes the organizational community is evident in the study of innovation-centric organizational communities. Diffusion of innovation theory has been widely used to explain knowledge dissemination and mobilization required for the building requisite organizational and innovative community action. The stream of inquiry is evident in the Gainforth et. al. (2014) study of the role of interpersonal communication in the process of knowledge mobilization within a community-based organization. The network analysis revealed that the diffusion of innovation through relational networks to be more effective when “membership in the core as opposed to the periphery is associated with knowledge mobilization” and there is a “high degree of quality” in the information being shared (p. 8). The findings are consistent with the trans-organizational pathways created by affective learning processes in the IOC network of influence.

Beharry and Pun (2020) provide what may be the most contemporary analysis of innovation and organizational community development in their contextual analysis of innovation process models associated with the “fourth industrial revolution.” The study focuses on “the stages and contextual themes governing the innovation process towards emerging industrial revolutions and organizational learning” (p. 52). Five contextual themes emerge from the analysis: 1. strategy; 2. management; 3. organizational culture; and 4. organizational learning; and 5. communication” (p. 43), further establishing the precedence and impetus for the current research.

Setting

Open Works is a state-of-the-art, 34,000 square foot facility in the heart of Baltimore, Maryland with a simple mission to “...make tools, technology, and the knowledge to use them accessible to all” and a long-term vision to “...rebuild the regional manufacturing economy from the grassroots up” (Open Works Baltimore, 2019). In the context of a city that experienced tremendous population growth during the mid-20th Century and lost many of the jobs that attracted and sustained working class families as manufacturing declined, residents who once reaped the benefits of industrial employment as a means of attaining a middle-class standard of living now represent leading statistics in overall poverty, child poverty, senior poverty, individuals living below 200 percent of the poverty line, residents receiving temporary cash assistance, children receiving temporary cash assistance, percentage of the population participating in food supplement programs, and the percentage of children who participate in the Free and Reduced Price Meals program (MD Alliance of the Poor, 2014).

While the Covid-19 global pandemic required the organization to change its business model, the mission remains the same, and they have now fully reopened. Their three-year and a half year pre-pandemic rapid growth demonstrates the valuable potential of makerspaces to contribute to the local and state economies.

At the time of data collection, the facility was equipped with a 3D printing bot farm with four Ultimaker 2 extended 3D printers, two Inventables Carvey desktop precision CNC routers, four computer workstations, and a filament recycler. The digital fabrication lab includes advanced large-format machines that can cut through plywood, plastic, and soft metals with hair-splitting accuracy, such as the 4'x8' Laguna Swift with vacuum bed hold-down, two 4'x8' bed ShopBot PRS Alpha CNC routers, a Tormach Personal CNC 1100 mill, two laser cutters, an 18" x 24" bed, and a laser cutter, 28" x 40" bed. The metal shop, woodworking shop, computer lab, industrial cut-and-sew studio, digital media studio, and the electronics shop are equipped with an equally impressive list of tools made available through membership, education programs, special events, and collaborative community relationships. The staff at Open Works grew to 33 employees at its peak in 2020, all of whom reside in Baltimore City.

The mission is supported by funders, including its primary sponsor, The Robert W. Deutch Foundation, which committed to three years of operating support for startup costs, which decline every year, and a list of contributors to education programs, capital projects, operating expenses, the EnterpRise Venture Competition, the Moms as Entrepreneurs program, and the Teen Maker Shop. The organization has also amassed an impressive list of partners that participate in an array of collaborative projects. The Open Works facility is 100% owned by the Baltimore Arts Realty Corporation (BARCO), a non-profit organization established in

2012 by the Robert W. Deutsch Foundation to create working spaces for Baltimore's growing community of artists, performers, makers, and artisans. In 2016, BARCO completed the \$11.5 million renovation of the Open Works facility, a 34,000 square foot nonprofit makerspace serving the greater Baltimore community.

Clientele use the facilities for an array of purposes, demonstrating the diverse types of engagement that occur at Open Works (Figure 1). Responses also reveal that many use the facility for more than one purpose, creating a utilization profile that is unique to each member. There is a relatively even distribution of those using the facility for art practice (36.3%), Do-it-Yourselfers (40%), and small manufacturing businesses (37.5%). The next largest user percentage is populated by hobbyists (26.3%), collaboration and community organizations (30%), and small service businesses (25%). There is a small percentage of social impact nonprofit organizations at 7.5%, and 10.4% of respondents engaged for other reasons such as production overflow and access to equipment.

The majority of those who utilize Open Works live in the vicinity (Figure 2). This is critical to the economic and social impact Open Works is committed to having on the community. It is also statistical evidence of the valuable contribution of the maker facility. The largest percentage of patrons (20%) reside in the 21218 postal code just north of Open Works, including communities such as Barclay, Charles Village, Homewood, and others extending to Coldspring Lane. Other postal codes that have significant representation are 21202, Open Works' home zip code, (7.5%); 21210 (6.3%); 21217 (6.3%); and 21211 (5%). All other postal codes were less than 4%.

