ADVANCING SOCIAL ERGONOMICS THROUGH SENSE OF COMMUNITY IN THE BUILT ENVIRONMENT OF THE BLENDED AND HOMOGENEOUS WORKPLACE (WSOC)

By

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ABSTRACT

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Wellness has been forecasted as the next trillion-dollar industry. Places of business that prioritizes employee, sense of community, holistically through connectedness and belonging tied to the workplace-built environment, commons space will benefit not only employees by advancing workplace, communal cultural social ergonomics, but additionally, benefit the entirety of corporate wellbeing through the triangulation relational strength of trust amongst employees. A defined community commons space within the workplace as a micro-ecosystem Placemaking planning approach linked to the outer macro workplace landscape, will ensure a compassionate lens of wellbeing through connectedness, resulting in a sense of community for all employees: remote, coworking and full time in both blended and homogeneous workplace environments.

This study undertook an extensive review of literature, whereby, Jane Jacobs's espoused writings and lexicon of urban vocabulary applied to a sense of community called the "neighborhood", acted as a guidepost for the research set forth. Given the rise in open planning, ancillary furnishings, and flexible workplaces on-demand, this research study examined a "key-defined" built environment anchor, that must be present, in order that a sense of community exists, as a thriving neighborhood in the workplace. Special attention was paid to how autonomy can advance connectedness in the workplace, anchored by the compelling theory-based research of the Self-determination theory (SDT) Autonomy,

Relatedness, and Competence (Gagne and Deci, 2005) coupled with Maslow's Hierarchy of Needs and ten contributing seminal theories and principles. Identifying the built environment tied to employee sense of community, specifically communal behavior resulting in strengthening workplace communal cultural social ergonomics and trust, amongst employees, under a single corporate identity was unfounded.

The research utilized a mixed-method methodology and implemented three custom instrument tools in an exclusive case study. The independent variable measured was workplace sense of community with two dependent variables measuring for: communal cultural social ergonomics and trust. The case study raw data collection was conducted at a North American Fortune 500 global corporate headquarters workplace. The method-tools and resulting statistical analysis was based on: 1) an employee preference image- sorting exercise based on theories and principles; 2) an online survey questionnaire administered to employees; and 3) on-site observations, augmented with a protocol field note checklist of observed activities and usage.

The findings illustrate a highly significant correlation between the variables measured. The tools outcome combined with the twelve theories and principles comprised the proposed Workplace Sense of Community (WSOC) theoretical framework. This framework can be used as a guideline for planners of work environments to advance social ergonomics through a nexus micro-Placemaking ecosystem.

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The individual(s) that guided my climb, I give thanks to my esteemed doctoral committee members: Drs. Mark I. Wilson, Sinem Mollaoglu, and Russell E. Johnson.

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KEY TO ABBREVIATIONS

SDT:	Self-Determination theory Workplace, Workplace Landscape, Floorplan, Floorplate: References to the space employees occupy where their work takes place. Otherwise known as, the occupied collective 'office floor.'
Built Environment:	The physical "built' out space employees utilize
WSOC:	Proposed new Guideline/Framework: Workplace Sense of Community
Work Design:	Research and methodology to enhance workplace performance.
Placemaking:	Reference to 1960s application of applied Urban Planning Principles to the study of "place" to the workplace layout.
Social Ergonomics:	The study of spatial relationship of people and proximity in social engagement and comfort levels.
ABW:	Activity Based Working- Non-assigned workstation/designated area to work within the office. Similar to Free address.
CRE:	Corporate Real Estate
WELL Building Standard®:	identifies workplace policy and environmental considerations that can be put in place to promote and enable overall occupant health and well-being.
LEED:	Leadership in Energy and Environmental Design
Autonomy:	Choice associated with a sense of wellbeing. Freedom from external control or influence; independence.
Ancillary:	Non built-in furnishings, movable.
Survey Pre-test:	A practice run of a survey/ questionnaire, participants are asked to explain reactions to question form, wording and order.
IRB:	Institutional Review Board
SPSS:	IBM statistical analysis software

CHAPTER ONE

1. Introduction

1.1 Background, Self-Determination Theory, Maslow's Hierarchy of Needs

"Work design" research and methodology to enhance workplace performance emerged due to the rise of the industrial revolution and implementation of machine-operated work that simplified tasks normally carried out through craft-based-industries also known as "Taylorism." Multiple factors since the turn of the twentieth century, have had a significant impact on the employee's performance and productivity. Morgeson, Parker, and Johns (2017) examined one hundred years of work design research that appeared in over 17,000 studies. They identified five distinct clusters that defined areas of psychology work design applied research. Their study also revealed how autonomy was "key" in advancing workplace happiness and contentment. Yet, if one focuses on the five cluster outcomes, one can deduce that there is little to no research conducted on advancing employee autonomy in relationship with the built environment. Additionally, minimal attention was paid to "space"

and “ergonomics”. Klein and D’Aunno (1986) also identified a lack of theoretical or empirical treatments of the psychological sense of community at work.

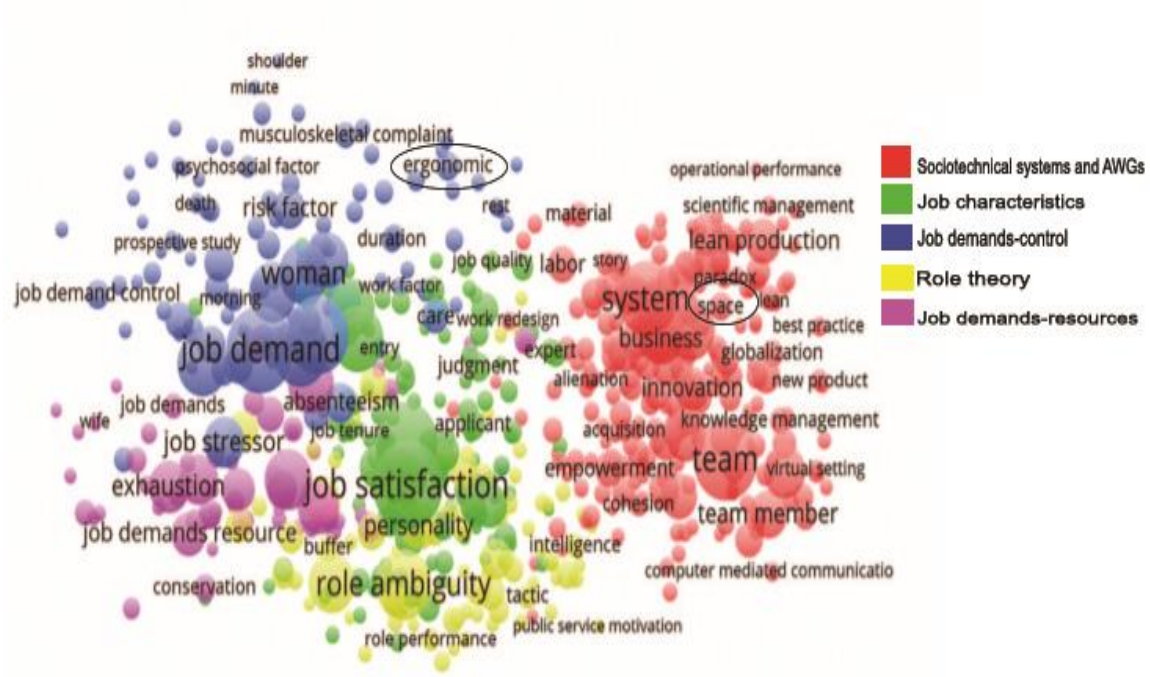


Figure 1: Morgeson, Parker, Johns, Generated cluster word map. (Source: Morgeson, Parker, Johns, 2017)

The generated cluster word map in Figure 1 illustrates limited peer reviewed - research in the 20th-century workplace, as it related to “space” and “ergonomics”, was conducted as opposed to significant attention awarded to human resources aspects of employee organizational management. Furthermore, mental wellbeing, connectedness and remote working consideration is void.

Since the introduction of the Self-Determination Theory (SDT), organizational behavior studies provided evidence that “...people need to feel autonomous and competent,

so social contextual factors that promote feelings of autonomy and competence enhance intrinsic motivation….several studies have found "autonomy-supportive interpersonal environments promote internalization and integration of extrinsic motivation and in turn positive outcomes" (Gagne and Deci, 2005, p332). Furthermore, Gagne and Deci (2005) note the need for the social context, interpersonal ambiance, and autonomy-supportive climates within the workplace. Gagne and Deci note that studies in organizations have provided support for the propositions that autonomy-supportive (rather than controlling) work environments and managerial methods aid in the promotion of basic need satisfaction, as well as intrinsic motivation and full internalization of extrinsic motivation. According to the authors, assisting in basic need satisfaction, will lead to persistence, effective performance, job satisfaction, positive work attitudes, organizational commitment, and over all psychological well-being.

Both the SDT scholars and previous psychological groundbreaking work and theory of Maslow's (1954) defined five Hierarchy of Needs: 1) Physiological, 2) Safety, 3) Love/Belonging such as friendship, intimacy, family and sense of connection, 4) Esteem and 5) Self-actualization. Herzberg (1960) and Alderfer (1972) unanimously support the classes of need and within the classes is defined psychological well-being as a key motivator, as adapted by the SDT scholars to enable and enhance individual workplace performance in the twenty-first century.

In addition, Klein, and D'Aunno (1986), stated that to encourage community, psychologists needed to devote greater attention to the psychological sense of community and the workplace with attention paid to the interaction of the two. Advancing employee autonomy measured in physical accommodations such as ergonomic furnishings in addition to the newly defined seven interior-focused built environmental standards outlined in the

WELL Building Standard® in the workplace such as: air, water, nourishment, light, fitness, comfort, mind expanding into community for 2020, is evidence that the built environment impacts employee autonomy beyond flexible work schedules and work design initiatives affecting mind and body as well as community.

1.2 Significance of Wellbeing and Built-Environment Consideration

An impactful survey showed that humans spend 90 % of their time indoors and that eight out of ten employees face back pain issues due to lack of ergonomic considerations within their built environment (Klepeis et al., 2001). Advancing employee autonomy measured in physical accommodations such as ergonomic furnishings is therefore important and was well-responded in the newly defined interior-focused built environmental standards of WELL Building Standard®. WELL AP certified building outcomes, that the built environment impacts employee autonomy beyond flexible work schedules and organizational management established practices affecting mind and body.

A more recent industry article showed how the connection between the built environment and wellbeing remains an important discussion in workplace design. Patel and Smith (2020), speak to the emergence and importance of improving wellness through design amidst rising health insurance costs. Additionally, a heightened awareness of the physical impact of environmental pollutants has peaked and when coupled, amplify interest in preventable disease and heightened health promotion for businesses, institutions and industries. The WELL Building Standard® strives to identify workplace policies that can be put in place to positively impact mood, sleep, stress levels and the psychosocial status of the employee in order to promote and enable overall occupant health and well-being. A substantive collaborated and defined first effort that recognized the built environment as a

landscape where ‘workplace design’ and “work design” managerial practices recognize the mental status and impact of the employee, as a ‘collective’ with regard to necessary accommodations. The 2020 WELL AP v2 exam has addressed and added new concepts: Movement, Thermal Comfort, Sound, Materials, and Community. Each WELL AP concept is comprised of features that hold distinct health and well-being consideration. The newly defined prioritization of “community” aligns with this study’s research as it will ideally foster a “sense of community moving forward.

Peripheral insight and research through peer-to-peer published works have isolated and defined specific “conditions” of the built environment such as how the human voice negatively affects the open plan with regard to employee concentration levels. These poor acoustical practices in place affect employees at open benching & desking systems across the floor plate and have led initiatives such as the WELL AP and LEED to advocate. Other examples include addressing poorly monitored interior airflow that negatively affects productivity. Gensler (2017) broke down key design factors that affect the workplace employee if unaddressed (see Figure 2).

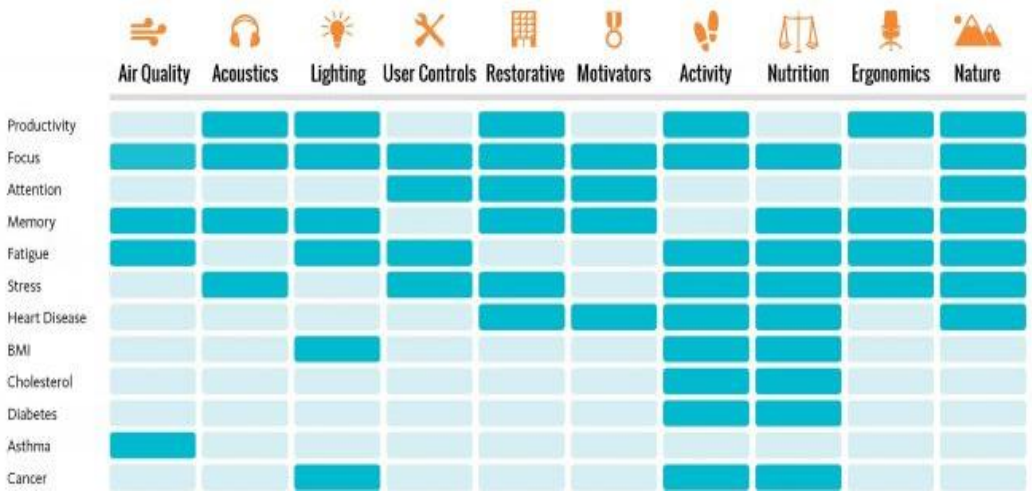


Figure 2: Gensler Design Consideration Factor Chart breakdown (Source: Gensler, 2017)

The profound shift of research has looked at the total building envelope with regard to design factors employees inhabit (Gensler, 2017). In addition, as buildings become more intuitive, efforts to control the climate of the physical interior space have emerged to offset the negative findings. Furnishings have also become intuitive, advancing ergonomic considerations to usage and well-being by providing facilities departments a dashboard glimpse into employee use. Yet, despite these advancements, the deficit not explored and remains unaddressed in many workplaces in North America, is the comprehension that the workplace plays a key role in fostering or hindering social cohesion (Crandall, 2017). Designers, architects, and planners who acknowledge the importance of a sense of community from an early stage of design will have a profound impact on the company culture and productivity at work (Crandall, 2017). Figure 3 empathizes how the

psychological experience(s) such as community is of paramount consideration in the workplace (Gensler, 2017).

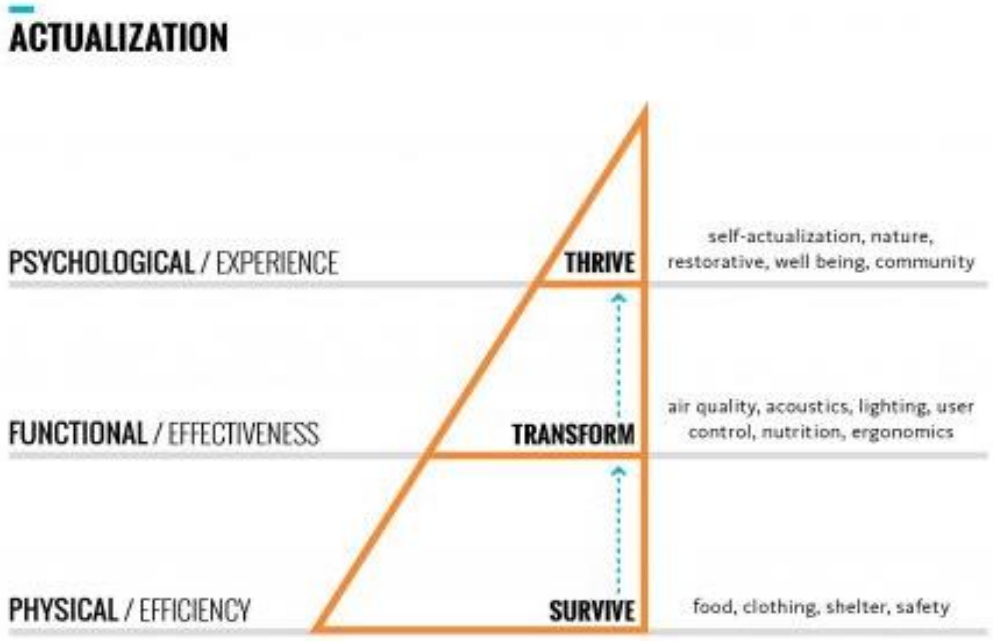


Figure 3: A framework demonstrating how the Psychological experience(s) such as community is of paramount consideration in the workplace (Source: Gensler, 2017)

1.3 Workplace Disruption

As "space" becomes more of a service-oriented business model, emerging research points toward the employee's psychological experience within the workplace as paramount consideration. The workplace has experienced much "flux" resulting in "disruption" in the first twenty years of the twenty-first century in planning, design and layout. While disruption can be advantageous in bringing forth new ideation, it can also disrupt the physicality of the workplace through significant change management shifts in how workplace functionality is perceived by those that inhabit the ever-changing space. By designing for a built environment "anchor" that will foster collaboration and community,

allowing organic conversations to emerge supporting employee well-being and happiness in the workplace, the presence of such an anchor will strengthen company communal cultural social ergonomics and trust as a result thereof advancing one's autonomy while providing a compassionate buffer for both mental and psychological needs that of connectivity and belonging.

According to Puybaraud (2018), humans have been identified as inherently social animals. In many instances that have exponentially increased remote participation, due to the age of digitization, the outcome is making people feel lonelier. We know that with loneliness is currently affecting one-fifth of the U.S. population, when not under mandated social-distancing. Despite being part of a highly connected social media world in outreach, in the ability to be 'highly connected online', in actuality, people are more isolated than ever.

Social alienation and the feeling of loneliness are significant issues that contribute to mental decline, as noted in a sociological study focusing on the elderly. The UK government appointed recently, a minister of "loneliness" for the first time. As the world becomes a more global workplace and employees are increasingly more remote, as in those transitioning from college to employment similar feelings of loneliness and separation have emerged despite the age gap. This group is referred to as the "transient generation". However, "transient" can be applied and extended to growing numbers of remote working employees as well as to those relocated through company initiated internal moves globally and/or across North America.

A Think Tank panel discussion hosted by Metropolis Magazine in January of 2020, focused on the discussion topic: What Can Designers Do to Combat the Loneliness Epidemic? In the opinion of one designer at a recent think tank panel, "we're either helping

create spaces that connect people or we're not" (Stone, 2020). Jill Duncan, director of place performance at HKS, commented during the discussion Duncan suggested that the office—where people spend a large chunk of their lives—should reinforce feelings of stability. Furthermore, Duncan added, "As things get less permanent in all other parts of our lives, workplace and a sense of permanence while you're there is becoming more and more important" (Stone, 2020).

The issue arises when people feel disconnected to each other at work, it had been noted that employees are less likely to share ideas—the lifeblood of innovation for many companies. Workplaces where people are inspired to share, in person, are less likely to lead to loneliness, and more likely to boost productivity according to Puybaraud (2018). Face-to-face meetings are considered thirty-four more times effective than email (Roghanizad et al., 2017). The waves of inevitable change in workplace planning cannot be prevented yet knowing so beckons attention on how to address those that are affected by its inevitability, the employee. The key here is to consider the workplace as a public space as Foong et al. (2019) describe. A public place that brings various related communities together, starting with community in workplace design, the authors note that the pendulum has swung back to recognizing that the benefits of daily interaction verses working alone.

The solution lies in prioritizing, designing for employees to have support and the creative liberty to engage, socialize and experience a sense of community through an honest, autonomous environment by prioritizing "Autonomy" from the pre-schematic design phase through construction and post-occupancy. "Although the Self Determination Theory, SDT is based on a strong empirical foundation, relatively few studies have tested the theory within organizational settings" (Gagne and Deci, 2005). This study's research purpose will define a new guideline, a framework for a workplace Sense of Community (WSOC),

embedding, applicable scholarly theories, principles and new consideration/findings that in turn, will advance employee autonomy and thereby improving social ergonomics in the workplace, built environment. In addition, survey outcome dashboard measurements will assist future workplace landscapes in the development of an identifiable built environment anchor and or assist in recommended improvements made to the existing physical workplace.

1.4 The Statement of the Problem

As research suggests, advancing autonomy, specifically the need to connect with one another, through advanced consideration of the built workplace environment is a new paradigm that will increase job retention and performance. Following the Self-Determination Theory, intrinsic motivation (interest) and autonomous extrinsic motivation (importance) impact performance, satisfaction, trust, and wellbeing in the workplace (Gagne and Deci, 2005).

Another growing area of research gives indication to the impact of workplace design on mental health. Mental health professionals are seeing increased workload as a sign of distress rather than drive not only in the workplace but for those who work remotely without the benefit of coworkers (World Economic Forum, 2019). Recent research also demonstrated strong linkage between workaholism and ADHD, OCD, anxiety, and depression (Andreassen et al., 2016). Figure 4 shows how mental health was the center of workplace conference as per the World Economic Forum.

In the last decade many architectural design firms and furniture manufacturers have looked to “Placemaking” to redefine how not to define the workplace landscape, in other words, to plan for adaptability and flexibility in impromptu use of glass enclosed meeting

spaces, phone booths and Spanish style inspired built stairways for random congregation. Yet, given the effort to date with an appreciative nod to both Jacobs and Lynch's urban principles in ideology planning layout applied; the employee's sense of community has not been accounted for in measurement or planning given the rapidly advancing flexible, remote workplace landscape today.

Planners' attempt to design for the urban neighborhood has been drastically altered through increasing demands to reduce square footage. This limits employees' ability to access once non-scheduled meetings spaces that are now scheduled leaving others to collaborate at an open desking area or resort to online meetings remotely, often one's home. The 2017 Gensler Experience Index^{SM} was the result of a multi-year research effort to identify and quantify the factors of design that impact the human experience. Gensler's aim was to gain a deeper understanding of why people go where they do, how design impacts

their behavior, and how to design spaces to deliver great experiences. Figure 5 illustrates the Gensler Experience Index [SM] on Social Connection, supporting sense of community.

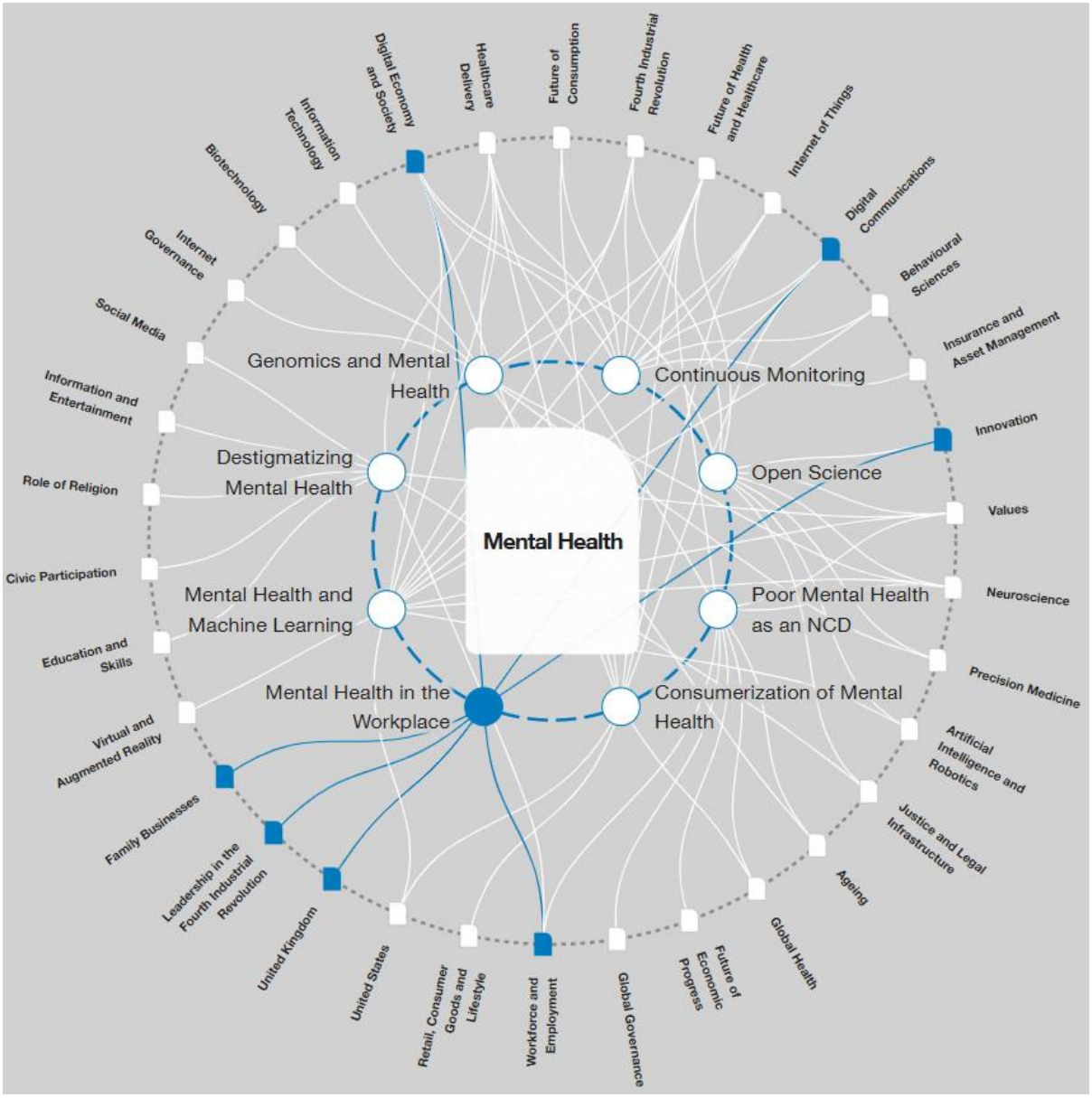


Figure 4: World Economic Forum, placed mental health at the center of Workplace conference interest, (Source: https://www.weforum.org/agenda/archive/mental-health/, 2019)

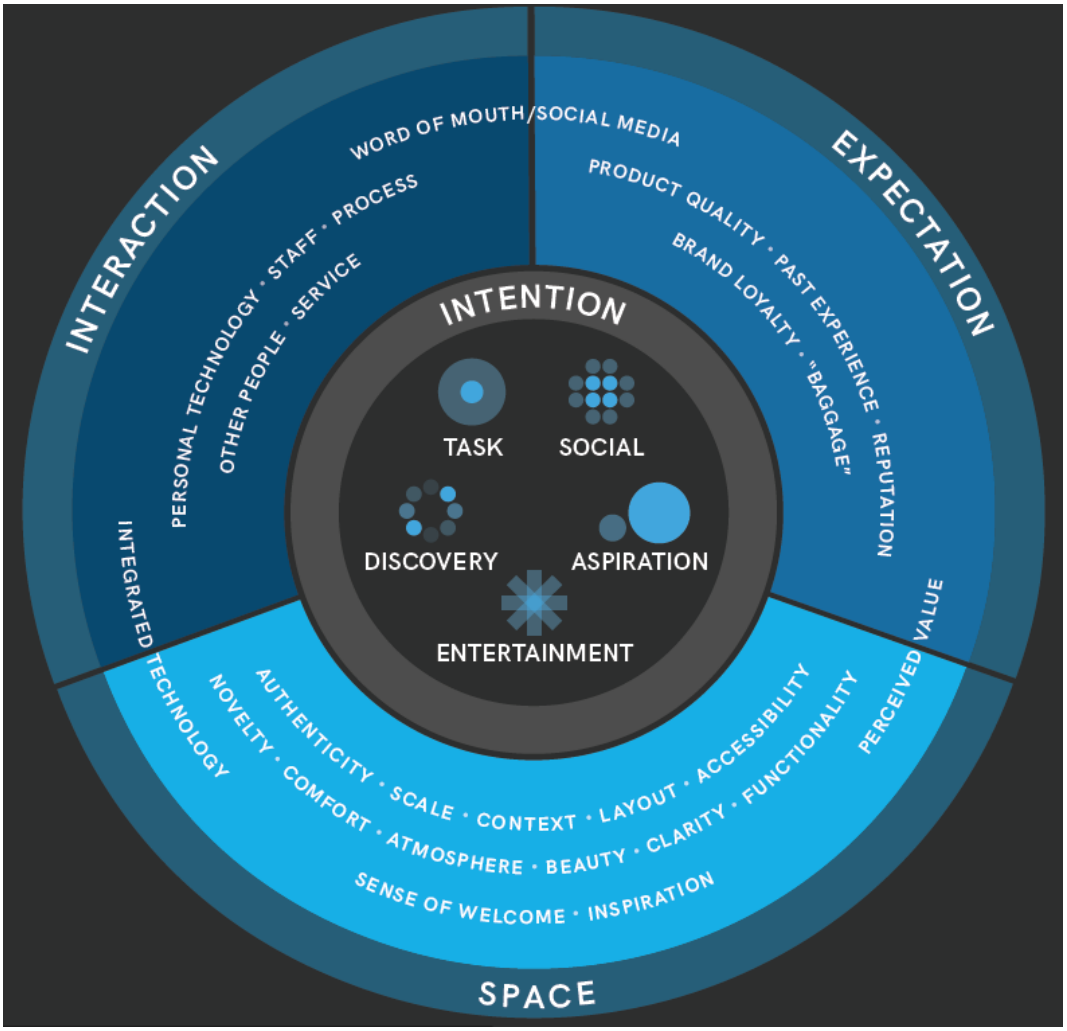


Figure 5: Social Connection figure supporting Sense of Community (Source: The Gensler Index)

The Gensler Experience Index^{SM} in 2017 underscored that creating a good experience is not enough; the best places—ones that engage people's emotions and keep them coming back—have to be great. To meet these higher standards for experience, design proves to be the key differentiator between good and great—and specific factors rise to the top. Spaces that are beautiful, authentic, unique, inspirational, and welcoming are most likely to engage users and stand out from the crowd. Work cafés, quiet/focus zones, and innovation hubs are all good examples of creating hybrid settings that deliver both an amenity and a workspace (Gensler, 2019). The focus then turns to the workplace landscape,

propelling beyond experience of design or user experience that can change with flux in workplace design set forth, the paramount need is to inherently and ideally support the employee, despite predictable change to the floorplate. Therefore, compassionate workplace planners should inherently consider:

1. How sense of community, social ergonomics, a communal, neutral, third space can be created/designed organically as a stable, anchoring space, in the workplace that will foster and advance employee Autonomy.
2. How to plan and design for a Sense of Community within the built environment of the workplace given a (WSOC) theoretical framework guide.
3. Key pieces of information resulting from: case study surveys, on site field observations, respondent image feature-preference sorting (methodology in set forth) that will ensure a productive space that supports a sense of community of teams and individuals effectively, while advancing autonomy and advancing social ergonomics for both introverted and extroverted persons.

The Arousal Theory of Motivation supports the importance of workplace employees finding a balance between high levels of stimulation and periods of rest and recovery. If employees are provided a community space, by which to rest and recover such as a well-planned anchor commons space, employees could reach optimal levels of mental alertness which then supports performance and productivity. Foong and Henry (2019) also support the notion that today's workplace should serve as a community hub where employees have the opportunity of working and celebrating their lifestyle. Adding features to the workplace that are more than mere functionality will boost their pride and sense of community (Leesman, 2018). Additionally, Google's EMEA Engineering Hub concept of

the communal areas related directly to the project research conclusions that of "relaxation to be crucial to innovation and stimulating original thought" (ArchDaily, 2009).

As the workplace continues to shift in size and layout, reexamining and drawing on the Self-Determination theory, Maslow's Hierarchy of Needs and Urban Placemaking principles provides substantive and rich peer-reviewed seminal research content for a collaborative Workplace Sense of Community (WSOC) planning design guideline and Framework that support a sense of community in the Workplace. The objective of this research examined advancing autonomy and communal cultural social ergonomics in the 21st century through the built environment, specifically built environment considerations that integrate sense of community in future workplace planning and do so by advocating for the workplace environment and those that work within while platforming how the communal aspect of workplace cultural and trust are paramount key building blocks of corporations and their collective employees. Important to note independent workers are driven to co-working spaces for the only resource they can't access alone that of sense of community (McCarty, 2019). This study illuminates, outlines and substantiates how employees that share a common corporate culture umbrella contribute significance in relevance related to their workplace community in benefit from the proximity of predictable, consistency of colleague connectedness.

1.5 Research Objectives

This workplace study is four-fold: *first*, it investigates the advancement of autonomy in the workplace through communal cultural social ergonomics beyond the known standards of work design, managerial practices within the built environment/landscape. *Second*, this study gathers exclusive case study data with an aim to substantiate a positive link between

impacting the employee in terms of autonomy as in choice to engage, connect, and belong resulting in trust and communal cultural outreach. *Third*, the outcome of this mixed method/quantitative/qualitative study result is intended to benefit social and behavioral sciences: sociology, anthropology and psychology. *Fourth*, this study considers autonomy, employee behavior affecting trust and workplace communal culture as it is related to the physical built environment of the workplace and the behavioral benefit a robust sense of community within the workplace, that of the built environment can provide. Happiness leading to increased productivity has been studied in work design, however happiness is only one facet supporting productivity, employee productivity related to autonomy is as meaningful when elevated in consideration as this study platforms in importance.

This IRB approved study consists of three custom designed tools: on-site observation protocol checklist, seventy-three custom designed questions in a survey, questionnaire related to use/access to dedicated commons/community space/areas and an image prioritization sorting exercise that informs, substantiates the final, proposed, (WSOC) guideline, framework. A pilot study was conducted at a Northeast corridor pharmaceutical headquarters location. A company listed company with earnings upward of $1.7 billion dollars and the actual study research instruments were conducted within an exclusive single case-study, at a separate workplace headquarters, a world leader in building products, located as well on the Northeast corridor of the United States, globally listed corporation with sales of $49.4 billion dollars (2018).

1.6 Hypothesis

The purpose of this research study is to demonstrate a relationship between an embedded sense of community through an identifiable built environment anchor in the workplace as a nexus of trust among employees, resulting in strong company communal cultural social ergonomics. The independent variable measured was Workplace Sense of Community, the dependent variable(s) measured were: Communal Cultural Social Ergonomics and Trust. The null and alternative hypotheses were:

-Null Hypothesis (HO)- Providing a Sense of Community through an identifiable built environment anchor will have no effect on a company's trust and communal cultural social ergonomics.

-Alternate Hypothesis (Ha, H1)- Providing a Sense of Community through an identifiable built environment anchor will have a positive effect on a company's trust and communal cultural social ergonomics.

1.7 Importance of Study

The importance of this research is to address the unprecedented; to tie workplace behaviors to the built environment, to identify and define a nexus of company trust, a physical space within the workplace that can provide a psychological as well as physical anchor to which employees can feel a sense of connectedness advancing communal cultural social ergonomics, in way of belonging to one's workplace community. The study considers full-time employees, remote workers and 'blended' coworking environments that may rent flexible space from a corporation for the advancement of ideation and collaboration. This study proposes that giving these employees access to a human-centric community, commons space, outside of the primary work area where typically focused tasks

occur facilitate creative problem solving which leads to ideation (Baird et al., 2012) and will lead to greater staff retention (Morris, 2018).

The result of a WSOC framework compliments the proposed survey instrument with tangible areas to plan/ build-out based on. Should a community space/area/anchor/hub exist, yet per a survey outcome that does not align in all areas of ideal sense of community percentages applied to the survey administered to their staff, the proposed WSOC framework will act as a guideline by which corporation can take steps to adjust, accommodate the built environment they have in place. In this way any, all fads, trends, current design implemented, such as bespoke amenities, provided to the employee is not dismissed as such and is incorporated and planned for based on the primary physiological benefit tying the built environment to the betterment of supportive employee behaviors in the workplace.

CHAPTER TWO

2. Review of Literature

The purposeful organization of the reviewed literature for the research hypothesis set forth, is presented in a progression of exploration on areas that address the workplace-built environment and sense of community tied to employee behavior. The first portion of the literature reviewed, provides pertinent evolution and contribution of the open- plan application and subsequent challenges related thereto spanning twentieth to the twenty-first century implementation. Autonomy review of literature is introduced, and its importance related to workplace sense of community (independent variable) within the open-plan. The Self-Determination theory (SDT) (Gagne and Deci, 2005), (Broeck et al., 2016) and psychological needs that of: Autonomy, Relatedness and Competence (Gagne and Deci, 2005), provide prominent validity and applied relevance to the topic of interest that of defined community commons space that best supports autonomy in the workplace.

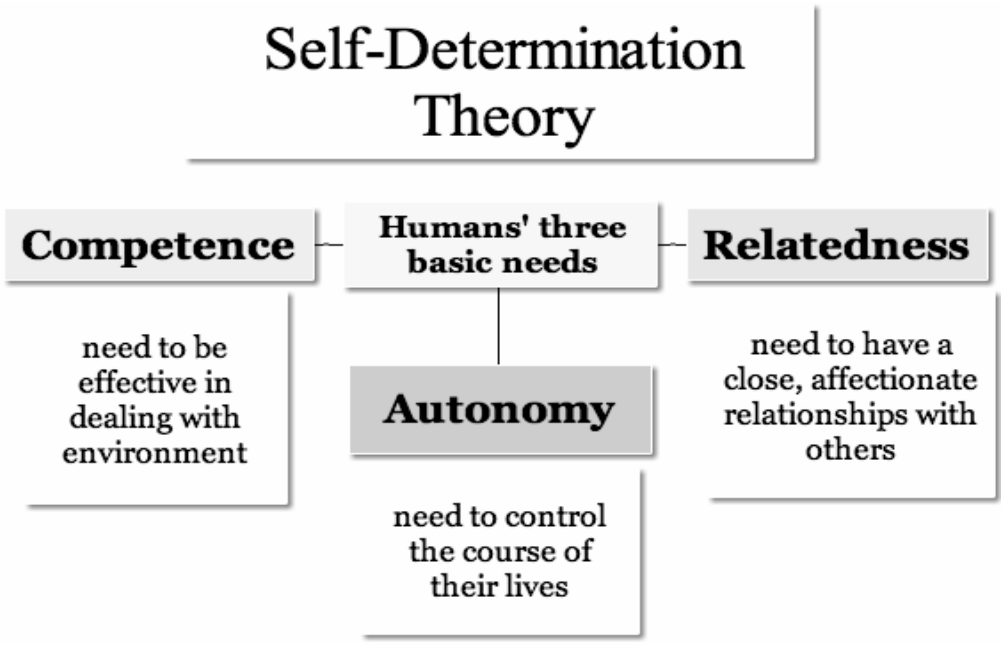


Figure 6: Illustrates the three Components of SDT (Source: Pennock and Alberts, 2018)

An additional eleven seminal theories and principles are addressed and reviewed as they add structure and significance in meaning to the totality of the three variables measured in this study and to the proposed Workplace Sense of Community WSOC theoretical Framework guideline which are: 1) Maslow's Hierarchy of Needs, Motivation and Personality 1934, 2) Placemaking Principles based on urban visionaries such as Kevin Lynch, Williams Whyte and Jane Jacobs, 3) 1975 Appleton's Prospect-Refuge Theory, 4) 1984 Ulrich's Evidence Based Design, 5) 1989 Oldenburg's Third Space Principle, 6) 1969 E.T Hall's Social Ergonomics Principles (physical, cognitive & social), 7) USGBC's LEED Principles, 8) WELL Building Principles, 9) MIT's 30-meter Rule, MIT, 10) 1975 Housing Adjustment Theory, 1975, and 11) Andrés Duany's 2000 The New Urbanism Transect Theory Methodology of planning, development, human-scale and complete communities.

The last portion of this chapter substantiates the employee's need to 'belong', and the need for a sense of community within the workplace espoused by Jane Jacobs through her urban planning principles. Closing with a summary on how providing a dedicated and defined commons space can advance employee social ergonomics in the 21st century workplace through and established Sense of Community in the built environment of the blended and homogeneous workplace.

2.1 Well-being, Holacracy and Autonomy

Companies today, seeking to renovate or build, are asking if designing for well-being, wellness and employee happiness is a fad. A survey by RAND Corp. valued the workplace wellness industry at $6 billion. (Wunderlich, 2016). It has been stated that companies that are able to connect and engage employees yield almost 150 percent higher earnings per share compared to their peers, according to Gallup's ongoing State of the

American Workplace report. All indications point to the benefits of addressing well-being and more so: The Key to happiness at work isn't money-it's autonomy. Cooper (2016) outlines various outcomes that defend the "Science of Autonomy" i.e. autonomy alleviates negative emotions, is less likely to contribute to coronary heart disease than standard risks such as smoking.

David Rock, Executive Director of the Neuroleadership Institute, offers many research papers on the topic of Managing with the Brain in Mind, in particular, Rock mentions: "Autonomy is negatively affected when employees are micromanaged, a threat response is triggered. When employees lack control, his or her perception of uncertainty is also aroused-raising stress levels" (Rock, 2009).

Nic Marks, a statistician and author of the Happy Index Planet spoke at the TEDGlobal conference in 2010 on the topic of his writings: A Happiness Manifesto. Marks pushed the needle forward and asked why as a society do, we continue to measure success by its productivity-instead of by the happiness and well-being of its people? This is a profound indicator suggesting previous forms of managerial autonomy offered in the workplace are dated and not addressing the totality of the employee's well-being and their happiness factor.

A comprehensive series of four experiments on Happiness and Productivity were conducted at a prestigious English University over a series of years. The college students, both male and female were given mathematical tests and rewards for correct answers in the form of pay (that was within research guidelines). The outcome provided the first evidence of its kind that a 10-12% increase in productivity occurred when the students were happy, correct answers were exhibited when the test subjects were exposed to favorable snacks, and or upbeat, comedic movies. Conversely, the same control of students did not do favorably

when they were asked about real-world bereavement memories or provided a placebo clip of a neutral movie lacking in heightened happiness or comedy prior to testing (Oswald, 2014).

Companies are becoming more and more aware that something has to be done to move away from measuring square feet and inches to employee/occupant satisfaction. In addition, an alarming group of facts with regard to negative health outcomes has been attributed to the employee and workplace hours worked has emerged: employees who work 24-7 is indeed damaging to one's health. A 67% increased risk of developing heart disease with an 11-hour workday, three times greater risk of alcohol abuse when working fifty plus hours per week and a .1% blood alcohol level is equivalent to twenty hours without sleep (Brower, 2014).

While workplace hours cannot always be controlled from individual to individual, providing an office environment where work-life balance is supported, and the employee has more control over their environment empowers employees to then face challenges and take ownership with a sense of purpose. Employees are then more highly motivated and engaged, they feel closer to each other, are more productive, and more innovative (Brower, 2014).

Conversely, if an employee is not given a sense of control and perceive themselves as being micromanaged a threat response ensues, in contrast, greater autonomy increases the feeling of certainty and reduces stress with a sense of control. Fostering a sense of community in the built environment that provides agility of the employee to freely and socially-connect, not only in the social verbal-sense but in physical proximity whereby verbal communication is not assumed nor required to feel connected, aligns with a new wave of metrics/analytics associated with the workplace, Holacracy is one philosophy rapidly being embraced. Holacracy is a philosophy where employees have multiple roles,

often on different teams, and those role descriptions are constantly updated by the team actually doing the work (Marsh and Bleckner, 2016). In turn, allowing employees more freedom for employees to express their creative talents, and companies can take advantage of those skills in a way it could not before. Roles are not directly assigned, and staff can hand-off and pick-up new roles easily. Holacracy supports autonomy for occupants as they navigate through their workday (Marsh and Bleckner, 2016). Marsh and Bleckner note, "Such participatory strategies are critical to engaging employees in a more purpose-driven workplace that extends from design to space management to new behaviors" (Marsh and Bleckner, 2016, p.2). The challenge arises then on how to measure happiness, well-being and autonomy within the workplace? While many thought leaders suggest asking new hires to participate in an enjoyment-quotient study which they could use as a recruiting tool, many also feel that the built environment is a significant unidentified contributor and yet how does one measure the impact of design anything approximating scientific rigor? "In the biomedical field, you have to be able to exactly replicate the research" (Abernathy, 2015, p. 14). Another consideration is that happiness is intrinsic to well-being, which some may say depends on having achieved well-being, simply another factor which makes measurement challenging. A compelling paper was written, in which the researcher, suggests that design, productivity and wellbeing hold links. Additionally, that a useful way to conceptualize the relationship between buildings and performance is to draw upon, reference a highly used framework in organizational psychology (Heerwagen, 1998).

Several in-depth studies have emerged in the last decade that supports the notion of advancing autonomy and promoting productivity in the workplace. It is more and more recognized that the physical environment affects an employee's satisfaction and consequently, their perceived productivity if designed well. Agha-Hossein, El-Jouzi,

Elmualim, et al. (2013) noted how well-being, productivity and the heightened enjoyment factor of a new move into a headquarters may in turn, be adversely affected over time due to lack of design consideration for interior 'climate' efficiency. Thermal comfort, lighting, just to name a few examples, were not effectively planned for, changing usage patterns were not anticipated. Wang's (2010) research purposely explored the relationship between "sense of control" over location, light, outdoor views, "visual comfort" related to productivity. His findings showed that sunlight and outdoor views while initially pleased subjects, it was later determined that privacy and a sense of control were two hidden factors that greatly affected subject's decisions and performance not sunlight and outdoor views as hypothesized.

While many studies have begun to examine the relationship of workplace factors to productivity, many studies have focused on choice of one variable i.e. lighting, noise etc. (Veitch, 1996). Few studies have yet to consider the workplace in its entirety, nor consider the physical built environment in ways it too can advance employee autonomy or social ergonomics leading to a strengthened Sense of Community.

One study did present an interesting and unique research topic, that of "self-schema." The study researched how a person's perception of themselves sets a precedent for how they view their environment in the workplace (Fischer, 2004). The study indicated that employees are predisposed to filter information about environment (Fischer, 2004). When one considers that in a 2013 Gallup poll survey taken indicated that the gap between and engaged and disengaged workforce equals roughly $500 billion and 25% greater profitability (Abernathy, 2015), it underscores the need to redefine and advance autonomy beyond "work design " managerial and human resource best practices in the twenty-first century workplace and with the occupied built environment at the forefront. The model below presents two axes of need, respected as functional need to psychological need within the organization to the individual, employee (Tidd, Dwivedi and Krishna, 2016).