The knowledge and skills required to be successful at Open Works vary depending on the purpose of engagement. There is the expected distinction between the knowledge and skills staff use to perform their administrative and supervisory duties and those required to produce art and products. There are also times when the distinctions are not clear. For example, overseeing staff and operations in the wood shop may require knowledge of machine functionality and planning. The knowledge of machine functionality and planning may be applied with other team members, requiring the demonstration of relational soft skills such as those required for effective communication. No unique knowledge and skills emerged among staff that apply specifically to functional areas within Open Works.

Methodology

Inductive reasoning refers to the inference of generalized conclusions from particular instances or observations as opposed to moving from general principles to conclusions about particular instances (Vogt, 1993, p.64, 111). In case study methodology, an inference is made every time an event cannot be directly observed (Yin, 1989, p.43). The researcher "infers" that a particular phenomenon resulted from an earlier occurrence based on interview and documentary evidence. Reasoning by inductive generalization is common in science. "Induction is the process that leads to hypothesis generation - that is, having a hunch or an idea, then converting it into a hypothesis and assessing whether it might provisionally work as at least a partial condition for a type of event, act, relationship, strategy, etc. (Strauss, 1987, p.11). Because science seeks to establish general knowledge that goes beyond particular observations, it inevitably uses inductive reasoning (Singleton, Straits, and Straits 1993, p.51). Eisenhardt (1989) makes the point that, "some researchers (e.g., Gersick, 1988; Bettenhausen & Murnighan, 1986) have converted theory-testing research into theory-building research by taking advantage of serendipitous findings" (p.536).

Analytic induction has been used by several social scientists over the years (Angell, 1936; Lindesmith, 1947; Cressy, 1953; Bruyn, 1966) and has particular significance in case research methodology. Analytic induction in an exploratory case study is most appropriate when exploring the less obvious, implied aspects of organizational life, when relevant variables have not been identified. It is also important to draw distinctions between the hypothesis generating activity of inductive, exploratory case research and other purposes for research activity.

The case study method has been criticized for lacking rigorous scientific protocol and an inability to support scientific generalization. This criticism is addressed with the understanding that inductive, exploratory case research serves a very distinct purpose; that is to search for patterns, ideas, or hypotheses regarding phenomena about which there is considerable uncertainty. The utility of the method is limited by its intended function. Problems arise when researchers attempt to utilize the method to accomplish more than is possible,

for example explaining phenomena. Care was taken to not report compelling findings as if they have been tested, rather than as hypotheses which may be tested.

The research methodology used in this study is subject to another limitation. This limitation is also present in all other forms of research; that is the potential for research biases to sway the direction of the findings. This problem is not different in inductive, exploratory methodology, but it is less frequently documented and addressed (Yin, 1989, p.21).

Triangulation was achieved by collecting data from multiple sources. Several sources of corroborative evidence were explored in data collection: 1) documents such as memos, contracts, and reports, 2) open-ended interviews, 3) direct observations, and 4) participant observations. Data from these sources were integrated in the analysis to help corroborate the findings and neutralize researcher biases. The method of generalization is analytic generalization, not statistical (causal) generalization. Previously developed theory is used as a template with which to compare the empirical results of the case study. If two or more cases are shown to support the same theory, replication may be claimed (Yin, 1989, p.39). Theory is the main vehicle for generalizing the results of the case study (Yin, 1989, p.40).

Data Collection and Analysis

Data was collected from the Open Works client map by city and zip code, adult class observation, adult class evaluation reports, children's class attendance records, and multi-year event benchmarking reports, and structured interviews with Open Works resident business owners, Open Works staff, and the general Open Works community. Qualitative content analyses were conducted on all data except data collection and analysis methods included multiple sources and multiple collection methodologies to ensure maximum generalizability of the findings. The data was analyzed using Computer-Assisted Qualitative Data Analysis Software (CAQDAS) and manual coding methods to reveal participant insights.

When social and behavioral scientists conduct research in organizations and other real-life settings, evaluate ongoing social problems and prevention efforts, or assume an adversarial role in their applied work, they often encounter unique and somewhat disconcerting ethical problems (Kimmel, 1988, p.104).

Two broad issues which encompass many of the specific problems and dilemmas that may arise are "informed consent" and "confidentiality and the right to privacy." In a practical sense, it is nearly impossible to define requirements for informed consent that adequately address every research situation. Even the guidelines put forth by the American Psychological Association (APA) do not require "full" explicit contractual agreement with research participants.

The American Psychological Association's "Ethical Principles of Psychologists and Code of Conduct" states that researchers "...do not conduct a study involving deception unless they have determined that the use of deceptive techniques is justified by the study's significant prospective scientific, educational, or applied value and that effective nondeceptive alternative procedures are not feasible" and if "delaying or withholding" information is justified, "reasonable measures" to reduce the risk of harm may be taken (APA, 2021, sections 8.07, 8.08). In response to suggested safeguard methods set forth by the APA, Kimmel (1988) states that the solution to the use of deception in social research requires the investigator to weigh the costs and benefits for each study, explore alternative research strategies, and employ debriefing in cases where deception is used (p.75). Brown (1975) also proposed that the reliability of informed consent in protecting the rights of participants varies depending upon: 1) the extent to which participants possess information needed for rational deliberation, and 2) the extent to which they are placed at risk or have their privacy threatened.