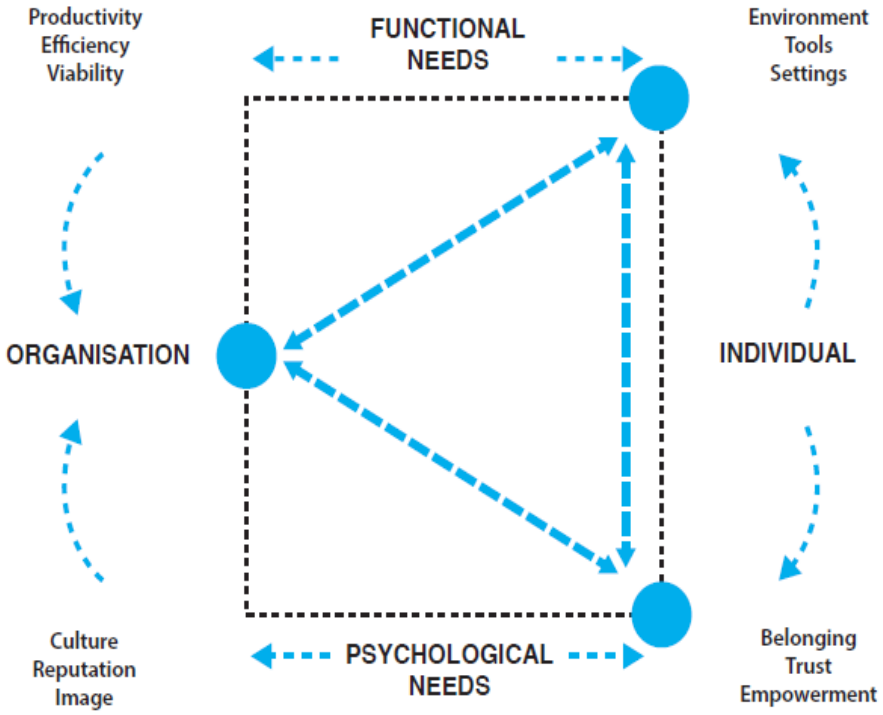


Figure 7 : The model presents two Axes of Need (Source: Tidd, Dwivedi and Krishna, 2016)

Perhaps the most compelling literature that underscores the importance of informal social interaction, and how the workplace can be both an enabler, and an obstacle when fostering social cohesion and improving productivity emerged from a Leesman Index study (2017). The outcome resulted in a measured satisfaction highest amongst employees where "informal social Interactions" occurred. A 97% satisfaction rating indicator attributed to top workplaces. In addition, the same respondents also reported a positive sense of community in their workplace. The study does not, however, isolate or attempt to define a built environment anchor. Yet the study does pose the peripheral question to the respondents that of: Do you think the design of your workplace contributes to a sense of community at work? Figure 8 illustrates these responses.

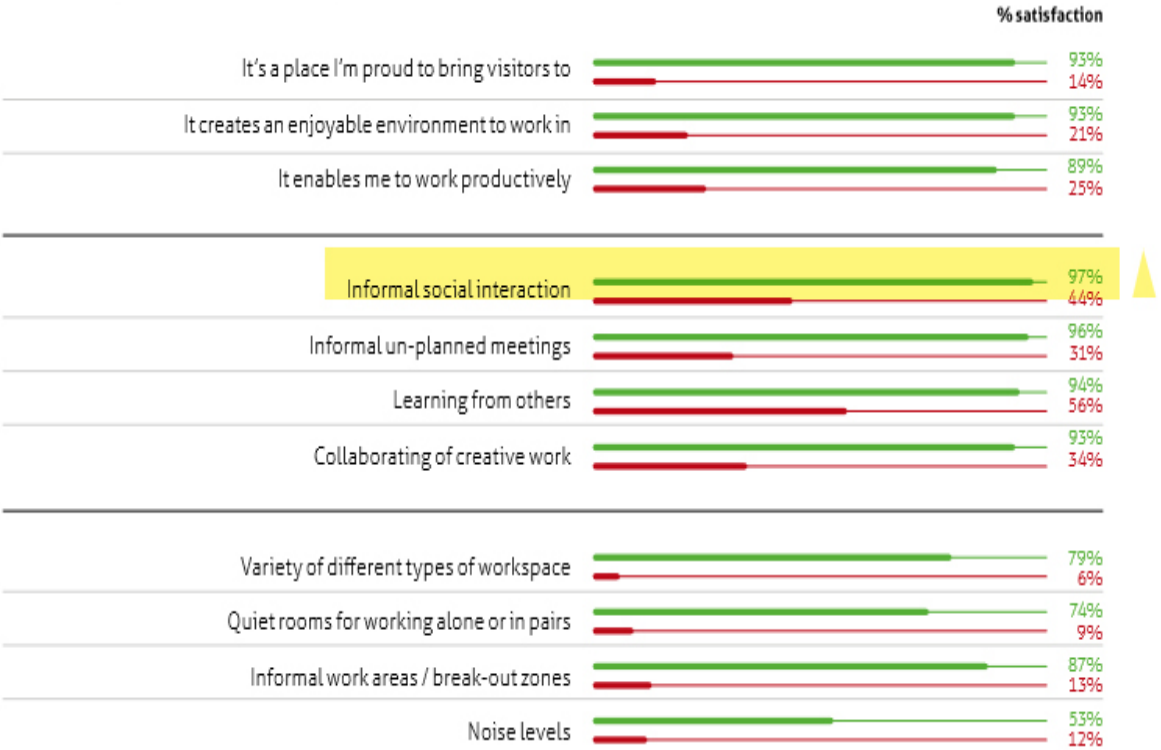


Figure 8: Illustrates differences between top ten and bottom ten workplaces (Source: Rothe (2016))

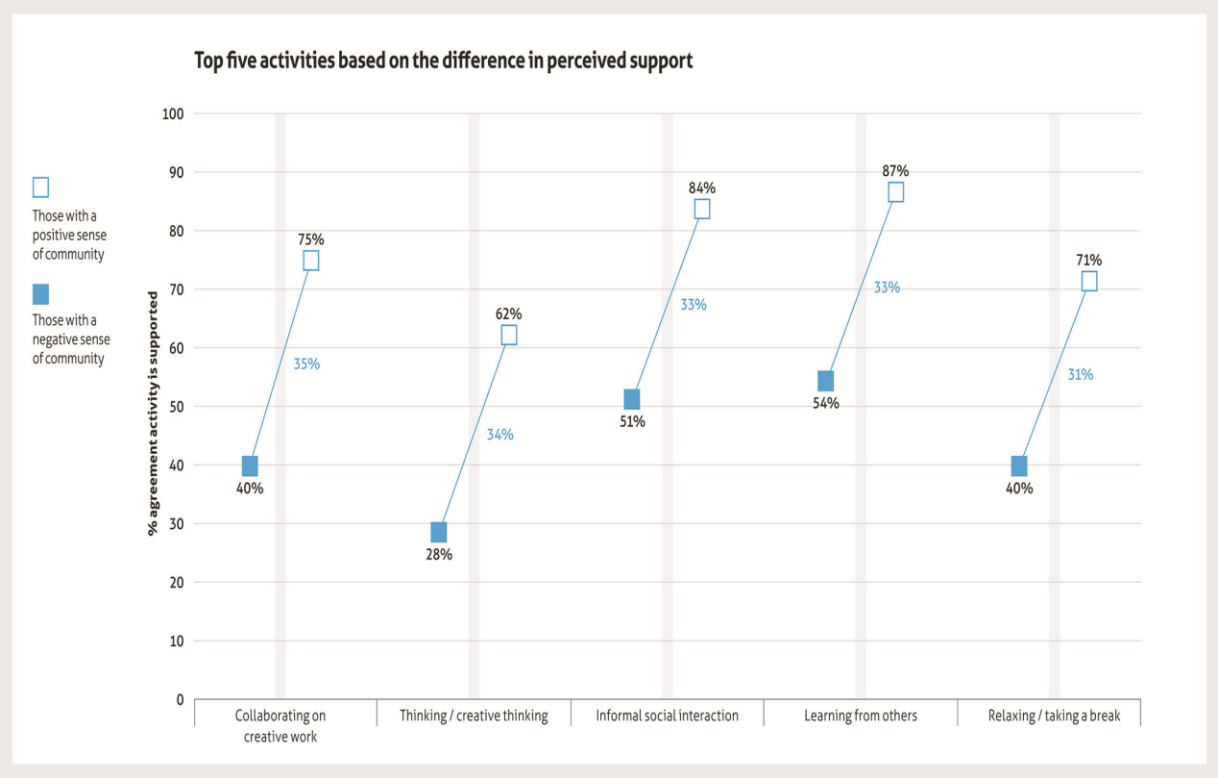


Figure 9: Illustrates top five activities based on difference in perceived support (Source: Rothe, (2016)

2.2 Evolution of the open-plan and the Unassigned desk

The open plan was ushered in with much enthusiasm during the first decade of the twenty-first century. In part, due to the recession of 2008, less physical building out of the interior office was able to be incurred financially, and also, the turmoil of the recession made tenants uneasy about signing long leases without the ability to take their belonging otherwise known as furnishings with them especially if they were permanent structures e.g. drywall. As a result, the open plan took shape. Guised as the solution to ignite collaboration, the open plan also delighted business owners since the price point of the furnishings was substantially lower than individual paneled and often wired for electricity workstations.

Quickly, the open-plan landscape yielded substantial negative finding research and white papers on topics ranging from noise levels to employee mental decline. Today, the

open plan, one would think would be rapidly disappearing due to the avalanche of unfavorable press and studies affecting employee's well-being, but price point, flexibility in ease of placement of the furnishings has yet to convince business owner to divorce the allure. Introverts are still overly exposed and while spaces are more open in linear air space, employees are increasingly without guest seating, often little storage at arm's reach and considerate boundary delineation. In addition, companies that offer open-plan landscapes believe that creative ideas will benefit from the layout and vast space.

A recent study compared open-plan offices in small, medium and large sized open-plan offices (Seddigh, 2015). They found that in the smaller scaled open-offices, employees performed at the highest level when compared to medium and larger scaled open-plans. Yet, there was no difference from cell as compared to the small open plan (Seddigh, 2015).

Interestingly, Laurence (2013) conducted a research in which experience of privacy served as a mediator between architectural privacy and emotional exhaustion in the workplace, which concluded that in an open-plan, is it critical to provide employees with the ability to personalize their area as it reduces emotional exhaustion. Companies that adopt a no-clutter or personalization policy are in turn, putting undue harm on their staff. Such results support the need to allow more adaptability in the workplace. Goins (2010) examined the physical or symbolic attributes of boundary/partitions dividers between employees. He found that occupants indicated that the two symbolic attributes were more important than the two physical attributes such as sound and privacy. Creating a home-like atmosphere with a sense of enclosure was favored over sterile practicality (Goins, 2010). A quasi-field experiment also showed that by enhancing thermal comfort, visual and acoustic privacy, ergonomics, interior design, and lower open-plan spatial density (less populated) within a workplace, job satisfaction significantly increased (Hongisto, 2016).

Irrelevant speech, meaning not specific to employees at a benching or desking configuration, in topic or interest, within the open plan remains the most significant distraction issue today. Jahncke (2012) investigated cognitive, emotional, and psychological effects of two open-plan office noise conditions. The open plan certainly has it challenges from noise and distraction to lack of privacy to implied lower status, yet there are still benefits that employers are holding onto as previously mentioned. These are, increased collaboration, creative thinking and innovation, lower build and fit-out cost, energy savings, reduced office equipment expenses and easier layout changes (Morley, 2017).

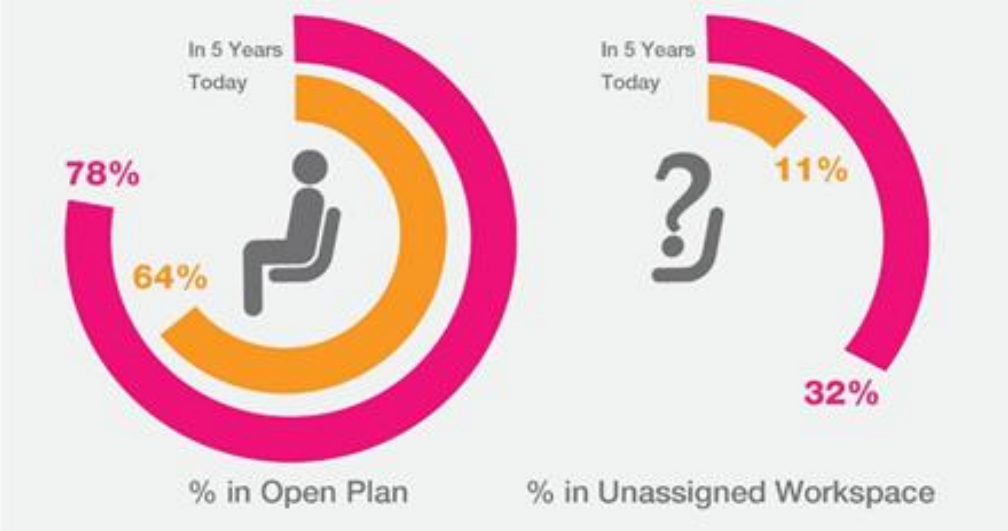


Figure 10: An increase in group work and an eye on real estate expense are driving a shift to open plan

The open plan is certainly easier when it comes to layout changes. It aligns well with adaptability and provides employees an agile built environment which promotes autonomy. Activity Based Working (also known as ABW) was a proposed solution that has been highly adopted within the last few years in many areas of Europe and the US. It was first coined by Erik Veldhoen, a Dutch consultant who authored the book *The Demise of the Office*. It can be described as a free-address that provides staff with a personal choice of a work location,

within the workplace, for a variety of workplace activities allowing one to locate themselves where it is most suitable for them to complete their work. Facilities, as remarked in Services Futures (2016), like the ABW concept as it allows them to expand the workplace according to demand over time. If one considers that at any given time 30-40% of the office space is vacant, it does seem like a logical solution. Especially when one considers the financial perspective of the upkeep of the space, for example, lighting cooling, heating etc. Conversely, studies, such as those Leesman has measured, indicate that for employees who performed the majority of their tasks at a single location, ABW was not successful. On the other hand, for employees performing individual work away from their desk, the employee satisfaction of ABW increased by 20%. Morley (2015) explains that even though employees are losing a desk, in return, they gain a space that is well suited for their task while being in an environment that provides employees the opportunity to connect.

Co-working, NICE (Neighborhood Choice Environments) and MEMO (Maker Environments, Mobile Occupants). They are more focused on designed functions for the office environment. have creatively tried to solve for the best employee work experience, more than ever, work design is tipping toward favoring the Immersive Environment which "pull the best lessons learned from work spaces—including open plan, co-working, ABW, NCE, and MEMO—and tailors them to meet the specific needs of a company to create tailored spaces. They are less about what is trending and more focused on desired functions, outcomes, and creating compelling places" (Sargent, Nurse and Lacey, 2017). Projecting outward toward 2020 and beyond, within the immersive environment resides the priority to plan for "access to community" and a "human-centric-experiential space".

Bernstein and Turban (2018) studied the impact of the open workspace on human collaboration. They found that open offices may be reducing rather than increasing

productive interaction. While much has indeed been expressed about the negative effects on the employee and the open office, plan; where balance can be introduced through a sense of community as an identifiable built anchor, the effects may be minimized when a ‘buffer’ is introduced. As in all planning, extremes yield issues, while the apparent solution at first, if the human element is not considered in terms of comfort and behavioral need, in no time, such innovative planning will erode via industry and non-industry criticism. The solution, therefore, lies in addressing in tandem, the open plan, the landscape on which the employee prospects out from balanced with a refuge to retreat, work within and connect with others on a more social level when sought/needed. In addition, a logical plan of spatial topography, a larger lens applied in zonal planning transition, as the New Urbanism Transect Theory underscores, when applied to urban to suburban planning or vice versa is ideal. Extremes in space planning, the furnishings specified, and features do not aide the employee experience nor wayfinding in the topography of the workplace landscape where built environment planning is without mindfulness of the end user.

Figure 11: Workplace evolution of space and usage (Source: Sargent, Nurse, Lacey, 2017)

2.3 Housing Adjustment Theory and Workplace Change Management

The Housing Adjustment Theory of 1975, Morris and Winter underscored so how one adjusts to best suit the environment. The conceptual and theoretical framework for the study of the housing adjustment behavior of families was examined. The authors noted that when one's environment, in this instance housing, did not meet their norm, it gave rise to dissatisfaction thus adjustment took place reduce such deficits toward balance that is unilaterally preferred by the residential inhabitants.

Designers who practice interior architecture, are inherently compassionate professionals who genuinely understand that any change and adoption of such in the workplace can be difficult, adding stress for employees, post a walkthrough of the completed space. For most designers and architects, it is an extension of what designers and architects offer with the understanding that it would be unethical to simply hand one the 'keys' and assume that there were no questions or need to review the new space with staff. Yet, as workplaces become more technology integrated and employees more mobile, the ability to control all elements of a design through construction while navigating the physical build-out or move has become more challenging and difficult to manage.

With regard to the workplace, while significant spatial planning at work points, across the landscape cannot be altered, small adaptability user preference can be offered in flexibility of a space provided within a provided a commons space in ancillary furnishings e.g. tables and chairs to reconfigure at will in turn offering the best iteration for impromptu, or planned meetings, connect space for social gatherings or for two person social proximity.

The need to address significant change and modification, corporate driven initiatives (sometimes with employee input, yet often management input for programming purposes)

has emerged as its own defined service known as: change management. Change management services provide sensors on furnishings to provide data feedback on which spaces are most underutilized and where work actually happens, given recommendations on ways to increase efficiency and advise on real estate cost savings.

In recent years, developing strategies to improve employee satisfaction and productivity based on client needs and the way they work has also emerged (Herman Miller, 2017). Beyond back of the house dashboard statistics, change management helps managers of various companies prepare their staff for a new workplace, engage their employees throughout the change, and drive positive outcomes.

Change management and those that provide such services recommend common suggestions when embarking on a major disruption to the workplace. These are 1) Create the business case for change 2) develop a common vision 3) communicate for buy-in 4) Manage the change 5) adopt and adjust to the change (Levine, 2015). Such language behind change management can be off putting to many in the workplace and infer a strong need to conform. Activity based working, while it may offer complete agility with non-defined workspaces is, as noted, not ideal for those that perform tasks at one location throughout the day, nor does activity based working account for multiple generations within the workplace that may be less agile to adapt at will. It is critical when anticipating "change" to amend the five recommended industry standard model for change management when embarking on a major disruption in the workplace to anticipate for and the understanding that many employees who do not adapt well to change will seek a type of "refuge" during and post changes to their workspace. In change, the entirety of a company's culture may be affected if not planned well. Therefore, providing a refuge zone such as a dedicated commons space that provides a necessary anchor to the buoyancy of change while helping absorb stressors

post occupancy through a socially welcoming space to gather, reconnect and adjust in predictability availability is physically and mentally beneficial.

Infrequently, employees have the option to accept nor deny planned change. Companies will commence with plans and purchases however, if communication is not at least conveyed in a transparent "coached" manner, the results can be extremely stressful- even for the managers. The average employee may feel placed without say and subsequently exposed to such an extent that they incur heightened workplace sensory stress which can manifest itself in personal struggle related to performance. Such as newly assigned to a sit-to-stand desk with their back exposed to a busy cross-corridor.

Change can be good, but without a predictable, anchored, environment to absorb significant disruption/change it is inevitable that employees will exhibit resistance and less likely to adopt. Lewis (2014), author of *Organizational Change and Innovation*, rhetorically asks what would happen if we do not provide for compassionate change management, how might corporate culture and trust negatively affect one's autonomy? Productivity of course may be affected as employees may be less productive if their health suffers in a physical or mental decline. However, a strong indicator witnessed across a workplace landscape of poorly managed change management is evidenced by employees who, once moved, reassigned or simply provided a change-out of furnishings e.g. a sit-to-stand benching desk configuration, reduced square footage, that the employee opts to work from home on a more frequent basis. It is then evident in the lack of on site, end user attendance post occupancy, that non-verbal sentiment has been expressed by the employees, despite the altruistic intention and significant capital investment.

2.4 Hackable Workplace Environments, Intuitive Furnishings and IoT

The notion of workplace “hackability” emerged alongside innovative, start-up, companies primarily based in and around Boston, MA. and San Francisco CA. Many such endeavors were the direct result of the great recession of 2008. A sort of ‘bucking’ at the system of intensely planned architecturally designed interiors that were costly and programmatic in formula. Many entrepreneurial millennials sought to pave their own path by establishing their workplace needs in addition to be able to ideate at will, by physically changing their environment e.g. furnishings to make way for innovative impromptu meetings and ‘plug-in-tech’ to overhead boom access for powering up their temporary workstation solutions. In many ways, the notion of a hackable environment advanced autonomy as well as innovation-yet only from an ancillary perspective in that, the furnishings are not considered the built-environment. For many, the workspace can either stifle or free the mind. Many companies, especially startups want their work environment to mimic their culture and products. Moreover, investors looking to seed the next level of funding, were attracted by spaces that appeared to have a buzz or creativity in the round. One such environment Fjord’s Berlin Studio doesn't have fixed workspaces, they travel and bring their igloos of design culture to client offices, gallery spaces and homes. The kitchen is fixed yet the workplace is completely hackable from technology booms to entire wall dedicated to writeable surfaces, the entire landscape is interchangeable so creativity can happen at any moment for team or an individual. They adjust their space as needed (Beckley, 2016). In such a hackable environment the need to physically de-construct is critical...the de-construction, re-construction process for many is enlightening.

Hacking is now being applied to building in general, as the real estate market enters an era of hackable buildings. Changing preferences, and market demands are requiring building to be reworked for another (O'Connell, 2014). While hacking one's workspace may be necessary for start-ups, the concept is valuable for all workplaces whereby infusing creativity and impulsivity that ignites energy and innovation. Most importantly, hacking is done by the end user to benefit their objective, personal and agile.

As large manufacturers such as Herman Miller that produce product lines such as Overlay and Prospect along with and Vitra's product called Hack have transformed research and development initiatives into customizable and movable furnishing solutions that provide instant mobility and change-out, the takeaway is that the focus remain on the need for the floor plate, in its entirety, to be adaptable not only limited to one furnishing solution. The phenomenon of "hackable environment" provided necessary evidence of employees feeling confined or limited in spatial needs, productivity as a result is compromised while a new, innovative best practice was introduced, change at will to support ideation. What emerged initially as an outcome of necessity based on a crowdfunded, ground swell outcome of limited furnishings funds coupled with the need to innovate them resulted in a new reality in how the client informs design for the first time. "Hackability" simultaneously became an early indicator in the profound shift to examine the built environment closer as it relates to advancing autonomy "choice" of where to sit, engage and how best to work.

The need to have flexibility however, and choice in implementing so in spatial usage toward 2019 experienced a seismic shift in flux and disruption of space neglecting the employee's desire to customize as they needed to adapt vs. being prescribed the adoption to occur at alarming rates. Such ushered in rapid change in workplace design resulted in employees seeking glass enclosed conference space for one user and overbooking of

conference spaces to meet team needs limiting use to other teams when critical planning needed to occur. Basic needs such as employee coat hooks and personal storage had been overlooked to make room for ever changing landscapes that then neglects the end user on the macro or micro planning level.

The Internet of Things (IoT) trajectory is to disrupt such thinking through connected wireless living and working like, hacking one's environment is an effort to provide the employee with more "perceived autonomy' resulting in increased productivity. Today's consumers can select online, an array of innovation, designed seamlessly into everyday objects; objects specifically designed to extend internet connectivity to physical devices in addition to other forms of hardware. The uniqueness of Internet of Things (IoT) innovation, is the ability to communicate through and to each other with little or no human interference or interface. User preferences drive the quickly emerging technology and 'uptick' in offerings that have flooded residences in voice recognition from Google's Alexa device to 'smart' refrigerators that anticipate dinner menus by digitally displaying results ready for the homeowner to start once home.

The ever-changing workplace is no different in the plethora of Internet of Things (IoT) venue hosting technology that adapts, speaks and reacts to personal preference across the workplace landscape. Yet, as the open office adapts to IoT the debate ensues regarding effectiveness. "Adopting open offices, therefore, appears to have the perverse outcome of reducing rather than increasing productive interaction" (Bernstein, Turban, 2018).

The introduction of an open source Sit-to-Stand desk is introduced as an innovative Internet of Things (IoT) desk solution to aid the end user/employee in advancing their workplace autonomy perhaps even social connectedness. The user preference along with the self-regulation of one's personal workplace climate can be 'key' in ultimate comfort and

happiness. Additionally, the single desk sit-to-stand specification is less favored today, benching sit-to-stand desks are more sought by team management. Workplace autonomy is challenged, given the new management preferred popularity of employee group planning as the benching desk's common chassis that supports many benching solutions disrupts the productivity/attention of the opposite colleague every time an employee heightens or lowers their own desk height via an LED intuitive touch paddle or via a programmable app several feet away upon approach. It is well known in the workplace, that once disrupted in heads down work, may take upwards of twenty-two minutes to be back on task. Not to mention, the stress of not being able to exhibit one's disdain for the disruption when one is facing their colleague at a benching Sit-to-Stand workstation only inches away from a colleague. Social connectedness in the way of Internet of Things (IoT) devices, is not necessarily the beacon of social connectedness in the workplace as it was introduced ~ 2018, it will take time for the technology and subscription-based dashboard outcomes to be deemed helpful or hindrance.

It is the totality of a healthy building envelope/built environment consideration along with providing employee choice will inevitably advance autonomy. Case in point, the dark side of disguising technology as a significant contributor of social connectedness in the form of online ease of use and anticipated use, those that own the data or in worse case "share" one's personal (setting) preferences and data usage. Collected data is now determining more than the height of one's desk surface, data is informing Human Resources in the collection of informatics on employee usage and their lack of standing with rise to group health insurance plans. In other words, what may seem like the ideal autonomous healthy choice has a big-brother-mindset opportunity for abuse of data collection and worse discrimination. Arieff, Hagberg and Fisher in a 2019 held an architectural, design industry roundtable, and

collectively remarked on IoT's use and misuse. A panelist commented that they feel "IoT is a dead end, but the prevailing logic is the same as what led us from the expensive personal empowerment of Robert Propst's Action Office II, to the deadening efficiency of the cubicle" (Arieff, Hagberg and Fisher, 2019). A panelist remarked as to what's the equivalent of the cubicle in the Internet of Things? and added that their personal Internet of Things nightmare is that an employer-issued Fitbit forces one to work at a standing desk after they decide they have been sitting for too long. While the panelists agree that it may be beneficial to stand more, it was commented that if sitting is the new smoking, the one panelist noted that he will slouch my way through whole cartons of unfiltered cigarettes.

While much has been expressed about the negative effects on the employee and the open office, plan and introduction of IoT with some positive forecasted implementation benefits; As in all planning, extremes yield issues. That said, IoT to advance communal cultural social ergonomics and connectedness in the workplace can be utilized and proposed to connect the open plan to a commons space/area in the following ways:

1. IoT can be used to inform an employee that the commons space has started a mid-day wellness class or employee collaborative wellness initiative.

4. IoT can be used to alert an employee that the commons space is available for use for a spontaneous team celebration-social gathering-surprise birthday/ team recognition.

5. A workplace (remote presence Robot-IoT) on floor w/ the employee's image to engage with fellow workers or to virtually invite them to the commons area for a gathering.

6. IoT can be in interactive art installation that encourages participation in social connection or provided visual introspective respite.

7. IoT can sense user preference in the commons area with music or lighting or sun control based on circadian rhythm sync.

The, workplace community, commons space must be actively mindful of inclusivity and not exclusivity. Exclusivity can be expressed in both analog and digital expressions such as: posters/ flat screens announcements/ residual gatherings that call attention to specific groups (religious or cultural) or purposefully isolate achievements whereby the cognitive consideration of all staff is neglected in shared commons space usage. IoT within the outerspace, open plan of the common space can be used to promote inclusivity and assist with self-esteem "Esteem" as defined by Maslow. Furthermore, with regard to the SDT theory and IoT, Intrinsic motivators with the workplaces such as: autonomy-supportive interpersonal environments e.g. the commons space, can enhance personal motivation and autonomy, conversely, when IoT is controlling in intent or perceived intent by employees as such, the use of IoT can not only negatively impact a sense of trust and company communal cultural social ergonomics but negatively affect one's intrinsic motivation. Jane Jacobs spoke of inclusiveness in adding "Social Diversity" to applied best practice planning. The same Social-Diversity sensitivity toward all occupants of the workplace commons space along with the varied mixed-use(s) the space provides is paramount. Such consideration will also aid in increased opportunities for productive encounters and proximity.

2.5 Smart Buildings: LEED, WELL Building Standard, Evidence-Based Design

Designing and constructing healthy buildings that promote well-being is not only a selling feature to tenants but a recruitment tool for human resources. Each generation that share today's workplace, of which there are now five generations, seek a workplace that is in some way environmentally conscious. According to the top five healthy building features

implemented by architects include: Better lighting and daylighting exposure, products that enhance thermal comfort, spaces that enhance social interaction, enhanced air quality and products that enhance acoustical comfort. Initiatives that increase employee participation and fulfillment. Sixty-nine percent of owners who measure employee satisfaction and engagement reported improvement in both attributes due to their healthier building investments (Construction Work Zone, 2016).

The Leadership in Energy and Environmental Design (LEED) initiative certifies buildings based on the level of compliance. Achieving a certification of Platinum is the highest acknowledgement from the organization a building owner and tenant can receive. The exclusive case study applied of this research paper study, Saint-Gobain CertainTeed, achieved a double LEED platinum certification. Leadership in Energy and Environmental Design efforts to comply with new building standards inside and out have been widely respected and adapted worldwide and holds with it a new status in the commercial and contract world when companies are seeking healthy workplace environment and succeed.

The new WELL Building Standard, introduced in 2013, focuses for the first time completely in the interior of the building space an employee occupies. The seven features that are applied toward WELL AP Certification address: Air, Water, Nourishment, Light, Fitness, Comfort and Mind. Core and shell, new and existing interior and new and existing buildings are taken into consideration (Delos, 2014 p. 18). WELL uniquely addresses all body systems where comfort is key because elevated levels of even carbon dioxide can affect cognitive abilities, and a variety of toxins in our living environments can leach into furnishings draperies and textiles that occupy a workplace (Mosher, 2017). In 2012, excellent or poor Indoor Environmental Quality (IEQ) translated into productivity gains or losses respectively related to the individual employee (Kim, de Dear, 2012). Another study

investigated how irrelevant speech, temperature and ventilation rate together affect cognitive performance and environmental satisfaction in open-plan offices. Based on subjective assessment, mental workload, cognitive fatigue and symptoms were measured higher when environmental conditions were lower. It was concluded that attention be paid to the whole indoor environment (Varjo, 2015).

A comprehensive review of literature also concluded that improved human comfort in the workplace, building environment were linked when acoustics and, thermal considerations were aligned (Frontczak and Wargocki, 2011; Lee and Guerlin, 2010). Investigated indoor environmental quality differences between office types in Leadership in Energy and Environmental Design-certified buildings in the US. The study found that balanced Leadership in Energy and Environmental Design enhanced employee job performance the most in private offices as compared to open-plan spaces. That said, all of the Leadership in Energy and Environmental Design certified buildings did improve employee performance overall. Color has also been studied in-depth as it relates to employee performance. In a controlled intervention study within a shift-working call center it was determined that the use of color correlated fluorescence lamps within fixtures showed significant improvement in the employee's ability to concentrate versus less expensive and harsh color rendering index output of fluorescence used within pre-existing lamps (tubular fluorescent) (Mills, Tompkins, Schlangen, 2007). Well-being also has been enhanced through the use of plantings, otherwise known as biophilia, applied to the workplace. Numerous studies have shown green initiatives applied present an overall feeling of contentment and improved performance.

Almost thirty years before the introduction of WELL building standards, Seminal research efforts made by Roger S. Ulrich, Professor of Architecture at the Center for

Healthcare Building Research at Chalmers University of Technology in Sweden, in Evidence Based Design significantly impacted the design of hospital construction, and improved the health outcomes and safety of patients around the world around based on the premise that the built environment can impact patient behaviors and health associated with recovery. The negative impacts of hospital noise on patients and nurses, and how by the introduction, use of nature, gardens, and art could lessen pain, stress, and healthcare costs. (Ulrich, 1984).

Such studies underscore that peripheral conditions within built environment can affect an employee's heath. The WELL Building Standard "Mind" category is now front and center focusing on employee's mental well-being. Inclusive of this is, then the need to advance mental well-being consideration beyond healthcare study to the physical built environment that of the workplace, where for many, occupy the cloistered environment upwards of ten hours a day.

2.6 Placemaking, M.I.T. 30-Meter Rule, Generative Design, New Urbanism Transect Theory

Jacobs wrote: "If you substitute 'office' for 'city street neighborhood,' that sentence becomes the perfect statement of what the modern employer wants from the workplace" (Gladwell, 2000). Moreover, "Sparsely populated suburbs may look appealing, she said, but without an active sidewalk life, without the frequent, serendipitous interactions of many different people, there is no public acquaintanceship, no foundation of public trust," (Gladwell, 2000). The writings of Jane Jacobs in the *Death and Life of Great American Cities* Jacobs spoke passionately about the street on which she lived, Hudson Street in lower Manhattan and how the location acted as an "urban ballet" in concert with the surroundings,

people and sense of place which resulted in a strong Sense of Community. Jacobs' writings became a critical primer that has guided workplace designers in the last twenty years. It was the sense of community that Jacobs exposed urban planners overlooked and in doing so "overlooked essential aspects of human make-up" (Sussman and Hollander, 2015).

The two key individuals that were instrumental in the promotion and groundswell behind Urban Planning were Jane Jacobs and Kevin Lynch. In addition, the 1960s, William Whyte offered ground-breaking concepts and ideas based on designing cities that considered the people within, not just the vehicles and exterior architecture. In Whyte's published work, Whyte emphasized the need to create social life in public spaces. Placemaking, used as a term, was adopted in the 1970s by architects and planners to describe the process of creating squares, plazas, streets, parks and waterfronts that attract society because they are designed to be engaging and attractive. Whyte's study of New York Urban Spaces focused on the urban 'Plaza'. In the short film, The Social Life of Small Urban Spaces established the planning theory that "The idea is to make all of a place usable for everyone." Whyte was a proponent of spaces where: Sitting space, sun, food, water and foliage were shared by all to thereby truly engaging a sense of community (Whyte, 1980).

Jacobs described cities social networks as places where purposeful 'activities' are engaged. While she did not hold an education in architecture or urban planning, she found inspiration from observing her own neighborhood as to why certain places "communities" synthesized. Her ideas were indeed considered extreme dialog for their time. In his book,

The Image of the City, Lynch defined communal qualities as a network of paths, edges, districts, nodes, and landmarks. Such an effort was the catalyst for “Placemaking”.

Figure 12: Illustration of The Image of the City (Source: Lynch, 1960)

Jacobs emphasized how critical it was that in order for a community to thrive, those that inhabit the space must be allowed to gather, converse and share thought. To Jacob’s the v, in lower Manhattan, was her laboratory to observe the larger truths about urban life. It was the village where Jacobs stressed that the character of a place, neighborhood should be the starting point for thinking about significant change. “Hers was not a prescription of what should happen but an observation of what does happen when certain genuine urban conditions exist” (Schubert, 2015 p. 16).

If we look at the workplace landscape it akin to an urban plan, as the workplace is in a continual state of flux and given the onset of fee-address more commuter-like in traffic-

use than ever. Gladwell reflected on the legacy office management's damaging effect on workplace connectedness and ideation and noted that the office used to be imagined as a place where employees would punch the clock and bosses would roam the office landscape halls like high-school principals, searching for miscreants. Furthermore, Gladwell remarked, when employees sit chained to their desks, quietly and industriously going about their business, an office is therefore not functioning as it should be. Gladwell closed with stating because innovation is considered the heart of the knowledge economy it is therefore fundamentally social. Gladwell mentions that ideas arise as much out of casual conversations as they do out of formal meetings within the workplace (Gladwell, 2000). Furthermore, Gladwell emphasizes that innovation comes from the interactions of people at a comfortable distance from one another, neither too close nor too far.

To highlight the necessity of proximity and community within range a researcher at M.I.T. named Thomas Allen conducted a decade-long study and found that the likelihood that any two people will communicate drops off dramatically as the distance between their desks increases. Conversely, employees within a workplace are four times as likely to communicate with someone who sits six feet away from us as we are with someone who sits sixty feet away. More so, it was noted that staff seated more than seventy-five feet apart hardly talk at all. Interestingly, British anthropologist Robin Dunbar theorized, first proposed in the 1990s, that the critical number to consider was 150 and relatable to all mammals, those her studied non-human and human (Dunbar, 1992). Dunbar's research underscored a ratio between brain sizes and group sizes through his studies of non-human primates. Dunbar then concluded that the size, relative to the body, that of the neocortex, the part of the brain associated with cognition and language, is indeed linked to the size of a cohesive social group. Furthermore, this ratio limits how much complexity a social system

can handle, no more than 150 people at a time in a social group. The same can be applied to a workplace commons space in square footage optimal planning given varied seating and spatial proximities of employees.

Jane Jacobs' west village success was dotted with a wealth of nearby cafes, stores, bars and public parks, all expressions of "community gathering places". Environments that were indeed 'built' and simultaneously anchored, intimate in size, focused community space, allowing for free exchange of ideas on a neutral specific site where social equality prevailed. "There are specific criteria for determining public space. Generally speaking, a public space is a place that is accessible to the public at any time of day, such as parks, beaches, squares, roads, sidewalks, etc. These spaces all serve different functions and can easily just be seen in spatial terms. Yet with the effort of communities, they can be turned into lively, creative spaces that bring people together" (Yang, 2015). Above all, public spaces help to build a sense of community, civic identity and culture." In addition, Jacobs then wrote about what defines a successful "place", which then led urban planners to adopt Jacobs's Placemaking principles from the mid nineteen sixties on. "Jacobs discovered that the most economically successful areas, as well as those that were the safest and most pleasant to be in, had these four characteristics: 1) There were various types and ages of buildings. 2) There was a high concentration and density of uses. 3) The uses were mixed, not just all one kind of thing. 4) There were frequent streets and very few long blocks (Urban Space Gallery, CA). In addition, Access and linkages, Comfort, and image, Uses and

activities as well as Sociability was included. It was in the late nineteen nineties that designers started to adopt and apply principles of Placemaking to the workplace.

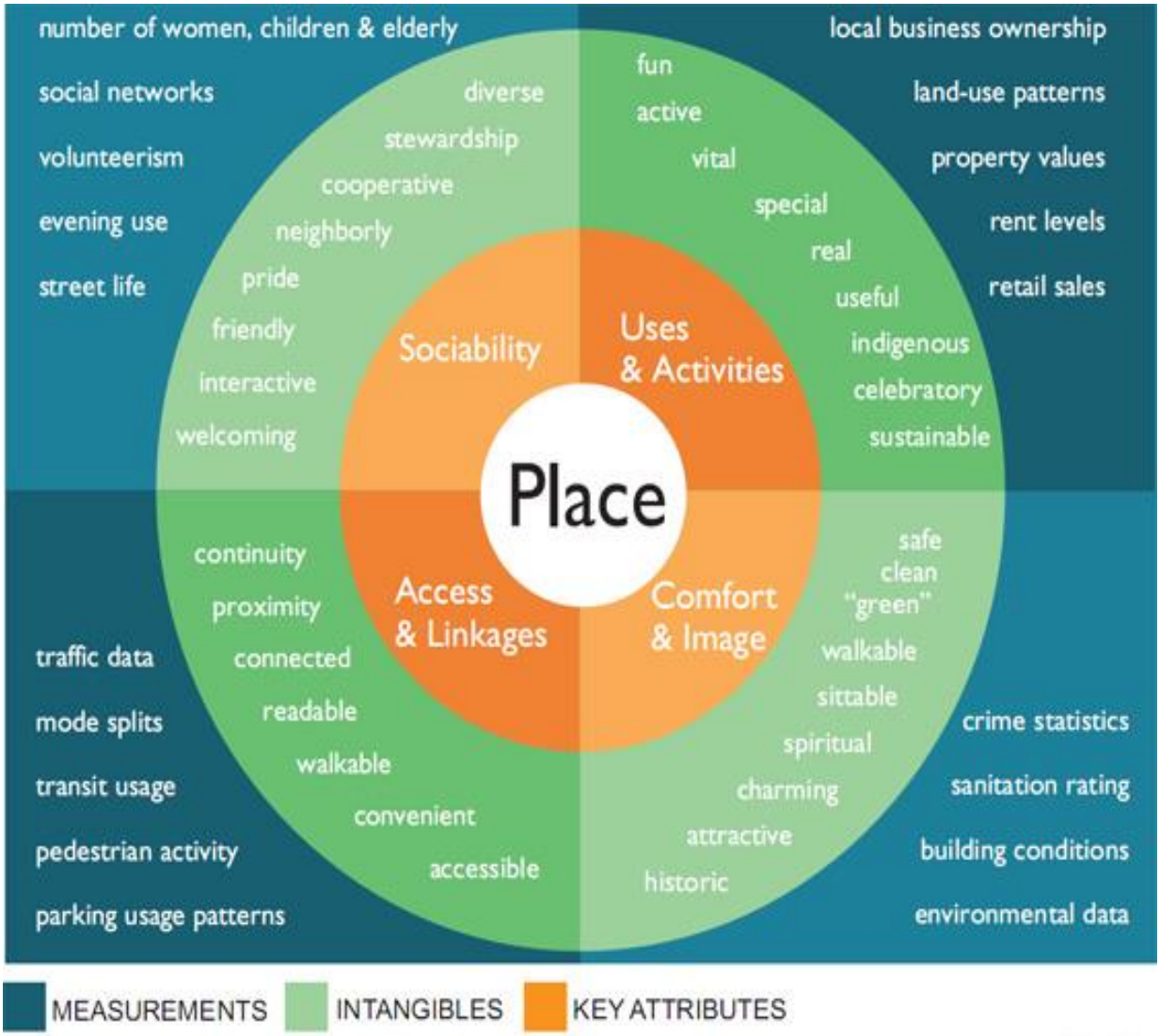


Figure 13: Illustration of Placemaking Planning (Source: Project for Public Spaces, 2016)

Interpretation of 'Place' and advancing Placemaking from a leadership hierarchy layout has been adopted per interpretation of Jane Jacobs's writing on key "Public Characters." "A vital community, in Jacobs's view, required more than the appropriate physical environment. It also required a certain kind of person, who could bind together the varied elements of street life. Offices are no different. In fact, as office designers have

attempted to create more vital workplaces, they have become increasingly interested in identifying and encouraging public characters" (Gladwell, 2000).

In essence, Jacobs was referring to community neighborhood individuals who own and operate anchor-like establishments within a neighborhood. The proprietor indeed provides a valuable pulse on those that enter and exist resulting in maintaining a mental snapshot of the well-being of the community as a whole. Yet, it is important to keep in mind that employees are not products, as they are not defined solely by their biology, family nucleus, schooling or their assigned organizational position; "their view and skills have been shaped by the organizations in which they spent their lives…. An organization is not simply, or even principally, a set of boxes, lines, and titles on an organizational chart" (Kim, 2013).

Stephenson (2014) distributes questionnaires to company employees, asking about which people they have contact with, whom do they like to spend time with? whom do they talk to about new ideas? Whereby, post the collected survey, every name in the company is identified, denoted, by a dot on a graph, Stephenson then draws lines between all those who have regular contact with each other. Stephenson refers to her graphs as a constructed social X-ray network. Stephensen depicts hidden social networks beneath organizations and co-created the formula for *ranking* the workplace individuals as knowledge conduits. "The mention of "Public Characters" Jacobs espoused as critical to the livelihood of a community, from a "Gatekeeper" viewpoint and indeed trust is assigned yet, it is specific to referencing, benefiting the "collective", the "community", identifying single individuals as in charted, identifiable "ranking" in the workplace with regard to a plotted staff social hierarchy isolates and labels particular individuals/staff unjustly and does not advance natural social networks to occur s*ans bias*. "Cities have the capability of providing something for everybody, only because, and only when, they are created by everybody." —

Jane Jacobs, *The Death and Life of Great American Cities*. The same quote can be applied to the workplace as they are created by everybody, providing a Sense of Community that welcomes non-identified individuals and establishes a universal social connectivity amongst staff. In particular, as the workplace becomes more of a touch-down space versus legacy drywalled offices, a location for collaboration, ideation and innovation, management practices are striving to change their hierarchical establishment structure of 'perception.' Managers more and more are encouraged to walk the landscape and engage at random times with employees to relate on a colleague level.

The millennial workforce is driving the preference for non-hierarchical management as well. Hierarchical practices of "networks and patterns of trust that arise as people work together over time, and that are hidden beneath the organization chart" is quickly identified and the same trust that was established through such charting may lead to instability. The shift in management style underscores Sense of Community as becoming paramount however with an honest unilateral transparency. In the book entitled: *Leadership in Spaces and Places*, the authors write that "there is a link between an objective architectural and managerial approach to physical environment and an understanding of the symbolic meaning of physical space in terms of social interactions and power relations" (Ropo et al., 2015). "Researchers of environmental psychology have typically focused either on psychology or the physiological systems of the human being and tried to understand how the built environment affects wellbeing through these systems" (Ropo et al., 2015). "Doolittle and MacDonald (1978) developed the 40-item Sense of Community Scale (SCS) to probe communicative behaviors and attitudes at the community or neighborhood level of social organization. The basis of the SCS was what had been called the "critical dimension of community structure" (Tropman, 1969, p. 215).

McMillan and Chavis (1986) identify four key component parts-membership, influence, integration and fulfillment of needs, and shared emotional connection, a scale called the SCI-2. The scale has been applied to neighborhoods, cities, recreational clubs, schools, universities, workplaces, etc. (Vanover, 2014). However, the study does investigate nor define trust and communal cultural social ergonomics associated with sense of community as it relates to the workplace-built environment.

Kim (2013) asserts that more purposely designed physical workplaces could contribute to performance improvement by leveraging human capital and management capacity in public organizations and provides an initial survey of the literature on workplace design by introducing a synthesis of available research drawn from environmental design, organizational ecology, social psychology, architecture, political science, and business and public administration. Per the author, "Based on the literature review, I developed a model of organizational performance that underscores the importance of "place" variables, such as space arrangement and indoor environment. The model implies that physical workplace has a significant impact on affective, behavioral, and performance outcomes in the organization. Kim (2013) concludes with implications for theory and practice.

Placemaking, identifying "public characters," behavioral and environmental psychology in addition to the physiological systems of the human being as it relates to the built environment, all underscore wellbeing as not only important but affected by the built environment. Through such groundwork research, the importance of establishing a sense of community, per Jacobs's vision is now on the cusp of industry dialog and prioritization. In a 2016-CBRE entitled: Wellness in the WorkPlace, Unlocking Future Performance report, the Top Ten wellness properties for employees have been defined with "sense of community" listed in the top three: Flexible working to improve work-life balance, Private health

insurance, Sense of community, Reduced extra hours, Opportunity to exercise, Availability of healthy food options, Adjustable desks, on-site amenities (e.g. child care, dry cleaning, banking), Medical advice from doctors, check-ups from nurses and Health advice on matters including diet and ergonomics. Anticipating that which 'socially binds' employees through connectivity in the workplace i.e. designing for and establishing a Sense of Community is paramount in consideration, planning and monitored application thorough maintenance.

Evidence has emerged that illustrates, more than money or comparable extrinsic incentives, the human brain is rewarded by forging connections with others. Lieberman, a pioneer of social cognitive neuroscience concluded that the human brain has been primed by evolution to view the world in social terms (Lieberman, 2013). However, some company CEOs believe that a sense of community can be established by an executive fiat across the board as a driven mandate (Naylor et al., 1996). The very essences of our free enterprise capitalistic system often involves promoting the virtues of individualism which then can often subordinate the interest of the greater overall community to those of the individual, as in the workplace employee (Naylor, Willimon and Osterberg, 1996).

One could apply a parallel of interest of the community to those of the individual to that of urban sprawl, beyond the city-scape of Manhattan or the west village, whereby the outline planning and development of areas outside of a city, urban center, are without connection in nature or linkage. Where "big box" planning and construction arises with complimentary, vast asphalt parking lots, lacking similar ingenuity or sensitivity to the "place" of Placemaking. The New Urbanism Transect Theory, is a vital concept for form-based design and coding providing pause to consider the natural iteration of planning so that there is less of a contrast between the urban and suburban community above all, in ease of access and predictability in travel to and from. "In every way, this is a model of how things

should change" (Duany, 2010). Such planning can be applied to the open plan of today's workplace landscape. A commons space (of which there may be more than one commons space per given floorplate or openly connected by floor) in the workplace, must be designed to flow and compliment the outer space so that there is present, logical linkage in planning and use to benefit the employee through ideal Connectivity via ease of access, walkability nearby, mixed-use & diversity.

A mixture of uses such as complimentary amenities within the dedicated commons diversity of people such as in ages, income levels, cultures, and races while enhancing employee Quality of Life (enriching, uplifting, and inspiring the human spirit), Quality Architecture & Urban Design (Emphasis on aesthetics, human comfort, and creating a sense of place) Human scale architecture and Sustainability considerations of the surroundings to nourish the human spirit. Six of the ten principles of New Urbanism when applied will ideally strengthen WSOC.

Active Design when applied to Workplaces combines multiple pathways for health risks and ideally complements New Urbanism Theory principles in tandem e.g. Walkability with Active Design objectives, by encouraging movement, stimulating physical action, and varying worker postures throughout the day. Research has shown that health promotion through human resources programs, policies, and environmental changes can improve employee health and productivity, with potential savings in healthcare costs. Active Design solutions are not only cost-effective and widely implementable in the workplace, but they are also capable of providing measurable outcomes.

Thigmotaxis, the human behavior associated with natural posturing of the body to aid in navigation of space can be heightened in city planning areas that do not provide for a cohesive transition of innate navigation, e.g. a narrow streets that randomly open upon a

vast plaza can cause a schism in flow for the pedestrian and introduce anxiety. Piazza San Marco in Venice, Italy skillfully funnels the pedestrian to a single point of entry, whereby transitioning, preparing, the visitor prior to the significant contrast in openness one then gazes upon when entering. Had the narrow perimeter Venice side streets not allow for transition to the plaza at a single point of entry; Piazza San Marco may not have been as tranquil, inviting and popular as a reflective setting once within the high walled courtyard.

Another example, on the commercial real estate end, is theme park use and popularity applied to transmission of space or "Pavilion". Disney's thematic transitions from land to land and attraction to new attraction is a well-planned effort to aid the park goer's subconscious by providing a feeling of comfort in walkability, connectedness and navigability within the park. Often denoted with planned archways to further introduce transition for the visitor much like a Japanese torii gate marking the entrance to a shrine or temple. Magic Kingdom is still highly popular today for this reason. Considerations in alignment in transition of space planning from macro (outer work point areas) to micro newly planned commons space has similar planning consideration needs. Applying a Birdseye lens to logical flow of space, interior architecture as well as aesthetics e.g.

furnishings will overt wayfinding and visual inconsistencies that prevent a natural succession to areas that a workplace commons space in use and benefit.

Generative Design offers a gateway of space planning iterations when coupled with Placemaking principles that consider sense of community as a critically embedded design consideration in the physical built-environment, and can offer creative programming solutions that may have never been considered resulting in an optimal outcome that benefits the entirety of the workplace experience through connectedness and belonging not only to the built space but to fellow staff. Defining a dedicated community space iteration while applying New Urbanism Methodology planning is “key” to support transitional linkage to the macro, vast outer floorplate.

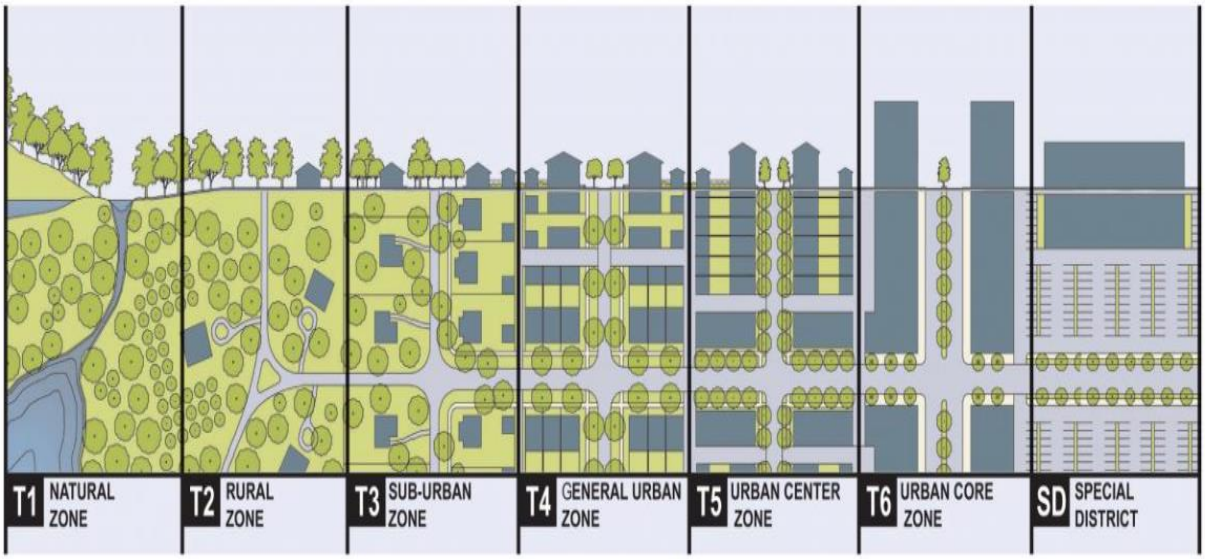


Figure 14:Illustration of new urbanism (Source:https://oxnardrenaissance.org/2017/11/02/25-great-ideas-new-urbanism/)

2.7 Social Ergonomics, Cognitive Architecture, Prospect and Refuge Theory

In application of Jane Jacob’s writings thereof; Placemaking applied to the workplace has been interpreted within the last decade within the built environment to

represent an open, “urban-like-plaza” setting where social exchange and community can be expressive and bonding advancing autonomy and company culture. Yet, while “Social sustainability can be attributed to various physical factors in the city, among the important factors that are often associated with social sustainability is the availability of public spaces. However, the success of this public space is still disputable. This study is about the urban plaza and its role in the formation of a sustainable and vibrant city. It asserts that the existence and preservation of such spaces in a city is vital. The findings from the study highlights that urban plaza has more than one meaning, strong reason that encourages the locals to utilize the area” (Harun et al., 2014). While the plaza is a public space with hierarchical status assigned, if too open, too exposed, it may not provide the necessary sense of refuge employees to seek to connect with one another and have the adverse effect of leaving one feeling isolated. The plaza-like setting is effective for initial exchanges in the open but not on a deeper level where community is developed, lives.

Plazas can hold similar characteristics to modernist built concrete open concourses as compared to Le Corbusier's United Nations building plaza concourse Jacobs was opposed to. Functional for pedestrians and automobiles to approach, open yet highly exposed. William H. Whyte commented that “Ideal locations are open to action but slightly recessed” Whyte was referencing ‘plazas’ and areas where people gather. Jacobs passion for the low line of brownstone buildings, storefronts that lined Hudson Street was just what Modernists at the time, had a profound disdain for. Higher and void of cloistered activity, Le Corbusier preferred. Yet, Jacobs principles were grounded on the innate human need to connect to nature because as humans we are of nature. That said, Jacobs was not opposed to Modernism, just a modernist approach without sensitivity to mixed-use diversity in planning.

The study of “Thigmotaxis defines the borders of space and visual scanning reframes it. We as humans appear to use these strategies during our everyday activity in novel situations” (Sussman and Hollander, 2015). Cognitive Architecture, the literary work, is based on the idea that the built environment can benefit from multiple subconscious knowledge and practice thereof innate human behavioral traits that when applied can result in spaces, interior and exterior that enhance a sense of order, well-being and ideal wayfinding for all persons. The book from start to finish underscores Darwin's theory of evolution, in that “the thesis of the book is that the more we understand how human beings are an artifact of Darwin’s theory of evolution, the more creativity and successfully we will be able to design and plan for them” (Sussman and Hollander, 2015). The notion that our sense of aesthetics is at the root of all biological, evolving over many millennia. Evolutionary biology, psychology, neuroscience, and genetic findings are constantly advancing our understanding of what it not only means to be human but the advancements as a populous is also what binds us in common behaviors.

Sussman and Hollander (2015) discuss psychological traits that can be found in patterns, storytelling of architecture, edges etc. and the idea that how we function and more importantly, relate to our surroundings is subconscious and innate. The innate need for humans in this instance employees to be able to seek out and find solace, refuge in an anchor that support a sense of community therefore should hold design elements that nestle, foster, engage the employee vs. having the employee find comfort on the periphery of a space due to no practical way in which they can transverse in and find refuge to engage fellow colleagues.

Appleton’s Prospect-Refuge Theory is the most well-known theory for explaining environmental preference in the architectural, interior and urban design disciplines its

application in design actually combines aspects of Berlyne's (1951) 'arousal theory' and Kaplan and Kaplan's (1989) 'information model'.

Dosen and Ostwald's paper revisits key quantitative evidence that is available for the Prospect-Refuge Theory and collectively assesses their findings and relevance to the design of landscapes, cities, buildings, and interiors. Dosen and Ostwald's paper reports that a close visual connection to nature and of inhabiting a space that offers both an open area for outlook and a more private area for being hidden such as an alcove or nook, the results for complexity seem to confirm that an offering a degree of complexity in interior space, such as the workplace is preferred, for example higher and lower variety in ceilings, but they are unclear about how much or where it should be.

The relationship then to creating a sense of community is to identify a space that purposely offers refuge, but that one can prospect out from, distant and expanded vistas, offering varied interior heights and visual access to natural views/light. Combining elements of biophilic attributes of natural habitats will aid as well in establishing such a necessary refuge. Important to note, that creating a sense of community by adapting refuge to prospect design considerations is not to be misconstrued with refuge rooms isolated spaces with the sole intent to allow for "heads down" work or an isolated location for one to "contemplate". Refuge rooms are intentionally closed off to others when in use or limited in use to no more than three persons. Spoken volume in refuge rooms does not elicit the same permissions that a community gathering of social purpose will allow for.

In the following workplace landscape progression image (below), one can see the integration of such refuge rooms AKA huddle rooms, phone booths, meeting spaces, offered as "flexible and or agile spaces", rooms that can be booked or occupied, a type of spillover space where, privacy due to inefficiency of open desking and/or acoustic interference

support such rise in preferred agile locations. Yet, while the newly added varied spaces offer flexibility in choice, when and if available, they are often not flexible in layout/multipurpose use which can further frustrate management when 'agile' accommodations are needed in turn providing little agility.

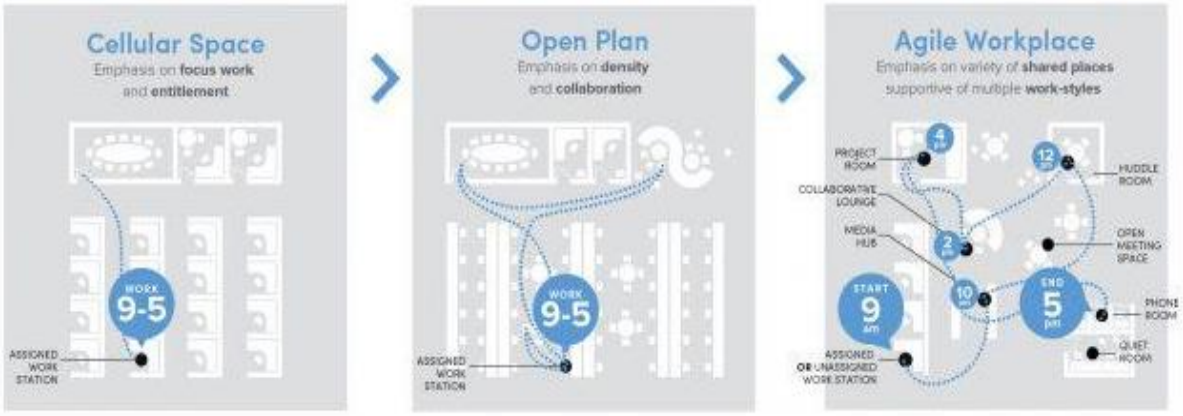


Figure 15: Illustration of Evolving Workplace Paradigm (Source: https://www.tedmoudis.com/)

A Geographic Information System (GIS)-Based Analysis of Social Capital Data research study: examined suburban communities looked at proximity of services, building and facility types concluding that the "location of the key common urban spaces and the visual connection between different spaces within a neighborhood, e.g., visual links between residences, are important factors for social interaction" (Rahimi, Martin et al., 2017). The research empresses that in order for communities to thrive "social" connection and visual social connection must exist. In addition, a stronger sense of trust in such neighborhoods is reported due to the social connectivity, sense of community. Social relationships studied in detail by E.T. Hall in his published work, *The hidden dimension* in 1969, was a monumental study of social proxemics, comfortable distances between people, how people congregate and engage. More importantly, how one's personal space is a defined territory that can ebb and flow affecting personal and workplace relations. To advance social proxemics to

workplace social ergonomics naturally factors in workplace: relationships, proxemics, privacy, and territoriality. Personal space in an open plan environment while ‘open’ does not automatically encourage subliminal spatial closeness in connection yet, commons, social gathering spaces support such postures in turn, strengthening workplace social relationships. With the introduction, integration of the built environment’s surroundings and furnishings infused with social proxemics, if planned with workplace community consideration at the forefront, not only in improved sightlines, circulation and posture of how spaces are furnished for improved visibility without hierarchical preferences of the user in macro space planning (outer floorplate area),but will then holistically support all staff thus strengthening company culture and trust inclusive of a micro-planned commons space as well.

2.8 Workplace Trust, Company Culture & Employee Centricity

Former Herman Miller CEO, Max De Pree once said, “The first responsibility of a leader is to define reality, the last is to say thank you. In between the two, the leader must become a servant” (Zak, 2017). “Yet despite being more sensitive to employees’ needs than lean approaches, it remains true that even the most benign, design focused space management strategies still tend to assume that it is management’s prerogative to retain control of the workspace (Laing et al., 1998). This assumption is one that is increasingly being called into question—not least by designers themselves. In particular, some psychologists have argued that employees should be encouraged to decorate their immediate space with meaningful artifacts to project their identity onto their own environment and to give some sense of permanency, control, and privacy (Baldry, 1997; Hall, 1968; Vischer, 2005)” (Knight and Haslam, 2010). “Meanwhile, research in both environmental design and psychology points to a link between a reduction in workplace autonomy and greater levels

of stress-related complaint (Bringslimark et al., 2007, Danielsson and Bodin, 2008, Scheepers and Ellemers, 2005). Similarly, a meta-analysis by Humphrey, Nahrgang, and Morgeson (2007) suggests that an integrated approach that accounts for social needs at work increases motivation and satisfaction" (Knight and Haslam, 2010).

In the book entitled: *Harvard Business Review on Managing People*, one of the articles co-written by Goffee and Jones presents an illustrated matrix that defines organizational culture, more so, the matrix defines what holds a company together: Culture, in a word has been defined as community. "It is an outcome of how people relate to one another. Communities exist at work just as they do outside the commercial arena...one of the great errors of the recent literature on corporate culture has been to assume that organizations are homogeneous" (Goeffe and Jones, 1996).

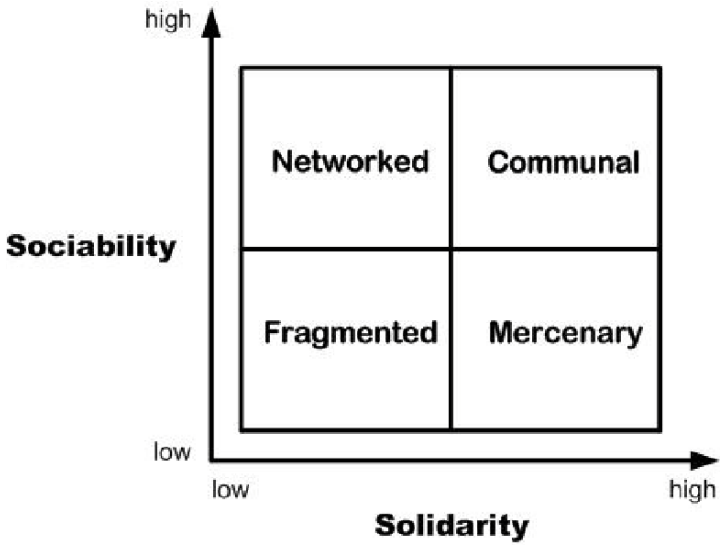


Figure 16: Illustration of matrix that defines organizational culture (Source: Goeffe and Jones, 1996)

Zak whose work is in the neuroscience realm commented that creating an employee-centric culture can be good for business and more so building a culture of trust is what makes a meaningful difference. He also mentions that employees in high-trust

organizations are more productive, have more energy at work, collaborate with their colleagues, and stay with their employers longer than people working in low-trust companies. Employees also suffer less chronic stress and are happier with their lives, and these factors fuel stronger performance. (Zak, 2017). A neuroscience study conducted by Zak concluded that the brain network that oxytocin activates is evolutionarily old which he explains that the trust and sociality that oxygen enables are deeply embedded in our nature. Zak mentions, in a similar way to that of cognitive architecture, in that it is innate. He references the importance of "mirror neurons" which allow for employees to sense, feel and react to another employee's emotion which he states is key in not only building trust but also in maintaining a strong sense of community within corporate organizations, the workplace. "Free and open communication in the workplace allows for smooth functioning and combats the we-they barriers that can arise...a loss in community shows itself in absenteeism, in high employee turnover, in breakage, and in the failure of quality control systems. Regenerating a sense of community opens up the possibility of raising employee morale, heightened productivity, and welding the company into a smoothly functioning team" (Rossi and Shank, 2000). If not applied lack of open communication can lead to that of "Loneliness also seems to interfere with the functions of mirror neurons — those agents of empathy used by the brain to infer the experience of others. In various tests, lonely subjects interpreted facial images of anger, fear, happiness, and sadness less accurately than did non-lonely counterparts. Other tests found that lonely people fixated on negative images,

such as that of a person in peril. Still others showed a tendency toward being distrustful among lonely players in a trust game" (Jaffe, 2008).

It is through recent breakthroughs that in neuroscience research, that we now know that our brain predominantly experiences the office workplace landscape as a social system. We navigate and then benefit from interrelationships among individuals, colleagues as well as groups and the organization as a whole. "We all come into the workplace with social needs, such as the need to feel acknowledged and appreciated, the need to be treated fairly and respectfully and the need to feel supported and valued by our supervisor. If these needs are overlooked, neglected or unmet, it's very difficult to feel engaged" (Anderson, 2017, online, main page). Subsequently, attention narrows to focus on the perceived threat to the workplace employee 1) The ability to think and reason decreases, 2) The ability to solve problems decreases, 3) Collaboration drops, 4) Empathy decreases, all factors that support the hypothesis that by not provided an appropriate "identified" refuge to foster a Sense of Community, a company culture due to diminishing sense of trust may falter as a result of not accommodating for.

It has been mentioned, in recent research, that employees not only work for money, they also are seeking meaning and more so, purpose in their work life; and accordingly, designers need to provide employers with a workplace landscape that promotes stronger employee engagement by supporting well-being (Govaars, 2017). Research conducted by Dietz examined the extent to which measures operationalization of intra-organizational trust reflect the essential elements of the existing conceptualizations of trust inside the workplace by first defining peer reviewed definitions of trust (Table 1) then demonstrating the different qualitative degrees of trust in a continuum in (Figure 17).

Table 1: Illustrates Common Definitions of Trust (Source: Dietz, 2006)

Definition	Author
The conscious regulation of one's dependence on another	Zand (1972)
The extent to which one is willing to ascribe good intentions to and have confidence in the words and actions of other people	Cook and Wall (1980)
A state involving confident positive expectations about another's motives with respect to oneself in situations entailing risk	Boon and Holmes (1991)
The extent to which a person is confident in, and willing to act on the basis of, the words, actions and decisions, of another	McAllister (1995)
The willingness of a party to be vulnerable to the actions of another party based on the expectation that the other will perform a particular action important to the trustor, irrespective of the ability to monitor or control that other party	Mayer, Davis and Schoorman (1995)
The specific expectation that an other's actions will be beneficial rather than detrimental and the generalised ability to take for granted… a vast array of features of the social order.	Creed and Miles (1996)
Confident positive expectations regarding another's conduct in a context of risk	Lewicki, McAllister and Bies (1998)
…reflects an expectation or belief that the other party will act benevolently	Whitener *et al* (1998)
A psychological state comprising the intention to accept vulnerability [to another] based upon positive expectations of the intentions or behaviour of another	Rousseau *et al* (1998)

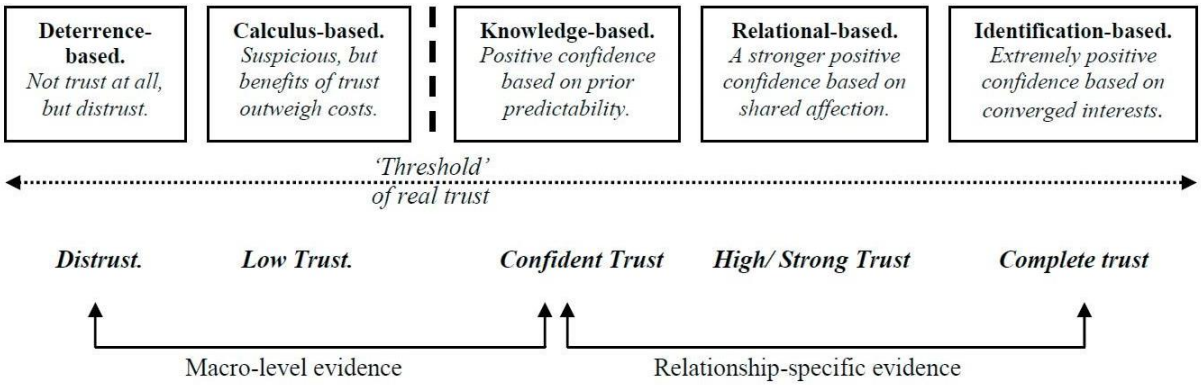


Figure 17: Illustrates the Continuum of Degrees of Intra-organizational Trust (Source: Dietz, 2006)

A comprehensive study on Wellbeing and Trust in the Workplace is based on three surveys that utilize life satisfaction regressions in Canada and in the United States. The studies based on a 1-10-point scale, resulting in a conclusion workplace results can be seen as part of a move towards using measures of subjective well-being to estimate the relative importance of income and other aspects of life at work, in the home, in the community, and across nations. The researchers accumulating results illustrate the high values attached to the

social context and furthermore helpful implications for how firms, communities and nations can be better managed. (Helliwell and Huang, 2010).

Workplace planners discusses envisioning the 21st century workplace as it invokes various images for different people. One planner commented that some imagine instability, others foresee the mainstreaming of folks working remotely. Others confirm that visions of teamwork and community such as pool tables and community spaces, are now commonly projected as the means to derive optimal creativity and increased profits. Goldstein (2017) commented, "diversity may rise to the top of firms' agendas, but too often, inclusion eludes them. The missing ingredient to these professional visions of grandeur is trust".

The notion of the significance of "*trust"* in the workplace sparked a lengthy in-depth study of prominent peer-to peer authored papers and research. The following compiled summaries are a comprehensive review, a nexus of theses based on the respected Organizational Management studies and authored perspectives that strongly support providing for a sense of community in the workplace.

Communication is the glue that holds organizations together according to Poole et al. (2011). Furthermore, the communication structure is the organizational nervous system, the interpretive perspective, focuses on the understanding, the meaning of the organization and its activities to its members. The authors view the organization as a community or culture, the socialization and the assimilation of employees are important for organizational effectiveness and survival. Tompkins and Cheney (1985) note that a critical aspect of socialization is the interaction of organizational belief, values and forms of reasoning. One could argue that 'national' context could relate to an organic interpretation that of the workplace, specifically, the built environment. Vernon Miller, who wrote on Assimilation outline the process by which "...individuals move from outsider to full-membership in an

organization." Within his writing, Miller, discusses "exiting" a final phase of an employee's time while employees. Today, there is a connection between 'existing' and the increasingly remote worker to be key areas of neglect, by providing a defined space between where a Sense of Community can exist in the workplace and assist in supporting such phases of onboarding on a peer-to-peer level. The profound consideration on the effect on the employee provides and intriguing correlation of a possible negative outcome as it can affect mental stability.

The People Make the Place is an intriguing deep dive paper into a framework for understanding the etiology of organizational behavior. Schneider's framework is based on theory and research and proposes that "…organizations are functions of kinds of people they contain and, further, that the people there are functions of an attraction-selection-attrition (ASA) cycle" (Schneider, 1987, p.437).

Campion et al. in 1985, 1988 and later in 1991, wrote about the relations between work group characteristics and effectiveness. Work groups throughout the earlier twentieth century were primarily established to increase assembly time and output of manufacturing efficiency (Taylorism). However, "psychological approaches to work design have been historically, theoretically, and empirically in conflict with traditional engineering approaches) e.g., specialization, assembly lines (Campion et al. 1985, 1988, 1991). The present study examines the rise in workplace collaboration and the simultaneous establishment of work groups to assigned employees to aid in such collaboration and ideation. The author(s) paper is based on review of the "work group" studies and research to date then applied to five themes and 19 characteristics that were delineated. The work groups were then "evaluated" against both objective and subjective criteria of effectiveness for eighty work groups.

Commentary by the co-authors throughout the paper that were relatable to this study topic were as follows: Groups hold the potential for simultaneously increasing both productivity and employee satisfaction. One characteristic in the theme is self-management, which is the group level analogy to autonomy at the individual job level. It is central to many definitions of effective workgroups. Environment is related to productivity. Effectiveness may be enhanced when members help each other and have positive social interactions. Lately, communication and cooperation with the work group are also important to effectiveness.

Christian et al. (2011), provided a quantitative review and test, a meta-analytic of techniques tested on how engagement will predict job performance over and above job attitudes based on the authors framework. In their review, Christian et al. (2011) found engagement as a fundamental motivator towards personal resources assigned to tasks associated with one's position/job. The overall common denominator provided through numerous cited examples is that work engagement concerns the 'self-investment' of personal resources in work.

The authors then describe factors that impact work engagement such as "state" vs. "trait", subsequently, debates have emerged as to whether "…engagement is best thought of as a relatively stable trait, a temporally dynamic state, or both" (Dalal et al., 2008). Additionally, defined 'influencers" of work motivation for ideal engagement mentioned, include job characteristics, leadership, and dispositional characteristics that influence proximal motivational factors. Overall, the paper speaks to "engagement" and in many ways, aligns with the importance of this research study. The authors ask for needed research to explore the workplace and engagement. Furthermore, they defined job characteristics to include autonomy and social support

Chen and Klimoski (2003) provided statistical meaning to the impact of expectations on newcomer performance in teams and mediated by work characteristics, social exchanges and empowerment is based on a precedent of twelve of hypotheses. The authors used a longitudinal model to test whether individual differences and motivational and interpersonal differences to predict newcomer role performance. The figure, Hypothesized Model of relationships (below) presents the co-authors hypothesized model of newcomer role performance, which is based on the work of Eden (1990, 1992) and of Anderson and Thomas (1996).

Eisenberg (1990), brings to light the importance of consideration applied to shared team meetings. Eisenberg looks to the musical world for inspiration to better explain his thesis that "jamming" experiences, instances of 'fluid' behavioral coordination that occur without detailed knowledge of personality strike a balance between autonomy and interdependence and can even be transcendent. In order for the workplace to be without limitations and move ideation forward, the workplace must not only allow for, but foster locations where such ideas can be freely expressed without prejudice or condescending subtleties for coworkers or mgmt. If jamming is introduced, the reward is not only in meeting outcome satisfaction but an experienced transcendence through connection to others. In addition, a feeling of belonging and being valued for what an employee not only 'brings' to the table but shares out on.

Van Maanen et al. (1979) break down the 'boundary passage', on boarding process for a new hire into six (6) dimensions which are: collective vs. individual socialization processes, formal vs. informal, sequential vs variable, fixed vs variable, serial vs. disjunctive, investiture vs. divestiture. While the paper emphasizes the role of boundary passage of the new hire and the influence of the mentor guiding the new hire then

determines the new staff's adoption of assigned tasks; the deeper take-away was that a Corporation is heavily culture based and the culture is defined and shaped by its environment not only figuratively but physically as well.

If the environment is not supportive or toxic to the boundary passage of a new hire in the way of aggressive and dismissive behavior on the part of coworkers, the new hire may experience high-anxiety during on-boarding that can then have detrimental effects on the new employee's learning outcome. Providing for acceptance and peripheral support/guidance through a healthy sense of community in the way of a social hub-lounge can assist the new hire in a less stressful environment to engage in verses the new hire's assigned desk. Meaningful and sincere connections can be made with new co-workers in a commons space. As a result, easing the anxiety around the boundary passage phase. "any group of people who interact regularly over an extended period of time will develop a sort of unexplicated or tacit mandate concerning what is correct and proper for a member of the group to undertake as well as what is the correct and proper way to go about such an undertaking" (Van Maanen et al., 1979).

In *Organizational change and innovation* written by Lewis (2014), Lewis provides ample scholarly references regarding how organizations "tag", "assign" change under the heading as continuous improvement. Lewis remarks that continuous improvement is a prime example of a culture's value. Yet, Lewis then describes the lack of ways in which "change" is applied effectively and more so disseminated amongst lower ranks. Lewis remarks that "organizational sociologists have devoted a good deal of scholarship to examining unplanned change." Lewis emphasizes that is communication that is paramount for change to occur providing for the least amount of stress on employees. "Communication plays a

central role in organizational change processes, including triggers and diffusion, change implementation, social construction, discourse in change, and dialectical change."

2.9 Coworking, Third Space, Collaboration, Collision, Need to Belong

What environment then best supports advancing autonomy in the built environment, specifically supporting community through communal cultural social economics? Google's new campus is designed to maximize chance encounters, Facebook's new headquarters implemented the largest open plan in the world and Samsung is exploring into more outdoor space to encourage employee conversations. Workplace analytics & metadata reporting is going beyond trend to necessity like that like of change management, companies that seek change but must validate reason for doing so first. What is certain, is that employees who which to collaborate and share new ideas are dampened when they are further than thirty yards away. Proximity and purposeful collaboration matters (Nielsen, 2016). Workplace layout is more and more influenced by team productivity and collaboration. Perhaps this is the main reason coworking has taken off at an exponential rate in the last decade, during the years 2008-2010, co-working sprang up as a way for unemployed workers to meet and network over a coffee. Starbucks was first branded coffee chain to offer a haven for laid off workers, yet the physical confines of the square footage could not accommodate all that needed a place to plug-in not only to a "temporary" sense of community" but to literally plug in their laptop chargers for periods of upwards of two or more hours a day.

Advance toward 2015, and co-working locations started to emerge in large metropolitan areas and in prime real estate locations with attractive maker space calling cards in reclaimed architecture often promoting high ceilings and explodes bean renovations. Startups valued the central locations for the ability to focus on company

development and attracting core employees versus paying high rent. In addition, a new benefit emerged, that of collaboration. Companies, such as The Hub and WeWork, became iconic early examples of co-working best practices and spaces that were purposely hip, unique, technology equipped and beautifully designed. Amenities came standard with membership.

WeWork, which recorded a valuation of $5 billion in 2015 and built to $47 Billion in June 2019, faced drastic *de*valuation forcing a 1.7 billion U.S. dollar CEO bailout plan out resulting in massive internal layoffs and a final restructuring by SoftBank, the new, primary, owner as of fall 2019. While the significant devaluation of Wework was noted based on primarily real estate transactions and subsequent amassed square footage, it is important to note that, out of early coworking established locations, such as WeWork, a "transient" ad hoc sense of community was born in addition to: collaboration, learning and sustainability.

Transient, in that the renters were short term lease inhabitants, not under a shared company culture umbrella. Yet, WeWork members interactively accomplished to maintain a desired community experience. The rapidly growing coworking movement offered insights, as uncovered in a qualitative, single case study in which the researchers analyzed how members of a coworking space work together to co-construct a sense of community through their day-to day interactions in the space. Apparently, people who belong to a coworking community report levels of thriving that approach an average of six on a seven-point scale. (Spitzer, Garrett, Bacevice, 2015) It is also interesting to note, that spending time away from the office at a coworking space can also spark new ideas and more important to note, it is often in a space that is not exclusive to being open in design or vast, advocating the open-

plan. Oversized ancillary furnishings such as distressed leather sofas, yoga balls for sitting and bar height stools adjacent to a latte bar often occupy WeWork environments.

What does occupy many coworking spaces is a farm-to-table approach where large work surfaces provide ample space to spread out and collaborate void of harsh lighting or sterile white on white interiors.

According to Commercial Real Estate Worldwide, (CBRE), it is estimated that a typical company spends upward of $12,000 per employee, per year, per office space which can make a case against return on investment (Mulcahy, 2017). In one survey of people who worked in coworking location, 92% reported an increase in the size of their social circle since joining, while 80% reported an increase in the size of their business network (Hodari, 2015). Hodari then goes on the speak about working remotely and "sapping of one's creativity." It would appear that there is a benefit to coming together in an office and being together in a coworking space for ideation, collaboration and creative thinking, that said, there is a profound benefit to gets one's work done uninterrupted, the ability to establish what such a work environment for the end user would look like that is agile, adaptable and addresses their needs is paramount. It has been stated that innovation is strongest, "when ideas can surreptitiously connect and recombine with other ideas" (Hodari, 2015). Dating back to the 17th century European coffeehouse to the emergence of the workplace, "Modern offices designed to fuel social interactions can be hives of activity and creativity" (Hodari, 2015).

Since the WeWork company opened in 2011, the focus was maximizing desks and utility. Two main principles are access to light and large common spaces. WeWork ensures that glass walls that do not block interior offices from natural light in order to have the space feel psychologically open. And a WeWork staple is big common areas, kitchen-like lounge

areas, that emphasize socializing. Socializing is particularly central to the entire WeWork ethos.

Figure 18: Example of a WeWorks use of space based on algorithms to maximize rentable areas around a central connecting space, the Lounge/Hub. (Source: CBinsights.com, 2019)

Each WeWork location is purposefully different in design aesthetics, attention paid to acquiring historically significant buildings that spark potential renter interest, in that, they are textured, engaging and modern in workstyle approach. WeWork applies purposefully bold applications of color in graphics, artwork, and landmarks for wayfinding aid, knowing that their renters are not familiar with the environment at first. Additionally, one design detail a "key" anchor that binds all that rent from the varied facilities: a "Kitchen-Lounge-Hub", the renter's community space. Further supported by extensive social marketing to maintain the renters as a WeWork community. The strength of WeWork was and is the significance of offering a hub at each location for remote workers to converse and feel

connected, to generate new ideation and find support. Comradery is a basic human need as Harry Harlow, a psychologist at the University of Wisconsin was notorious known for experiments in the 1950s and 1960s. Newborn Rhesus Macaques who were starved of connection to other monkeys and left in isolation failed to thrive. WeWork, like many of today's coworking spaces inherently now know that their success is heavily reliant upon the human need to connect, camaraderie, given the instability of the circumstances the renters face that attracted them to sign the lease or pay the daily rate initially.

As more and more companies consider and plan for impromptu collaboration to yield, generate new ideas in-house, the popularity of co-working has taken hold. In addition, companies and facility managers who seek innovative ways to reduce their own square footage and attract new short-term leases are leasing out a portion of their floorplate to coworking. It is the 'potential' of connecting "social space between", the "blended" merge can provide a rich opportunity for collaboration provide for a Sense of Community as well. Scenarios where employed and non-employee or employed elsewhere yet on site for the day come together. The combination of the intercompany community coworking collaboration experience aligns with William H. Whyte's findings on urban plaza congregation of a more shared 'public' space experience. In that, a portion of those that gather within the newly merged community, commons space, location on the floorplate may not be assigned/employee to the (company itself). A Workplace **S**ense **o**f Community (WSOC) planning guideline/framework as proposed in this study, will benefit both a merged environment as a result of coworking as well as a singular company workplace wherever people can gather to interact.

Oldenburg (1989) defines "third places" as "places that are neither work, nor home, where people come together to socialize." Coffeehouses, barbershops, hair salons, social

halls for example, area all considered typical third places in their openness, low key features and architectural qualities that visually permit one to linger and converse in turn, providing patrons of all diversity and age groups, a neutral ground where to work, rest, and converse with friends and occupants.

Third places as essential to the shaping of local communities and key to the wellbeing of city life. Oldenburg exclaims that in third places “the human being is a person... he or she is an individual, unique and possessing a character” Oldenburg (1989). Additionally, "Third places play an important role in society as they provide a catalyst space between the privacy of home and the sterility of work, allowing one to engage with "familiar strangers" (Milgram, 1977). Oldenburg (1989), defined several key properties of third places, such as: neutrality, democracy, inclusiveness, publicness, the ability to become levelers, conversational, exhibiting a low profile, playfulness, and welcoming to regulars and new patrons.

WeWork is the entrepreneurial advancement and realization of Oldenburg’s 1889 writings on the Third Place, WeWork’s social lounge is the epitome of the Third Place yet without a common corporate unifying identity for those renting space and for prolonged connection to be made in-house due to renter turnover, culture can be. This is slowly changing as WeWork rebranded into the “We” Company in 2017 advancing its portfolio of real estate in leasing to include corporations that bring with them their own branded cultures. As the We Company model of diversified business ventures amass as Amazon in nature, such as WeGrow and WeLive, all of their endeavors pivot on the success of community, the necessary glue of commonality offsetting onsite nomadic leases and locations to check-in to or work from. Oldenburg’s outlined key properties of third spaces providing a valuable precedent and framework for the ideal corporate community, commons

space to then be based upon in consideration going forward to benefit culture resulting in trust formed.

Rethinking Third Places: Contemporary Design With Technology by Memarovic et al. (2014) advances Third Space consideration in the twentieth century by way of analysis and comparison of Oldenburg's Key Third Space principles to that of a nine Parisian coffee houses much like The We Company's social coffee lounge/bar. Yet despite employees to the shift of the "temporary" workplace to provide "Shared Services", in this instance WeWork (The We Company) success is the environment that provides connectivity, the Kitchen-lounge-Hub.

The remote worker, has been studied as well in that last decade as it relates to working from home or holding a meeting at temporary leasing facility and yet, "Remote workers are less likely to work at their company long-term, due to remote workers over time view their on-site campus colleagues as acquaintances" (Schawbel, 2018). Schawbel (2018) remarks that one third of the global workforce works remotely and disparagingly, two thirds are disengaged or considered highly disengaged (Schawbel, 2018). It has been said, as well, that "remote workers are at a significant risk of feeling disconnected from their coworkers and as a result productivity therefore declines after one reaches a threshold of about fifty hours a week (Moran, 2017).

Work in the workplace is considered a profoundly social activity it therefore poses a design problem of virtual work such as how to develop information systems that support social exchange. Furthermore, "despite abundant evidence of successful social interaction with online communities, many people still believe that the internet cannot replicate theses social benefits" (Carpenter, 1998).

Jaitli and Hua (2013) measured sense of belonging among employees working at a corporate campus and created a new model to correlate a sense of belonging to the perception of the workplace's physical environment. Workplace planning and management implications are discussed for organizations to incorporate physical and spatial measures in their workplace to effectively enhance employees' sense of belonging. The authors point out that the physical layout of a workspace is relevant because it inherently influences behavioral outcomes for example, the authors note, interaction and collaboration amongst fellow employees. Unplanned meetings lead to informal exchanges and knowledge sharing among coworkers from different parts of an organization and therefore increase the likelihood for collaboration among colleagues from across a workplace.

What is emphasized in the study as well is that new mediums of communication, online teleconferencing for example, cannot replace the benefits of the idiosyncrasies of the face-to-face environment. More so, that remote, virtual workers are often at a deficit of key visual social clues that are key and the essential prerequisite to organizational identity.

If Placemaking principles are designed for the workplace with the benefit of a defined and designed micro-ecosystem anchor, such as a "Commons" space (non-cafeteria type) that which will provide a unilateral opportunity for connectivity, void of hierarchy; the likelihood of trust and subsequent cultural company bonding is increased. A common denominator that of: hired vs. transient employee status is supported, employees working under the same company values versus randomizes e.g. kickstarter rented offices, impromptu meetings off site thereby advancing autonomy through a shared, common experiences and goals is sustainable and additionally beneficial in wellness measured in both mind and community initiatives.

Baumeister and Leary (1995) noted that people form social attachments readily under most conditions and resist the dissolution of existing binds. Further lack of attachment is linked to a variety of ill effects on health, adjustment, and well-being. The authors propose that the need to belong has two main features. First the author comments that people need frequent personal contacts or interactions with the others, described interactions as positive or pleasant, but mainly that the majority be free from conflict and negative affect. Second, that colleagues need to perceive, gauge, that there is an interpersonal bond or relationship marked by stability, affective concern, and continuation into the foreseeable future. “This aspect provides a relational context to one's interactions with the other person, and so the perception of the bond is essential for satisfying the need to belong. Much of what human beings do is done in the service of belongingness” (Baumeister and Leary, 1995).

Authors Garrett, Spreitzer and Bacevice (2017) studied coworking spaces and authors note that “as more individuals are working remotely, many feel increasingly isolated and socially adrift...to address this challenge, many workers are choosing to work in coworking spaces.” The authors applied a relational constructionist lens to effectively deconstruct and then define the process of “community work” to maintain a desired community experience. The illustration below, by Garrett et al., depicts the relational constructionist lens study, the first of its kind, to address the fundamental as well as behavior benefits in understanding the need to support a Sense of Community in the workplace in the twenty-first century.