Privacy is the claim of individuals, groups, or institutions to determine for themselves when, how, and to what extent information about them is communicated to others. There are four types of individual privacy: solitude; intimacy (a close trusting relationship with the researcher necessary for emotional comfort); anonymity; and reserve (the right to restrict communication when necessary) (Westin, 1968, p.7). Confidentiality refers to the agreement between persons that limits others' access to private information (Sieber, 1982, p.146). Failure to take these issues seriously can create situations in which participants are at high risk for embarrassment and the researcher is legally exposed.

Steps were taken to ensure a reasonable and prudent approach to the ethical issues. The goal was to approach these issues in such a way that the value of exploratory, unobtrusive research methodology is maintained, while assuring the participants of confidentiality, all forms of privacy, and reasonable safety from "harm."

Research Questions

The study was designed to answer the following questions:

RQ1. How does a large, urban, makerspace located in an economically challenged neighborhood build an inclusive community?

RQ2. What are the dominant relational patterns that develop a sense of belongingness in a large, urban, makerspace located in an economically challenged neighborhood?

Results

Theme One – Community is a significant paradigm in makerspace organizations.

As we describe the uniqueness of Open Works, a communal theme is evident throughout the data. Open Works is an organic community that results from a balance of trust and safe space where members, program participants, and those utilizing the facility interact and enjoy a sense of belonging to a creative enterprise. Whether you are an artist, entrepreneur, machinist, technician, craftsperson, or a combination of them all, it all begins with “access, space, and community.” Open Works is also a leader in providing inclusive, diverse “ingepreneurial” (Williams, 2017, p. 104) opportunity in a space where creative manufacturing competencies flourish. Ingepreneurship is distinguished from entrepreneurship by its focus on the socioeconomic trajectory of a group or community, their entrepreneurial knowledge and skills, and access to space for “playful ingenuity.” By its definition, ingepreneurship is what happens at the facility through a focused intentionality around the communal pillars of affiliation and acceptance.

“The primary way of overcoming potential barriers to success here is to continue building community.”

Vocabulary is rapidly evolving to describe forward-leaning approaches to community-focused economic development driven by makers, those who engage in the use of tools to fulfill artistic, entrepreneurial, or utilitarian pursuits based on personal need. The metal shop, woodworking shop, computer lab, industrial cut-and-sew studio, digital media studio, and the electronics shop are equipped with an equally impressive list of tools made available through membership, education programs, special events, and collaborative community relationships. The descriptive data in this study provides insight into the structure and relevant trends in this urban, state-of-the-art makerspace and possesses the potential to inspire replicative innovation in other maker settings. The findings will also help interested parties make inferences about developing maker communities that bring positive advances to the movement.

In addition to the prevalence of “communityship” (Mintzberg, 2017, p. 5), Open Works demonstrates national leadership in diversity and inclusion indicators. There is evidence of intentional trust-building in many of their policies and practices. This distinction has provided an opportunity for the organization to forge trust frameworks for strengthening maker communities and enabling them to serve as “trust hubs” and “trust brokers” for economic development and growth. There is multi-contextual interest in exploring rural-urban ingepreneurial relationships between Baltimore and rural Maryland and West Virginia communities. The inspiration is a direct result of the inclusive community culture observed during this project. The challenge for such efforts is one of funding and overcoming the conundrum of providing low-cost access to tools to the largest, most inclusive community possible.

“There will always be tension between the capitalistic reality that investors live in and the community widespread access need for creative space that the artists of a creative community need, there's a tension there that in order for this to work, that must be worked out.”

While Open Works reaches clients from 297 unique zip codes, 61% of its clientele is from Baltimore City and 34% from zip codes directly adjacent to Open Works. This local engagement offers potential to build community by serving more participants in educational programs and the ability to expand community

engagement through additional partnerships. As described by Open Works leadership, the organizations' educational programming is "providing community access to a design-thinking pedagogy that teaches fabrication skills, practical problem-solving, and iterative design processes" (Open Works Baltimore, 2019).

"I think one thing about our community that makes it awesome is the walls, you know, like no walls around in the micro studio area, so you can see what people are working on."

Theme Two – Trust is an important relational pillar in an innovative makerspace organizational community. Makerspace communities are "living organisms" that grow, evolve, change, and are susceptible to relational influences. As makerspace patrons seek to establish and maintain climates conducive to creativity and productivity, "trust frameworks" and "organizational community models" will contribute to the cultural "heartbeat" of maker communities. The academic, corporate, community-nonprofit collaboration that produced this study as one of the first of its kind in the sector may assist in creating "trust hubs" and ingepreneurial ecosystems wherever makerspaces are found. The transdisciplinary nature of making and entrepreneurship, as well as the value "trust hubs" create for the purpose of community and economic development, and the intersectoral characteristics of ingepreneurial ecosystems suggest that individuals and organizations of all types will be interested in the findings of this study. This occurs despite the heightened climate of historical distrust that has excited between underrepresented, underestimated communities and formal institutions.