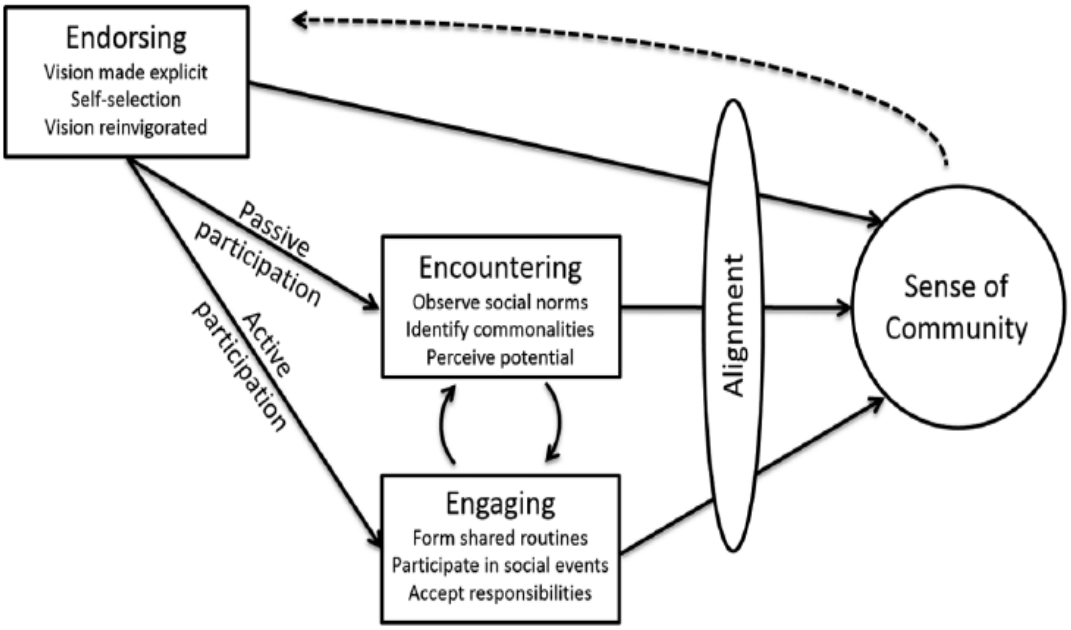


Figure 19: Illustration depicts the relational constructionist lens study (Garrett, Spreitzer, Bacevice, 2017)

Garrett, Spreitzer and Bacevice's (2017) research organized codes into a coherent framework. After developing, exploring, and evaluating the utility of several alternative frameworks to represent the team's findings, the team arrived at one that offered a theoretical contribution and represented the actual experience of WelCom members. The team identified that the "The co-constructed nature of the encounter unfolds as some members demonstrate the potential of community through their actions, and others encounter and make sense of the encountered actions as constituting a SOC that they can then claim" (Garrett, Spreitzer and Bacevice, 2017).

The study does not however, address the singular corporate umbrella that affects communal cultural social ergonomics and trust nor applying the study to autonomous behaviors affected by the built environment by identifying how to apply the research in a pragmatic design, applied planning approach. Nor does the Garrett et al. study speak to the

need to consider a blended workplace communal environment where renters (coworking identified) and non-rentable (remote, while visiting onsite and colleague employees) space can and will convene, merge more and more, in the near future, as an infused community where planners must address connectedness and gathering to benefit both populous, campus.

The subtle emergence of employees seeking familiar residential surroundings to soften the edge of commercial real estate's hard contemporary edges coupled with the feeling of being hyper-exposed in open floorplates has ushered in the phrase resimercial...ancillary furnishings are hand hewn, infused with color and textures that are purposefully non-matching yet provide choice of mixed designs that offset currents of workplace uncertainty. In addition, for those that work remotely, upon entry of the workplace today, an environment that is warm and less of a transition from home to stark office is more and more desired. However, this can lead to issues of non-predictability of spatial layout as ancillary furnishings are movable and moved and a defined predictable space to transition within is not considered nor provided. In summary, members described their experience of WelCom as a collective identity, filling a social void, a sense of ownership, and genuine friendships – consistent with the four dimensions of a SOC" (Garrett, Spreitzer and Bacevice, 2017).

Interestingly, a seminar delivered by Haworth at NeoCon in 2018, highlighted the trends and advancement of the co-working space from WeWork rented space to the lobby of corporations embarking on innovative ways to ignite innovation and attract new employees. The spaces are more of a makerspace, digital lab and project room all in one, with ever changing layout-purposefully. The room and management are overseen by a new work title in the industry, a "Community Manager". Yet, while the outcome of collaborative innovation and shared thought among varied companies is an impressive yield, the

unspoken outcome is far from successful even to the point of disturbing, that of observed and noted ‘depression’ in a temporary set-up coworking scenario. “Culture trumps strategy-every time, anytime. At some organizations, it was still not culturally acceptable to work from elsewhere (trust issues). Others had employees who got depressed after having to go back to their previous corporate work environment after they had spent some time at the co-working space” (Gabor Hagy, Ph.D., NeoCon conference: Corporate Coworking as Innovation Driver, 2018).

What was not anticipated of the new co-working micro setting that emerged, was an established culture despite the employees knowing (in advance) the co-working experience held an innovative objective and was temporary. Tight relationships, despite the ideation agenda, flourished, significantly advancing the co-working employees’ collective autonomy. Post the experience, the need and more so the opportunity to connect with the original co-working team was no longer accessible thus, leading to the noted depression experienced when the employees returned to their assigned work points across the workplace landscape. Consideration of the physicality of the two spaces (original WorkPoint and co-working space) in design and layout contrast may have also contributed to feelings of depression, as spatial ease of visual layout transitioning between the two may not have been evident or planned leaving a stark contrast, post occupancy communal use, when returning to their assigned work point.

In a 2019 published Wall Street Journal article entitled” In a WeWork World, it’s hard to Find an Office Buddy” the article speaks to the issue of freelancers in shared spaces facing rejection and awkward encounters. Figure 20, forecasts the exponential, projected growth of coworking fueled in part by high rent as in San Francisco where renters are forgoing traditional ten, fifteen-year leases preferencing shorter-term leases, from three to

five years and even monthly rents due to instability of forecasted revenue, talent acquisition, retention and rising employee health insurance costs resulting in lack of commitment. Ten year plus furniture warranties came into question by furniture manufacturers as Amazon effortlessly overnighted pop-up brands furniture, the purchases temporarily suffice then remained an ancillary solution. “Remote work does have its share of problems. Some people dislike working in the same place where they live and relax, and it can be difficult to create and maintain a company culture without people being in the same room...For some situations, it’s good to have a face-to-face connection” (Molla, 2019).

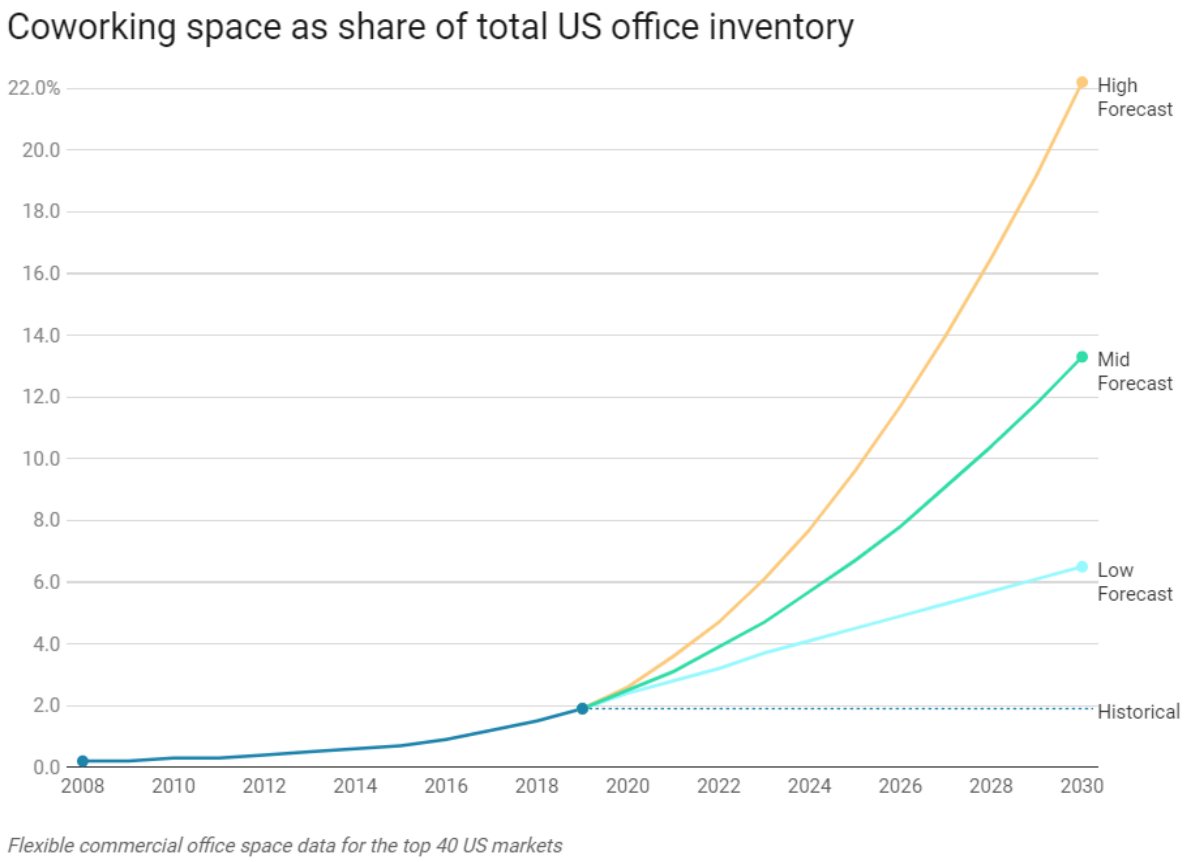


Figure 20: Future projection of coworking in the U.S. (Source: Molla, 2019)

It has been noted that “…as the ranks of independent workers are swelling, and that means more people no longer having the comfortable companionship of arranged corporate

seating" (Gamerman, 2019). WeWork knowingly and actively promoted interaction and invited workers to weekly branded "Boosts and Bites" gatherings to appeal to the transient worker.

2.10 The Central Kitchen, Amenities, from Remote to Inclusive

Proving a sense of community, a shared-space, and for this paper's purposes: the newly defined and dedicated community commons, A.K.A the third space to advance employee autonomy in the 21st century requires an identity, a defined location that can bring together employees on a non-hierarchical level where freedom of conversation and exchange of thought can foster ideation, collaboration through face-to-face exchange. There exists one identifiable space and symbolic manifestation of 'gathering' that has brought together generations through a common space, that of the kitchen. Critical, as a place to prepare nourishing meals the kitchen is also symbol of change much like the workplace. In an extensive research paper written by Bech-Danielsen in 2012, examines over one hundred years of architecture as it relates to the kitchen from an external, purposeful and purely functional space, once detached from the primary main house, in that "...the kitchen was not designed to be used by the primary residents, today where the kitchen has developed into a central room of the home, and it has great social qualities" (Bech-Danielsen, 2012).

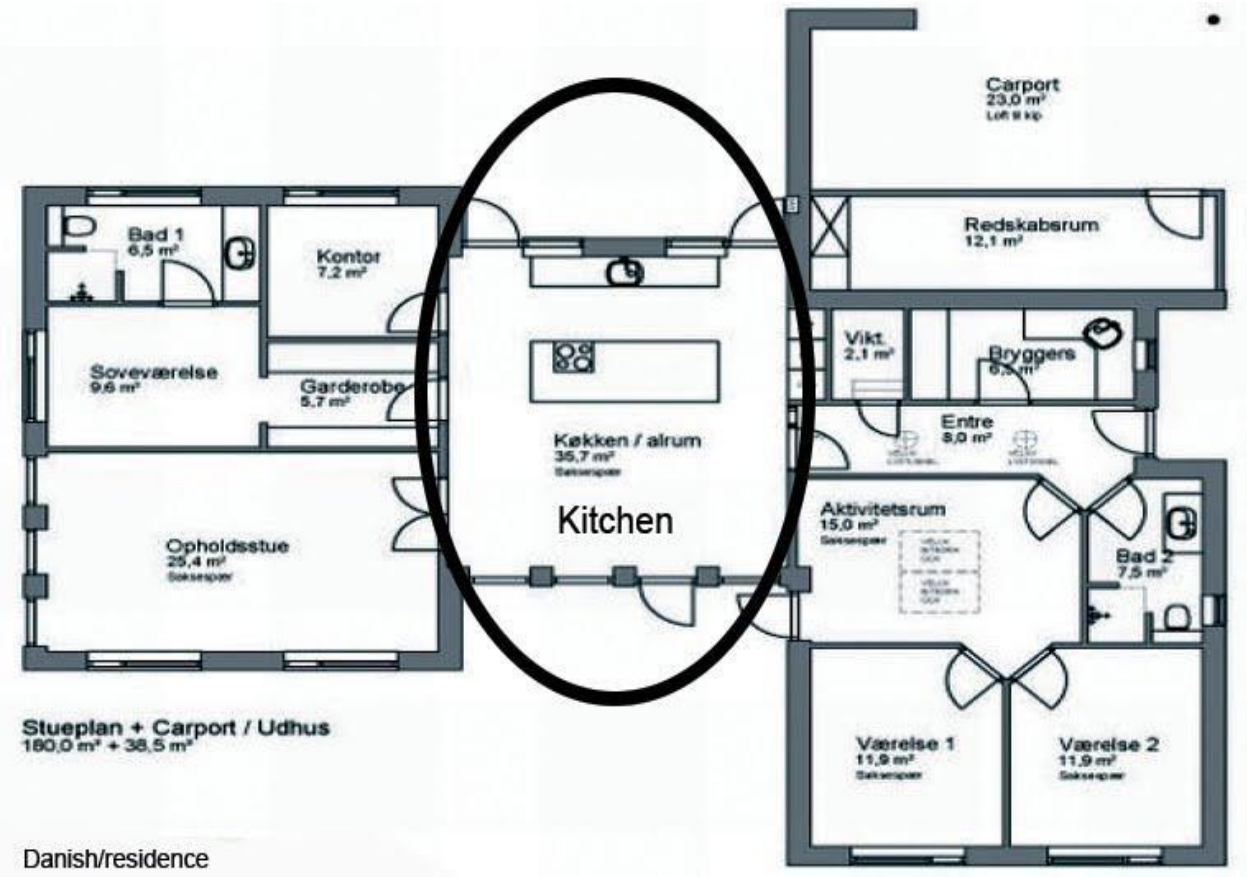


Figure 21: Illustration how the kitchen has developed into a central room of the home (Source: Garrett, Bech-Danielsen, 2012)

Over the last century, the importance of the kitchen hub has emerged as a prominent, central architectural space. In the twenty-first century, the "kitchen as a place to be, that the kitchen is often the "hub of the house" and has become the a necessary component, of the workplace, a communal "hub," where a sense of community can occur and flourish. It has recently been stated that "If kitchens are one of the biggest selling features of homes, shouldn't the kitchen of your workplace also be its greatest selling feature? A kitchen is an indispensable community hub. It is a space that people want to go to, and a place that encourages employees to gather, interact, share ideas and stories. And perhaps that area of

commingling can breed a cross-pollination of ideas that plants the seed for innovation" (Crigler, 2013).

The question then arises: Does the workspace reflect the individual, or is the individual increasingly defining the workspace? In a 2016 survey lead by IA, Interior Architects; The Workplace Anchors Social Connection, IA asked respondents how the future will define the workplace, with a majority of survey participants supporting the idea of one centralized location; where the *workplace is a community environment and centralized hubs will anchor employees looking for genuine connections* with colleagues and peers...the desire for honest connections?

IA commented that the amenity areas are more café than break room and provide not only lounge seating for casual conversation, but the necessary tools for impromptu collaboration. As such, spatial layouts provide from the array from flat panel displays to writable surfaces. IA notes that environmental collision points are best around serendipitous moments of social interaction. Architectural design forums, such as IA have noticed that for countless clients, casual exchanges can drive profitable results to the company's bottom line and assist in employee retention (Smith, 2016).

For many companies, the kitchen is a key part of the office not only a place for employees to refuel and refresh themselves, but it is also a place for people to share ideas and form strong working relationships.

A rhetorical question posed by a design firm asked, "with 57% of employees expressing that having a work kitchen would make them more productive, why not invest in making this space as accommodating as possible?" **(**King Business Interiors, 2016).

For Barnaby Lashbrooke, founder of virtual assistant platform Time etc., kitchens are sociable places because socializing always begins with a drink, whether coffee or water,

or something stronger. Other business owners concur that kitchen culture as an upgrade to the office 'watercooler moment' is widespread recognition that a quick chat can lead to bigger things and in many instances' new ideation.

The cosmetics and fragrance company Coty, recently renovated and moved into five floors of office space in New York's Empire State Building and has dedicated a kitchen on each floor, designed with quartz countertops and stainless-steel appliances. Employees are encouraged to engage, as a community, over a coffee. Coty remarked that they designed the space, in particular, the kitchen, right into the center where everyone mingles. Coty noted that their space is flexible and serves as a place where they can share with the larger community during communal meetups. The 2018 issue of Interior Design magazine lists the top four concerns and issues to address soon regarding planning. One of the top four considerations is mentions that research shows that social connection is essential to human health. More so, the issue ponders if it is any wonder facilities of all kinds are being designed to forge communing and collaboration in various sectors. It is then followed by kitchen has have consistently been paced as the heart of the home, and is now becoming a contributing social hub factor of the workplace in all areas of business.

Advancing the topic of the kitchen as a social 'glue' of the workplace is not without careful layout and consideration. The emergence of Hospitality consultants advises Corporate Human Resources and architectural/design planners to purposefully plan amenities that will entice the future employee or entice the remote worker to come back to the office to work. If not planned correctly with key guidelines, a framework in place, the social hub, planned for ideal socialization and connection may quickly fade into the past as simply another design 'fad' due to the planners and corporation not having the full breadth of the deeper significance such a micro-environment provides on a cultural, trust and human

connection level given that "...telecommuting millennials is up from 21% from 2016, with studies linking remote work to increased performance and productivity.

Culturally, remote working in the workplace is on a rise yet over the past few years, however, many businesses that once supported and even encouraged telecommuting are reconsidering. While there is a multitude of online software to connect the remote worker to the main corporate campus e.g. Skype, Zoom, Slack and WebEx, it has been recently aggressively argued that spontaneous conversations in the office is declining and the environment to nurture innovation and building company culture is on site; the more conducive solution.

The increased benefits that on site, identifiable, anchor, built environment location for employee connection yielding behavioral benefits from face-to-face interactions cannot be undervalued nor identified as a random amenity to simply check off to provide for or not. The key kitchen amenity to be considered is the significance of running water and functioning running water with surround seating, not unlike the key findings of Whyte's Manhattan Plaza observations. "Water and water features that create welcoming social spaces." (Whyte, 1980) That said, unlike a kitchen or bar top counter the workplace is to be a space of mixed in use and diversity without hierarchy, a commons area should not visually create hierarchy in use or service. A counter island may be counterproductive to staff. Running water planned with neutrality in use and access is best. The movement of the water in practices of Feng Shui encourages and supports flow of chi which is a symbolic meaning, an ancient art and science that was formalized over 3,000 years ago in China. The literal translation Feng translates to "wind" and Shui to "water." In Chinese culture, wind and water are associated with good health.

2.11 Future Workplace Planning

Workplace strategies that enhance performance, health and wellness, through this literature review, have clearly shown strong indicators that architectural design firms recognize the need to address overall employee happiness; that of "autonomy". The phrase wellbeing has emerged as the overarching phrase linked to many factors as well as commented on within this literature review. Industry leaders have defined, at the minimum, specific considerations that must be taken into account when planning for the twenty-first century workplace: 1) Thermal Comfort and Temperature 2) Access to nature, views and daylight 3) Sensory change and variability 4) Color 5) Noise control 6) Crowding 7) Human factors and ergonomics 8) Indoor air quality 9) Choice 10) Employee engagement. (Wright, 2013) Many have defined the new workplace to be Place as in it is the "place where work gets done". What has changed is the use of the term "office", perhaps because office conjures up images of drywalled-enclosed spaces for the individual versus the team.

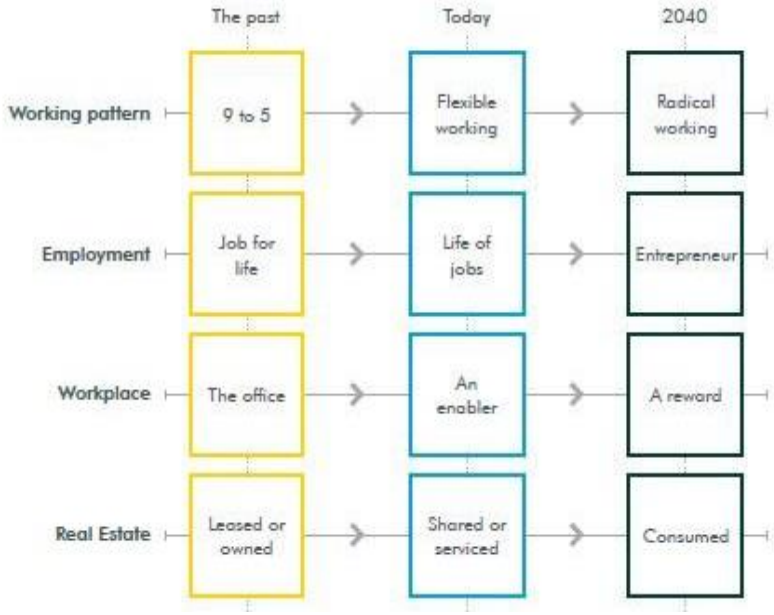


Figure 22: Illustration The changing face of employment and the workplace in the decades to 2040 (Source: CBRE, 2016)

As the office becomes more transient, transparent, versatile and open, workplace seems to simply be a more relatable term to use in the twenty-first century landscape. In addition, furniture manufacturers and architectural firms alike are planning landscape iterations based on their Point of View, methodology and in some instances referenced as "the neighborhood" as illustrated below:

Figure 23: Illustration of The Neighborhood Concept Source (Source: Ted Moudis Associates)

Herman Miller's Living Office introduced in 2013, interpreted and adapted Maslow's original, seminal research: Hierarchy of Needs "...an ever-deepening understanding of what makes us human and how that knowledge can be applied to help organizations and their design partners develop and manage workplaces that address fundamental human needs for security, autonomy, belonging, achievement, status, and purpose. Workplaces that fulfill these needs, as well as the needs of the business, help people and organizations prosper" (Herman Miller, 2016, p. 4).

As we design for agile workplace environments, it is imperative that planners recognize that while generous entry reception areas, large open gathering spaces can be novel in architectural intrigue spaces by planning default, such spaces do not yield a sense of community or deeper belonging by their planned presence. Nor do amenities placed for employees at built-in corridor nooks or dedicated cloistered break rooms void of outdoor views. Such areas are ideal for convenience of use and employee conversive random passage, but do not ideally support connectivity at a focused, face-to-face intimate level. Workplace Sense of Community (WSOC) commons space/area should foster and inherently provide a means for connectedness but not exclusively for 'social-activity' in consideration. Workplace commons must compassionately consider the extrovert as well as the introvert employee and their individual needs within the space. Planners must recommit to the Jacobson principle of the neighborhood that was centered on community and all inherent rights to such. The significant question and consideration arise: What identifiable built environment anchor acts as a nexus of trust amongst employees; resulting in strong company culture, retention and improved work performance that has yet to be defined or planned for? Furthermore, reassessing for workplace sense of community opinion tied to a defined environment that is compassionately planned to support verses open ended survey questions, vast reaching in scope, that are non-defined leading employees to not properly access or accurately respond.

Workplace researchers are also looking at the patterns in the way people work, many believe that tomorrow's organizations will not be served simply by open-plans and breakout areas. Raphael Gielegn, head of Vitra's research feels that if one works in a hierarchical organization, there is no space for one as an individual and there is no community. If the

organization is truly agile there would be more space for such an employee to prosper (Makovsky and Rajogopal, 2017).

Capital One has taken on the task of fully emerging their staff in participatory conversations about the future of work and planning. Capital One has established a Workplace Solutions division where initial early feedback of staff post significant renovations and newly designed workplaces yielded that "80% of staff respondents say they are more productive when they move to a different room or environment while working." In addition, noting that "...87% agree that office design is key to encouraging innovation." Capital One is forging innovative design paths to advance employee autonomy by recognizing the built environment as a 'key' contributing factor. In addition: Preferred design elements: The top four choices in both years were natural light; easily reconfigurable furniture and spaces; artwork and creative imagery; and collaborative spaces (the same top four at the 2018 national data).Prioritizing wellbeing: When asked which benefits professionals would most like to have at their company if it meant forgoing the rest, the top four responses were onsite healthy food and beverage options; relaxation/social areas; onsite health center/wellness programs; and quiet, reflective space (the same top four at the 2018 national data) (Capital One, 2018).

Interesting to note, is how, future workplaces are evolving more and more in terms of two kinds of spaces: Analog and Virtual/digital. As Virtual Reality (VR & AI) emerges, the application will evolve from static meeting room pitches on future project for clients, to dynamic uses in the day to day of the workplace: used to assisting in creating work output as opposed to viewing content. Interesting to note in addition, is how analog spaces will look more and more to coworking success to implement a sense of community outcome that can then foster congregational efforts as needed to inspire innovation and spark employee

performance. Other industry thought leaders have forecasted how the physical building that houses employees will change: 1) Rethinking the lease and the building 2) Changing use over-time 3) High-tech, high touch 4) Dominance of the smart office 5) Reducing environmental impact (Williams, 2017). “The new workplace is a moving target-as organizations flatten, collaboration increase, and technology frees workers from their desks” (Gensler, 2017 p. 3).

2.12 Review of Literature Framework: Addressing Findings/ Factors/Variable contribution to Dissertation Topic Defined Variables

Table 5, the Framework of Factors, represent many of the studies and peer-reviewed papers have been referenced within the sections of this review of literature, represent concise summaries of the in-depth peer reviewed papers mentioned throughout the review of literature. The body of work presented is related to the three variable(s) measured in this research study. The review of literature as presented, a comprehensive body of research, encompassed additional supportive written work(s) that support the research question in architectural design related industry white papers and thought pieces.

For the purpose of this paper, the study’s hypothesis acted as the source, the main impetus for keyword research: Workplace sense of community, Trust and Communal Cultural Social Ergonomics. The hypothesis was comprised based on a void in industry-related research within the workplace given the author’s acumen in the field of interior architecture and education in the sector of contract workplace design. Scholarly and peer reviewed journal papers, published by respectable publishers, then confirmed the viability, validity and workplace term appropriateness for the Keywords in use of the study set forth for the assigned IV and Dvs that of: Workplace Sense of Community as well as the two

Dependent variables, Trust and Communal Cultural social Ergonomics. The Snowballing method for procurement of peer-review-papers was not utilized, as a common disadvantage of the method is searching sources that are dated, more so than the previous source. Timely demonstration of scholarly awareness of the proposed research with broader implications as the Epilogue addresses were added.

Restated: Dissertation Hypothesis Research Question: This research study purpose is to demonstrate a correlation between an embedded Sense of Community through an identifiable built environment anchor in the workplace as a nexus of *Trust* among employees, resulting in strong company *Communal* Cultural Social Ergonomics.

Independent Variable: Workplace Sense of Community

Dependent Variable(s): Trust and Communal Cultural Social Ergonomics

Table 2: The Framework of Factors

Review of Literature Framework: Addressing Findings/ Factors/Variables contribution to Dissertation Topic		
Authors ☆ Indicates a Theory or Principle applied to proposed Dissertation (WSOC) Guideline/Framework	Description of Published Research	Abstract/Studied Measured/Variables Bolded: Measures/area of interest/variables identified that contribute (add validity) to Dissertation Variables of study as indicated by (IV) or (DV) _____ *Bolded & Italicized*: study measures/area of interest/variables that contribute (add validity) to establishing a (WSOC) Guideline/framework
Agha-Hossein, M., El-Jouzi, S., Elmualim, A., Ellis, J., & Williams, M. (2013).	Post occupancy studies of an office environment: Energy performance and occupants' satisfaction.	(WSOC) *Building design, temperature comfort, use of space, control over noise and ability to meet occupants' needs* were significant predictors for overall comfort. *Lighting* overall, *temperature comfort*.
Andreassen, C. S., Griffiths, M. D., & Sinha, R. (2016).	The Relationships between Workaholism and Symptoms of Psychiatric Disorders: A Large-Scale Cross-Sectional Study	(DV, Culture) Hypothesized: that there would be a positive association between anxiety, depression, and workaholism (and what the authors found)Working hard is praised and honored in modern society, and thus serves as a legitimate behavior for individuals to combat or alleviate negative feelings – and to feel better about themselves and raise their self-esteem.

Table 2 (cont'd)

☆Appleton, J. (1975). *The experience of landscape*. John Wiley and Sons. Applies to Prospect & Refuge Theory	Proposed a new theoretical approach to landscape aesthetics, including "habitat theory" and "prospect-refuge theory"	(WSOC) "Habitat theory" and "*Prospect-Refuge theory*" and he sought to apply these theories to the detailed and practical analysis of actual landscapes through an appropriate system of symbolism and why certain environments feel secure and thereby meet basic psychological needs in the outdoor landscape. Key themes: refuge for safety, edges vs. exposed, covered overhead, balance of P&R, sitting space, access to sun, people attraction, water feature,
Aryal A, Anselmo F, Becerik-Gerber B. (2018)	Smart (Internet of Things) IoT Desk for Personalizing Indoor Environmental Conditions.	(WSOC) The authors describe their vision and ongoing effort of creating a smart IoT sit-to-stand that can personalize the environment around the occupant and can act as a support system to drive their behavior towards better environmental settings and improve posture, ergonomics as well as wellbeing and productivity.
Baird, B., Smallwood, J., Mrazek, M. D., Y., J. W., Franklin, M. S., & Schooler, J. W. (2012).	Inspired by Distraction: Mind Wandering Facilitates Creative Incubation.	(WSOC) Empirical research has not yet investigated this potentially critical source of inspiration. The authors used an incubation paradigm to assess whether performance on validated creativity problems (the Unusual Uses Task, or UUT) can be facilitated by engaging in either a demanding task or an undemanding task that maximizes mind wandering. Findings suggest that engaging in simple external tasks that allow the mind to wander may facilitate creative problem solving.
Baumeister, R. F., & Leary, M. R. (1995).	The need to belong: desire for interpersonal attachments as a fundamental human motivation.	(WSOC) A hypothesized need to form and maintain strong, stable interpersonal relationships is evaluated in light of the empirical literature. Existing evidence supports the hypothesis that the need to belong is a powerful, fundamental, and extremely pervasive motivation. ("Meaningfulness comes from contributing to other people, whereas happiness comes from what they contribute to you," Roy Baumeister).
Bech-Danielsen, C. (2012).	The Kitchen: An Architectural Mirror of Everyday Life and Societal Development.	(WSOC) This paper is part of a research project that analyses trends in housing architecture over the past 100 years. The research illustrates how changing norms and new forms of everyday life have altered our views on housing and have led to fundamental changes in housing architecture. The paper analysis focuses on the kitchen as a central hub of social and common space.
Bernstein ES, Turban S.(2018).	The impact of the 'open' workspace on human collaboration.	(DV-Trust & Culture) & (WSOC) in two intervention-based field studies, examine using digital data from advanced wearable devices and from electronic communication servers—the effect of open office architectures on employees' face-to-face, email and instant messaging (IM) interaction patterns (before and after the adoption of open office). Face-to-face interaction decreased significantly (70%) in both cases, with an associated increase in electronic interaction rather than prompting increasingly vibrant face-to-face collaboration, open architecture appeared to trigger a natural human response to socially withdraw from officemates and interact instead over email and IM.

Table 2 (cont'd)

Broeck, A. V., Ferris, D. L., Chang, C., & Rosen, C. C. (2016).	A review of self-determination theory basic psychological needs at work.	(DV, Culture) Self-determination theory (SDT) conceptualizes basic psychological needs for autonomy, competence, and relatedness. The authors conducted a meta-analytic review of 99 studies with 119 distinct samples examining the antecedents and consequences of basic need satisfaction. Findings conclude with recommendations for for future research, including the study of need frustration and culture, integrating the basic needs with other motivation theories, and a caution regarding the measures and methods used.
Byron, W.J. (1985).	The workplace as a community: promoting employee satisfaction.	(WSOC) Byron states that if employers celebrate traditions, recognize achievement, and encourage creative thinking, such workplace enhancement should encourage employees' participation in a shared enterprise but not substitute for workers' outside ties. Byron suggests that: To offset excessive competition, which can lead to suspicion and hostility, employers can provide communication outlets.
Campi Campion, M.A., Medsker, G.J. & Higgs, A.C. (1993).	Campion, Relations between work group characteristics and effectiveness: Implications for designing effective work groups.	(WSOC) Common themes on effective work groups and relates 19 group characteristics representing the themes to effectiveness criteria. Themes included job design, interdependence, composition, context, and process; effectiveness criteria included productivity, satisfaction, and manager judgments. Results show that all 3 effectiveness criteria were predicted by the characteristics, and nearly all characteristics predicted some of the effectiveness criteria. Job design and process themes were slightly more predictive than interdependence, composition, and context themes.
Chen, G., & Klimoski, R. J. (2003).	The impact of expectations on newcomer performance in teams as mediated by work characteristics, social exchanges, and empowerment.	(WSOC) The authors integrate research on the Pygmalion and Galatea effects with a group socialization model and theories of work motivation and interpersonal leadership. A defined and tested a model of newcomer role performance in work teams was assessed. Newcomer general self-efficacy and experience predicted newcomer and team expectations, and motivational and interpersonal processes (captured by work characteristics, social exchanges, and empowerment) helped link expectations and newcomer role performance.
Christian, M. S., Garza, A. S., & Slaughter, J. E. (2011).	Work engagement: A quantitative review and test of its relations with task and contextual performance.	(DVs, Trust and Culture) & (WSOC) Work Engagement, job satisfaction, organizational commitment and job involvement were the factors studied. Autonomy and Social Support were of key interest to my research.
Dietz, G., & Den-Hartog, D. N., (2006).	Measuring trust inside organizations.	(DV, Trust) & Trust, Organizations, Workplace. The paper provides a detailed content-analysis of several different measures for trust through content of 14 recently published empirical measures of intra-organizational trust.

Table 2 (cont'd)

Dinas, P. (2009).	Gender differences in private offices: A holistic approach for assessing satisfaction and personalization.	(WSOC) The literature finds that women when compared with men participate more in private environmental behaviors such as recycling and green consumer activities. There is also some evidence for the moderation effect of post materialism. The study concludes with theoretical and policy implications. Factors: Pro Environmental behavior, environmental knowledge, postmaterialist values, gender
☆Dosen AS, Ostwald MJ (2013). Applies to Prospect and Refuge Theory	Prospect and refuge theory: constructing a critical definition for architecture and design.	(WCOC) The theory of "prospect and refuge" describes why certain environments feel secure and thereby meet basic human psychological needs. There is little evidence is available to support its application in the A & D industry. The paper constructs a critical definition of prospect and refuge theory, utilizing past research that was undertaken originally in art theory and landscape design and later in architectural and interior design to explore the theory then applied.
Druskat Druskat, V. U., & Wheeler, J. V. (2003).	Managin Managing from the boundary: The effective leadership of self- managing work teams.	(DV, Trust) (WSOC) The authors studied how effective leader behaviors and strategies unfold over time. Analysis of the data showed that effective external leaders move back and forth across boundaries to build relationships, scout necessary information, persuade their teams and outside constituents to support one another, and empower their teams to achieve success. Factors: Business teamwork, Personal empowerment, Leadership, Delegation of authority, Focus groups, Political awareness, Trust, Coaching, Social engineering, Engineering management
Duany, ☆ Duany, A., Plater-Zyberk, E., & Speck, J. (2010). Applies to Urban & Placemaking Principles & Zonal Planning for optimal transitioning ☆ Additionally: Duany, A., Emily, T. (2002). Applies to Urban & Placemaking Principles	The rise of sprawl and the decline of the American Dream. Making the Good Easy	(WSOC) Key Book points why urban sprawl is so detrimental to society: In mindful planning and logic of connection. Key themes: Connectivity, Walkability, Mixed-use & Diversity, Quality Design, Sustainability Transect is a geographic cross section of a region used to reveal a sequence of environments. New Urbanism Transect-T-Zones.
Eisenberg, E. (1990).	Jamming: Transcendence through organizing.	(DVs Culture & Trust) (WSOC)Borrowing a term from music and sports, this article describes characteristics of "jamming" experiences, instances of fluid behavioral coordination that occur without detailed knowledge of personality. Jamming has been been noted as ignored in the literature. Examples are given of how these experiences strike a balance between autonomy and interdependence and can even be transcendent. Preconditions for jamming—skill, structure, setting, and surrender— are outlined.

Table 2 (cont'd)

Fischer, G., Tarquinio, C., & Vischer, J. C. (2005).	Effects of the self-schema on perception of space at work.	(WSCOC) The research studies how a person's self-schema can affect his or her perception of reality at work. The findings suggest that the self-schema filters information about the environment in two directions, affecting how employees assess their workplace environment, and also how employees perceive themselves on the basis of the attributes and functioning of their workplace environment. The study has interesting implications for a better understanding of the complexity of the *person–environment relationship in the workplace.*
Frontczak, M., & Wargocki, P. (2011).	Literature survey on how different factors influence human comfort in indoor environments.	(WSOC) The authors show the result of a literature survey focused at exploring how the indoor environment in buildings affects human comfort. The results suggest that when developing systems for controlling the indoor environment, the type of building and outdoor climate, including season, should be taken into account. *Providing occupants with the possibility to control the indoor environment* improves thermal and visual comfort as well as satisfaction with the air quality. As well as seems to influence to a higher degree the overall satisfaction with indoor environmental quality compared with the impact of other indoor environmental conditions.
✯Gagne, M., & Deci, E. (2005). Applies to Employee workplace/self-motivation	Self-determination theory and work motivation. Autonomy/Relatedness/Competence	(DVs, Trust & Culture) (WSOC) Autonomy/Relatedness/Competence The authors apply the SDT Theory to the workplace setting and note that the simple dichotomy between intrinsic and extrinsic motivation made the theory difficult to apply to work settings. The article describes self-determination theory as a theory of work motivation and shows its relevance to theories of organizational behavior. Copyright # 2005 John Wiley & Sons, Ltd.
Garrett, L. E., Spreitzer, G. M., & Bacevice, P. A. (2017).	Co-constructing a Sense of Community at Work: The Emergence of Community in Coworking Spaces.	(WSOC) (DVs Trust & Culture) In the authors' qualitative, single case study, they analyze how members of a coworking space work together to co-construct a sense of community through their day-to-day interactions in the space. Autonomy, community, coworking, relational constructionism, relationships

Table 2 (cont'd)

<table>
<tr><td>Goins, J., Jellema, J., & Zhang, H. (2010).</td><td>Architectural enclosure's effect on office worker performance: A comparison of the physical and symbolic attributes of the workspace dividers, building and environment.</td><td>(WSOC)
TABLE 1 -- LIST OF VARIABLES BY TYPE
<table><tr><td>Outcome</td><td>worker performance or symbolic attribute</td></tr><tr><td>Physical</td><td>speech privacy
noise level
amount of light
air quality
temperature
visual privacy</td></tr><tr><td>Symbolic</td><td>I feel at home in my individual workspace.
I feel at home in the area immediately surrounding my individual workspace.
I feel at home in the spaces occupied by other branches in other parts of the building.
I feel at home everywhere in the building.
A workplace that makes me proud to be part of the organization.
A workplace that makes me feel like I´m part of a community.</td></tr><tr><td>Demographic</td><td>gender
age
building tenure
job type</td></tr><tr><td>Workplace</td><td>workspace divider height
near window?
near exterior wall?
survey year</td></tr></table></td></tr>
<tr><td>Harphan, T., De Silva, M., & Tauan, T. (2006).</td><td>Maternal social capital and child health in Vietnam.</td><td>(WSOC) This study is the first to explore the association between multiple dimensions of social capital and a range of different child health outcomes in the developing world. Focusing on Community health and wellbeing, social capital, child health, nutritional status, mental health, Vietnam</td></tr>
<tr><td>Harun, N. Z., Zakariya, K., Mansor, M., & Zakaria, K. (2014).</td><td>Determining Attributes of Urban Plaza for Social Sustainability.</td><td>(WSOC) The study is about the urban plaza and its role in the formation of a sustainable and vibrant city and emphasizes that the existence and preservation of such spaces in a city is vital. Conclusion: highlights that urban plaza has more than one meaning, strong reason that encourages the locals to utilize the area. Public space; urban plaza; social sustainability</td></tr>
<tr><td>Heerwagen, Judith H., Ph.D. (1998).</td><td>Design, productivity and wellbeing: What are the links?"</td><td>(WSOC) A highly effective facility is one that has positive impacts on work performance, psychosocial wellbeing, and health. Environmental design work, and wellbeing: Buildings have potentially far reaching impacts on human wellbeing and on organizational effectiveness where Performance = Ability x Motivation x Opportunity. Performance is viewed as a function of these three factors acting together: ability, motivation, and opportunity.</td></tr>
</table>

Table 2 (cont'd)

Helliwell, J., & Huang, H. (2011).	Well-being and Trust in the Workplace.	(DV, Trust) The paper summarizes life satisfaction regressions to estimate the relative values of financial and non-financial job characteristics. Findings: The well-being results show large values for non-financial job characteristics, workplace trust and other measures of the quality of social capital in.
Hongisto, V., Haapakangas, A., Varjo, J., Helenius, R., & Koskela, H. (2016).	Refurbishment of an open-plan office and job satisfaction.	(WSOC) The study set out to provide evidence that there is a *relationship between the quality of the physical environment and employee satisfaction*. Significant improvements were identified in nearly all inquired aspects of environmental satisfaction. *Both environmental and job satisfaction* were noted to be improved.
Jaitli, R., & Hua, Y. (2013).	Measuring sense of belonging among employees working at a corporate campus.	(WSOC) (DV, Culture) The paper presents a new model to link sense of *belonging to perception of workplace physical environment*. Workplace planning initiatives and management implications were discussed in the paper for organizations to incorporate physical and spatial measures in their workplace to effectively enhance employees' sense of *belonging. Sense of belonging,* Workplace physical attributes, Corporate campus, Mixed model, *Workplace, Employees*
☆Jacobs, J. (2011). Applies to Uban & Placemaking Principles	The death and life of great American cities.	(WSOC) Jane Jacobs defines what makes streets safe or unsafe; about what constitutes a *neighborhood*, and what function it serves within the larger organism of the city. Additionally, why some neighborhoods remain impoverished while others regenerate themselves. The book set the foundation for *Placemaking/Urban Principles.*
Kamarulzaman, N., Saleh, A., Hashim, S., & Abdul-Ghani, A. (2011).	An overview of the influence of physical office environments towards employee.	(WSOC) The paper presents a literature review of several *environmental factors* which directly or indirectly affect employees work performance such as: indoor temperature, color, noise and also interior plants towards *employee's well-being* and *performance* have been discussed.
Kim, J., & De Dear, R. (2012).	Nonlinear relationships between individual IEQ factors and overall workspace satisfaction.	(WSOC)In the workplace, excellent or poor IEQ translate into productivity gains or losses respectively. The focus of the study is to better understand relationship between perceived building performance on specific IEQ factors and occupants' overall satisfaction with their workspace. Factors: *Air quality, amount of light, visual comfort, sound privacy, ease of interaction, comfort of furnishing, building cleanliness and building maintenance.*
Kim, S. E. (2013).	Physical Workplace as a Strategic Asset for Improving Performance in Public Organizations.	(WSOC) The paper presents a literature review on workplace design by introducing a synthesis of available research drawn from environmental design, organizational ecology, social psychology, architecture, political science, and business and public administration. A developed a model of organizational performance that underscores the importance of "*place*" variables, such as *space arrangement* and *indoor environment*. The paper provides implications for theory and practice in using workplace strategy for organizational excellence. *Physical setting, workplace design*, organizational performance
Klein, K. J., & D'Aunno, T. A. (1986).	Psychological sense of community in the workplace.	(WSOC) The workplace may be a key referent for the psychological sense of community and the paper speaks to how little community psychologists have devoted attention to workers or work organizations in particular the psychological sense of community. Above all: *New directions for research and theory-building on work organizations and the experience of work are suggested.*

Table 2 (cont'd)

Knight, C., & Haslam, S. A. (2010).	An Experimental Examination of the Impact of Workspace Management Strategies on Well-Being and Productivity.	(WSOC)The authors argue that tight control over office space and the people within it and alternatively, design-led approaches without employee input, may compromise organizational outcomes by disempowering workers. *Improvements in well-being and productivity in the workplace are observed when workers have input into office design and decor.*
Laurence, G. A., Fried, Y., & Slowick, L. A. (2013).	A moderated mediation model of the effect of architectural and experienced privacy and workplace personalization on emotional exhaustion at work.	(DV, Culture) The paper's research "examined a model in which experience of privacy served as a mediator between architectural privacy and emotional exhaustion in the workplace and personalization of one's workspace served as a moderator, mitigating the adverse effect of low levels of experienced privacy at work on emotional exhaustion." Finding: "*Higher personalization at work reduced the adverse effect of the experience of low levels of privacy on emotional exhaustion."*
Lee, Y., & Guerin, D. (2010).	Indoor environment quality difference between office types in LEED certified buildings in the US. Building and Environment.	(WSOC) "The study compared IAQ, thermal quality, and lighting quality between 5 different office types in LEED-certified buildings in relation to employees' environmental satisfaction and their job performance." The study findings suggest a *careful workplace design* considering the height of partitions in LEED-certified buildings to *improve employee's environmental satisfaction and job performance.*
☆Lynch, K. (1960). Applies to Urban & Placemaking Principles	The Image of The City. M.I.T. Press.	(WSOC) The book focuses on the evaluation of city form. The study leads to valued urban planning method for the evaluation of city form. Key Themes: Paths, Edges, Nodes, Landmarks, Gather, Converse, Shared thought.
☆Maslow, A. H. (1954). Applies to Employee workplace/self-motivation	Motivation and Personality.	(WSOC) (DVs, Culture & Trust) Maslow's paper speaks about the nature of human fulfillment and the significance of personal relationships. He implements a conceptualization of *self-actualization. Physiological, Esteem, Security, Belonging* once achieved, can advance to self-actualization.
☆Memarovic, N., Fels, S., Anacleto, J., Calderon, R., Gobbo, F., & Carroll, J. (2014). Applies to: Third Spaces Principle	Rethinking Third Places: Contemporary Design with Technology.	(WSOC) The authors looked at nine third places in Paris. Findings: most of the properties have changed and also three new ones have emerged mixing the physical and the virtual. The authors provide implications for *ICTs that aim at stimulating and supporting properties of third places.*
McMillan, D. W., & Chavis, D. M. (1986).	Sense of community: A definition and theory.	(WSOC)(DVs Trust & Culture) The paper references the original work that of: theory of community, the first conceptualization of which was presented in a working paper (McMillan, 1976) The authors focused on the literature on *group cohesiveness,* and build on the original definition. This paper describes the "dynamics of the sense-of-community force — to identify the various elements in the force and to describe the process by which these elements work together to *produce the experience of sense of community*." Membership, boundaries, emotion and safety influence, integration, and fulfillment of needs, shared emotional connection.

Table 2 (cont'd)

Miller, V. D. (2008).	Assimilation	(WSOC) (DV, Culture) "Organizational assimilation refers to the process by which individuals move from "outsider" to full membership in an organization. Fredric Jablin (1982, 1987, 2001) developed a framework to consider the influence of communication on the social construction of role expectations and their enactments that considers the stages of vocational *socialization*, organizational entry, metamorphosis, and organizational exit."
Mills, P., Tompkins, S., & Schlangen, L. (2007).	The effect of high correlated colour temperature office lighting on employee wellbeing and work performance.	(WSOC) The paper focuses on: "The effects of lighting on the human circadian system are well-established. The recent discovery of 'non-visual' retinal receptors has confirmed an anatomical basis for the non-image forming, biological effects of light and has stimulated interest in the use of light to enhance wellbeing in the corporate setting…. *High correlated colour temperature fluorescent lights could provide a useful intervention to improve wellbeing and productivity in the corporate setting*, although further work is necessary in quantifying the magnitude of likely benefits."
Morgeson, F. P., Parker, S. K., & Johns, G. (2017).	One hundred years of work design research: Looking back and looking forward.	(WSOC) "In this article we take a big picture perspective on work design research. In the first section of the paper we identify influential work design articles and use scientific mapping to identify distinct clusters of research. Pulling this material together, we identify five key work design perspectives that map onto distinct historical developments: (a) sociotechnical systems and *autonomous work groups*, (b) job characteristics model, (c) job demands-control model, (d) job demands-resources model, and (e) role theory." The authors argue that *there is scope for further integration that is broader, more contextualized, and team oriented*.
Morris, E. W., & Winter, M. (1975).	A theory of family housing adjustment.	(WSOC) The authors present "a conceptual and theoretical framework for the study of the housing *adjustment behavior* of families... Families are viewed as evaluating their housing in terms of cultural and family norms. When their housing does not meet the norms, it tends to give rise to dissatisfaction, producing a propensity to reduce the normative deficit. Residential mobility, residential adaptation, and family adaptation are the modes of adjustment used to reduce such deficits and are undertaken when the constraints on the behavior can be overcome."

Table 2 (cont'd)

Naylor, T. H., Willimon, W. H., & Osterberg, R. (1996).	The search for Community in the Workplace.	(WSOC) (DVs, Trust) 10 defining characteristics of *community building* in the workplace: 1. Shared vision — commitment to a shared vision of the future. 2. Common values — identification of common values and objectives. 3. Boundaries — definition of the community's boundaries. 4. Empowerment — creation of a system of governance and a community decision-making process, which empowers all community members. 5. Responsibility sharing — *implementation of a communitywide responsibility sharing system*. 6. Growth and development — formulation of strategies for spiritual, intellectual, and emotional growth and development as well as physiological well-being. 7. Tension reduction — development of a conflict resolution mechanism to reduce tension among community members and between the community and those outside community boundaries. 8. Education — provision of members with education and training on community values, decision-making, governance, responsibility, growth and development, and tension reduction. 9. Feedback — implementation of an adaptive feedback control system which monitors community performance against objectives and adjusts community strategies; accordingly, and 10. *Friendship — creation of an environment, which encourages friendships* to develop among managers, among employees, and between employees and managers. "Cooperation, Trust, and Human empathy are among the shared values."
✯Oldenburg, R. (1989). Applies to: Third Place Principle	The great good place: Cafés, coffee shops, bookstores, bars, hair salons, and other hangouts at the heart of a community.	(WSOC) (DV, Culture) "Third places," or "great good places," are considered *public places* where people can *gather* and are the *heart of a community's social vitality* and the grassroots of a democracy such as: coffee houses, cafes, bookstores, hair salons, bars, bistro. Oldenburg offers a vision for their revitalization. Key themes: Social space, Gathering Space, Neutral Ground, Inclusive
Pogosyan, M. (2017, April 11).	On belonging.	(WSOC) (DV, Trust & Culture) "By *finding solace in each other's humanity*—that someone else has walked through our pain and someone else has tasted our joy. *We need others.* For completing the patchwork of our identities, with our singular traits and those that we share with kindred and friends. For the safety they give us to pursue our goals." "Belonging also takes shape on the grounds of shared experiences."
Poole, M. S. (2011).	Communication.	(DV, Culture & Trust) "One of the givens in the field is that, when an organization or employer attempts to affect one aspect of behavior—for example, job satisfaction—the organization or employer is likely to affect several other areas, such as compensation, supervision, performance review, and the like. Accordingly, through extensive cross-referencing to other chapters, individual chapters attempt to acknowledge the links with other topics in order to present an *integrated approach* to the field, both within and across volumes."

Table 2 (cont'd)

Rahimi, S., Martin, M., Obeysekere, E., Hellmann, D., Liu, X., & Andris, C. (2017).	A Geographic Information System (GIS)-Based Analysis of Social Capital Data: Landscape Factors That Correlate with Trust.	(WSOC)(DV, Trust) "The authors focus on: *community sociology* and note that built environment and configuration of the landscape, including infrastructure, amenities and population density, *may also contribute to community social capital.* The authors embed zip code-level responses from Harvard University's Saguaro Seminar's 2006 Social Capital Community Benchmark Survey with a geographic information system. And they correlated responses on residents' general trust, trust of one's neighbors... more so, *amenities that support sustainable community ties."*
Rashid, M., Kampschroer, K., Wineman, J., & Zimring, C. (2006).	Spatial layout and face-to-face interaction in Offices—A study of spatial effects on face-to-face interaction.	(WSOC)(DV, Culture) They use space-syntax techniques to explain how spatial layouts, through their effects on movement and visible copresence, may affect face-to-face interaction in offices... where v*isible copresence, not movement, is an important predictor of face-to-face interaction.*
Roghanizad, M. M., & Bohns, V. K. (2017).	Ask in person: You're less persuasive than you think over email.	(DV, Trust) The paper supports the strength of face to face interaction in the workplace: •People underestimate compliance when making requests of strangers in person. •In two studies, theey found the opposite pattern of results for emailed requests. •Requesters overestimated compliance when making requests over email. •The error was driven by a perspective-taking failure. •Requesters failed to appreciate how untrustworthy their emails seem to others. This work also contributes a new perspective to a growing body of literature on trust in computer-mediated interactions.
Rossi, R. J., & Shank, A. M. (2017).	Community in the workplace.	(WSOC)
✯Ryan, R. M., & Deci, E. L. (2018). Applies to the SDT Theory Applies to Employee workplace/self- motivation	Self-Determination Theory: Basic Psychological Needs in Motivation, Development, and Wellness.	(WSOC) (DVs Culture & Trust) "Self-determination theory (SDT) provides a framework for understanding the factors that promote motivation and healthy psychological and behavioral functioning. In this authoritative work, the co-developers of the theory comprehensively examine SDT's conceptual underpinnings (including its *six mini-theories*), empirical evidence base, and practical applications across the lifespan. The volume synthesizes a vast body of research on how supporting--or thwarting--people's basic needs for competence, relatedness, and autonomy affects their development and well-being. Chapters cover implications for practice and policy in education, health care, psychotherapy, sport, and the workplace."
Schneider, B. (1987).	The people make the place.	(DV, Culture) "A framework for understanding the etiology of organizational behavior is presented. They outline a model that includes (1) the difficulty of bringing about change in organizations, (2) the utility of personality and interest measures for understanding organizational behavior, (3) the genesis of organizational climate and culture, (4) the importance of recruitment, and (5) the need for person-based theories of leadership and job attitudes. It is concluded that contemporary I/O psychology is overly dominated by situationist theories of the behavior of organizations and the people in them."

Table 2 (cont'd)

Seddigh, A., & Berntson, E. (2015).	The effect of noise absorption variation in open-plan offices.	(WSOC) Noise has repeatedly been shown to be one of the most recurrent reasons for complaints in open-plan office environments. The aim was to investigate if enhanced or worsened sound absorption in open-plan offices is reflected in the employees' ratings of disturbances, cognitive stress, and professional efficacy. The authors' analyses support "studies demonstrating the importance of acoustics in work environments and shows that the measures suggested in the new ISO-standard can be used to adequately differentiate between better and worse room acoustics in open plan offices."
Smith-Jackson, T. L., & Klein, K. W. (2009).	Open-plan offices: task performance and mental workload.	(WSOC) The Open-plan office and the Expanded Tellegen Absorption Scale (ETAS) based upon Tellegen and Atkinson scale was used to assess individual differences in focused attention. Findings: Main effects of noise were found on performance and mental workload. More so, irrelevant speech appeared to increase false alarms and completion rates. *Therefore, supporting that a (WSOC) community defined area could provide a practical setting/area for non-related (irrelevant) or related work dialog to occur.*
☆Sussman, A., & Hollander, J. B. (2015). Applies to: Social Proxemic/ Placemaking & Prospect & Refuge Theory	Cognitive Architecture, Designing for How We Respond to the Built Environment.	(WSOC) The authors review new findings in *psychology and neuroscience* to help architects and planners better understand their clients. There is a central paradox to architecture and planning that this book also addresses. *Practitioners rarely meet the people who will be most affected by their work. Post-occupancy evaluations are expensive and infrequent.* The book outlines four main principles-*Edges Matter, the fact people are athigmotactic or a 'wall-hugging' species; Patterns Matter, how we are visually-oriented; Shapes Carry Weight, how our preference for bilateral symmetrical forms is biological; and finally, Storytelling is Key*, how our narrative proclivities, unique to our species, play a role in successful place-making.
Teboul, J. C. B., & Cole, T. (2005).	Relationship development and workplace interaction	(DV, Culture) The authors discuss employee adjustment and the integration process. In doing so focus on *human nature and behavior in the workplace*.
Tomasello, M. (2019).	Becoming Human A Theory of Ontogeny.	(WSOC) (DV, Culture) The author proposes a theory of human uniqueness, his data-driven model explains how those things that make us most human are constructed during the first years of a child's life. The author identifies eight pathways that clearly differentiate humans from their closest primate relatives: social cognition, communication, cultural learning, *cooperative thinking, collaboration*, prosociality, *social norms*, and moral identity-through the new forms of *sociocultural interaction* they enable—into uniquely human cognition and *sociality*.
Unger, D.G., & Wandersman, A. (1985).	The importance of neighbors: the social, cognitive, and affective components of neighboring.	(WSOC) Reviews the concept of neighboring to involve the social interaction, symbolic interaction, and the attachment of individuals with the people. They discuss (1) the *social component* (emotional, instrumental, informational support, and *social network linkages*); (2) the cognitive component (*cognitive mapping and the physical environment and symbolic communication*); and (3) the affective component (*sense of community and attachment to place*)."

Table 2 (cont'd)

☆Ulrich, R. (1984). Applies to Evidence Based Design Theory	View through a window may influence recovery from surgery.	(WSOC) Discuss records of recovery of twenty-three surgical patients assigned to rooms with windows looking out on a natural scene had shorter postoperative hospital stays, received fewer negative evaluative comments in nurses' notes, and took fewer potent analgesics than 23 matched patients in similar rooms with windows facing a brick building wall. Key themes: Sense of control, Access to nature, social support, positive distractions, non-stressful, noise control, access to fresh air.
Van Maanen, J. & Schein, E.H. (1979).	Toward a theory of organizational socialization.	(WSOC) (DV, Culture) As workplace organizations struggle to meet the demands of a changing economy their core essences, or cultures can also be altered. Companies must incorporate new members into this process.
Varjo, J. (2015).	Simultaneous effects of irrelevant speech, temperature and ventilation rate on performance and satisfaction in open-plan offices.	(WSOC) Similar in study to that of: Smith-Jackson, T. L., & Klein, K. W. (2009). The investigates how irrelevant speech, temperature and ventilation rate together affect cognitive performance and environmental satisfaction in open-plan offices…. "It was concluded that special attention should be paid to the design of *whole indoor environment* in open-plan offices to increase subjective comfort and improve performance."
Veitch, J. A., & Gifford, R. (1996).	Choice, perceived control and performance in the physical environment.	(WSOC) While many studies have begun to examine the relationship of workplace factors to productivity, many studies have focused on choice of one variable i.e lighting, noise etc.
Verderber, K. S., & MacGeorge, W. L. (2017).	Interact Interpersonal Communication.	(DV, Culture) Inter-Act enables the reader to understand and differentiate studies in communication. They address readers' experiences of communicating across differences in individual identity, gender, and culture. Additionally, to think critically about key concepts in *interpersonal communication*.
Whyte, W. H. ☆ Whyte, W.H. (Director) (1980). Applies to: Urban Planning, Placemaking, Sense of Community, Social proxemics/ ergonomics.	The Social Life of Small Urban Spaces.	(WSOC) Whyte published the findings from A NYC Street Life Project. He focused on the planning and study of public spaces. Urban planning, sociology, environmental design, and architecture departments have embraced the findings and supported the principles of Placemaking. Key themes: refuge for safety, edges vs. exposed, covered overhead, balance of P&R, sitting space, access to sun, people attraction, water feature.
Zak, P. J. (2017).	The Neuroscience of Trust.	(DV, Trust) This research discusses employee-centric culture and how it can be good for business more so, building a culture of trust is what makes a meaningful difference. Employees can be more productive and collaborate well with one another.
LEED & WELL AP (USGBC)	Assessment of exterior and interior of built environment	*Air, Water Light, Nourishment, Fitness, Comfort & Mind*

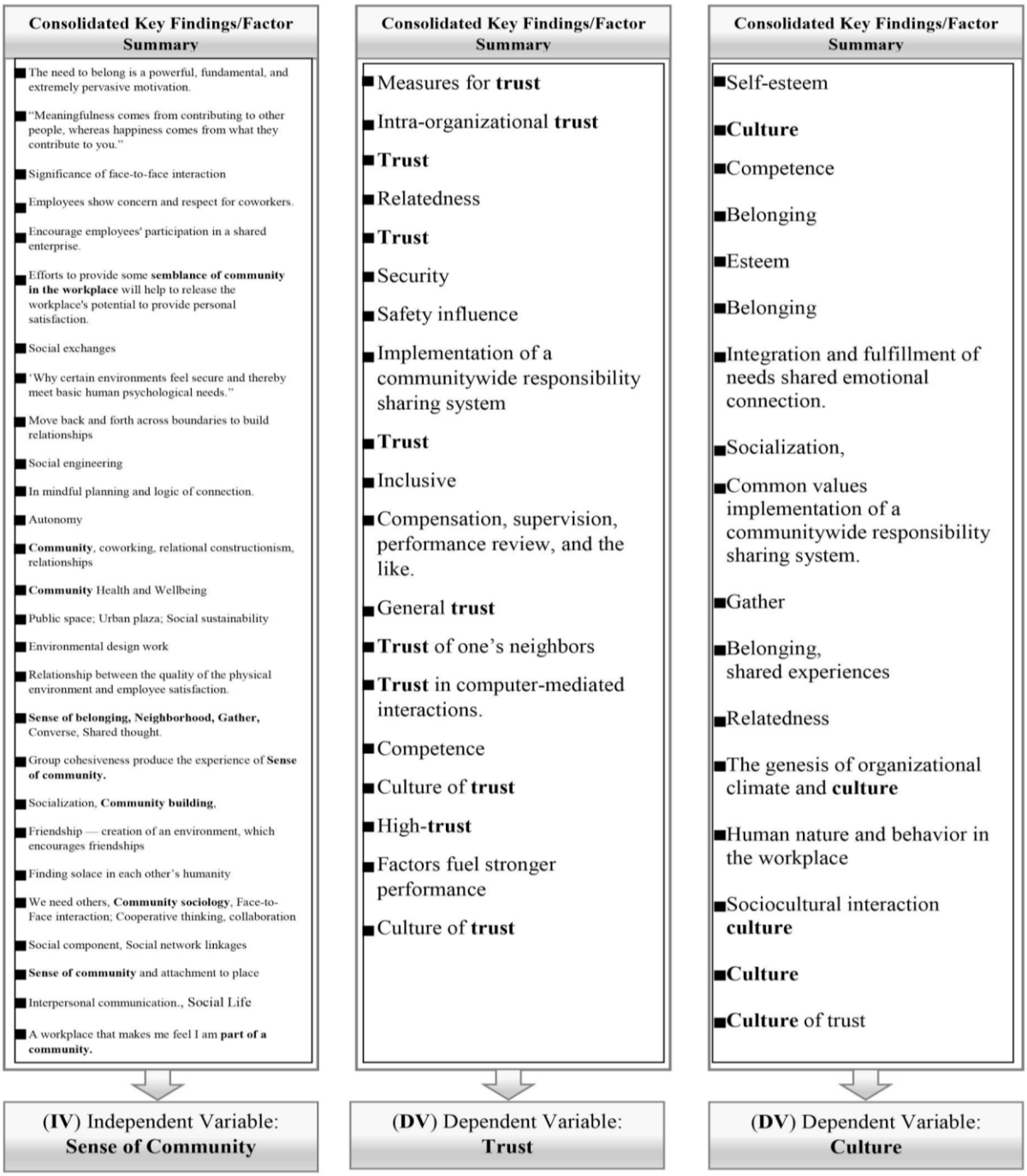


Figure 24: Summary of the Framework of Factors strengthening the validity applied to the research IV and (two) DVs

1. **Self Determination Theory-Gagne & Deci: which supports employees' (3) basic needs:**
(Ryan and Deci as well as Gagne, Deci, 2005-applied to the Workplace)

(Basic human needs) Competence-Autonomy-Relatedness

2. **5-level Hierarchy of Needs/Motivation and Personality-Maslow 1934:** (Maslow, 1954)

Self-Util. Esteem Belonging Safety Psychological

3. **Placemaking/Urban Principles-Lynch/Jacobs:** (Jacobs, 2011, Lynch, 1960)

Path Edge Node Landmark Gather Converse Share Thought

4. **Prospect-Refuge Theory**: (Appleton, (1975)

William H. Whyte: Study of Manhattan inner city Plazas concluded that higher levels of plaza utilization are associated with a **Correlation Research Method applied-in a natural setting:** *Observing* (behaviors) of the people and the (Exterior built environment) through *time-lapse film*

Refuge for Safety | Edges vs Exposed | Covered Overhead | Balance of P&R | Sitting Space | Access to Sun | Water Feature | Access to Food/Bev | ADA | People Attraction

5. **Evidence Based Design**: (Ulrich, (1984)

Sense of Control | Access to Nature | Social Support | Positive Distractions | Non-stressful | Noise Control | Access to Fresh Air

6. **The Third Space Principle**: (Oldenburg, (1989)

Social Space | Gathering Space | Neutral Ground | Inclusive

7. **Social Ergonomics Principles** (& Physical, Cognitive, Social): (Hall, (1969)

Relationships | Proxemics | Privacy | Territoriality

8 & 9. **LEED & WELL Bldg. Principles:** https://new.usgbc.org/

Air | Water | Nourishment | Light | Fitness | Comfort | Mind

10. **30 Meter Rule/Principle**: MIT student research

Speaks to connectedness: MIT researchers discovered that two people in the same enterprise who sat over thirty meters apart were only as likely to collaborate as if they were located in different buildings or cities.

11. **Housing Adjustment Theory:** (Morris, Winter, (1975).
Theory related to: *Adjustment* to exposed workstation vs. *choice, in comfort* to sit in a Community Social space.

12. **New Urbanism Transect:** (Duany, 2010).
Theory related to: Connectivity, walkability, mixed-use & diversity, Quality design, sustainability

Figure 25: Summary of theories and principles incorporated in the research related to the measures

2.13 Summary of Review of Literature

Today's urban environment prioritizes cars over people. This is slowly changing. As more and more efforts are made to prioritize pedestrians within their urban surroundings, the reality of emerging innovative urban gentrification initiatives can be quite inspiring.

Making concerted efforts in planning to provide for a 'pocket', a redefined area fostering sense of neighborhood within an urban environment, has shown significant benefits to those that experience the new surroundings. Improved plantings, social proxemics with applied best layout consideration in utilization, can quickly convert a "Pop-up" to a plaza resulting in a permanently adopted environment if the newly defined area provides for community connectedness beyond aesthetic consideration. A successful case in point is the urban gentrification in Times Square Manhattan., NY. where an exchange of traffic lanes for visual and soundscape experience by providing ample public café, seating benefits the tourist and resident alike.

In many ways, the parallel between the changing urban landscape and the highly redefined 21st century workplace landscape is similar. Both landscapes have experienced significant changes in prioritizing large scale, open planning, traffic prioritization patterns, often without consideration of the individual having to adapt to the continually disruptive 'flux' in their environment. Edging more and more toward that of Grand Central station, the workplace environment assumes a concourse like-effect only buffered by the rotund haven structure located in the center. The fully staffed haven known and visible by all, the information booth. A beacon to travelers overwhelmed by the fast-paced open environment.

If society has been encouraged to believe that change is good, then why is there a significant need for and subsequent rise of Change Management services sought today? Just

as traffic patterns are aided by signals at intersections, assisting workplace employees navigate their ever-changing workplace is necessary given the continuum that ensues.

While change management is critical to support staff transition, the reality is that workplace metamorphosis is occurring at a rate comparable to rapid urbanization of large cities. Just as micro 'pop-ups' of urban oases are proposed, planned and constructed in turn, providing at onset, a physical buffer to the hardscape of city life, the same consideration must be applied to today's workplace interior space planning iterations.

The significant interest and ground-swell around co-working, and the interpretive way in which remote workers conduct business engagement and ideate today is similar to shifts in the workplace and urban setting. The uptick of co-working did not occur out of a design iteration or best practice. It simply became an evolution of necessity in the last decade, resulting in a fine tuning of co-working menu services offered. The Great Recession of 2008 sparked ingenuity, not only in those who took to local coffee houses to charge their laptops and convene with fellow out-of-work colleagues, but for those who advantageously took note for the need to provide basic workplace amenities such as wireless and conferencing services. However, in actuality, those frequenting the coffee houses were seeking much more than office space basic amenities. Coffee house frequenters were seeking a 'connect space' where they could gather and feel part of a community based on relatable economic down-turn experiences.

Co-working has exponentially increased in demand and use as a result of rapid shrinkage in corporate square footage coupled with non-defined, non-anchored open plans that support nomadic activity-based working and hoteling workstations. In 2018, WeWork, one such co-working provider, moved to purchase the flagship Manhattan location of Lord & Taylor; an 850 million acquisition to house their new 'Galactic' headquarters. Such

sizable single real-estate acquisition has been is a significant financial marker of co-working's impact.

While the co-working prime Fifth Avenue N.Y. real estate acquisition is attention worthy; the noteworthy factor of co-working is not the software algorithms, real estate acquisitions or related IPOs, it is to not lose sight of the importance for renters, corporate workplace employees to gather, connect, converse and have a *sense of belonging satisfies basic human needs* according to Maslow, even while temporary in use, thus providing co-working renters and remote workers alike, the ability to achieve Self-actualization: achieving one's full potential is the significant most important factor to be supported. The co-working emergence of the communal lounge hub has become the significant outcome. Developments and the emergence of "Hubs" have, in only a few short years, become the "calling card" of developers' choice in every applied use the word. Such can be seen on Grand River Avenue, Lansing, MI. outside of Michigan State University, the twelve-story apartment building is actually called the "Hub on Campus". Grand River Avenue is the main artery of student life. As new buildings are erected boasting Hub-like amenities to attract students, a similar amenity and business model co-working utilizes to convert to renters alike. Yet, even school-spirit in associate college or university hubs in kinship are fleeting post-graduation. Therefore, it remains key to recognize that Blended **Co**-worker(s) as well as homogeneous:

Co-rporate workers seek Co-nnnection through Co-mmunity

and doing so with sensitivity planning as to how the built environment affects people's behavior within Hubs is paramount.

Established sense of a 'temporary' community exists as well as in the instance of co-working a "pop-up spaces". A pop-up co-working space is where employees enter and

occupy a mock-space, think-tank with fellow 'selected' staff or even outside thought *starters* to generate ideation and innovation at a rapid-fire level. While beneficial to a new corporate product launch idea, the temporary inhabitants, who at first viewed themselves as having merit for entry, quickly became the have nots, not having a lasting sense of community they worked so hard to build while creatively innovating. Those employees not part of the experience became, as a default, the true haves, not experiencing signs of depression for not having been invited to participate. "Others had employees who got depressed after having to go back to their previous corporate work environment after they had spent some time at the co-working space" (Hagy, 2018). The establishment of sense of community in mock co-working spaces was never anticipated nor the void in comradery once dismantled, only to make way for the next iteration of think-tank contributors and subsequent siphoning of yielded innovation outcome.

Unlike urban pedestrian oases, rentable or think-tank co-working spaces inhabitants, the workplace employee, however, shares a common corporate culture umbrella where the importance of community, given workplace change, has yet to be compassionately addressed. Designers, we are keenly aware when the workplace landscape shifts in use and flexibility so too does the extent that an employee's need for 'predictability' in space use is no longer predictable. Lack of predictability in the workplace for many employees has been disruptive and for others, simply a continual adjustment of space through assigned and non-assigned allocation. Given the five generations that share the workplace today, shifts in opinion can divide where comradery could be supported through meaningful connection.

Employees, much like urban pedestrians, have an inherent need to connect and feel a sense of belonging which yields a Sense of Community. In *The Image of the City published, by* Kevin Lynch 1960, Lynch presented extensive research on human perception of the city

and how pedestrians navigate the urban landscape. The publication influenced an innovative and sensitive human-centered approach to urban design. Only a year later, Jane Jacobs published, *The Death and Life of Great American Cities.* Jacobs related her experience as a resident in New York's Greenwich Village to raise awareness of excessive modernism development in Manhattan resulting in void in character and scalable relatedness of the city for the city dweller, not intended to be a criticism of Modernism, but merely a point to consider mixed-use building types in development.

In the *Social Life of Small Urban Spaces*, William H. Whyte writes of his seminal research through filmed time-lapse observation of New York City public plazas in 1970, his writings discuss Plaza planning successes and lack of; we are then only made aware that without planning framework of best planning consideration, such well-intended oases do not necessarily guarantee occupancy.

Urban planning principles applied in Placemaking to the interior application has, in many instances, been highly successfully. Yet, as the rise in open planning, ancillary furnishings and flexible workplaces On-demand advances; the constant shifting workplace landscape has moved us father from the essence of communal "commons" Jacobs' passionately advocated for toward potential regression, void(s) in character, scalable relatedness and mixed-use within a micro-environment. Commons are the community advocate.

A defined, physical, common 'third space' that fosters connectedness and belonging for pedestrians and employees alike to rebound and thrive is paramount in today's evolving work landscape, more so, an environment that transitions from the outer space in applied New Urbanism Transect Theory consideration. The dedicated or defined anchor by which a commons is offered, or more than one, on a given floorplate must be planned with logical

continuation of offering verses a stark contrast from panning outside the space both in architecture, furnishings and Urban Placemaking principles. The prerogative is not to "blend" the macro space planning (the outer work point area) but not to divide either with the micro-commons area. Sensitive interior architecture practices when best applied to a micro-commons area will provide a common-sense approach yielding the most use and benefit.

As previously stated, wellness has been forecasted as the next trillion-dollar industry. Various iterations of corporate commons in interpretive *social hubs* have emerged in recent workplaces as staged amenities in and around central workstations as well-being initiatives. Yet, amenities are simply amenities if not properly planned for how to best support the employee from a behavioral standpoint in the built environment. "When creating workspaces, designers are often asked to apply planning methodologies or specify products based on design trends, rather than the specific operating needs of a business. But the best designers are those rooted in solutions specific to company culture, environment aspirations and respect for individual user choice" (Thompson, 2019). Therefore, defining a dedicated community space addressed as its own micro-ecosystem in planning is key while supporting, logical, transitional linkage of the macro, vast outer floorplate.

A commons anchor that is resistant to change, beyond the emerging workplace trends of coworking and predicable workplace redesigned spaces that follow suit, that offer an island of respite in purposeful character and scale while fostering and supporting community will ensure a compassionate lens of wellbeing resulting in a Sense of community for all employees; remote, coworking and full time in both blended and homogeneous environments. A purposefully designed anchor space that is a needed and resilient respite. Furthermore, places of business that prioritize employee Sense of

Community, holistically, through connectedness and belonging tied to the workplace-built environment will benefit not only the employee's autonomy but the entirety of the corporate culture.

The literature reviewed the need to provide a newly defined system for addressing employee autonomy inclusive of many factors within the built environment is realized. Yet, studies to date, have not researched the built environment with regard to a defined, specific "anchor" that may significantly contribute to a Sense of Community as Jane Jacobs espoused and more importantly, what effect it may have on employee wellbeing, the company culture and retention if not planned for. Studies such as (Oswald, 2014) provide real evidence for an increase of 10-12% in productivity and performance based on levels of happiness. However, the study is not based in a workplace environment, rather a controlled lab with a control of subjects: college students. "When one is designing with an eye toward employee's well-being, it's critical to seek out employees' opinions and keep them top of the mind. What works for one company may not work for another" (Wunderlich, 2016 p.22). "If real estate is simply the next for housing staff, you have not utilized it to its full potential. If you're not using the work environment for engagement and well-being, you're not leveraging your second asset very well" (Wunderlich, 2016 p.22). Judith Heerwagen, Ph.D.'s compelling paper suggests that design, productivity and wellbeing hold links, moreover, she provides a way to conceptualize the relationship between buildings and performance (Heerwagen, 1998). The most notable and encouraging literature review resulted from (Kamarulzaman, 2011) where it was emphasized that the workplace in its entirety be considered. A step forward, however Kamarulzaman did not consider the physical built environment i.e. furnishings, partition and, boundaries. Advancements in Generative Design will provide for flexible workflow iterations applied to architectural

space planning, but without a compassionate lens toward Sense of Community the best ‘physical’ plan scenario may not consider for best plan outcome for connectedness in the workplace.

CHAPTER THREE

3. Research Methodology

3.1 Approach and Procedure

The goal of this study is to address the unprecedented; to tie workplace behaviors to the built-environment, to identify and define a nexus of company trust, a physical space within the workplace that can provide a psychological and physical anchor to which employees can feel a sense of connectedness: belonging to their community. This study investigated the biological benefits beyond of the known standards of work design, managerial practices, extended autonomy to the individual staff/employee: Location: the corporate workplace, where employees lack the opportunity to advance autonomy due to constraints placed on them by an established, pre-set, built environment/landscape. This study gathered data with the aim to substantiate a link between impacting the employee in terms of happiness as in connectedness, health and productivity when personal employee sense of community in the built environment is considered such will positively affect corporate-wide employee-workplace trust and advance communal cultural social ergonomics as a result.

As previously stated, the results of this mixed-method *study consider employee autonomy* as it is related to the physical workplace and that of workplace sense of community. Numerous industry articles, white papers, and research of work design reference happiness as the goal to productivity, however *happiness is only a facet supporting productivity*. Therefore, this study *considers workplace employee autonomy*.

3.2 Design of Study

The study set forth was contingent upon (3) constant variables: An open floor plan, full time employees with the option to work remotely (at least one day a week) and a functioning dedicated community space/area/anchor/commons with seating that is not a solely designated cafeteria, during cafeteria-access hours (as a point of internal reference). The study utilized three custom designed instruments/methods, forming a mixed-method approach: 1) a custom designed, online questionnaire survey based on ~ seventy questions administered to purposefully varied department employees, 2) An Image Sorting Employee Preference exercise of a commons/anchor space, and 3) onsite employee observation coupled with collected field notations of the use of such space(s) provided per floor in the building. The main survey instrument is predominantly quantitative (ranking, interval, ratio-true zero responses) along with a qualitative (open-ended, categorical-grouped) response. The survey questionnaire was approved by MSU's IRB office. The image sorting exercise is quantitative, in that, the exercise is ranked and will be coded as such. The observation on-site is qualitative in collection.

With regard to securing an exclusive, single case study that would meet the constant variables criteria sought; fourteen globally recognized corporations representing different sectors were approached and engaged with over the period of one year. The companies were invited to take part in the research study via email and follow-up personal telephone conversations. Thirteen of the corporations, were not able to provide access to visit the facilities due to access/security reasons (e.g. a banking facility and sector) and/or not able to meet the constant three research variable sought in time or at the time of the study to be conducted. However, unanimous interest and intrigue in the research was expressed by all the companies approached. One of the companies, West Pharmaceutical services Inc.

located in Exton PA., while not meeting all three constant variables did *enthusiastically* and *generously* offer to act as the pilot study for the survey. Saint Gobain CertainTeed, the established leader of commercial and residential building products with a legacy of creating the original mirrors installed in the Louvre in France and the glass incorporated in the construction of I.M. Pei's Pyramid in front of the Louvre, welcomed the research invitation to act as the exclusive case study, as Saint Gobain CertainTeed as well recognized the value the study would bring to their employee population, per the findings as well as benefiting fellow employees, worldwide, in the corporate workplace. Additionally, Saint Gobain CertainTeed meet all three constant variables required for the research to commence.

The research instruments were then conducted at a Fortune Global 500, Saint Gobain CertainTeed Headquarters located in, Malvern, Pennsylvania. It was determined that the Image Sorting Employee Preference Exercise, would aid in corporate workplace employee preference of commons features, valuable feedback, which funneled into the compilation of the (WSOC) guideline/framework proposed final outcome to inform planners on how best to design and plan for a workplace commons (anchor) space/areas to best support and foster workplace sense of community.

According to Yin, case studies are the preferred strategy when "how" and "why" questions are posed. Yin emphasizes the power of high-quality case study research that focuses on rigor, validity, and reliability and continues to defend case study research as an integral and rigorous methodology, and he presents this argument through a very practical and readable structure. Yin emphasized that the case study "process be given careful attention and if so, the potential result would be a high-quality case study" (Yin, 2014, p.199).

Case Study Description: Saint-Gobain-CertainTeed is a world leader in the habitat and construction architectural engineering markets and designs. It manufactures and distributes building and high-performance materials with a 49.4 Billion in sales annually-2018. Saint-Gobain-CertainTeed supplies and answers for innovative solutions to the architectural/design industry for: growth and energy efficiency.

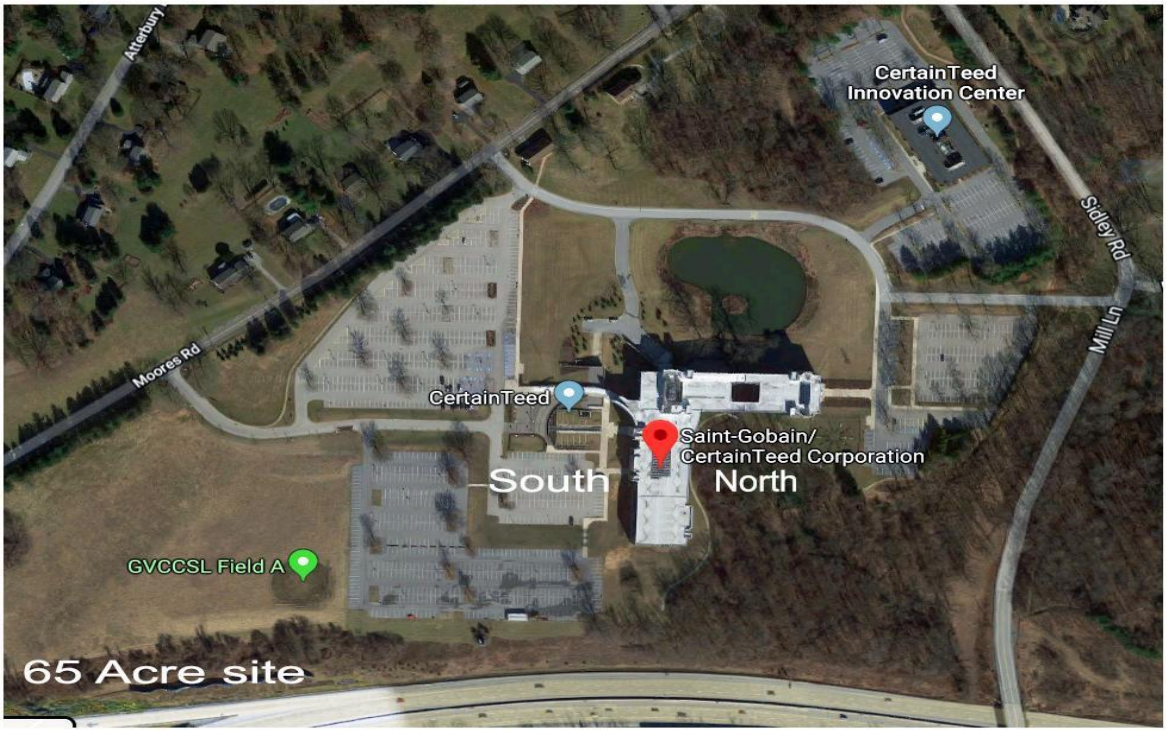


Figure 26: Top view of Saint Gobain-CertainTeed headquarters, Malvern, PA (Source: Google Maps)

Figure 27: Front view of Saint Gobain-CertainTeed headquarters (Image source: Architect Magazine.com)


Figure 28: A side view of Saint Gobain-CertainTeed headquarters (Image source: Architect Magazine.com)

Figure 29: A View of the lobby of Saint Gobain-CertainTeed headquarters (Image source: Architect Magazine.com)

Location, building descriptor & furnishings: Saint Gobain-CertainTeed's headquarters located in Malvern Pennsylvania, houses the North American Headquarters for the corporation and a population ~ 800 employees representing various departments and levels within. Departments ranging from general council to marketing and facilities are housed under one roof. The building consists of 320,000 square feet which was opened in October 2015, on the company's 350th anniversary (originally founded in Paris in 1665). The North American headquarters is located on a 65-acre campus featuring an outdoor pond and fountain and walking trails. The building is double-platinum LEED certified and has interior systems in place to purify and monitor the indoor air quality (IAQ) as well as continuously collect data on humidity, air velocity and volatile organic compounds (VOCs). The headquarters incorporated 40 of its own products, eight exterior and 32 interior products

into the design, including 17,000 square feet of zoned electrochromic glazing from its SageGlass brand on the building's façade.

Jacobs Buildings & Infrastructure, the interiors firm, designed the headquarters which houses: an open-plan office space, collaborative work areas, a cafeteria and spatial layout gym. Knoll furniture, specifically Generation by Knoll® and Dividends Horizon® for workstations Dividends Horizon® EQ Tables with Gigi® Chairs for outer cafeteria commons area and activity/ancillary spaces was specified throughout the building as well as seating in the main panty and outer cafeteria commons area along with coffee shop ancillary furnishings for the employees.

Table 3: Single case study outline of validity and reliability factors

Single Case Study: Researching a Workplace Complex Social Phenomena	
(H) This research study demonstrates a correlation between an embedded Sense of Community through an identifiable built environment anchor in the workplace as a nexus of trust among employees; resulting in strong company Communal Cultural Social Ergonomics.	
Case Study Tests (Mixed-Method approach) Construct Validity through Factor analysis (F-Test) a statistical technique that examines the inter-relationships among variables. Associated with the instrument, Construct Validity is the extent to which a test measures the concept or construct that it is intended to measure.	Meta-analysis through a comprehensive review of literature conducted deemed best Instrument approach: Single case study (12) Theories and Principles infused into (3) method instrument tools (3) Multiple sources of evidence ---------- 1. Survey (Overall on-site corporate HQ population: 800, seeking a size of ~260 yielding a confidence interval of 95% 2. Observation (of commons space/area on-site during a typical workday, pre and post lunch time hours) 3. Employee Participation Image Sorting Exercise (48 one-on-one engagement employee input cases/respondents) Establish Chain of Evidence: Mindful recording of data and process (Charts, Dashboard, Survey Monkey outcomes) IRB reviewed and approved Expert panel reviewed survey prior to IRB submittal and Pilot Study Key informants reviewed Case Study draft (Committee members)
Quantitative - Internal Validity The actual experiment: Actual Data Collection phase	Logic Models: Graphs/Charts/Pie chart dashboard data outcome results of Survey Commons area usage & Image Sorting Preferences * Coded by Lead researcher (control of data) * Run through Descriptive and Inferential Statistics * Assumptions met * Pearson's r (for correlation of linearity among variables) * ANOVA comparison between groups (Demo, response/generation preferences) * Factor Tests & T-Tests (non-parametric if needed) Chi Squared, etc.
Qualitative - External Validity Generalization	Use of Theory (Single Case Study): * (12) Theories and Principles infused/referenced & embedded into the ~70 survey questions. Creating questions with built-in credibility * Employee Participant Image Sorting exercise (built environment commons as factors) * Observation (field onsite): Protocol check-list to then best inform the (WSOC) guideline framework
Reliability: does not imply validity * Cronbach's alpha is a measure of internal consistency * Reliability coefficient (0-1) where .70 or higher represents good reliability * Pearson's correlation (p) is used * Pearson's r is widely used for correlation	Case Study Protocol (On-site observation) * Pilot Study in workplace conducted May 3rd, 2019 (W. Pharmaceutical Services, Exton, PA) strengthens reliability for future re-test * (3) Constant variables measured for the Case Study * Case Study Database created to assist in Mixed-Method conclusion and findings Cronbach's alpha: testing to be run of group/scaled: Trust, Culture, Sense of Community * Custom survey too assessment to collect raw data * Raw data entered into SPSS SPSS Steps: * Analyze Scale and Reliability looking for Inter-Item Correlation * And reliability coefficient of .7 or higher * Additionally Pearson's r
Cronbach's alpha tests if the study fulfills its predicted aims and hypothesis and also ensures that the results are due to the study (reliable) and not any possible extraneous variables.	

Custom-designed surveys: The online custom-designed survey increased the study's validity through support of theories and principles embedded into the questions themselves. Employee participants represent various teams in the company case study increasing participant population and validity. The case study consisted of a ~800 Population (employee participant opportunities for survey feedback) with a respondent sample size sought (those who ideally completed the survey) of approximately ~260 which represents a confidence interval of +/- 5%. Subsequent floor/campus building access/granted permission, in addition to remote employee access of the survey, would yield a larger population thus increasing the validity of a larger sample size to take the survey. An eight-dollar gift card as gratis was designed into the survey.

The online questionnaire consisted of basic demographic collection additionally, the survey seeks job types and levels, as assessment of "community use" supports community intake. The anonymous, custom designed, Survey Monkey questionnaire was administered, opened online, during the fall, November 2019, prior to the holidays and was identified as the ideal month for the survey is administered. Consideration of holidays not conflicting with attendance or feedback was anticipated.

The seventy-three-questionnaire survey, noted, was custom designed by an industry licensed design professional in the field of Interior Architecture, the lead researcher. The questionnaire was ethically submitted to an expert industry panel comprised of an urban planner, Dr. Mark Wilson and an architectural, design professional, Dr. Linda Nubani to take, review and comment on prior to administration. Notations that required editing were addressed per meaningful feedback. The survey created was also checked by the panel for validity, feedback, feasibility, and compliance with regard to the Americans with Disabilities Act through a survey pre-test. The actual submitted survey received IRB

approval in (3) business days. A testament of the survey's clarity and compliance with IRB standards for use with human subjects as shown below.

The categories of questions created were based on addressing the key factors of the hypothesis. The survey was administered through a valid online link provided to the respondent and a valid user ID assigned by Survey Monkey, in this way, the questionnaire can be duplicated. The survey was designed to take approximately thirty minutes in length with an eight-dollar gift card as gratis upon completion.

Twenty-one corporate workplace employees representing purposefully varied departments, participated. The online Survey Monkey survey was also checked for software fault and defect, revisions made as recommended. The categories of questions created was strategically based on addressing the key factors of the hypothesis: *Autonomy, Built environment identifiable anchor, Culture, as it represented workplace Communal Cultural Social Ergonomics, Performance, Sense of Belonging/Community, Refuge/Spatial Proximity and Trust*. The anonymous, survey was then administered through a link provided to the respondent and a valid user ID, in this way, the questionnaire nor test was able to be duplicated.

As discussed, the survey was based on the hypothesis that inquires employee access to a dedicated commons space, frequency of use for nourishment and brief social exchange to preference to utilize for heads-down work. In addition, if 'Activity Based Working' is in practice, i.e. employees have the option to sit anywhere they please (unassigned), then survey questions address their preference, or not, to be located in or within the vicinity of the commons space. Personal preferences such as: does the employee work within the commons space with their earbuds out or in? (the purpose for this type of questioning is to

explore the psychological connection for subliminal social welcomeness-verses earbuds worn when working at their assigned workgroup area-closed-off social inference)

The objective of the survey was to measure the two dependent variables, *Trust and Communal Cultural Social Ergonomics and the independent variable, that of workplace sense of community* assessed by Likert ranking scale questions. The employee's overall rating of satisfaction was also part of the survey. The qualitative/qualitative survey was given to a sampling across all departments that had access to the dedicated workplace commons spaces, areas. A sample size of employees within varied departments per survey administered was sought as the best cross section of collective workplace opinion. The lead researcher then conducted an on-site visit to observation of the physical surroundings of the built environment to deduce and note what, *if any*, connectivity- proxemics setting that would provide a sense of community exist or is purposefully provided to the collective employees. The constant variable included in the case study were open desking/benching occurs and a commons space, outside of a canteen/cafeteria exists. The visual and physical access to dedicated commons space for social interaction were noted during the on-site observations. Combinations of work style environments and applied workplace methodology were noted. For example, ABW (Activity Based Working, free address e.g. non assigned) in place. In which case, the environment and/or adapted style of working were observed.