"I think that an initial barrier we faced when we opened was the perception of what a large institution was going to do, coming into a Black neighborhood, and there were a lot of people from the Black creative community who were skeptical about joining, a certain level of distrust of institutions and organizations."

Open Works' leadership in diversity and inclusion cannot be completely explained by their location in the heart of an urban setting. Many organizations in the same area have remained homogeneous when considering ethnicity and gender representation. Their leadership can be partially explained by staff's willingness to acknowledge institutional distrust and the perception that diversity may not be valued, especially considering the history of the makerspace industry. Their leadership diversity may also partially be attributed to intentional action like partnerships with organizations. Some examples include: 1. Moms as Entrepreneurs, which ran two 16-week cohorts of entrepreneurship training that successfully launched 18 women-owned businesses on Etsy, 2. the Memorandum of Understanding with Coppin State University, which is the first agreement of its kind between a public Historically Black College and University (HBCU) and a community-embedded makerspace, and 3. programs like the EnterpRISE annual business competition, garnering over 60 entrants in 2018 with ten finalists, of which eight were women—or minority-owned businesses. All of the relationships help contribute to Open Works' leadership in diversity and inclusion. The organization is a model for intentionally creating and maintaining a climate of institutional trust and community that facilitates transparency and cultural intelligence.

"So those are the two - trust and financial obstacles. Yes, and making sure that folks feel like this is a space for them. We've been designing programming that does do that and performing and you know, keeping relationships healthy in the neighborhood is really important."

Theme Three – Affective learning processes and practices produce a relationally sensitive makerspace organizational climate.

Learning is an important theme in the Open Works case. However, it is important to distinguish between learning domains to understand the type of learning innovations that are critical to build an organizational community that facilitates affiliation and acceptance. It is not that cognitive and psychomotor learning domains are less important. Knowledge and skills that are inherent parts of cognitive and psychomotor development require the understanding of tools and use of them. The reality is that learning and relational innovations in the affective domain, involving feelings, emotions, and attitudes are the psycho-social pillars of affiliation and acceptance. Affective learning innovations at Open Works emerged from a sincere desire to build internal and external relationships between dissimilar parts. It has been the willingness to perceive, conceive, and act when interpersonal encounters occur in challenging ways.

The level of internal and external trust is reflected in the practice of never locking the doors during business hours, which may be interpreted by some as a questionable practice in a high-crime community. However, Open Works has reflected the true symbology in the first word of its name, “Open” Works.

“My best hope for Open Works would be using my background as an educator and community artist, an organizer, making arts a platform for connections, for relationship building.”

Affective learning domain is one of three domains in Bloom's Taxonomy (Bloom, et al., 1956). The domain (Krathwohl, Bloom, Masia, 1973) includes five major categories: 1. Receiving, an awareness and willingness to hear, selected attention, 2. Responding, an active participation on the part of the learners, 3. Valuing, the worth or value a person attaches to a particular object, phenomenon, or behavior, 4. Organizing, arranging values into priorities by contrasting different values, resolving conflicts between them and creating an unique value system, and 5. Internalizing values (characterization), having a value system that controls their behavior. The emphasis on gathering members from dissimilar backgrounds and experiences, creating a cooperative or collaborative learning culture and utilizing feedback to continuously improve, is the essence of developing an innovation-centric organizational community (IOC).

“In some cases, it really does take experience and right wisdom in that area - so that person comes in with that and you are able to benefit? Yes, absolutely - it contributes to the community.”

“So, this is a shared space in education and also educational, and it's a place of business and development and self-explorations.”

Collaborative learning theories are grounded in the work of Social learning theories of Lev Vygotsky (1962), a Russian teacher and psychologist who asserted that we learn through our interactions and communications with their peers, teachers, and other experts. Consequently, teachers can create a learning environment that maximizes the learner's ability to interact with each other through discussion, collaboration, and feedback. The entire theory is based on developing collaborative learning communities where discussion and feedback drive the learning narrative. To the extent that new, innovative practices that facilitate communication and discussion are encouraged, innovative organizational communities can materialize and grow.

Theme Four – Innovative makerspace communities value space and opportunity.

Space is one of the major themes that emerged from the research, especially regarding the ability to accommodate business growth and business activity needs such as conference room space. The level of event activity, the demand for classes, and space for business expansion may appear to be competing interests. Innovation, collaboration, and strategic alliance strategies among those with space needs may assist in maximizing utilization and meeting demands as Open Works grows.

“I see Open Works as a supportive space, that is actually a platform or a launch pad for bigger things. So, I hope we can continue to be a company where anybody who has a desire to be here and a desire to make things and to learn can be, and we can help them figure out how to self-start and figure out their pathway to move on and move out of this place.”

The space must have a purpose that aligns with the community-focused values. Diversity and inclusion inherently bring dissimilar members into a community. Overcoming the typical in-group, out-group behaviors associated with all social interactions requires learning innovations that reach the level of “arranging values into priorities by contrasting different values, resolving conflicts between them, and creating a unique value system.” Conflicts regarding space or space utilization become secondary to the primary value of community cohesion. It is the value of acceptance, affiliation, and belongingness that is a catalyst for new ways of overcoming conflict in the organization.

Leadership is important to creating a learning community where communal cohesion informs approaches to logistical challenges like space utilization. The Open Works leaders, staff, and board view the organization as a launchpad of opportunity. This view is evident in their core value of “democratizing tool access.” It is easier to create a climate conducive to organizational members advancing grassroots, self-directed change that supports innovative organizational communities when values are reflected in organizational leadership. The broad spectrum of organizational stakeholders (i.e., members, volunteers, community members, partner

organizations, etc.) show evidence of their appreciation for having a space that is accessible for all who have a desire to use it.

“...when you see more people using the space of all different types, I think that helped with some of the apprehension folks had before they came into the doors.”

Theme Five – Innovation based on affiliation and acceptance leads to a more inclusive makerspace community.

Open Works is bringing innovation to the makerspace industry. The industry’s reputation for a lack of inclusive practices created an opportunity for a large, urban makerspace organization to demonstrate inclusivity in an external environment that potentially held high levels of distrust. The approach is consistent with disruptive innovation that leads to expanding, sustainable organizational viability. This is evident in the failure of other large, well-funded makerspaces. Innovative disruption in the approach to affective, relational intelligence can lead to great inclusion. This assertion is based on the observation of a willingness to meet the defining standard of new learning, which is most often accompanied by new experiences that may have been previously resisted. It is not as if new learning cannot occur during repetition of known information and practices. It is that learning from repetition is less likely to be disruptive because of its adherence to practices that are already known. Disruption is finding ways to make tools even more accessible to the community when revenue is an ongoing concern.

“My hope for Open Works is that we just continue to diversify, and we continue to have different options for - to lower but make the access, no threshold just make it as small as possible and if you want to come here.”

Being an innovative disruptor in a sector that is not diverse requires relational innovation and ability to find new methods for transcending relational barriers. O’Reilly and Bennis (2019) identified three stages of disruptive innovation that provide context for the Open Works approach. They are ideation, incubation, and scaling. Ideation is a process of developing prescriptive solutions to a recognized problem. There are other forms of ideation. However, the emergence of Open Works was based on the recognition of a set of problems (i.e., the lack of community, low-cost access to tools that could be advantageous to those with entrepreneurial pursuits, and the lack of diversity and inclusion in the sector. The Open Works commitment to innovatively disrupting the two perceived problems is a classic example of innovative disruption in the affective, relational, communal domain of learning.

“I was excited about the prospect of Open Works being a place where minorities could hopefully be on the forefront of makerspace, accessibility for minorities and historically excluded communities. I’m queer and have mixed ethnic heritage, and I’m so used to being in white male, older male-dominated makerspaces and feeling actually unsafe or harassed or and maybe targeted in some ways... You come in here, and it’s visibly different.”

Discussion: An Innovation-Centric Organizational Community (IOC) Model

Innovation-centric organizational community (IOC) model (Figure 3) captures the elements of “communityship” found in a large, urban, community-embedded makerspace. The framework shows the exchange that occurs between the internal and external environments of all organic, open systems (Morgan, 1986). It is the infusion of “human, financial, informational, and material resources” into internal organizational sub-systems that fuel organizational responses to the external environment, output, and growth (Kast and Rosenzweig, 1973). The resource that oxygenates the organic nature of the organization in the IOC model is affective learning practices and principles. Internal and external sub-systems defined by a trans-organizational, evolving community provide a system that meets the emerging needs of 21st Century organizations in a way that is demanded by the insatiable demand for learning readiness.

This insatiable demand for learning skills reflected in the IOC model is consistent with The World Economic Forum’s 2020 declaration of “a reskilling emergency” while recognizing that more than a billion jobs are being transformed by technology (Weforum, 2020). However, the IOC places the affective learning process as primary because of its ability to determine outcomes in other learning domains. As the McKinsey & Company projects that automation and artificial intelligence will take on the more routine tasks associated

with work, there will be a corresponding surge in the need for social and emotional skills and a decline basic cognitive skills and physical and manual skills (Bughin et.al., 2018)

Affective learning and cultural transformation happen on two levels at Open Works, individual and group level. This does not preclude organization-wide activities. However, for the purposes of this model, organization-wide activities are considered and amalgamate sub-groups and teams. The performance of sub-groups is partially assessed according to social identity, belongingness, and trust frameworks that help determine standards and performance metrics for continuous improvement of community climate. The common denominator of innovation-centric internal and external organizational communities is the affective learning process that permeates the ecosystem with relational capital and related affective learning processes.

In the IOC framework, process innovation is differentiated from business model and product innovation. Process innovation involves changing the way items are produced or service is rendered. In the instance of affective learning, the methods of improving relational, cultural, or communal competence involve innovations and new ideas that are germinated and applied in an amorphous community that transcends traditional organizational boundaries. The continuous improvement of community climate within the trans-organizational community network is bolstered by effective development of social and emotional skills such as adaptability, communication, creative thinking, dependability, work ethic, teamwork, positivity, time management, problem-solving, critical thinking, conflict resolution, and other human affirming capabilities. Pedagogical and andragogical practices are more likely to render positive outcomes when aligned with best practices from social and emotional learning paradigms.