On-site observations: The second phase study's data collection, onsite observation, field notation, at set case study workplace campus location garnered recorded employee access to and engagement within the functioning dedicated community spaces or like scenario that was not the primary, assigned, employee cafeteria. The main objective of onsite observation was to assess usage, frequency and distance from an employee's defined

location, preferential work area within proximity of the community space/anchor as well as non-assigned relationship to the provided social area.

The onsite observation with an accompanying custom-designed protocol checklist occurred on September 10, 2019 for consistency of observation notation of the physical dedicated onsite community space(s) Main Pantry provided on every floor adjacent to the open plan workstations and the main outer cafeteria commons area and connected Starbucks coffee shop/seating located on the first floor for open use after cafeteria hours. All case study raw data was then collected, and the completed instruments prepared, data sets created in SPSS for data analysis for interpretation followed by communication of findings related to the original research hypothesis question.

The lead researcher conducted the on-site visit to observe the physical surrounds of the built environment and deduce, record and interpret non-verbal communication as part of a respondent's feedback is additional valuable information during analysis that the onsite visit. An observation checklist protocol was assessed and an ID# to each dedicated space employee visitor during the observation period as preference in seating was then noted. Characteristics: such as the employee's age range and sex or *unsure* was assigned.

Image sorting preference exercise: Employee Image Sorting Preference Exercise: Original/custom designed Employee Image Sorting Preference Exercise to inform defined built environment features of a community commons space/area based on (key aspects of twelve Theories and Principles) that then informed the Workplace Sense of Community (WSOC) theoretical framework, guideline for workplace planners in build out and renovation application/use.

Forty-eight employees representing varied departments of the case study workplace site surveyed with a custom designed method/instrument measuring: Employee Image

Sorting Preference exercise: Each Saint Gobain CertainTeed employee, during the exercise on October 4th, 2019, was presented with the IRB approved MSU consent form in a conference room for agreement to participate. Each employee then reviewed the instrument construct with the lead researcher (author) to occur (Present: Deirdre M. Cimino). The employee's verbal agreement to the consent/exercise marked the start of the exercise.

On a conference table placed in front of the participant were twenty (20) image cards black and white, all measuring 5"x5" laminated image-size cards representing individual built-considerations/features within a community commons space/area e.g. an operable window, drinking water, access to outdoor areas, banquet/alcove seating; twenty collated based on extracted overarching significant findings of the (twelve) industry-established theory and principles, custom-designed in depicted visual format for ease of sorting by employee preference.

The participants were informed, prior to the start of the exercise, that their opinion was intended to add validity to a future (WSOC) "framework/guideline" for workplace planning consideration for all employees that worked within offices and coworking spaces (blended and homogenous) of the built-out or renovated Commons space. The lead researcher instructed each employee participant at Saint Gobain-CertainTeed in Malvern, PA. to select three (3) image cards from the (20) built-considerations/features of a commons/community space/area that were:

The most important feature, consideration to them and then to select the corresponding image/number to note down: then to select three (3) image cards that were the least important feature, considerations to them and then to select the corresponding image/number to note down on the individual score sheet provided to each respondent (see Appendix B).

The six-cards selected by the employee/participant were then noted/recorded and the (20) conference room images reset for the next employee participant's preference feedback. The time assigned to each exercise session was ~ 10 minutes. The total collected responses were then coded in SPSS and ran through statistical analysis for statistical significance resulting in invaluable employee opinion/feedback as part of data and insights compiled in turn informing the final proposed framework, the (WSOC) planning guideline.

There was (1) one qualitative open-ended question asked of each employee participant at the end of the preference sorting exercise that asked and (1) quantitative Likert ranking question asked: Q. *What feature in a workplace commons/community space/area would you like to see that had not been represented*? And a universal qualitative question: Q. *How important is having an employee community/commons space, in the workplace*? The participants/respondents for probability sampling represented various departments in the corporate organization, a homogeneous population, and not limited to management, executive leadership, hierarchy as autonomy. As sense of community affects all levels, all levels were questioned in the image preference sorting exercise as such and part of the survey and observational data collected, therefore random sampling of employees at Saint Gobain CertianTeed was employed.

Data Analysis: As will be discussed in the next chapter, the raw data responses collected from the survey questionnaire participants, along with the on-site observation protocol checklist results and image sorting exercise feedback, for review and compared via SPSS software with scaling and crosstabs applied. Assumptions met showing even distribution of data outcome. In order to measure for internal consistency and scale reliability, a Cronbach's Alpha was run in SPSS. The final evaluation to reject or fail to reject the null hypothesis per each section questioned on the survey, causation was

examined looking for themes or commonality as detailed in outline in the analysis section, chapter four of the research study.

Assuming the *p*-value is <0.05, then the survey along with the image sorting exercise and observation protocol will have provided the knowledge to then reject the null hypothesis and indicate that there was enough evidence to accept the: Alternate Hypothesis (Ha, H1)- Providing a Sense of Community through an identifiable built environment anchor *had a positive effect* on a company's trust and communal cultural social ergonomics. Resulting in successful planning of future work environments that provide thoughtful ranges of the commons space, an ecosystem, by prioritizing Workplace Sense of Community (WSOC), an applied outcome as a guideline, a novel framework based that advances autonomy in the way of choice for the individual to decide where and how they best work, engage and thrive. Following Creswell and Creswell (2018), the author illustrate a mixed-method approach for data collection process in (Figure 28).

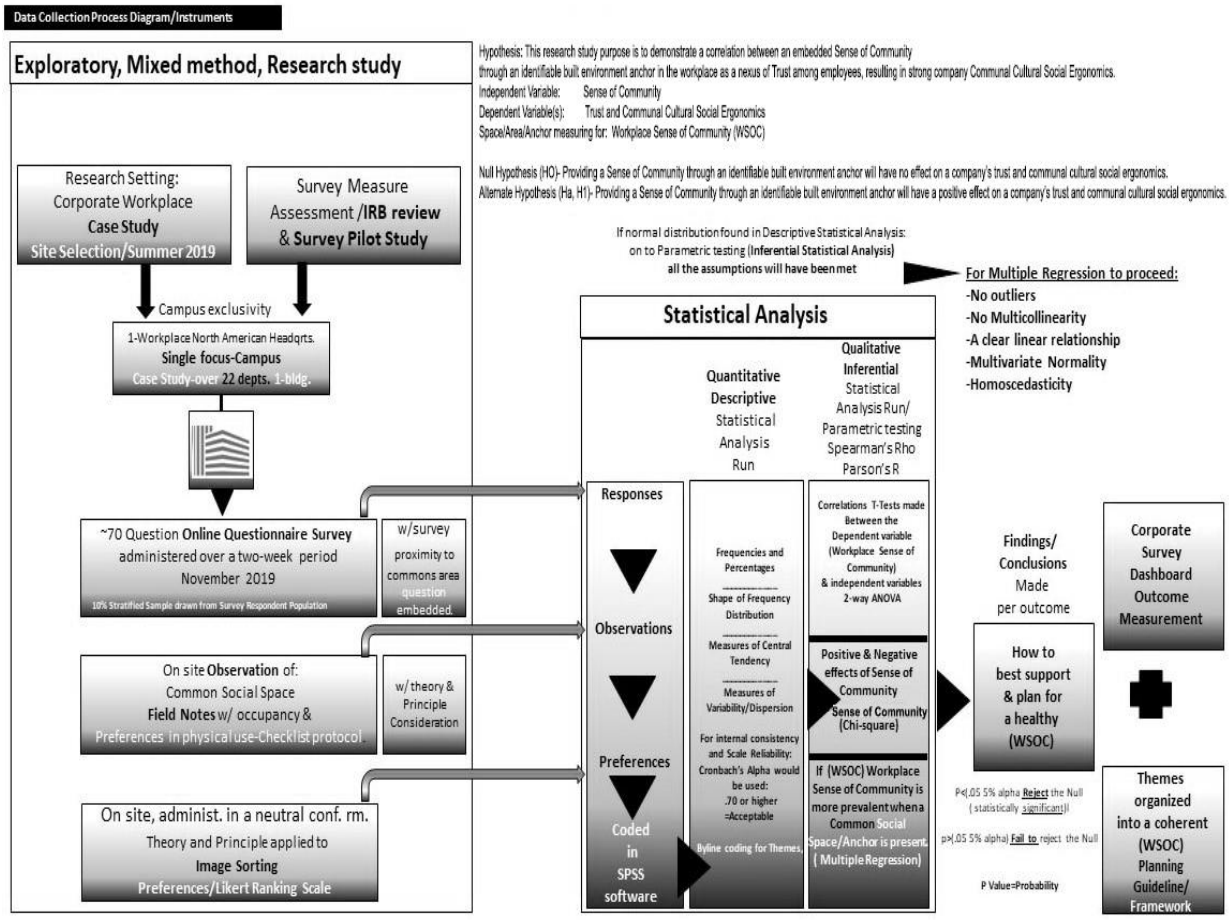


Figure 30: Research Data Collection Plan Process Diagram

3.3 Participants

The participants/respondents for this probability sampling study was represented by the various departments in the corporate organization, a homogeneous population, and not limited to management, executive leadership, hierarchy as autonomy, as Sense of Community affects all levels, and should be measured as such and part of the survey and observational data collected, therefore random sampling was used, a stratified random sampling/response. As attrition due to job loss, job changes and relocations occur in many corporations, such consideration did not affect the outcome of the study as the response/data was administered and collected over a concise two-week time period, purposefully not open over titrated time. The case study consisted of a ~800 Population (employee participant

opportunities for survey feedback) with a respondent sample size sought of approximately ~260 survey respondents which represents a confidence interval of +/- 5%. The image sorting exercise provided forty-eight one-on-one engagement participation with employees adding robust opinion and interaction to the overall study population sampling.

3.4 Pilot Survey Data Analysis Results/Sampling

A comprehensive and thorough pilot study strengthening the study's reliability (test-re-test) was conducted of the custom created survey at West Pharmaceutical Services Inc., Exton, PA. on May 3rd, 2019 from 12-1 PM. Twenty-one employees, representing mixed departments participated and reviewed all sixty-five survey questions as a collective group for discussion and edit feedback. Engagement in the dissertation topic and survey with a sincere interest. Minimal edit comments regarding the survey were collected and noted as the participants found the survey to be of merit, non-leading, appropriate question and answer tied responses as well as cohesively laid out. There were a few enlightening suggestions by the pilot study workplace participants such as to: *consider the new hire perspective with regard to transitioning into a company and that a commons space environment, if provided, may assist/ease in the transition to the company*. The feedback substantiated the need for a neutral *third place* as Oldenburg's Theory-research supports. Feedback collected was then entered into Survey Monkey for final case study preparation and the administration of the measure/online survey instrument. The study added validity and reliability to the research topic. A nominal survey participant payment of an on-site beverage card voucher was provided in the amount of $5.00 each pilot study respondent's time, interest in the topic and insightful feedback contribution.

Figure 31: Pilot Study in progress at West Pharmaceutical Services, Inc.

CHAPTER FOUR

4. Instrument Findings and Analysis

The following chapter of this study represents findings and analysis of the three-custom method utilized in assessment of the dependent variable against the dependent variable(s). Both descriptive statistics and inferential statistics were run based on assumptions met.

For the first method, *On-site Observation*, raw data in actual usage of the workplace dedicated community spaces offered to the case study employees was noted on a protocol checklist. The findings were summarized in observed behavior, along with occupancy usage, of the space as compartmentalized per time period observed.

The second method and instrument, the *Image Sorting Preference exercise* resulted in rich-data collection that was then analyzed. Respondent raw data collection was entered into SPSS software based on the forty-eight responses collected at the case study. Three tests were run in SPSS to ascertain the exercise data collected statistical significance: Frequency output files were run on the twenty image feature variables them self to examine the image feature preference as most important or not important to the employee/respondent. Pearson's Chi-square crosstabs descriptive statistics was run as well.

The third method and instrument, the online survey questionnaire, Cronbach's alpha, a recognized measure of internal consistency (inter-item correlations) for reliability was run in SPSS based on the survey questionnaire raw data collected and then averaged on group scales run for: Culture, Trust and Sense of Community. In addition, Pearson’s Chi-squared statistics was run to infer if there were relationships between the variables, the probability distribution of the sum of squares of normally distributed as a correlation

coefficient. Three -way ANOVA (multi-factor analysis) parametric tests were additionally run in SPSS.

4.1 Data Analysis

Initial data collected from the mixed method experiment/instruments: questionnaire/survey, on site observations and employee preference image sorting ranking/exercise were reviewed and compared via SPSS software scaling e.g. crosstabs of the Dependent variable: Trust & Culture against the Independent Variable that of: Workplace Sense of Community. Various views into the trends were developed. This was conducted with descriptive statistics in SPSS software. As assumptions were met, indicating a normal distribution of data outcome no outliers and linearity, the research then progressed into Parametrics at which time: Correlation, T-Tests and ANOVA inferential statistics were run to further determine the relationship between the two DV(s) trust and culture and the (IV) sense of community in the built-environment and moreover establish the built environment as a credible measurement of employee autonomy platforming Trust and Communal cultural social ergonomics not previously considered and identified by a sense of community.

The final analysis/conclusion of the scientific Method was based on the construct of the proposed research question by then *rejecting* or *failing to reject* the null hypothesis will be made. Additionally, a (WSOC) guideline, theoretical framework was established, based on the instrument findings coupled with the (12) theories and principles key summary points to offer future planners and corporations shared knowledge that may enhance connectivity and belonging through trust and culture in the built-environment, that of: sense of community in the workplace.

4.1.1 Data Analysis: Instrument Method No.1: On-site observations

Per the review of literature, establishing quality of empirical social research lies in in-depth case study, more so, that is robust in external validity: utilizing theory in a single case study for such example (Yin, 2014). Additionally, this research utilizes a mixed-method approach of three instruments. Granted onsite observation of employee behaviors tied to the workplace-built environment additionally strengthened triangulation by utilizing multiple sources of evidence.

The constant variables incorporated in the research case study were met:

1. An open workstation plan
2. The ability for employees to work remotely (employees are permitted to work remotely one day a week/of their choice: 70% of the employees do so every week)
3. A functioning commons space, dedicated commons area(s) (as a point of reference for the employee/respondents)

On-site observation: Weather conditions September 10th, 2019: The day of on-site observation weather conditions were dry with an outdoor temperature of 80 degrees, the clouds were clearing upon arrival at 10:45AM turning to weather conditions: sunny with minimal cloud cover during the onsite observation (Figure 30).

Figure 32: Photo taken 9-10-2019 10:45 AM at case study site

Employee population observed: The number of employees that were in the headquarters workplace during the on-site observation was estimated to be ~ 500. Typically, 70% of the employee population work remotely one day off a week and other employees may have been traveling (off site). Additionally, some employees may have been on maternity/paternity leave and/ or sick day leave.

Breakdown of dedicated community commons areas observed: Saint Gobain-CertainTeed headquarters location was built four years prior to the on-site observation. At the time of planning, the architect and designers forecasted with Saint Gobain to provide spaces that supported wellness in a community space emerging beyond a single use pantry or standing only access built in. While there was not a single commons space defined on-site given the vast square footage, the client provided a solution, that would provide ample

employee access to commons spaces within proximity to employee workstations located on each of the four floors.

Saint Gobain-CertainTeed observation access on the physical spatial use and tied behaviors associated with the employees' dedicated community commons area occurred on floors two, three and four, which serve as a central point of congregation for the employees per floor and is internally referenced as the Main Panty. Each floor provides a "main pantry" and an additional small satellite pantry for use throughout the day. The "main pantry**"** serves as one of the areas observed, as it provided several features regarding usage category observation collection. The second and third dedicated community commons areas provided to the entirety of the workplace population and observed were both located on the first floor. The "outer commons space" is located *outside of the cafeteria*. The adjoining Starbucks space is referred to by the employees as the "coffee shop area".

The combined three dedicated community commons spaces support employee autonomy, providing ample access to gather freely, at will, on each floor as preferred. Important to note: all employees have the option to eat at their workstation.

Schedule of onsite observation: The observation of areas: #1 & 2 (outer cafeteria commons areas and coffee shop) Area #3 main pantry areas) schedule as followed.

- 11-12 AM Main Pantry on 2nd floor (Area #3)
- 12-1 PM Main Pantry on 3rd floor (Area #3) during lunchtime-for field note comparison
- 1-2 PM Main Pantry on 4th floor (Area #3)
- 2-5 PM Outer cafeteria commons area and adjoining coffee shop on 1st floor (Areas #1 &2)

The observation of Areas: #1 & 2 (outer cafeteria commons areas and adjoining coffee shop) Area #3 (main pantry areas) schedule was based on purposefully not observing

the outer cafeteria commons areas during open cafeteria lunch hours, but after the cafeteria yellow acrylic doors closed 2-5PM and conversely to observe the main pantry area during lunch hours since employees have the ability to eat at their workstations, observing during the lunch hour on the 3rd floor main pantry, provided the opportunity to see if employees chose to convene with coworkers, as evidence of social ergonomics outreach presence.

Five "key" observation categories: The categories for observation were compiled into an extensive, custom designed, observation Protocol checklist purposely, designed by the author, to note employee behaviors associated with: Workplace Sense of Community (WSOC) in the (observed) built environment/anchor spaces. Figure 31 illustrates a sample section of the observation protocol checklist. A new set-copy of the checklist protocol and category items for noted observation for each area observed during the times noted below. Purposeful copies were made to ensure consistency in employee behavior interaction with the built space and coworkers to be observed adding validity to the research and informing the independent variable, that of, Sense of Community. (Appendix A) contains the full version of the custom protocol check list used during on-site observation.

Custom Designed: Commons/Community Space/Area
Behavior of Employee Use/Commons Space/Area/Observation/Protocol Checklist Form

Lead Researcher: Deirdre M. Cimino, Ph.D. Candidate, Michigan State University
Case Study Corporation Name: ________________________________
Case Study Address: ________________________________
Date of Observation: ________________________________
Start Time: ________________________________
End Time: ________________________________

Estimated Age Range of employees in the Commons/Community Space/Area:
Young Adult (18-25 years) ______________ **Adult (25-64 years)** ______________ **Senior (65+)** ______________

Upon Entry/Purpose of use:

1. Does the employee **appear to be confused as they enter the space (e.g. not the area they were looking for-wayfinding confusion)?**
(F) ☐☐
(M) ☐☐

2. Does an employee enter the space for the **purpose of showing off the space to others?**
(F) ☐☐
(M) ☐☐

3. Did the employee **arrive with a group?**
(F) ☐☐
(M) ☐☐

4. Does the employee utilize the **space for exercise?**
(F) ☐☐
(M) ☐☐

5. Did the employee **use the space for a social gathering with others?**
(F) ☐☐
(M) ☐☐

6. Did the employee utilize the space for a **one on one meeting?**
(F) ☐☐
(M) ☐☐

7. Did the employee **utilize the space for isolated use/them self?**
(F) ☐☐
(M) ☐☐

8. Did the employee **look up at any time to a friend and/or acquaintance who greeted them?**
(F) ☐☐
(M) ☐☐

Figure 33: Sample/portion of custom designed checklist form: Utilized & repeated for observed differentiating behaviors per observation Area # & time designated.

Observation Protocol categories observed for each dedicated commons space:

-Upon entry/purpose of use

-Physical Built-environment/proximity/use

-Snack/beverage/preparation use

-Behavior/engagement with the space

-Isolated respite employee usage.

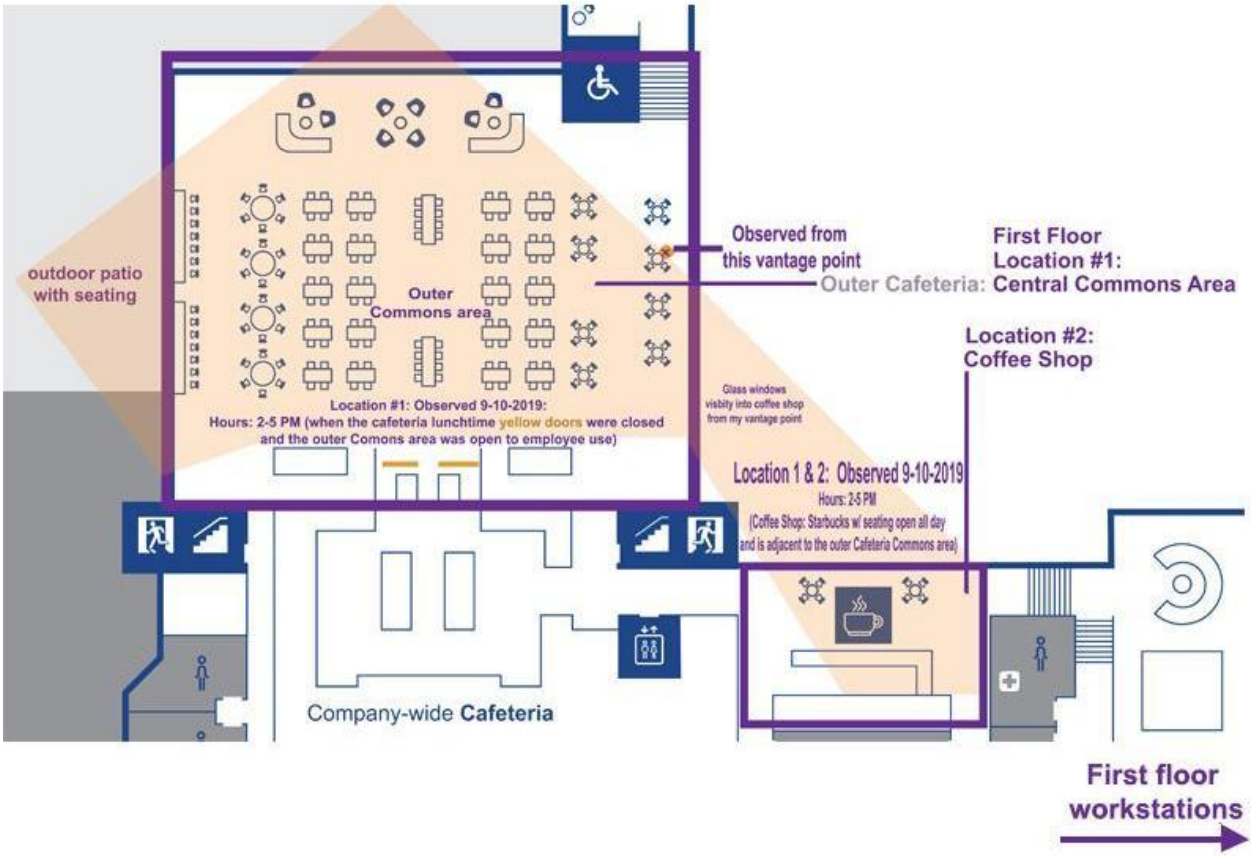


Figure 34: Floorplan of Areas #1 (Outer cafeteria commons/area) & #2 (Starbucks/Coffee Shop): First floor entrance to cafeteria/ closed yellow doors

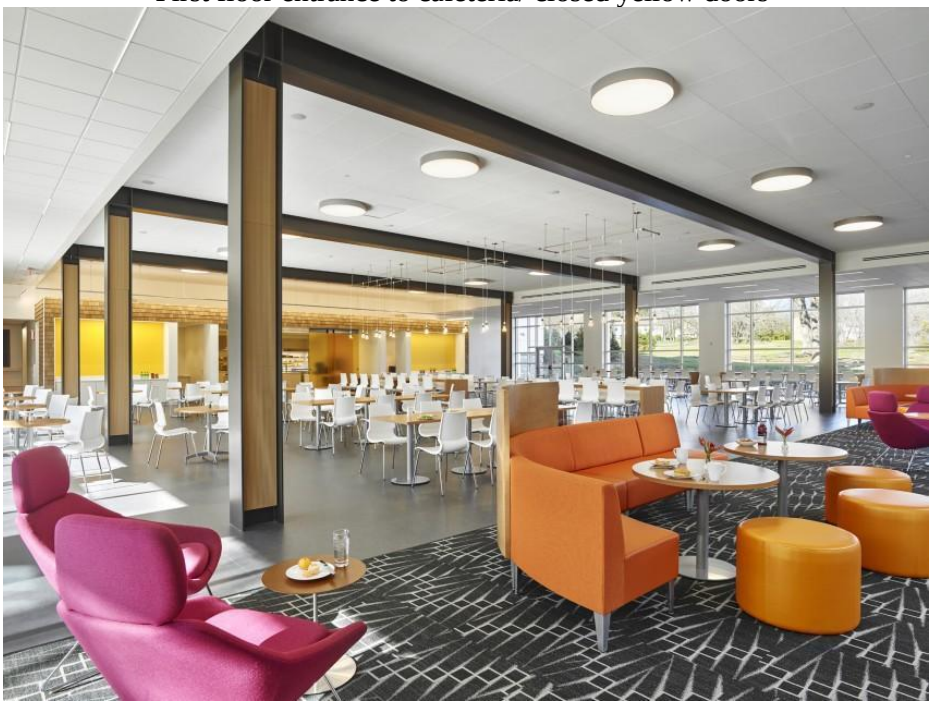


Figure 35: 2015-Image taken of outer cafeteria, commons space at time of the project completion: (yellow cafeteria doors in background-cafeteria closed).

Figure 36: Photo of 10-2019: Post lunch, impromptu employee meetings (both meeting ~30 min. in length) in outer cafeteria commons area

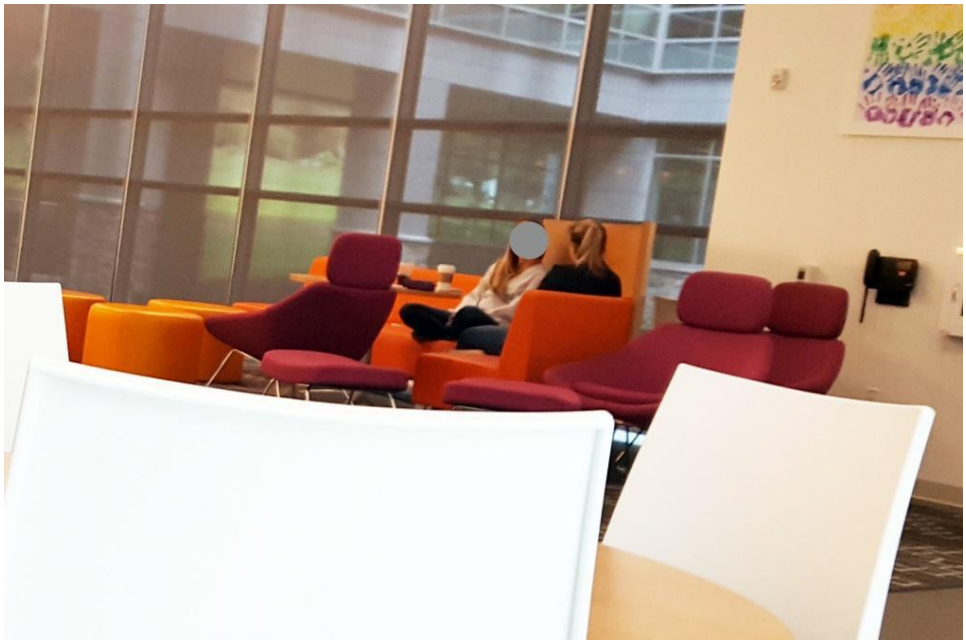


Figure 37: Photo taken post lunch on 9-10-2019. Note 1:1 employee dialog-conversation lasting ~ 1 hour, post purchase of a coffee shop beverage (relaxed body language) in outer cafeteria commons area

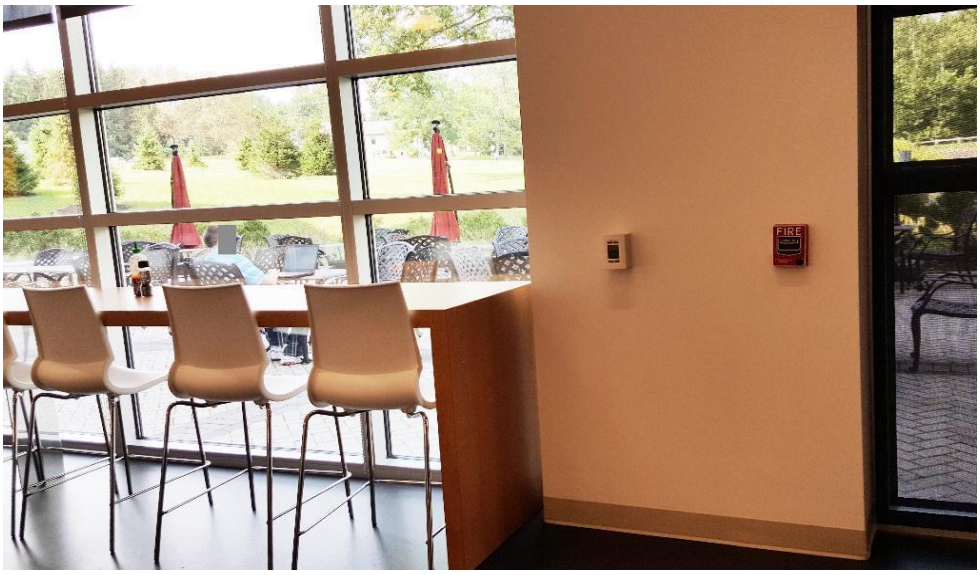


Figure 38: Photo taken post lunch on 9-10-2019. Employee chose to sit & work on the outdoor patio-attached to the outer cafeteria commons area: Observation Areas 1 & 2

Figure 39: Photo taken 9-10-2019: Post Lunch hours: 2:10 PM Adjacent Starbucks “Coffee Shop” Observation areas 1 & 2

Figure 40: Photo taken 9-10-2019-Camaraderie-social connectedness exhibited in the “Coffee Shop” Observation areas 1 & 2

Figure 41: Photo taken 9-10-2019-Coffee Shop healthy snack options available for purchase when the cafeteria was closed.

Description of observed Activities: Area #1 (Outer cafeteria commons/area) & adjoining Area #2 (Starbucks/Coffee Shop): A view of both spaces simultaneously was possible due to window that connected the spaces. Observation of areas #1 &2 occurred between 2 and 5 PM. Immediately upon entering the coffee shop, five employees were noted waiting for beverage orders to be filled to place their order. The general employee physical postures were relaxed. The employees started random conversation with those also waiting. Pleasantries were exchanged with the three fellow employees that walked through the space. There was a seasonal effort made by the Starbucks to add fall décor and specials on a large chalkboard next to the main counter. Additionally, while the cafeteria was closed during this time, the coffee shop offered healthy snack options available for purchase e.g. yogurt, apple juice.

There was seating made available but those that ordered after conversing left the area or then traveled through to the outer cafeteria commons space to sit down to talk. Two groups engaged in a conversation, one a male and female over coffee. It appeared business was being discussed and the space was sought to engage in a peer-to-peer review of some type. Another group, of three men, sat in a relaxed seated posture and discussed amongst themselves for approximately thirty minutes, the same noted length in time as the male and female employee. Interesting to note, in the back of the outer commons space, a high-back upholstered seating group had two females engaged in a work related conversation where both had purchased beverages from the coffee shop and one of the females sat with her legs crossed under her exhibiting a very relax posture as she spoke with the other female for approximately thirty minutes as well.

During the observation time, several males walked through and make cell phone calls stopping to look out the window. Windows wrapped both sides of the space, floor to ceiling. By this time, it was sunny and well into the mid-eighties in temperature. A young male employee entered the space and walked directly outside to the patio to set up his laptop to work on at an outdoor table and chair provided. He did for twenty-five minutes. Soft pop music played in the background of the outer commons area during the entirety of the author's observation time. Seventeen additional employees walked through the space and as they did their pace was noticeably slower and more casual. At 3 PM, the coffee shop checked out their last customer and closed for the day. Shortly after the closing of the coffee shop, the outer commons area traffic shifted in usage to tours being given to six visitors in each group. The tours engaged with the space's-built features that were sensitively designed into the room platforming the Saint Gobain and CertainTeed's product lines.

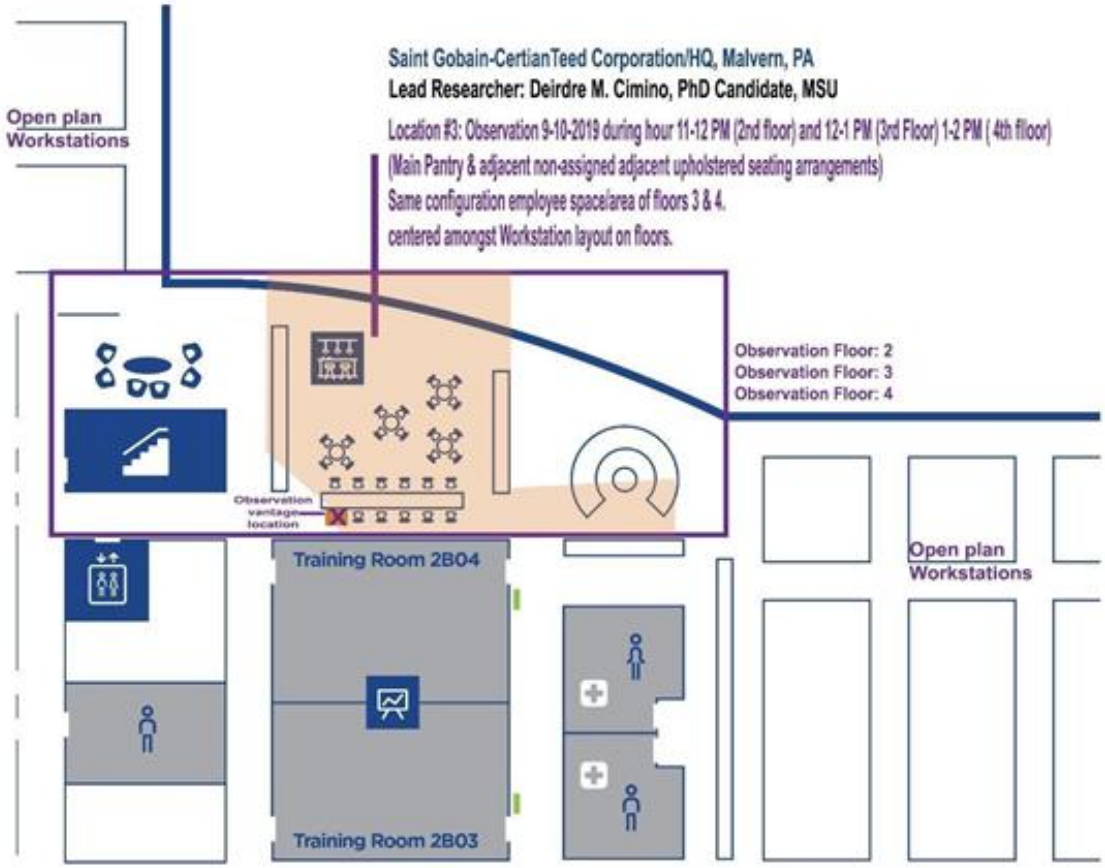


Figure 42: Floorplan of adjoining Area # 3 (Main Pantry) & inclusive upholstered ancillary seating

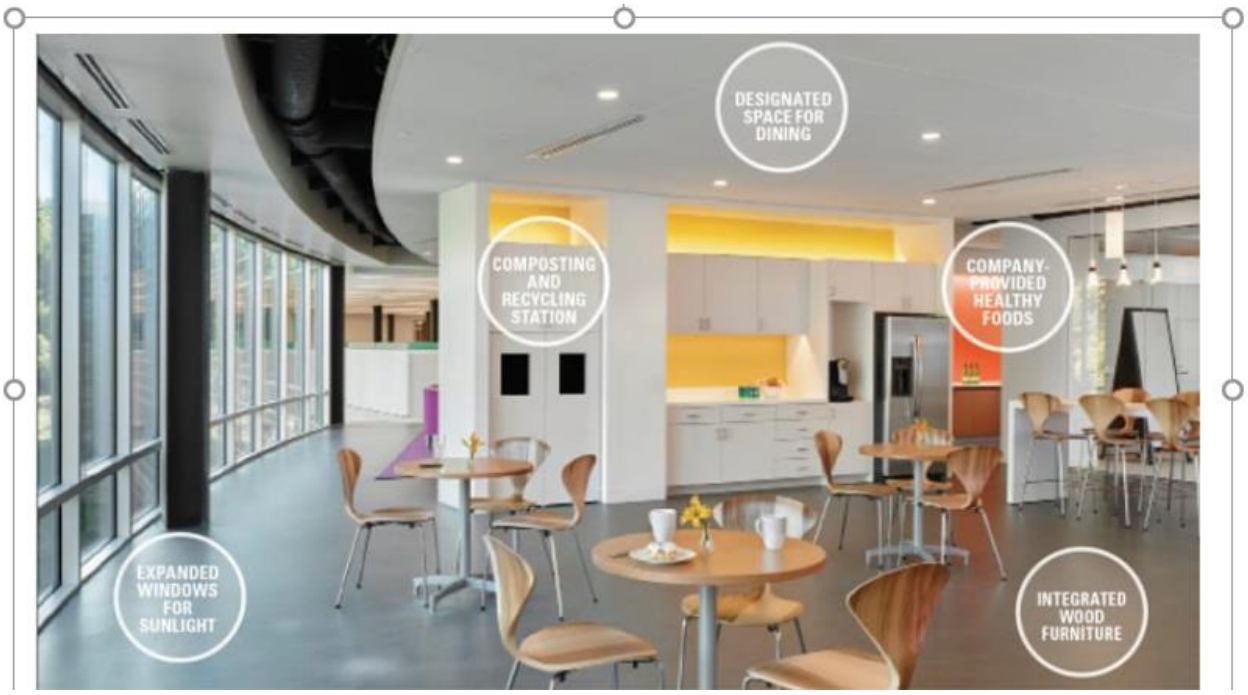


Figure 43: Photo of a Main Pantry, Saint Gobain CertianTeed, (Source: Powers, 2017)

Figure 44: Photo of the opposite side of the Main Pantry

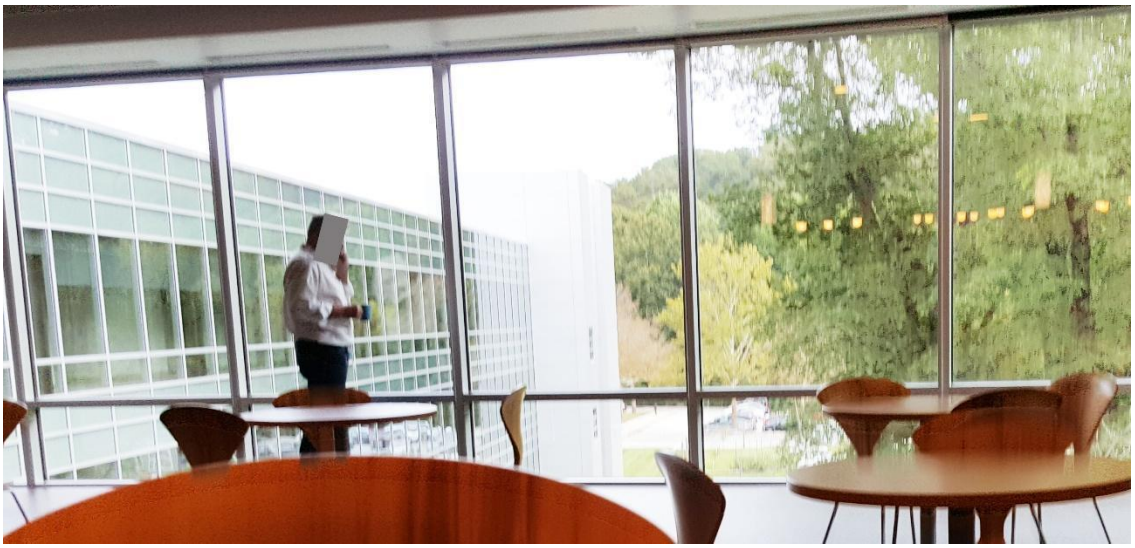


Figure 45: Photo of the Main Pantry cell phone 1:1 conversation started near window then moved to round upholstered seating group

Figure 46: Photo of a conversation continued within round upholstered seating group proximity

Figure 47: Photo of the training room 2B04 located behind the Main Pantry area: same location on 2,3 &4th floors:

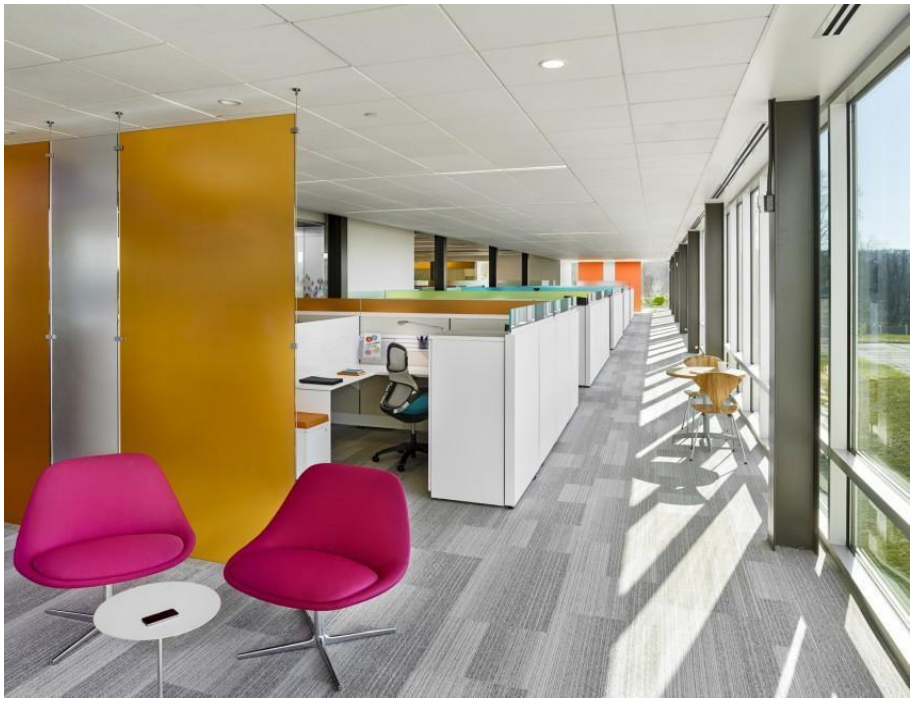


Figure 48: Photo of a typical open plan workstation product and layout on the four floors flanking the Main Pantry area on floors: 2,3 & 4

Description of observed Activities: Area #3: Main pantry 11-12 noon: Second floor: Observation started at the corporate headquarters at eleven AM. The space was well lit and complemented by full height windows, facing North with a view to the back of the building that looked out on walking paths, employee-community garden and a pond. The backside of the main pantries observed all had lecture training room facilities that shared a common wall of partial hexagonal orange and grey patterned graphic glass and drywall. On the two open sides of the main pantry were adjacent upholstered seating group areas that flanked the central pantry area. Observation areas 1, 2 & 3 are all centrally located in the corner of the L-Shaped building. Additionally, an open connecting stairwell for employee use is located on the back side of the coffee beverage counter. Access to both areas was connected by non-enclosed walls. The layout for the 2nd floor main pantry was the same for the observation space that occurred on the 3rd and 4th floors. The main pantry was

immaculately kept in cleanliness and offered literature on how to recycle and which bins were appropriate for use. The orange and yellow color scheme was inviting and warmed by the use of natural wood tone furnishings, white color accented cabinetry and high-top table created a contemporary, clean aesthetic accent color. A consistent light source of a Northern exposure thought the day was observed.

The author assumed a seated position at the table top at the end of the table so that she would have an optimal view, vantage point of the space as well as maintain a discreet area to sit that would not distract from the employees seeking to convene at a bar height common-use table or to utilize the remaining open seating. During times of observation the author chose to wear earbuds (with no sound coming through , purposefully, so the author could be decipher as business or other conversation generalities) as well as to let others know she was engaged in her work and that should fellow colleagues who stopped in the main pantry area would not be more likely to engage in conversation with others in the room freely.

For the first hour assigned to the 2nd floor, there were a total of twenty-two employees that utilized the commons space for beverage preparation, access to filtered water and ice. On three occasions, the microwave was used to heat up coffee in a coffee mug. At least three employees read internal postings on the cabinetry related to community drives and sustainability initiatives while waiting for their beverages to fill. At approximately, 11:30, two females prepared meals in the microwave in sealed containers then sat down to eat their lunch together. The two females were in their late fifties and often stopped their conversation to enthusiastically greet those that stopped in the space at their table. The two women then continued to eat their lunch. Five of the twenty-two employees would humm *a* tune as they traversed in and through the space then stopped humming or singing under their

breath as soon as they walked within the outer corridor of the main pantry. The observation of the humming was joined by physical expression of a relaxed body type and facial smiles. It was evident that the commons area brought a shift in lower stress levels, exhibited by a lifted gait, as the employees entered. Body language would visibly assume corrected posture as they existed the main pantry. The overall tone of the main pantry was respectful but not silent despite the space not being fully enclosed. It was noted that four employees on cell phones voices would increase as they entered the main pantry or crossed though it then lowered upon exiting. Two females stopped, randomly, at two times to engage in a conversation with the seated women eating lunch while remaining standing. Both of the standing women's posture became more relaxed as they briefly chatted before exiting the space. Sixty minutes later, at 12 noon, the author collected her belonging to start observation notations on the 3rd floor in the main pantry.

Area #3: Main pantry 12 noon-1 PM: Third floor: Observation of the 3rd floor main panty space had significant uptick in overall use. The one large island at a counter height, had a total of six coworkers sit, at staggered times to eat their lunch together. All meals were prepared in the main pantry area by accessing one of the two full height refrigerators, filtered water, beverage appliance and/or microwave preparation use. One male sat at the high top with five females ages ranging from 30-45. As the group joined, each would high-five the next employee until all enthusiastically greeted one another before starting their meals. Extroverted behavior exhibited in use of the space. Three tables were occupied at the seated height of 29" above the finished floor. The tables were single occupancy yet chose to sit in the main pantry where connection within proximity of peers was sought, in that, no one at the three tables wore earbuds they read quietly a book or were reading/scrolling on their cell phones while eating lunch. All three females at were at a

lower seated height tables purposefully sat and arrange their foods facing out the window/view. Introverted behavior exhibited in use of the space.