Understanding that social identity, belongingness, and trust are foundational concepts in IOC affective learning constructs, external organizational community members meet community standards in less formal ways. While there may be some rules of engagement for external community members, they are less subject to the structure faced by internal community members by virtue of their more arbitrary options for disengagement. Therefore, it is the perceived value for engagement that helps drive community membership from external stakeholders. The Open Works makerspace is an excellent example of “trust-inspired volunteerism, values-inspired mobilization” and the application of Lean Manufacturing principles of production (Williams, 2020). Their emergence of a trans-organizational, amorphous community network in the context of two affective learning processes and the application of a proven mode of production enabled the organization to completely pivot in 10 days, produce 28,000 PPE face shields in 56 days for over 100 clients, and land a government contract to produce face shields for meat packing plant inspectors. The 2020 case of PPE production demonstrated the sometimes-hidden value of the trans-organizational community and affective, relational learning processes.

The significance of this case has far-reaching implications for theory and practice. It generates hypotheses that may be tested through nomothetic epistemological methods while raising awareness of exemplary organizations that are engaged in practices that meet the emerging needs of workers and organizations. The study also yields recommendations for practical approaches to emerging realities associated with organizational life. Solutions-oriented approaches to 21st Century organizational challenges must occur in real-time. The learning curve for organizations and individuals has been compressed by scientific and technological advancement. Organizational communities that have climates conducive to “failing fast, pivoting, and moving forward” demonstrate the rapid learning necessary to meet what may appear to be overwhelming demands for information processing and the development of innovative responses.

Conclusion

This study establishes a clear need for additional research to build on the emerging hypotheses and provide a foundation for nomothetic analysis. The themes that emerged set forth an equal number of hypotheses for further consideration, including:

- H1. Organizational community is a significant concept for advancing innovative processes and practices in makerspace organizations.***
- H2. Trust is a relational pillar in the organizational communities associated with makerspace processes and organizational innovation.***
- H3. Affective learning processes and practices are significant in shaping the interpersonal climate within makerspace organizational communities.***
- H4. Innovative makerspace communities value space and opportunity.***
- H5. Innovation based on affiliation and acceptance leads to a more inclusive makerspace community.***

The findings will assist in meeting the challenges posed by threats associated with declining economic and social conditions in former industrial centers and rural communities that were part of thriving economic pipelines during the height of industrialism. Makerspaces are a viable part of the solution that will create jobs, fill gaps in the supply chain, and help reshoring manufacturing opportunities. The IOC approach also possesses potential for helping to close organizational equity gaps and facilitating inclusive practices. The concept of innovation-centric organizational communities based on maximizing affective learning domains is consistent with the emerging workforce demands of the mid-21st Century.

References

- Amabile, T. (1988). A model of creativity and innovation in organizations. In B. M. Staw, & L. L. Cumming (Eds.), *Research in organizational behavior* (Vol. 10, pp. 123-167). Greenwich, CT: JAI Press.
- Anderson C. (2012). *Makers: the new industrial revolution*. Random House.
- Andersson, LM & Pearson, CM 1999, 'Tit for tat? The spiraling effect of incivility in the workplace, *Academy of Management Review*, Voi 24 No 3, pp. 452-471
- Avramchuk, A. S. (2017). Building Positive Organizational Communities: Communal Leadership at Work. *Graziadio Business Review*, 1-6.
- Barrett, T., Pizzico, M., Levy, B.D., Nagel, R.L., Linsey, J.S., Talley, K.G., Forest, C.R. and Newsletter, W.C. (2015). A review of university maker spaces. Georgia Institute of Technology.
- Baumeister, R. F., & Leary, M. R. (1995). The need to belong: Desire for interpersonal attachments as a fundamental human motivation. *Psychological Bulletin*, 117(3), 497. <https://doi-org.proxy-cs.researchport.umd.edu/10.1037/0033-2909.117.3.497>
- Baumeister, R.F. & Vohs, K.D. (2007). Self-Regulation, Ego Depletion, and Motivation. *Social and Personality Psychology Compass*, Vol 1 No 1, pp. 115-128
- Baumeister, R.F., Twenge, J.M. & Nuss, C.K. (2002). Effects of social exclusion on cognitive processes: Anticipated aloneness reduces intelligent thought. *Journal Of Personality and Social Psychology*, Vol 83 No 4, pp.817-827
- Beharry, A. K., & Fai Pun, K. (2020). Contextual Analysis of Innovation Process Models toward the Fourth Industrial Revolution. *West Indian Journal of Engineering*, 43(1), 43–54.
- Bowlby, J. (1969) *Attachment and Loss: Volume 1, Attachment*. Harmondsworth: Penguin
- Bughin, J. et.al. (2018) *Skill Shift: Automation and the Future of the Workforce*. *McKinsey Global Institute*. Retrieved online <https://www.mckinsey.com/featured-insights/future-of-work/skill-shift-automation-and-the-future-of-the-workforce>

- Burke, J. J. (2014). *Makerspaces: a practical guide for librarians* (Vol. 8). Lanham, MD: Rowman & Littlefield.
- Carlson, L. E., and J. F. Sullivan (2006). "A Multi-Disciplinary Design Environment." *ASME 2006 International Design Engineering Technical Conferences and Computers and Information in Engineering Conference* 4c: 835–840.
- Chell, E., Nicolopoulou, K., & Karatas, -O" zkan, M. (2010). Social entrepreneurship and enterprise: International and innovation perspectives. *Entrepreneurship & Regional Development*, 22(6), 485–493.
- Citi GPS: Global Perspectives & Solutions (2020). Closing the Racial Inequity Gaps: The Economic Cost of Racial Inequality in the U.S. Retrieved online from https://ir.citi.com/NvIUklHPilz14Hwd3oxqZBLMn1_XPqo5FrxsZD0x6hhil84ZxaxEuJUWmak51UHvYk75VKeHCMI%3D
- Cockshaw, W. D., Shochet, I. M., & Obst, P. L. (2014). Depression and Belongingness in General and Workplace Contexts: A Cross-Lagged Longitudinal Investigation. *Journal of Social & Clinical Psychology*, 33(5), 448–462. <https://doi-org.proxy-cs.researchport.umd.edu/10.1521/jscp.2014.33.5.448>
- Covington, E. (2018) Creating a Diamond in the Rough: An Evaluation of Sustainable Business Opportunities for Inner City Communities. *Journal of Leadership and Management*. 12, 67-73.
- Cropley, D., & Cropley, A. (2012). A Psychological Taxonomy of Organizational Innovation: Resolving the Paradoxes. *Creativity Research Journal*, 24(1), 29–40. <https://doi-org.proxy-cs.researchport.umd.edu/10.1080/10400419.2012.649234>
- Davis, Kingsley (1949). *Human Society*. New York: The Macmillan Company.
- Dees, J. G. (1998). Enterprising nonprofits. *Harvard Business Review*, 76, 54–69.
- Durkheim, Émile. [1912] 1995. *The Elementary Forms of Religious Life*. New York, NY: The Free Press.
- Etzioni, A. (1996). The responsive Community: A Communitarian Perspective. *American Sociological Review*, 1-11.
- Fløysand, A., & Jakobsen, S.E. (2011). The complexity of innovation: A relational turn. *Progress in Human Geography*, 35(3), 328–344. <https://doi-org.proxy-cs.researchport.umd.edu/10.1177/0309132510376257>
- Gainforth, H. L., Latimer-Cheung, A. E., Athanasopoulos, P., Moore, S., & Martin Ginis, K. A. (2014). The role of interpersonal communication in the process of knowledge mobilization within a community-based organization: a network analysis. *Implementation Science*, 9(1), 1–16. <https://doi-org.proxy-cs.researchport.umd.edu/10.1186/1748-5908-9-59>
- Gkorezis, P., Kalampouka, P., & Petridou, E. (2013). The Mediating Role of Belongingness in the Relationship between Workplace Incivility and Thriving. *International Journal of Employment Studies*, 21(2), 63–78.
- Godin, B. (2008). In the Shadow of Schumpeter: W. Rupert Maclaurin and the Study of Technological Innovation. *Minerva: A Review of Science, Learning & Policy*, 46(3), 343–360. <https://doi-org.proxy-cs.researchport.umd.edu/10.1007/s11024-008-9100-4>
- Griffin, O. H., and S. Cortes (2006). "A Learning Space of, by, and for Engineers: Virginia Tech's Joseph F. Ware, Jr. Advanced Engineering Laboratory." *ASME 2006 International Design Engineering Technical Conferences and Computers and Information in Engineering Conference* 2006: 841–848.
- Hagerty, B.M.K., & Patusky, K. (1995). Developing a measure of sense of belonging. *Nursing Research*, 44, 9–13.
- Hecker, A. (2017). The Intrapreneurial Nature of Organizational Innovation: Toward a New Process Model. *International Journal of Innovation* (2318-9975), 5(3), 375–398. <https://doi-org.proxy-cs.researchport.umd.edu/10.5585/iji.v5i3.208>