To the left of the main panty area, nearest to the connecting stairwell, three males struck up a random conversation as they stood, they all straddled their legs in a widened stance. One male swayed a bit in form side to side as he listened to fellow colleagues, smiled, and laughed intermittently. The pitch of the three-male conversation was audibly louder than the adjacent workstation area. I purposefully wore earbuds without sound coming through, so that I could assertion conversation pitch and engagement with coworkers without the employees being inhibited to carry on by my proximity and/or presence. Employees that occupied the main panty area represented diversity in race and shared the space in a copasetic demeanor. During the observation time, a male walked into the space to have a conversation within twelve inches of the outer full-length window wall facing North. He held the conversation at the same spot, while standing then walked out of the area as he hung up on his cell phone. One male stood within two feet of a refrigerator and called out in a loud to voice (while smiling) to a fellow coworker to “hurry it up!”. The coworker quickly responded from the workstation, a significantly quieter voice from a male, then they met and left down a connecting corridor. Interesting to note, the male who hollowed, stood on the floor material that defined the edge of the main panty. Exhibited evidence of ease within the main pantry and a louder vocal pitch exhibited when not. A final observation was also interesting to view. The male at the high-top table when finished with is meal got up to greet on of the solo seated females facing the window and blocked her view to congratulate her on her recent wedding shower and to inquire how it went? The conservation between the two then gained interest from the other two females eating alone

who then chimed in about their personal wedding thank you note writing experiences. Every employee was consciously diligent in cleaning up their area prior to exiting the space.

Area #3: Main pantry 1 PM -2PM: Fourth floor: The fourth floor layout of the main pantry was the same, in layout, as the previous two floor observed, immediately, an immediate uptick in laughter came from the workstations- as a group of employees emerged together to walk past the pantry area to the outer corridor. As the protocol checklist was started for the observation hour; a male employee entered the area, then proceeded to heat up his beverage in the microwave first removing one earbud from his ear. Within moments of leaving the main pantry, he returned then once again removed an earbud as if to be available for random dialog should someone in the main pantry strike up a random conversation with him. His demeanor was outwardly friendly and seemed to be very content. Another male entered the space to finish eating a piece of cake, he then went to the window to slowly finish the cake while he took in the outdoor views. He purposely did not devour the cake yet chose the view to enjoy his dessert before meticulosity cleaning his hands at the sink when done. Another male stood within the adjacent upholstered round seating sofa. Interesting to note, he never left the vicinity of the sofa area beyond five feet as he engaged in his conversation on his cell phone. His conversation was a mixture of business and travel plans. His cell phone conversation lasted twenty-eight minutes, while he slowly paced around the circular sofa, he did not sit nor leave the defined relaxed seating area either. The use of the space by those that entered was a total of fifteen people and noted use: filtered water, ice machine, recycling and refrigerators was accessed.

Table 4: Number of Visitors observed during the onsite observation

Number of visitors observed during the onsite observation (including visitor groups & counted individuals within each group)

22 persons observed & activities: **11-12 AM** 2nd floor Main Pantry (Area #3)
28 persons observed & activities: **12-1 PM** 3rd floor Main Pantry (Area #3)
15 persons observed & activities: **1-2 PM** 4th floor Main Pantry (Area #3)
37 persons observed & activities: **2-5 PM** Outer cafeteria commons area and adjoining coffee shop (Area #1 &2)
102 Total persons/employees observed

4.1.2 Instrument Method No. 2: Image Sorting Employee Preference Ranking Exercise

In this method, the image sorting exercise, as previously noted, was created based on twelve embedded theories and principles to test employees' perception of community anchor commons space. The second method of data, the image sorting exercise was collected, on October 4th, 2019. The weather conditions were dry and sunny with intermittent cloud coverage, temperature in the mid-60s (66°C), pleasant.

Figure 49:View taken 12:45 PM, outside the North American headquarters, Malvern PA.

Per Section 3.2 Design of the Study, a custom-designed exercise based on twelve embedded theories and principles associated with the research topic were depicted in

twenty, five by five inch black and white images (Appendix B reference). Additionally, each participant, post verbally consenting to the Institutional Review Board (IRB) approved study, was provided a form to fill in that asked of the twenty images in front of the employee: What is the most important Commons Space/Area feature, consideration in your opinion? The second question posed was: What is the least important Commons Space/Area feature, consideration in your opinion? There was one open-ended qualitative question on the form which asked each participant: What feature in a workplace dedicated commons/community space/area would you like to see that has not been represented? Employees were provided a, self-fill-in form, five-point Likert ranking question: How important is having an employee dedicated community/commons space, in the workplace to you? The ranking participant response ranged from one: Not at all important to five, extremely important.

The exercise took place on Friday, October 4th, 2019 starting at 1:15 PM and ended at 3:30 PM, during which time forty-eight response forms were collected, represented by varied department feedback in level and location dispersed amongst the four floors of the headquarters: The fifteen departments represented were: Customer Service, Facilities, Ceilings, Supply Chain, IG Logistics, Corporate Treasury, Credit Services, Marketing, Commercial Sales & BD, Insulation, Customer Service, CertainTeed Customer Master, Gypsum, Central Marketing and the Total Rewards department.

Employees were provided a $10.00 Starbucks gift card as gratis for their returned form and participation in the one-on-one engagement exercise as direct interaction in instruction to every employee was required of the lead researcher/author. A representative of the company's Facilities Department was present for the duration of the exercise and worked quietly at the one end of the conference table and did not partake in the assisting the

lead researcher nor influence opinion. The company representative did however mention to the respondent, upon entry, that the employee was in the right conference room for the activity to take place. Varied department employees funneled into the reserved, windowless, conference room to engage in the exercise with the lead researcher. Sign-up Genius was generated, in-house, two weeks in advance of the onsite exercise occurring to assign times to partake.

The level of engagement was high, there was a genuine enthusiasm and interest for the research topic and the exercise's collection of feedback to assist workplace employees, worldwide, in the formation of a guideline/framework that would guide planners when designing for workplace community commons spaces. Fourteen of the forty-eight respondents reported that: having an employee dedicated community/commons space, in the workplace was extremely important to them (29.2%). Overwhelmingly, twenty-four of the forty-eight participants (50%) responded that: having an employee dedicated community/commons space, in the workplace, was very important to them. Representing ranking the very and extremely combined responses of the importance of a dedicated commons area in the workplace to *(*79 %) favorability. Zero employee respondent data collected noted that the exercise's focus was not at all important. Eighteen males participated ranging in age from (18-65 plus), twenty-eight females (same age group) participated, one gender response of data was missing.

Several highly engaged employees asked while filling in the response form provided, if they could add additional community commons space features on the form that they deemed most important beyond the three correlating numbers assigned to the images, that they already listed. The employees were them assured, that while adding additional choices was not part of the exercise/option, as they were limited to picking three, as the study was

previously IRB approved, their additional feature preference contribution would be noted in the write-up portion of the exercise by which the employees were satisfied that their opinion was recorded and recognized as an important contribution. The collective, additional features were: Feature #1: Ability to adjust the environment/temperature, Feature #3: Healthy snacking options/nutritional, Feature #4 Fitness/wellbeing activities, Feature #5 Environmentally conscious interior building materials & recycling efforts, Feature #12 Autonomy-the personal choice to go to a Community Commons area at will & use of the space itself, Feature #14 Wayfinding/landmark/signage to lead you to the Commons area, Feature#17 Access to the outdoors, Feature #18 Running water, Feature #20 A functioning water feature.

Respondent raw data collection was entered into SPSS software based on the forty-eight responses collected at the case study. Every image of a commons feature that was based upon the twelve theories and principles was assigned a given number for the purpose and ease of respondent feedback notation provided on their individual fill-in form. The exercise Feature images were numbered from one to twenty, with no particular preference in order assigned. Of the forty-eight cases entered onto the SPSS dataset, every image garnered a response as either a most important feature or least important feature. Three tests were run in SPSS to ascertain the exercise data collected statistical significance: Frequency output files were run on the twenty image feature variables them self to examine the image feature preference as most important or not important to the employee/respondent. Pearson's Chi-square (2), crosstabs descriptive statistics was run as well, which tested how likely it was that the observed distribution, categorical data, is due to chance and measured how well the observed distribution of responses collected data fits with the that is expected if the variables are independent.

The three most important features were then run against the gender identities of the male and female employees to ascertain which image/features were most responded to based on identified gender. Output file significance was noted on image feature preference number (15) Access to Natural views with a ***P***-value of .05, a Chi-square (2) (value of 5.25, sig., 2-sided result of .034 and a sig., 1-sided result of .23. It was predicted more men would preference image no. 15 with a n expected count of 8.2, however, the actual response was (12) men surveyed that preferred access to natural views. Additionally, this is a significant result as the North American Headquarters offers a double LEED certified Platinum rated environment with outdoor views as a benefit of the workplace, the male respondent still identified the feature of Access to natural views as an attribute that was identified as most important. The finding also coincided with Saint Gobain CertainTeed's product focus and internal efforts to prioritize visual connection to natural views. Image no. 16 was the Most preferenced feature of importance amongst respondents that of: Access to sunlight: "Daylight and a connection to the outdoors have a powerful impact on employee well-being and it's concerning that many office workers spend most of their day in an environment with no access to natural light," stated Dr. Alan McLenaghan, CEO of Saint Gobain CertainTeed SageGlass. Additionally, "No matter the size or location of a company, the workplace is at the heart of a strong internal culture and therefore should be a space that is healthy and comfortable."

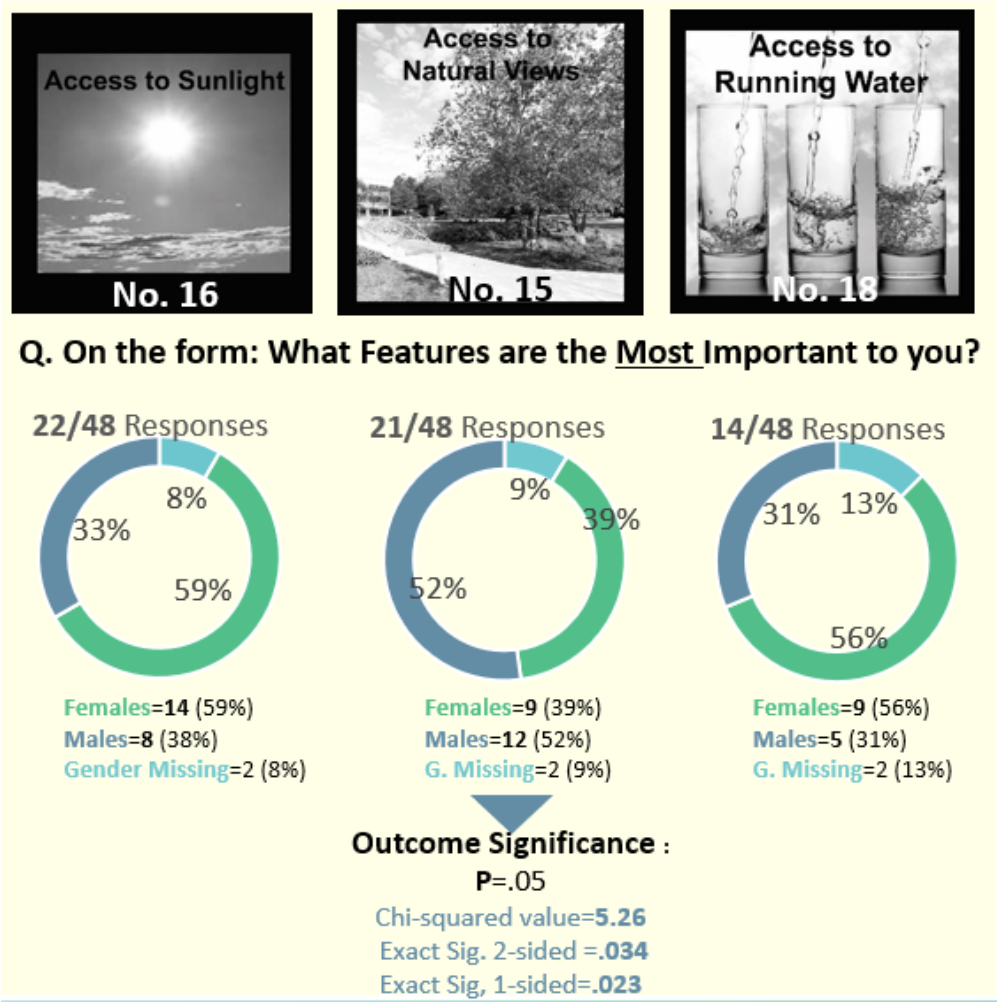


Figure 50: Illustrates statistical data outcomes based on the (3) *Most important commons features* employees rated.

Descriptive statistics run on variables whereby the employee noted the least important commons feature preference were variables number(s):

(14): Outer workplace navigation in wayfinding/signage to the Commons space/area

(20): Functioning water feature e.g. a decorative fountain, wet wall fountain etc.

(6): Background entertainment/news/weather etc.

Employees identified with high prioritization that running water was most important to them while water as a feature was not important. Interestingly, (21) of the (48) cases

reported that background noise was of least importance and yet background white noise was noted on the employee feedback forms as a feature not represented yet important to them. Frequencies were run on the (48) cases to ascertain: *What feature in a workplace dedicated commons/community space/area would you like to see that has not been represented*? A quiet place to nap and rest was the most sought feature that was not represented with 6/28 responses followed by a place/section for private conversations to occur within a commons area with 4/28 cases that responded to the qualitative open-ended question. Twenty cases did not have a write-in response to the question which indicated there was not a feature consideration lacking in their opinion.

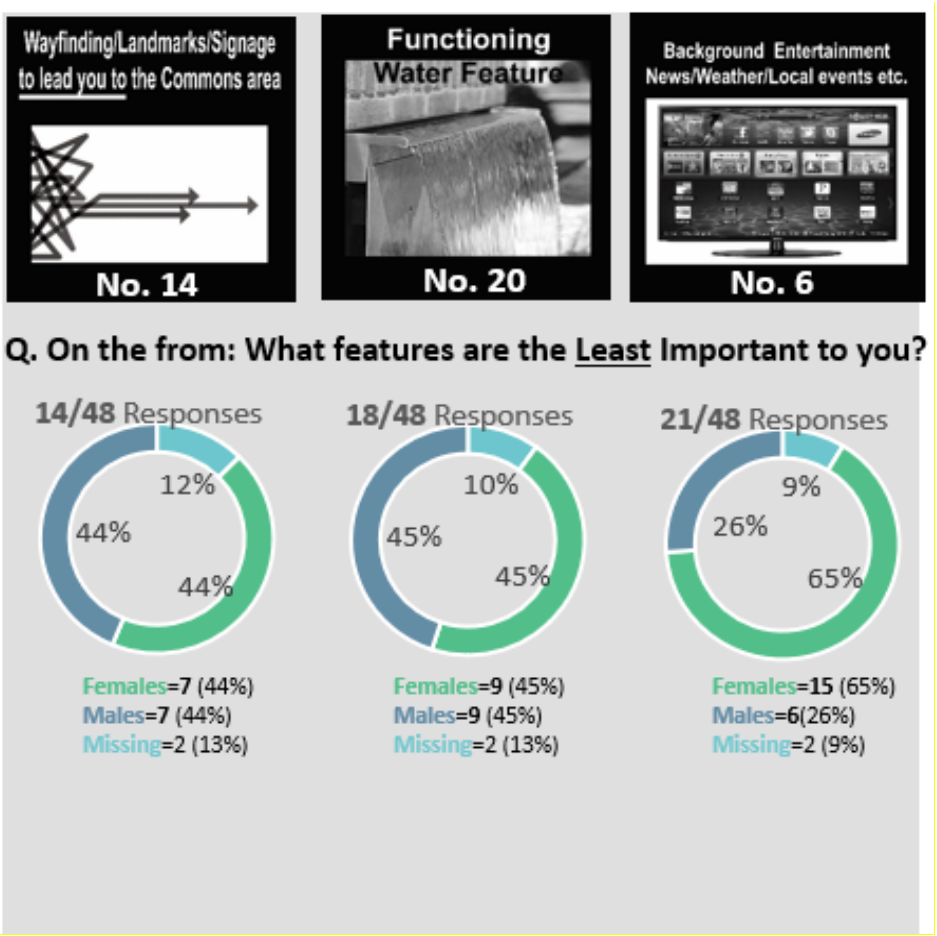


Figure 51: Illustrates statistical data outcomes based on the: (3) Least important commons features employees rated.

Table 5: Illustrates statistical data frequencies outcomes based on the question: What feature in a workplace dedicated commons/community space/area would you like to see that has not been represented?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Docking station-Large Screens	3	6.3	10.7	10.7
	Effective scheduling to manage commons area features offered	1	2.1	3.6	14.3
	Autonomous commons space/area-non restricted in use	1	2.1	3.6	17.9
	Adjustable Interior lighting	1	2.1	3.6	21.4
	Varety of aesthetic-styles	1	2.1	3.6	25.0
	Ergonomic considerations-in furnishings	1	2.1	3.6	28.6
	White Noise	1	2.1	3.6	32.1
	Nap pod- quiet rest area	6	12.5	21.4	53.6
	Private section-space for conversations	4	8.3	14.3	67.9
	Separate Childcare facility in porximity	1	2.1	3.6	71.4
	Massage chairs	2	4.2	7.1	78.6
	Lighting that mimicked natural sunlight	1	2.1	3.6	82.1
	More choices of non-caffeniated and caffinated beverages	2	4.2	7.1	89.3
	Ability to prepare one's food w/ their cooking equipment	1	2.1	3.6	92.9
	Technology charging station	2	4.2	7.1	100.0
	Total	28	58.3	100.0	
Missing	No response	20	41.7		
Total		48	100.0		

Of the twenty images that reflected the twelve theories and principles, adding validity to the research hypothesis questions set forth, excluding the six images not preferred as most or least important by the forty-eight respondents; the remaining images represent the respondent responses of commons features that were neither most nor least important are visually represented in the following figure:

#(8). Operable windows/doors: Access to fresh air

#(5). Environmentally conscious interior building materials & recycling efforts

#(17). Access to the outdoors,

#(3). Healthy snacking options/nutritional,

#(2). Being able to physically adjust commons area to suit your needs,

#(4). Fitness/wellbeing activities,
#(19). Variety of seating,
#(7). Ability to focus-acoustical consideration of the built space,
#(13).Varied ceiling heights/high and low mixture
#(11). Snug alcove/seating area.

The exercise method yielded every image being commented on by the forty-eight respondents. Every image of the twenty images presented in the exercise garnered feedback. For statistical analysis image preferences that did not fall within the three most or three least noted on as important categories sought were not added to the analysis summary, yet the response to third and fourth choices and so on were all recorded to then best inform preference and importance to the workplace employee in the proposed Workplace Sense of Community (WSOC) guideline /theoretical proposed framework outlined in section 4.2 of this paper.

Figure 52: Photo illustrates commons feature/consideration that were neither most nor least important to the respondent.

4.1.3 Instrument Method No. 3: Analysis: Online questionnaire/survey tool

This research was based on a mixed-method approach, per the comprehensive review of literature and review of factors of scholarly research. It was deemed best to

conduct a single approach case-study assigning Workplace Sense of Community (WSOC) as the independent variable (IV) and Trust and Culture as the two dependent variables (DVs). Yin defines components of Research Design related to case study research having five components that the research set forth has followed: "a case study's questions; it's propositions, if any; its unit(s) of analysis; the logic linking the data to the propositions; and the criteria for interpreting the findings" (Yin, 2014 p. 29).

The third instrument, method to measure, adding validity to the research, was that of the online survey. In this research study, Survey Monkey was incorporated to distribute the survey questionnaire to the participants online (see Appendix D: coded survey). Seventy-three questions were embedded into the survey to represent twelve seminal theories and principle associated with this study. The questions ranged from personal preference of use of the onsite commons space features to demographic collection. The questions were specifically categorized to address key factors of the research hypothesis such as: Autonomy, Built environment identifiable anchor, Culture, Performance, Sense of Belonging/Community, Refuge/Spatial Proximity and Trust (as referenced in Appendix C, Excel survey spreadsheet view).

After obtaining IRB approvals from MSU's HRPP's office, the online survey was made available on November 18, 2019 prior to Thanksgiving and residual holidays. Saint Gobain CertainTeed employees provided time and input of the raw data collected, and as previously stated, as gratis, an eight-dollar Starbucks gift card was provided to each respondent upon completion of the survey. It was important to the lead researcher (author) to not identify the respondent's survey opinion, therefore use of an online gratis format was foregone in favor of the on-site management handing out the gift cards based on an honors system. In this circumstance, the employee's anonymity was protected. All remaining gift

cards were sent back to the researcher post the close of the survey. Contact at Saint Gobain CertainTeed for survey administration was coordinated by the Manager of Partnerships and Business Development for Saint-Gobain Commercial Markets, the Senior Communications Manager of Issues and Reputation and the Campus Facilities Manager. The survey was open for eight days leading up to the day before Thanksgiving, November 28, 2019.

Following the Dillman survey method (Dillman, Smyth and Christian, 2014), a reminder email was sent to the survey participants, per an internal email sent by the onsite contact three days before close of the survey and in-person reminders. A limitation of the survey was the number of employees absent in anticipation of Thanksgiving and associated travel. An additional limitation was that the corporation, coincidentally, initiated an internal corporate-wide human resources global employee survey, and it was a concern to not tax the employees with back to back surveys, resulting in the research survey being administered the week prior to Thanksgiving verses the October 2019 date initially considered. Post the internal global employee survey close and subsequent review of the online survey, the CEO, representing 181,000 employees worldwide and the Senior Vice President of Human Resources approved the use of the Assessment of Workplace Sense of Community research survey concluding the research would benefit their employee as well as to workplace employees worldwide and permitted the survey to take place without edit of the lead researcher's (author) seventy-three custom designed questions as presented.

Employee survey respondents represented over twenty-two (22) various teams in the company increasing participant population and validity were: Customer Experience, Consulting, Facilities, Ceilings, Marketing, Supply Chain, Human Resources, I.G. Logistics, Total rewards, Legal, IT- Information Technology, Insulation, Gypsum, Credit Services, Customer Service, Executive Leadership, Quality Finance, Roofing, Purchasing, Siding,

Customer billing, Business development. The case study consisted of a population ~800. The sample size sought was ~260 which represented a confidence interval of 95%, a 5% margin of error. The actual number of online survey questionnaire respondent participants *was 166* which represents a 6.7% margin of error. Additionally, the forty-eight one-on-one, participant and lead researcher engagement from the employee image sorting commons feature exercise conducted on October 4th, 2019, yielded robust data opinion as well from the case study HQ population. Each online survey participant was provided a valid user ID and start and finish time stamp in Survey Monkey, in this way, the questionnaire could not be duplicated. A consent form was provided under IRB guidelines, only upon agreeing "yes" to the partake were the employee permitted to advance to the questioning portion of the survey engagement (see Appendix D). Per the question seeking, engaged participation, (90%) correctly answered the prompt. The raw survey data was then coded and added to a data set in SPSS to run analysis.

The online survey's intent in design was three-fold, to measure for the IV, workplace sense of community against the two DVs, that of Trust and Communal Cultural Social Ergonomics to therefore reject the Null hypothesis or fail to reject the Null hypothesis of the research set forth. Second, the qualitative portion of the survey sought to add validity to the two overarching research theories applied to this study, those of the Self-Determination Theory and Maslow's Hierarchy of Needs, psychological health predicated on fulfilling innate human needs, in this study then applied to the workplace, culminating in self-actualization of the employee. Third, quantitative and qualitative employee opinion providing insightful feedback in preference and use of a workplace commons space toward the establishment of a Workplace Sense of Community (WSOC) theoretical guideline/framework outlined section 4.2 to guide workplaces worldwide.

Research Hypothesis: This research study will demonstrate a correlation between an embedded Sense of Community through an identifiable built environment anchor in the workplace as a nexus of trust among employees; resulting in strong company Communal Cultural Social Ergonomics. Dependent variables: **Trust** and **Communal Cultural Social Ergonomics**. Independent Variables: **Workplace Sense of Community (WSOC)**

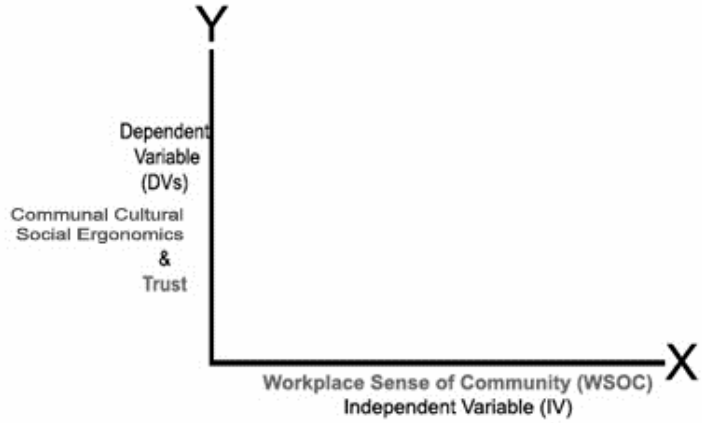


Figure 53: Image of study's (2) DVs and (1) IVs measured

Null Hypothesis (HO)- Providing a Sense of Community through an identifiable built environment anchor will have no effect on a company's trust and *Communal* Cultural Social Ergonomics.

Alternate Hypothesis (Ha, H1)- Providing a Sense of Community through an identifiable built environment anchor will have a positive effect on a company's *trust* and *communal cultural social ergonomics.*

Respondents: The survey results illuminated representation, feedback, in every age bracket of men and women with four genders self-identified as "other". Women, age 31-41, represented 21% of the survey responses. In order to assess the online survey sample

population further, specifically, the age and gender breakdown that completed the survey, initial descriptive statistics was run in SPSS testing for cross tabulation of variables Age and Gender which are nominal variables (Table 8). In addition, Pearson's Chi-squared statistics was run to infer if there was a relationship between, the variables, the probability distribution of the sum of squares of normally distributed as a correlation coefficient.

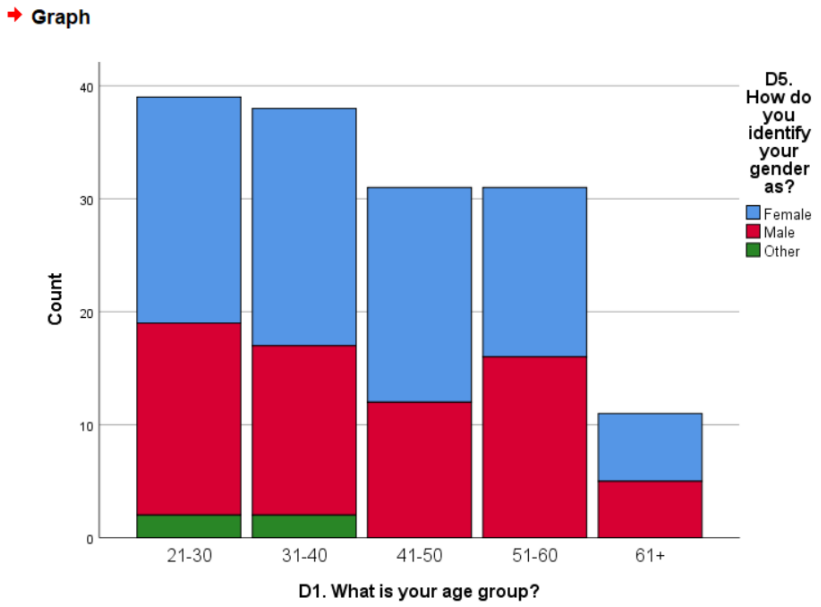


Figure 54: Representation of respondents by grouped age

The output shows asymptotic chi-square distribution with 8 degrees of freedom. The *p*-value of 0.744 implies that there is no significant effect, age is independent of gender. Yet, the variability in the SPSS output file underscores a homogeneous workplace survey sample population, in that, there was diversity represented by over twenty-two departments who responded to the questionnaire. This study set out to consider the homogeneous workplace and the results supports the research.

Table 6: Chi-squared output of age and gender breakdown

Age Group	Female		Male		Other		Total	
21-30	20	24.70%	17	26.00%	2	50.00%	39	26.00%
31-40	21	25.90%	15	23.10%	2	50.00%	38	25.33%
41-50	19	23.50%	12	18.50%	0	0.00%	31	20.67%
51-60	15	18.50%	16	24.60%	0	0.00%	31	20.67%
61+	6	7.40%	5	7.70%	0	0.00%	11	7.33%
Total	81	100.00%	65	99.90%	4	100.00%	150	100.00%

Chi-Squared Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Squared	5.131[a]	8	0.744
Likelihood Ratio	6.648	8	0.575
Linear-ByLinear Association	0.254	1	0.614
N of Valid Cases	150		

6 cells (40%) have expected count less than 5

The minimum expected count is 29

Cronbach's alpha, a recognized measure of internal consistency (inter-item correlations) for reliability was run in SPSS based on the survey questionnaire raw data collected & averaged, to ensure that the custom survey tool questions asked of the respondent, with regard to measurement, were in actuality, what was indeed measured, the same construct and more so, to ensure that the variable results measured, scored, in the same positive direction, that they all correlate positively with one another. Four statistical analysis tests were run, all four test results scored a .70 and higher Cronbach's alpha result (as tabled below), indicating good reliability of measurement set forth in the study as achieved.

In this statistical analysis, Likert questions responses were grouped and scaled based on the survey categories of *trust, culture, sense of community* per twelve adopted and adapted established theories and principles. In the fourth analysis as shown in (Table 13) was run in SPSS, in which, the predominant questions measuring for *sense of community*

(S8) *trust* (T4) and *culture* (C4) were reliable. Additionally, the Mean was run for grouped survey question in the category of *trust* (Table 7) and *culture* (Table 9).

In this research, *trust* was represented as follow:

- T2: My opinion counts in my company
- T3: I can trust people in my company
- T4: I can trust people who access my company's' community space.

Table 7: Mean of grouped Likert Trust survey responses

Descriptive Statistics

	N	Range	Minimum	Maximum	Mean	Std. Deviation
Trustsumpositive	151	12.00	3.00	15.00	10.1921	2.26190
Valid N (listwise)	151					

A Mean score of 10.1921 represents the average of positivity responses on that of: Trust.

The "Mean" represents the "average" Likert survey participant response.

Cronbach's alpha/Group Scales run for: Trust: Variables: T2, T3, T4 (result=.826)

Cronbach's alpha/ Data view>Analyze>Scale> Reliability Analysis (for scale and correlation)

Table 8: Cronbach's alpha run on Survey-grouped Trust responses

Case Processing Summary

		N	%
Cases	Valid	151	91.0
	Excluded[a]	15	9.0
	Total	166	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.826	.831	3

Item Statistics

	Mean	Std. Deviation	N
T2positive	3.2517	.94670	151
T3positive	3.5298	.83911	151
T4positive	3.4106	.83484	151

Culture was represented in this survey with the following:

- C2: I feel that I am an important part of my workplace culture
- C3: My company places a lot of emphasis on having culturally diverse work environment.
- C4: My company has a strong sense of workplace culture.
- C5. The dedicated community space/areas are where co-workers gather for celebrations.

A Mean score of 14.2733 represents the average of positivity responses on that of: Culture

The "Mean" represents the "average" Likert survey participant response.

Table 9: Mean of grouped Likert Culture survey responses

Descriptive Statistics

	N	Range	Minimum	Maximum	Mean	Std. Deviation
sumpositiveculture	150	14.00	6.00	20.00	14.2733	2.74387
Valid N (listwise)	150					

Cronbach's alpha/Group Scales run for: Culture: Variables: C2, C3, C4, C5 (result=.718)

Table 10: Cronbach's alpha run on Survey-grouped Culture responses

Case Processing Summary

		N	%
Cases	Valid	150	90.4
	Excluded[a]	16	9.6
	Total	166	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.718	.727	4

Item Statistics

	Mean	Std. Deviation	N
C2recodedpositive	3.4600	.95980	150
C3recodepositive	3.9267	.91297	150
C4recodepositive	3.5600	.84726	150
C5recosepositive	3.3267	.99998	150

Workplace sense of community (WSOC) was represented as per the following:

- S5: I enjoy being with co-workers in a social setting at work
- S6: I consider myself an extrovert
- S7: I can engage in collaboration more freely in a dedicated community space/are.
- S8: My company provides a sense of community.
- S9: I can freely socialize in a dedicated community space/area with co-workers.
- S10: The dedicated community spaces enhance our company culture.
- S11: I feel I can be myself at work.

A Cronbach's alpha/group scales were run for: WSOC Variables (S5, S6, S7, S8, S9, S10 & S11) and results were at 0.772

Table 11: Cronbach's alpha run on Survey-grouped WSOC responses

Scale: ALL VARIABLES

Case Processing Summary

		N	%
Cases	Valid	150	90.4
	Excluded[a]	16	9.6
	Total	166	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.772	.789	7

Grouped survey/questionnaire variables: S8/C4/T4 (Cronbach's alpha result=.738) as they were key variables in the survey supporting the hypothesis and measures. As a result, measured for good reliability.

Table 12: Cronbach's alpha run on Survey-grouped S8-C4-T4 responses

Case Processing Summary

		N	%
Cases	Valid	151	91.0
	Excluded[a]	15	9.0
	Total	166	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.738	.737	3

Identifying the specific *departments*, that completed the survey and provided feedback responses to survey questions S8 (My company provides a sense of community) and S10 (The dedicated community spaces enhance our workplace culture) a stacked bar graph was run in SPSS to illustrate the result findings. In both tests run, overwhelmingly,

the category response “Agree” resulted with the majority of case study headquarters departments represented. A further look into the survey results revealed (three) departments whose preference use of the dedicated community spaces, often associated with heads down focus work as in: Financial, Supply Chain and the IT, Agreed that (S10) the dedicated community spaces enhance our workplace culture.

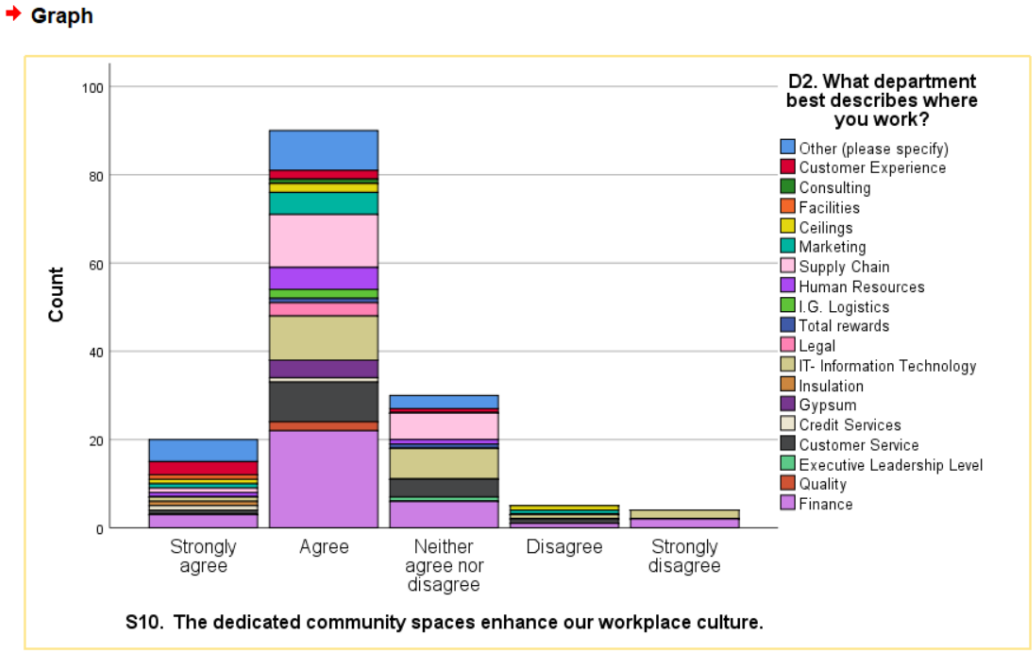


Figure 55: Response to Sense of Community based on Department breakdown

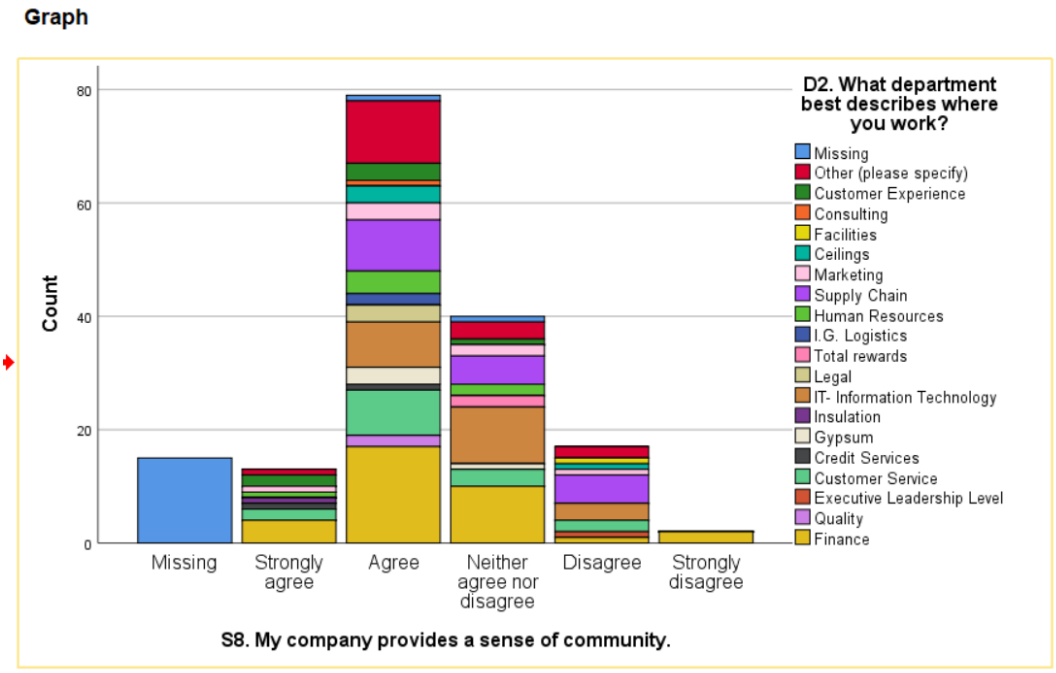


Figure 56: Response to Sense of Community based on Department breakdown

Descriptive Statistics Analysis: were then run on variables S8 (my company provides a sense of community), S10 (the dedicated community spaces enhance workplace culture), C4 (my company has a strong sense of workplace culture) and T3 (I can trust people in my company), representing *151 responses* (n=151) collected for each variable, to measure for square root of the variance, the measure of dispersion and the mean (mathematical average of the scores):

The output was as follow:

- S8 variable mean and reported Standard Deviation, measure of dispersion (*M* = 2.44, *SD* = .85)
- S10 variable mean and reported Standard Deviation, measure of dispersion (*M* = 2.21, *SD* = .813)

- C4 variable mean reported Standard Deviation, measure of dispersion (*M* = 2.43, *SD* = .85)
- T3 variable mean and reported Standard Deviation, measure of dispersion (*M* = 2.47, *SD* = .839)

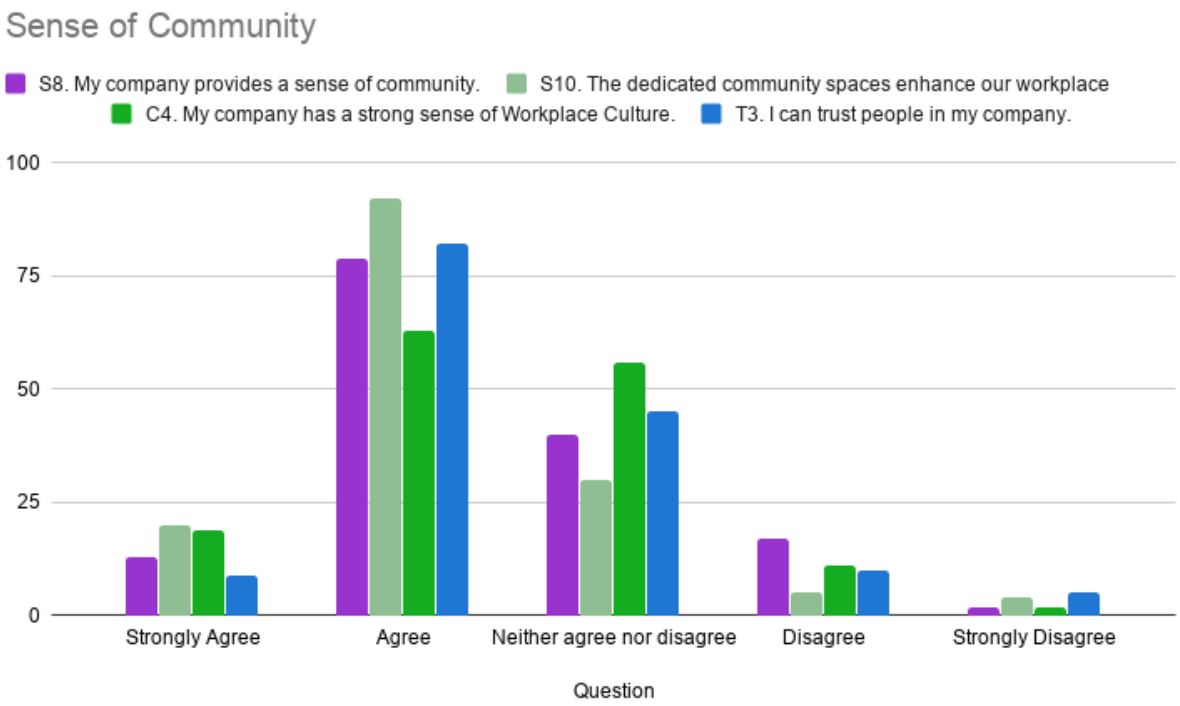


Figure 57: Key study analysis based on the IV and DVs.

Correlational Analysis: Pearson's r (Pearson's product-moment correlation coefficient) was run to illustrate *basic univariate analysis* as Pearson's r is the basis of most statistics for *multiple regression* and *factor analysis* and is measured on a scale from +1 through 0 to -1. Pearson's r correlation coefficient data assumes a *linear relationship* and was run on correlational analysis such as Likert type variables as in this study. One variable

the (IV) Workplace Sense of Community (X) is associated with another variable the two (DVs) Trust and Culture (Y) as a negative or positive variation association.

First, in the specific instance of survey question posed: T3 variable (I can trust people in my company) was run against survey question response S8 variable (My company provides a sense of community) and statistically analyzed with a bivariate correlation yielding a Pearson's r value of .507 which is statically significant with additional significance value of sig (2-tailed) $p<0.001$. A strong positive linear correlation was noted.

Second, in the specific survey question posed: C4 variable (My company has a strong sense of workplace culture) was then statistically run in SPSS software against survey response S8 variable (My company provides a sense of community) the results were: a Pearson's r value of .624 which is statically significant with additional significance value of sig (2-tailed) .000 $p<0.001$. A strong positive linear correlation was noted.

Third, in the specific survey question posed: S10 variable (The dedicated community spaces enhance our workplace culture) was then statistically run in SPSS software against survey response S8 variable (My company provides a sense of community) the results were: a Pearson's R value of .555 which is statically significant with additional significance value of sig (2-tailed) .000 $p<0.001$. A strong positive linear correlation was noted.

Table 13: (next 3- grouped data tables) Analysis of survey questions related to IV and DVs

Correlations

		S8. My company provides a sense of community.
T3. I can trust people in my company.	Pearson Correlation	.507**
	Sig. (2-tailed)	0
	N	151
C4. My company has a strong sense of Workplace Culture.	Pearson Correlation	.624**
	Sig. (2-tailed)	0
	N	151
S10. The dedicated community spaces enhance our workplace culture.	Pearson Correlation	.555**
	Sig. (2-tailed)	0
	N	151

** Correlation is significant at the 0.01 level (2-tailed).

Statistical analysis: As Workplace Sense of Community increased in survey opinion so too did the two (DVs) Trust and Culture in association, positive linear strength correlation and statistical power was established. The significance value of the three sig (2-tailed) tests in SPSS all resulted in evidence $p<0.001$ supporting:

- A strong positive linear correlation was present, the Null Hypothesis was rejected whereby the Alternate Hypothesis of the research set forth (Ha, H1) was accepted:
- Providing a Sense of Community through an identifiable built environment anchor has a positive effect on a company's trust and communal culture social ergonomics.

A hierarchical linear, descriptive statistics, correlation matrix was also run in SPSS prior to regression analysis reporting. Each variable run in the matrix (S8, S10, C4, D5, S7, S9) resulted in positive highly significant correlation on the variable run.