- Joshi, R. G., Chelliah, J., Sood, S., & Burdon, S. (2016). Nature and Spirit of Exchange and Interpersonal Relationships Fostering Grassroots Innovations. *Journal of Developing Areas*, 50(6), 399–409. <https://doi-org.proxy-cs.researchport.umd.edu/10.1353/jda.2016.0124>
- Kast, F. E., & Rosenzweig, J. E. (1973). *Contingency views of organization and management*. Chicago: Science Research Associates.
- Light, P. C. (2006). Reshaping social entrepreneurship. *Stanford Social Innovation Review*, 4(3), 47–51.
- Li-Min Chuang. (2007). The Social Psychology of Creativity and Innovation: Process Theory (Pt) Perspective. *Social Behavior & Personality: An International Journal*, 35(7), 875–888. <https://doi-org.proxy-cs.researchport.umd.edu/10.2224/sbp.2007.35.7.875>
- McClure, J., & Brown, J. (2008). Belonging at work. *Human Resource Development International*, 11(1), 3–17. <https://doi-org.proxy-cs.researchport.umd.edu/10.1080/13678860701782261>
- Morgan, G. (1986). *Images of organization*. Beverly Hills: Sage Publications.
- O'Reilly, C., & Binns, A. J. M. (2019). The Three Stages of Disruptive Innovation: Idea Generation, Incubation, and Scaling. *California Management Review*, 61(3), 49–71. <https://doi-org.proxy-cs.researchport.umd.edu/10.1177/0008125619841878>
- O'Reilly, J. & Robinson, S.L. (2009). The negative impact of ostracism on thwarted belongingness and workplace contributions, *Academy of Management meeting*, Chicago
- Pallagst, K., R. Fleschurz, and S. Said. (2017). “What Drives Planning in a Shrinking City? Tales from Two German and Two American Cases.” *Town Planning Review*, 88(1), pp. 15–28.
- Parsons, T. (1966). *Societies; evolutionary and comparative perspectives*.
- Pearson, CM & Porath, CL (2005). On the nature, consequences and remedies of workplace incivility: No time for "nice"? Think again. *The Academy of Management Executive*, Vol 19 No 1, pp. 7-18
- Reaiche, C., de Zubielqui, G. C., & Boyle, S. (2016). Deciphering Innovation across Cultures. *Journal of Developing Areas*, 50(6), 57–68. <https://doi-org.proxy-cs.researchport.umd.edu/10.1353/jda.2016.0132>
- Remembering Black Wall Street. *Afro American Newspaper* (May 26, 2010). Retrieved from: <http://www.afro.com/remembering-black-wall-street/#sthash.QZMumAt8.dpuf>.
- Sheridan, K., E. R. Halverson, B. Litts, L. Brahms, L. Jacobs-Priebe, and T. Owens. (2014). “Learning in the Making: A Comparative Case Study of Three Makerspaces.” *Harvard Educational Review*, 84(4), pp. 505–531.
- The *Afro-American*, June 13, 1896, p.1. Maryland State Archives, BALTIMORE CITY SUPERIOR COURT (Charter Record), Lib.33/Fol. 203, T-2357, May 10, 1895; The *Baltimore Morning Herald*, March 10, 1897, p. 11.
- Tönnies, F., C.P. Loomis. (1957). *Community & Society (Gemeinschaft und Gesellschaft)*. East Lansing: Michigan State University Press,
- U.S. Census Bureau (2019). Food Stamp/Supplemental Nutrition Assistance Program, 2019 American Community Survey 1-Year Estimate Subject Table. Retrieved from https://data.census.gov/cedsci/table?q=American%20Community%20Survey&t=Income%20and%20Poverty&g=0500000US24510_8600000US21202&tid=ACST1Y2019.S2201&hidePreview=true
- Valcke, B., Van Hiel, A., Van Assche, J., Van Roey, T., Onraet, E., & Roets, A. (2020). The Need for Inclusion: The relationships between Relational and Collective inclusion needs and psychological well-and ill-being. *European Journal of Social Psychology*, 50(3), 579–596. <https://doi-org.proxy-cs.researchport.umd.edu/10.1002/ejsp.2641>
- Van den Broeck, A, et.al. (2010). Capturing autonomy, competence, and relatedness at work: Construction and initial validation of the Work-related Basic Need Satisfaction scale. *Journal of Occupational and Organizational Psychology*, Vol 83 No 4, pp. 981-1002

- Van Holm, E. J. (2015). Makerspaces and contributions to entrepreneurship. *Procedia-Social and Behavioral Sciences*, 195, 24-31.
- Wilczynski, V. (2015). Academic maker spaces and engineering design. In *American Society for Engineering Education* (Vol. 26, p. 1).
- Williams, R. "Ingepreneurship: A Trust Framework for Facilitating Urban Economic Growth and Socioeconomic Advancement." 14th European Conference on Innovation and Entrepreneurship, September 19-20, 2019, Kalamata, Greece
- Williams, R. et. al. (2019) "Turning Makerspaces into Greater Places: Organizational Assessment and Economic Impact Study of Open Works." Retrieved Online at <https://www.greaterspacesandplaces.com/>
- Williams, R., Holman, W., Fuchs, J. (2020) "A Makerspaces' Rapid Response to the COVID-19 Pandemic." Retrieved online at <https://www.greaterspacesandplaces.com/>
- World Economic Forum (2020). "The Reskilling Revolution: Better Skills, Better Jobs, Better Education for a Billion People by 2030." Retrieved online at <https://www.weforum.org/press/2020/01/the-reskilling-revolution-better-skills-better-jobs-better-education-for-a-billion-people-by-2030/>
- Yin, R. K. (1989). *Case Study Research: Design and Methods*. Newbury Park, California: Sage Publication.
- Yin, R. K. (2018). *Case study research and applications: design and methods*. Sixth edition. Los Angeles: SAGE.