Table 14: Hierarchical linear, descriptive statistics, correlation matrix

Correlations

Descriptive Statistics

	Mean	Std. Deviation	N
S8. My company provides a sense of community.	2.4437	.85351	151
S10. The dedicated community spaces enhance our workplace culture.	2.2119	.81330	151
C4. My company has a strong sense of Workplace Culture.	2.4305	.85253	151
D5. How do you identify your gender as?	1.4834	.55202	151
S7. I can engage in team collaboration more freely in a dedicated community space/area.	2.5733	.85410	150
S9. I can freely socialize in a dedicated community space/area with co-workers.	2.2384	.73674	151

Correlations

		S8. My company provides a sense of community.	S10. The dedicated community spaces enhance our workplace culture.	C4. My company has a strong sense of Workplace Culture.	D5. How do you identify your gender as?	S7. I can engage in team collaboration more freely in a dedicated community space/area.	S9. I can freely socialize in a dedicated community space/area with co-workers.
S8. My company provides a sense of community.	Pearson Correlation	1	.555**	.624**	.023	.336**	.583**
	Sig. (2-tailed)		.000	.000	.781	.000	.000
	N	151	151	151	151	150	151
S10. The dedicated community spaces enhance our workplace culture.	Pearson Correlation	.555**	1	.493**	.142	.485**	.672**
	Sig. (2-tailed)	.000		.000	.083	.000	.000
	N	151	151	151	151	150	151
C4. My company has a strong sense of Workplace Culture.	Pearson Correlation	.624**	.493**	1	.022	.218**	.430**
	Sig. (2-tailed)	.000	.000		.786	.007	.000
	N	151	151	151	151	150	151
D5. How do you identify your gender as?	Pearson Correlation	.023	.142	.022	1	.195*	.108
	Sig. (2-tailed)	.781	.083	.786		.017	.186
	N	151	151	151	151	150	151
S7. I can engage in team collaboration more freely in a dedicated community space/area.	Pearson Correlation	.336**	.485**	.218**	.195*	1	.447**
	Sig. (2-tailed)	.000	.000	.007	.017		.000
	N	150	150	150	150	150	150
S9. I can freely socialize in a dedicated community space/area with co-workers.	Pearson Correlation	.583**	.672**	.430**	.108	.447**	1
	Sig. (2-tailed)	.000	.000	.000	.186	.000	
	N	151	151	151	151	150	151

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Post the correlation matrix output, a follow up test on a comparison of means was run to evaluate survey question (S7, I can engage in team collaboration more freely in a dedicated community space/area.) against (D5, Gender of those that completed the survey)

to determine which identified gender utilized the space more effectively to benefit team work initiatives and subsequent production of work outcomes leading to the workplace commons supporting work workplace performance. The very interesting result was that while less men responded to the survey question (65 male responses) verses (82 female responses), men significantly endorsed that they could engage in team collaboration more freely in a dedicated community space/area. Mean for females was 2.4 and 2.7 for males.

Table 15: Follow up test on a comparison of means

D5. How do you identify your gender as?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Female	82	49.4	54.3	54.3
	Male	65	39.2	43.0	97.4
	Other	4	2.4	2.6	100.0
	Total	151	91.0	100.0	
Missing	System	15	9.0		
Total		166	100.0		

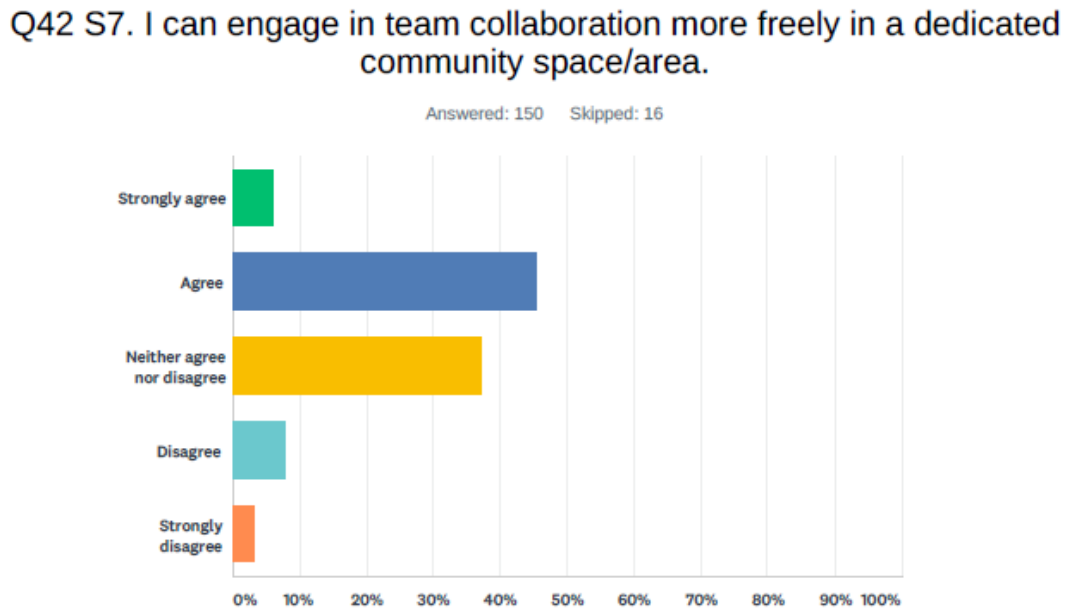


Figure 58: Analysis of survey question S7: Collaboration

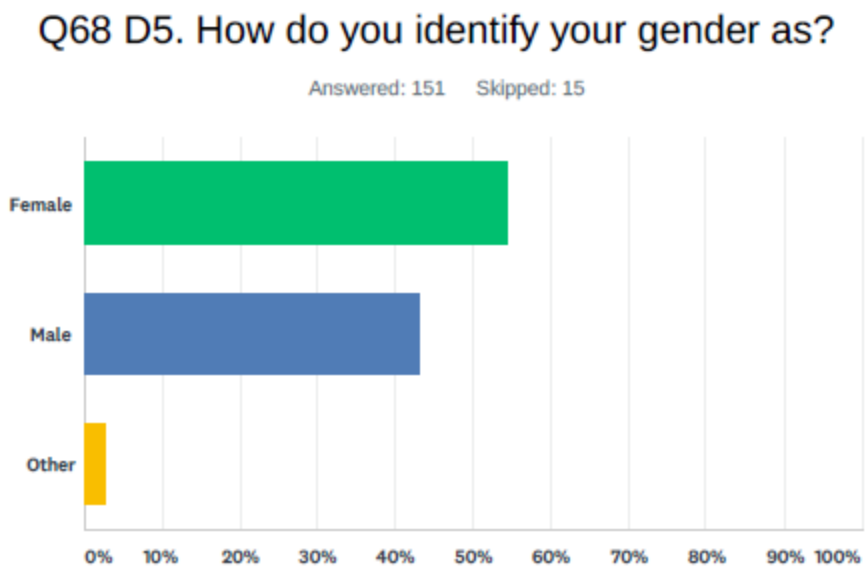


Figure 59: Analysis of survey question D5: Gender

4.1.4 Analysis of Variance (ANOVA)

A three-way ANOVA (multi-factor analysis) parametric test was subsequently run in SPSS to check if the means of three groups of responses: in this instance S10, the dependent variable (The dedicated community spaces enhance our workplace culture) against D1, age (independent variable) and D5, gender (independent variable) of the workplace survey participants. (variables) are indeed significantly different from each other and what we would expect to predict (simply due to chance or sampling error) if the null hypothesis were true. Running the ANOVA test in SPSS was based on the variable participant responses were normally distributed (and/or approximately normally distributed) and the variances of the populations were equal by meeting the following six assumptions:

#1: The dependent variable is measured at the continuous level.

#2: The independent variables each consist of two or more categorical, independent groups.

#3: There is independence of observations

#4: There are no significant outliers.

#5: The dependent variable is normally distributed for independent variables.

#6: There is homogeneity of variances for each the independent variables.

Post correlation model tests run, regression statistical analysis was run, analysis of variance (ANOVA) with R-square value reporting factored in. Resulting in a strong factorial analysis reporting, highly significant, that being 39 % of the variance in the DV (Culture), measured as (C4 survey response) was explained by the IV (workplace sense of community) (S8 survey response). The standardized beta coefficient $\beta = .624$. compared the strength of the effect of the individual independent variable (S8) to the dependent variable (C4). (.624) absolute value of the beta coefficient indicates a stronger effect.

Table 16: Output file: Regression statistical analysis was run, analysis of variance (ANOVA)

Regression

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	S8. My company provides a sense of community.[b]	.	Enter

a. Dependent Variable: C4. My company has a strong sense of Workplace Culture.

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.624[a]	.390	.386	.66809	.390	95.251	1	149	.000

a. Predictors: (Constant), S8. My company provides a sense of community.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	42.515	1	42.515	95.251	.000[b]
	Residual	66.505	149	.446		
	Total	109.020	150			

a. Dependent Variable: C4. My company has a strong sense of Workplace Culture.

b. Predictors: (Constant), S8. My company provides a sense of community.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.906	.165		5.480	.000
	S8. My company provides a sense of community.	.624	.064	.624	9.760	.000

a. Dependent Variable: C4. My company has a strong sense of Workplace Culture.

Regression statistical analysis was run Analysis of variance (ANOVA) with *R*-square value reporting factored in. Resulting in a significant factorial analysis result, that being 25.7 % of the variance in the DV (Trust), measured as (T3 survey response) was explained by the IV (workplace sense of community) (S8 survey response). (S8) (My company provides a sense of community) had more predictive value for (C4) Culture than for (T3) Trust. $\beta = .507$.

Table 17: Output file: Regression statistical analysis was run, analysis of variance (ANOVA)

Regression

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	S8. My company provides a sense of community.[b]	.	Enter

a. Dependent Variable: T3. I can trust people in my company.

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.507[a]	.257	.252	.72555	.257	51.630	1	149	.000

a. Predictors: (Constant), S8. My company provides a sense of community.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	27.179	1	27.179	51.630	.000[b]
	Residual	78.437	149	.526		
	Total	105.616	150			

a. Dependent Variable: T3. I can trust people in my company.

b. Predictors: (Constant), S8. My company provides a sense of community.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.251	.180		6.968	.000
	S8. My company provides a sense of community.	.499	.069	.507	7.185	.000

a. Dependent Variable: T3. I can trust people in my company.

A three-way ANOVA (multi-factor analysis) parametric test was subsequently run in SPSS to check if the means of three groups of responses: in this instance S10, the dependent variable (The dedicated community spaces enhance our workplace culture) against D1, age (independent variable) and D5, gender (independent variable) of the workplace survey participants. (variables) are indeed significantly different from each other and what we

would expect to predict (simply due to chance or sampling error) if the null hypothesis were true. Running the ANOVA test in SPSS was based on the variable participant responses were normally distributed (and/or approximately normally distributed) and the variances of the populations were equal by meeting all of its assumptions.

|The three-way ANOVA conducted in SPSS through steps: Analyze, General linear model, Univariate then the IV and 2(DVs) were entered and run. Ancillary to the main desertion research question, was to ascertain if employees located more than fifty feet away from the commons area would seek out the commons space despite the greater distance. Survey question (B7) 137 respondents said that: The ability to socialize/connect with others was what they liked most about their workplace commons area. 33.99% of respondents answered (B3) that their desk was more than fifty feet away. Which then substantiated the commons space as meaningful to physically visit despite the greater distance.

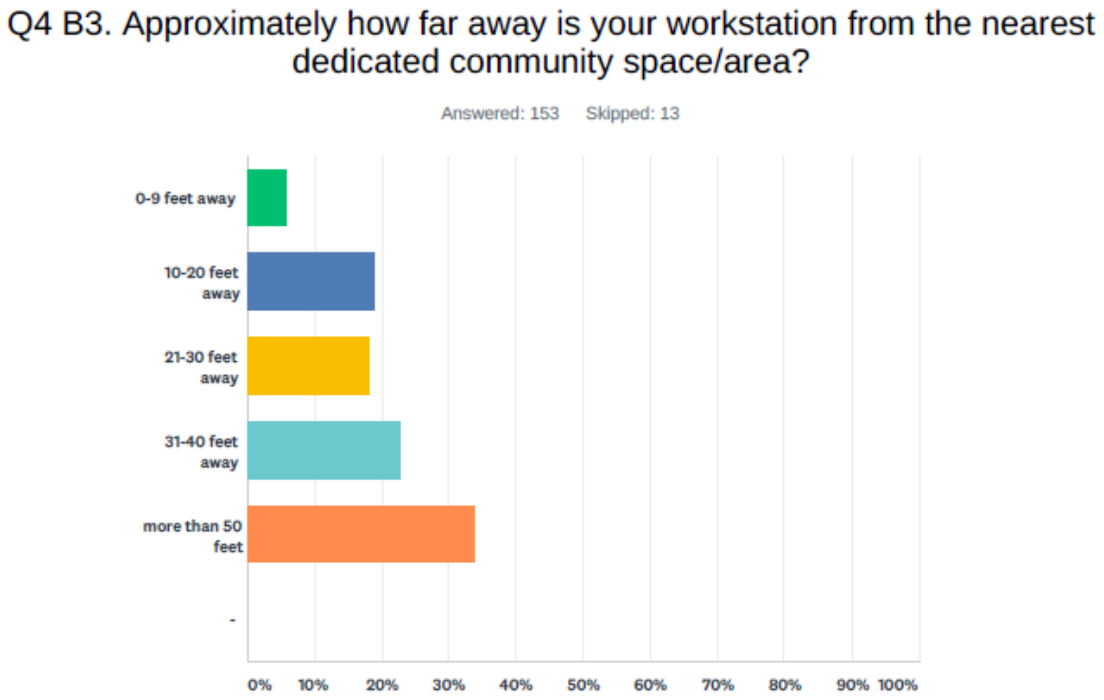


Figure 60: Analysis of Survey question B3: Critical distance measured

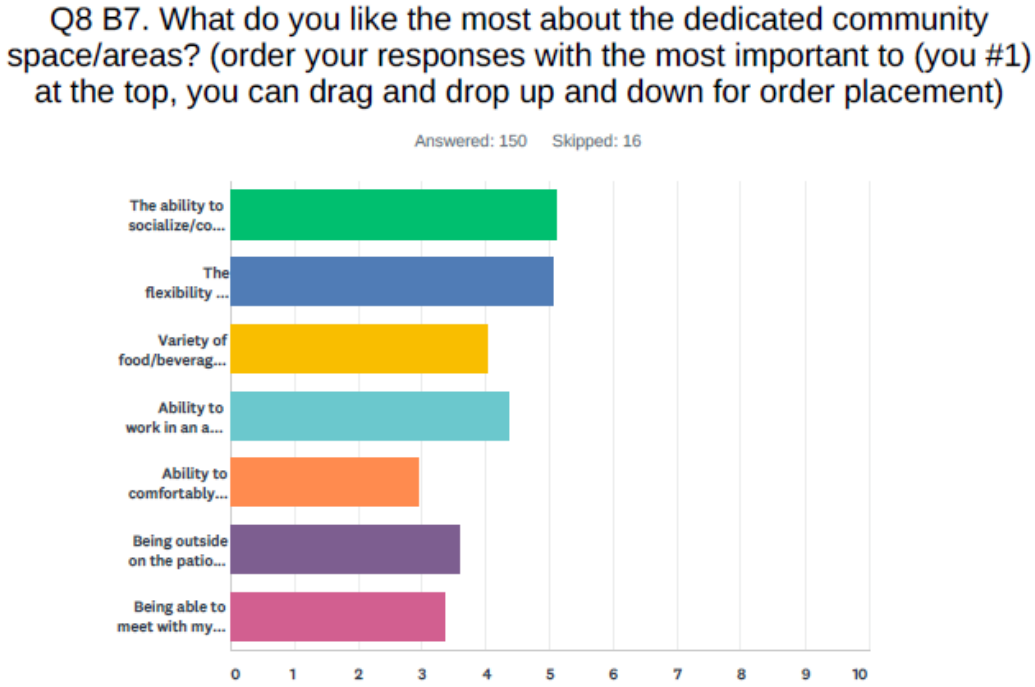


Figure 61: Analysis of Survey question B7: Ranking -like most about the dedicated community space

An additional key introspective and supportive consideration of the research question was to observe through response feedback, the use of earbuds/headphones, in the

workplace at their assigned work desk vs. non-assigned as in the dedicated commons space, as it related to social proxemics and social ergonomics. Would employees use earbuds to remove distractions at their desk and then purposefully remove the earbuds/headset in the commons area despite continued work taking place and/or need to focus? The question was based on the consideration that a workplace community commons space should mindfully benefit both extroverted and introverted personality types of employees in usage. As such, the Workplace Sense of Community (WSOC) theoretical framework proposed prioritizes such that "connection" to others is not always verbal in social outreach, introverted employees can benefit from the proxemics of others thereby advancing social ergonomics the like.

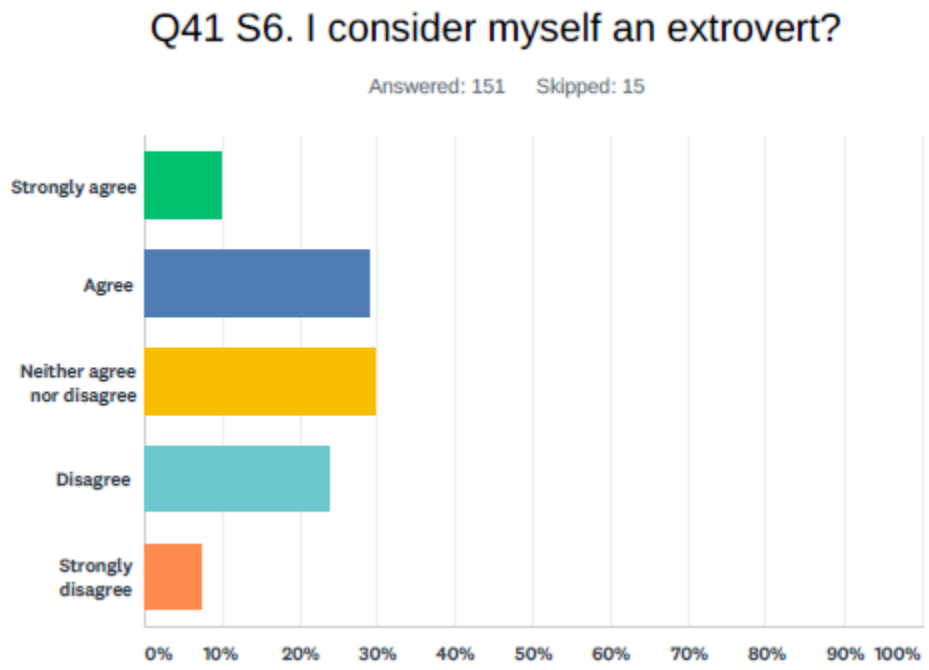


Figure 62: Analysis of Survey question S6: Personal reflection Introvert vs. Extrovert

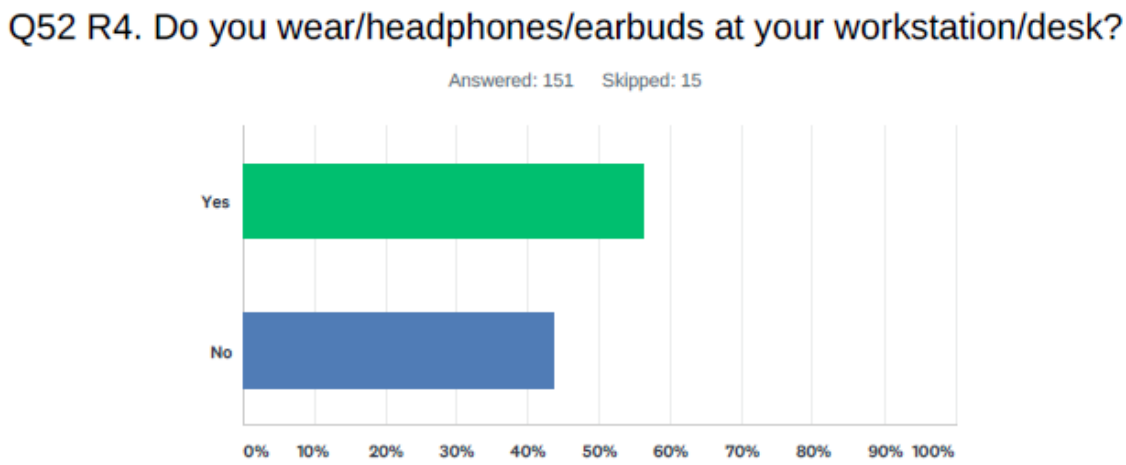


Figure 63: Analysis of Survey question R4: Earbud/headphone usage at workstation/desk

Survey question (R4) follow up question: **Why do you** wear headphones/earbuds at your workstation/desk?

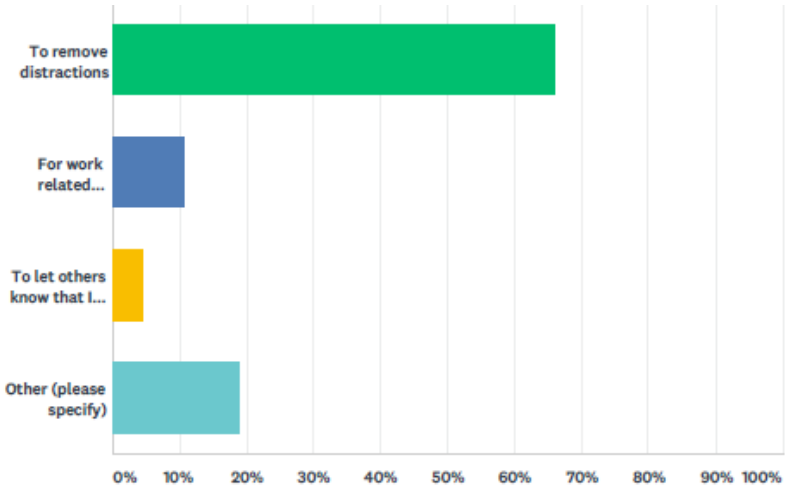


Figure 64: Analysis earbud/headphone usage follow-up question to R4

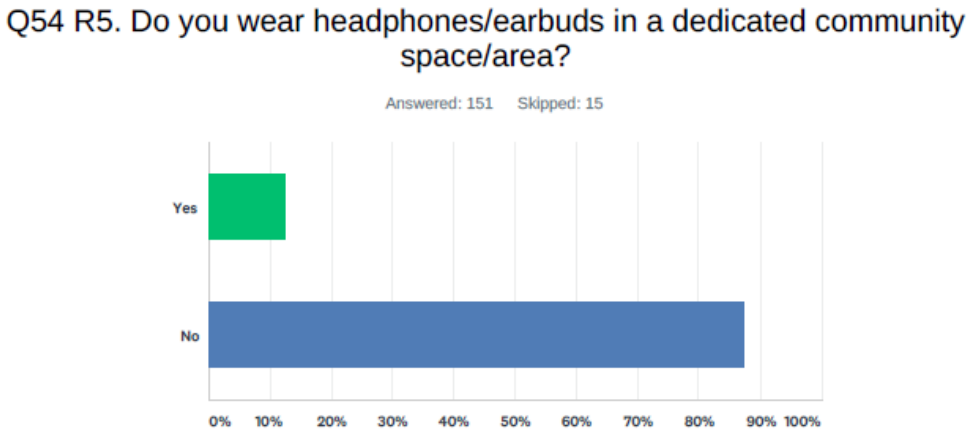


Figure 65: Analysis of Survey question R5: Earbud/headphone usage in the commons space

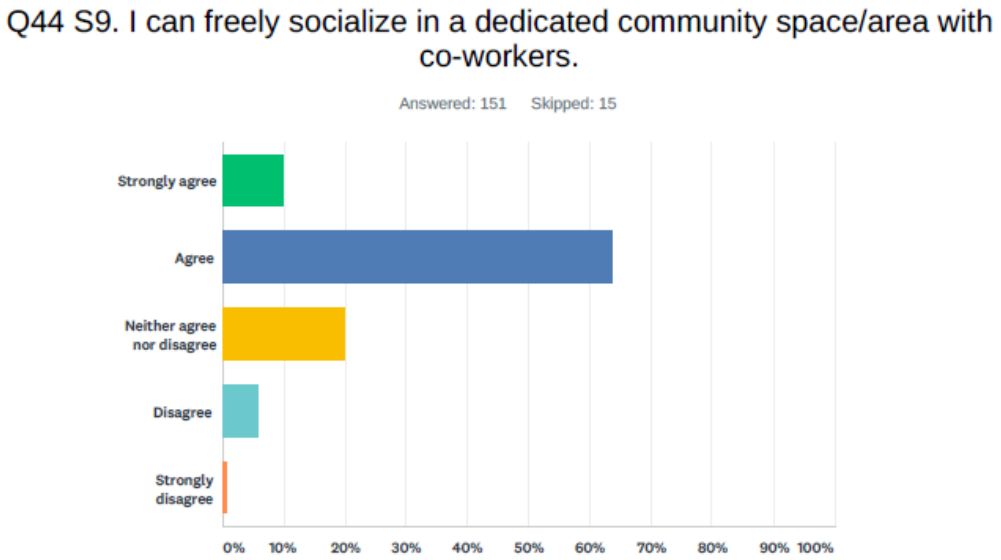


Figure 66: Analysis of Survey question S9: Ability to freely socialize in the dedicated community space

Qualitative, open-ended survey results: The research study conducted was a mixed-method approach where descriptive statistics analysis was run as well as inferential statistics resulting in highly significant results, the null hypothesis was rejected. However, open-ended survey questions yield substantial, candid information and offer unique insight as respondents often find open-ended questions less intimidating than scaled survey questions and were therefore purposely added into the survey to seek qualitative input and meaningful opinion by the case study survey respondents.

The online survey reflected unparallel consideration of seminal twentieth century research of twelve identified theories and principles that directly or peripherally addressed common areas in public urban settings. Research included William H. Whyte's Public spaces to Appleton's Prospect-Refuge theory that addressed how people engage in the open and retreat and/or seek solace in refuge-like spaces. The author then extrapolated key findings to and add validity to the research interpreted in a unique approach toward the application of a workplace commons space that ideally supports workplace employee behaviors and autonomous work patterns advocated by the built environment.

Perception of Autonomy, Culture, Sense of Community and Trust: Novel in application were custom designed questions that addressed the 20th century research then embedded into the online survey questions and grouped further into eight (8) defined sections administered: B-section (Identifiable Built Anchor-Commons) A-section (Autonomy) C-section(Culture) P-section (Performance) S-section (Sense of community) R-section (Prospect/Refuge) T-section (Trust) D-section (Demographics). Each survey section ranged from four to ten questions totaling seventy-three questions. Four (4) of the eight survey sections posed qualitative *open-ended* opinion-responses:

For the quesiton related to: Autonomy 151 answered, 9% skipped, for Culture 147 answered, 11.4% skipped, for Sense of Community 146 answered, 12% skipped and for Trust 146 answered, 12% skipped. The employee repsonses were *extensive in expressed thought and opinion* applied to of the all four questions queried. Starting with a word cloud response caputre as shown:

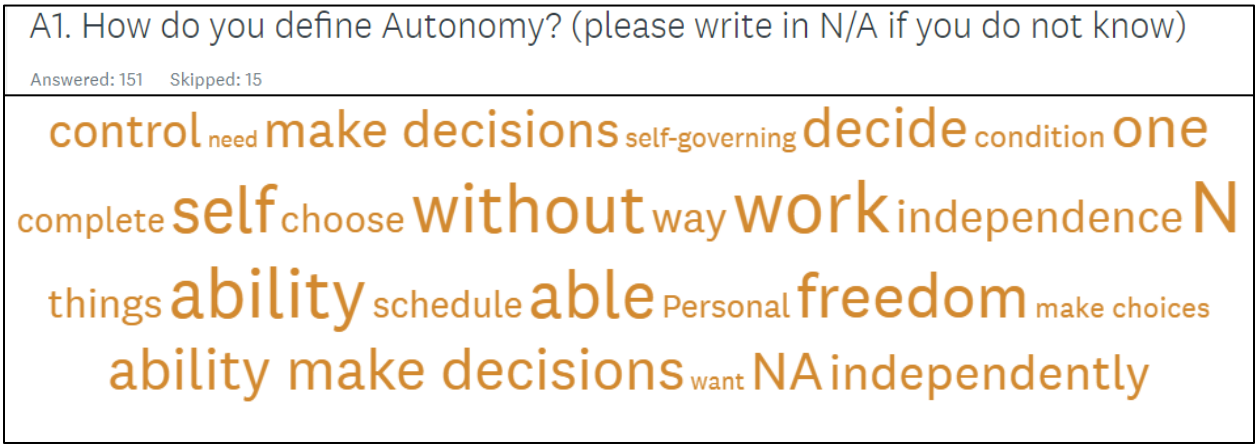


Figure 67: Qualitative Survey question A1-151word cloud responses

A sampling of the (151) open-ended responses were:

-"Ability to be **in control of your work, life, day**, etc.
- Right of **self-government**.
- Work **independently**.
- The ability to execute work according to **one's own schedule**.
- To rely on **self-complete** a task.
- **Authority over oneself**.
- Flexibility to be **a table for one**.
- **Self-reliant**.
- **Independence** or **freedom from external control/influence**.
-The ability **to act and think on one's own**.
- Reach goals any **way I decide**.
- Being able to work where I **want when I want**.

One response in particular: **"The ability to do one's role and be trusted despite the**

location of the activity" is supportive of a commons space as it supports employee

Autonomy, a key factor of the Self-Determination Theory.

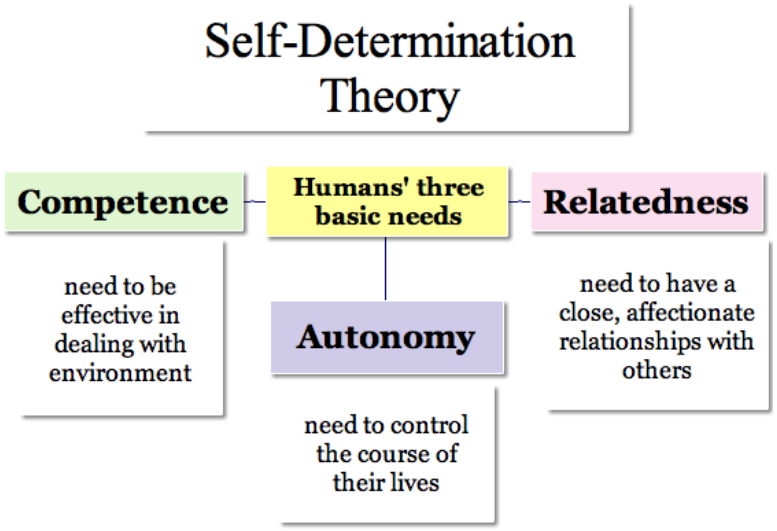


Figure 68: For reference: the three Components of SDT (Source: Pennock and Alberts, 2018)

Of considerable qualitative significance, **an actual employee's written response that of "Self-Determination"** directly supports to the S.D.T. theory title without prompt in the open-ended question (A1).

Figure 69: Qualitative Survey question C1-147word cloud responses

Per survey question (C1), a word cloud was generated (above). A sampling of the (147) open-ended responses were: "Workplace culture is the environment that you create for your employees. It is the mix of your organization's leadership, values, traditions, beliefs,

interactions, behaviors and attitudes that contribute to the emotional and relational environment of your workplace., The way it feels at work. It's everything. Its everyone, everywhere, everyday., A culture that is adopted by all or most of the employees in a given environment., The environment in the building., Theoretical values + expressed rules as they apply to interactive and solitary tasks in the workplace., The sense of common purpose shared by one's self and other employees., The environment of the people and place you work., Shared values and goals within the company., the societal norms governing behavior in the work environment., How employees act in an environment., The social and cultural norms of the workplace evidenced from reality rather than the stated definition., The integrated sum total of learned behavior traits characteristic of the members of the organization., Ability to work freely and discuss ideas."

Several open-ended responses included referenced beyond that of the assigned work desk to expand on culture to include community and space where employee could gather freely such as:

- "An atmosphere of **inclusion and hospitality**., Sharing equipment and **amenities**."
- "The availability of a community within the work environment."
- "A work **environment that promotes my best performance during work hours**."
- "Workplace culture is essentially boundaries and expectations that are established through **engaging in intentional community**."
- "It defines what the atmosphere should and will be like., **Harmony and productivity**."
- "Work life balance, work from home ability, offerings to employees such a competitive benefit, gym, **cafeteria**, **outdoor space**, general office environment that it updated.
- "Ability **to meet/collaborate with others in many different areas within the building**."
- "The general feeling, norms, and **sense of community** at one's job working alongside others."

The open-ended responses aligned with the Self-Determination Theory that of: Relatedness: need to have a close, relationships with others.

Figure 70: Qualitative Survey question S1-146-word cloud responses

Per survey question (S1), a word cloud was generated (above). A sampling of the (146) open-ended responses were: " feeling of belonging with others., The feeling of belonging to the group., A feeling of belonging to a common purpose and goal which, by our support, supports us., an atmosphere that employees collectively create. can be positive neutral or negative., Shared values + common goals + assumption that all colleagues have something to offer., colleagues agreeing on the values and culture., When employees are on the same page about workplace culture and feel as though they are an important part of the community., The community is very active socially and has events, groups, activities, and is inclusive., When the company culture is supportive and encourages personal health., Lack of office politics; sense of trust and respect; caring for those around you; having some common goals., Feeling like a part of a functional group that you take pride in., How welcomed I feel within the company and how I fit into the culture."

Several open-ended responses referenced beyond belonging and expanding on culture as well as mention of a physical space that could then accommodate community with commons space consideration such as:

- "A sense that people are more than just coworkers and that we **have a common habitat.'**

- **"**The concept of feeling **connected to the people around you**."
- "I feel our department is isolated from the rest of the surrounding departments. Seems other departments have a decent work/life balance while ours does not, it stands out and **leaves us isolated**."
- "Feeling of belonging, **relating to and caring for my peers**."
- "Coming **together as one."**
- **"**The Ability to interact and work together."
- "**Being able to have a quiet area to work at when distractions are overwhelming when you are in a group**."

Employee feedback on seeking group interaction, belongingness, feeling isolated is collectively directly related to Maslow's seminal research, in that, such personal feelings if not considered would prohibit self-actualization and stifle the employee in reaching their full potential.

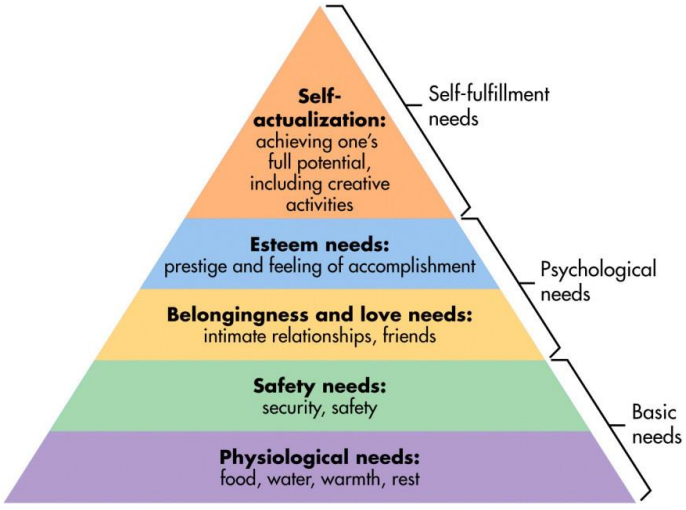


Figure 71: Maslow Hierarchy of Needs (Source: Maslow)

Figure 72: Qualitative Survey question T1-146-word cloud responses

Per survey question (T1), a word cloud was generated (above). A sampling of the (146) open-ended responses were: “The ability to work confidently knowing positive intentions are understood., team work., Assumed degree of confidentiality + assumed degree of value in subjective opinion., Being accountable and transparent and honest., Believe in each other's integrity., Knowing your input is valued. Knowing people are being honest. Open communication., Demonstration by others that what they say and profess to do will be followed through (i.e. honesty in all actions)., Trust in the workplace is feeling like a team where everyone supports one another., Transparency., ability to fail without fear., Believing in one another.”

Interestingly, while the qualitative query sought a personal definition for Trust, several responses resulted in aligning with the research benefits of a commons space such as: “Being able to **openly work with and converse with your colleagues and feel comfortable** that they will provide open feedback and not spread your message if not intended.”

- “Working together to achieve a goal, including sharing information and **building relationships**.”

- "**When a company grants trust to employees to manage their workload as they best see fit**, including timing and location., Company allowing us to work from home **or in a different area other than our workstations**."

4.2 Public Third Space, application, and importance in the 21st century

In Tokyo, Japan, population density has driven multi-tenant use as standard in design planning. Only recently, North American developers have started to seek innovative solutions to linear sprawling vacant spaces such as in local malls and in vertical long-term corporate leases. Yet, Tokyo's vertically stacked solution has existed for decades with much success. Multi-storied buildings that house cafes alongside corporate offices commonly share leased floor space. Multiple businesses on multiple floors. A foreign notion to many in the West, yet a cornerstone in the East where high-density cities are not foreign to co-habiting in business and or in one's personal life. The benefit is proximity of leases is shared community space that is accessible only steps away from one's work desk. After work hours, comradery is always nearby on the lower building floor, provided in Izakayas and Shokudo community bar and restaurant establishments, were Japanese colleagues strengthen local community ties by sharing dinner over conversation.

Public third spaces such as Tokyo's Izakayas and Shokudo venues, in addition to re-designed and repurposed public libraries and local YMCA facilities in North America, all have successfully advocated connectivity in turn, strengthening the neighborhood nucleus. Purposefully temporary in design, third space "pop-up" neighborhoods such as Olympic cities provide utopian connectivity for the athletes and visitors, if only for a few weeks. On the traditional spectrum of connectivity planning, the third spaces designed into higher education master campus planning is the commons area A.K.A. the hub. The campus hub is the calling card of the student population, connecting students as they traverse through, resulting in shared school spirit and the experience of social connection. The campus hub is

a successful example of a micro-designed environment that is linked to the macro-planned master campus environment topography of connected buildings.

What public third spaces have in common is a transient variable e.g. student populations that share the legacy of their campuses only during the few years they attend, the same too aligns with the uptick in coworking spaces, temporary occupancy. Whereas in corporate organizations, such as in North America, there has been a significant rise in task-oriented space, activity-based-working (ABW) (Gensler, 2019).

Figure 73: Completion percentage Rise Figure (Source: Gensler, 2019)

As workplace continues to change and flex at a significant rate in trend and augmented iterations in planning usage, and management is shifting. Indicators show a flattening in hierarchical leadership style, more engagement and connection with direct reports. However, employees are increasingly relegated to adjust, transition and adapt to their changing environment, management styles upended resulting in mental decline ensuing at compounding rates. There is a significant disconnect emerging, a potential schism, neglect of the worker's basic physiological needs in the workplace that addresses autonomy. Applied workplace micro- Placemaking to the commons space can address the emerging schism.

It is important to remember that Placemaking, at its most basic level, is predicated on the premise that the people make the place. Placemaking capitalizes on a local community's assets, inspiration, and potential, in this instance the workplace, as opposed to traditional Placemaking protocol which manifests into urban development at a macro level. Furthermore, the intention of Placemaking is to generate public spaces that promote people's

health, happiness, and well-being-so too is the approach here, however interpreted and applied to a workplace community Common space at a novel narrative of a focused micro-level in planning. Through the extensive review of literature, fulltime, part time employees, activity-based use of space and remote workers that occupy the corporate HQ of the near future will rise in transient usage but remain associated in company name and culture (CBRE, 2016). It is therefore paramount to recognize, through the body of work presented, that it is the people that make the place. Such recognition propels the importance of planning for workplace sense of community having in place, a guidepost for planners as the next iteration that of a micro-interior architecture (WSOC) Placemaking, the common denominator being, the built workplace commons environment that focuses on behaviors that shape and define the interior space.

Furthermore, Placemaking by nature, is based on a community of thought, ideation and input for best implementation to serve and benefit the community as a whole. Whyte commented in his writing City: *Rediscovering the Center*, page 109, "It is difficult to design a space that will not attract people. What is remarkable is how often this has been accomplished."

> Linn (2007) mentioned that the "The process of building community begins at the earliest stages of shared envisioning and design of a commons. Once a design has evolved that satisfies the future users of a commons, self-help construction can begin" (Linn, 2007, p. 202). Project for Public Spaces emphasizes that "making a place is not the same as constructing a building, designing a plaza, or developing a commercial zone. As more communities engage in placemaking and more professionals come to call their work "placemaking," it is important to preserve the meaning and integrity of the process. A great public space cannot be measured by its

physical attributes alone; it must also serve people as a vital community resource in which function always trumps form" (Project for Public Spaces (PPS), 2007).

4.3 Proposed Workplace Sense of Community (WCOC) Theoretical Framework Guideline

Early stage programming and visioning engagement should approach designing for the workplace commons space with the author's proposed (WSOC) framework employee input and opinion. A healthy workplace culture of trust through sense of community can be achieved when employee mental and physical wellbeing are at the forefront. The workplace has transformed from the fixed office to the open landscape, where people will incrementally continue to convene at will based on individual prescriptive of use and gather. *E Pluribus Unum*, out of many, a community of one emerges.

Two of the three instrument methods, of the research set forth, were based on pivotal contributing foundational theories and principles, twelve in all. Maslow's work and that of Gagné and Deci's Self-Determination Theory in addition to the ten other works were embedded into the custom designed survey questionnaire and image sorting employee commons space feature preference exercise. Original research that addressed psychological needs of persons applied today to the blended and homogeneous workplace that supports self-actualization. Additionally, the three-basic human needs of the Self-Determination Theory: Competence, Autonomy and Relatedness were also explored and underlined the importance of providing choice. Autonomy to be able to connect with colleagues serendipitously, not online, and best work with others in an environment that is self-serving. Just as Placemaking is critical and unique to each urban environment of which it is being planned for, so too must the interior built environment workplace include and engage

employee input prior to renovation or new construction of an employee workplace Commons space.

Over the past decade, wellness has been prioritized in the workplace, LEED and the WELL building Standard are early stewards in this effort. Yet, while declarant data-entry systems and frameworks have been established to promote interior workplace environmental wellness; the emergence of supplemented innovative methods and instruments to streamline and or convey ease-of use for the non-architectural/design professional will permit the lay person to verify and comply benefiting the workplace employee. However, per the extensive literature review grounding this body of work, “connectedness”, advancing social cultural ergonomics in the workplace has yet to be considered and is predicted in importance in order to advocate for Autonomy, Relatedness and Competence in addition to self-actualization of all employees.

Workplace management can assist in strengthening workplace trust and the advancement of cultural social ergonomics by applying the WSOC Theoretical Framework on behalf of employees in Micro-Placemaking engagement, employee consent and opinion collected input (in advance of planning coupled with built feature considerations) will best support the entirety of the employee population.

The following (WSOC) theoretical framework will allow for best outcomes, furthermore, the framework will allow employees visiting for short periods of time or extended work periods to have the best scenario, in order that, they may build trust and share in a strong sense of corporate culture. The figure 74 (below), advances present Placemaking graphic application consideration applied to urban community ideation and creation to that of the interior application, specifically: Micro Interior Architecture

Placemaking planning whereby the cumulation of insight and employee input benefits the workplace community in a culturally unique Commons Space.

The study's twelve theories and principles have uniquely been evaluated and applied to the body of research as an acting guidepost for the body of work benefiting the Workplace Sense of Community (WSOC) theoretical framework by providing a constructive frame, outline and guidance for workplace planners. The theories and principles interpreted for workplace planning are: 1) The Self-Determination Theory, Gagne and Deci, 2005, Maslow's Hierarchy of Needs, Motivation and Personality 1934, 3) Placemaking Principles based on urban visionaries such as Kevin Lynch, Williams Whyte and Jane Jacobs, 4) Public spaces: 1975 Appleton's Prospect-Refuge Theory and William H. Whyte, 5) 1984 Ulrich's Evidence-Based Design, 6) 1989 Oldenburg's Third Space Principle, 7) 1969 E.T Hall's Social Ergonomics Principles (physical, cognitive & social), 8) USGBC's LEED Principles, 9) WELL Building Principles, 10) MIT's 30-meter Rule, MIT, 11) 1975 Housing Adjustment Theory, 1975, and 12) Andrés Duany's New Urbanism Transect Theory Methodology of planning, development, human-scale and complete communities.

Study results combined from the two custom-designed instruments, additionally along with the on-site observation create validity in a productive springboard for further advancement of the original theories and principles toward an applied 21st century (WSOC) framework as noted in figure 74 (WSOC) Theoretical framework overview:

The outer most green circle represents the integration of the applied Andrés Duany's New Urbanism Transect theory, interpreted for the workplace landscape. This ensures that the commons space is not purposefully distanced from the outer workplace landscape and is planned so a logical zoned linkage approach of connectivity and thoughtful wayfinding from high traffic corridors w/ ample landmark wayfinding to and from supportive areas/districts

in ease of accessibility to the dedicated commons space. It is important to keep in mind when planning for a Commons space, that it is not solely assigned to a high traffic, centrally defined location on the workplace floorplate, as a commons space accommodates heads down focus areas within as well as social connectivity in engagement by choice.

Additionally, the Commons space is not intended to act as a reception area, the pulse of the organization in traffic flow, lobby space of the business nor provide wayfinding assistance for the entirely of the workplace. Nor is the Commons space limited to one area thus will be defined by the culture of each company and employee need. Important considerations regarding the physical design of the commons space is to ensure that counters near beverage areas do not sublimely promote servitude of one employee over another as it is a commons space. Ample space for two employees to pass behind counter areas e.g. island must be considered along with ADA complaint height and accessibility at all times. While the commons space is an advocate of advancing social ergonomics, the usage in which employees chooses to engage is not to be prescribed but supported. Autotomy in engagement of others and the physical space is a key building block of the commons space.

The main outer ring on the WSOC framework represents nine principles applied through this body of research culminating toward the central focused outcome: a well-defined, bespoke Workplace Commons space supporting Workplace Sense of Community (WSOC). The sections emanating inward from the main theory ring represent interpretation of the nine theories applied to the workplace commons space. Culminating toward the central ring closet to the commons space are two key theories guiding the research study: The Self-Determination Theory and Maslow Hierarchy of Needs.

Pairing the unique to each cultural outcome of an organization with predicated employee preference in gathered opinion is first and foremost (WSOC) based on the two study instruments: employee common feature image sorting preference and survey assessment of workplace sense of community. Methods that will assist an employee-owner-planning micro Placemaking visioning session through informative insight while simultaneously supporting the origin of defined behavioral-activities of the inhabitants, will inform and guide fine-tuned planning built environment outcomes, in turn, successfully transforming a commons space into a commons place.

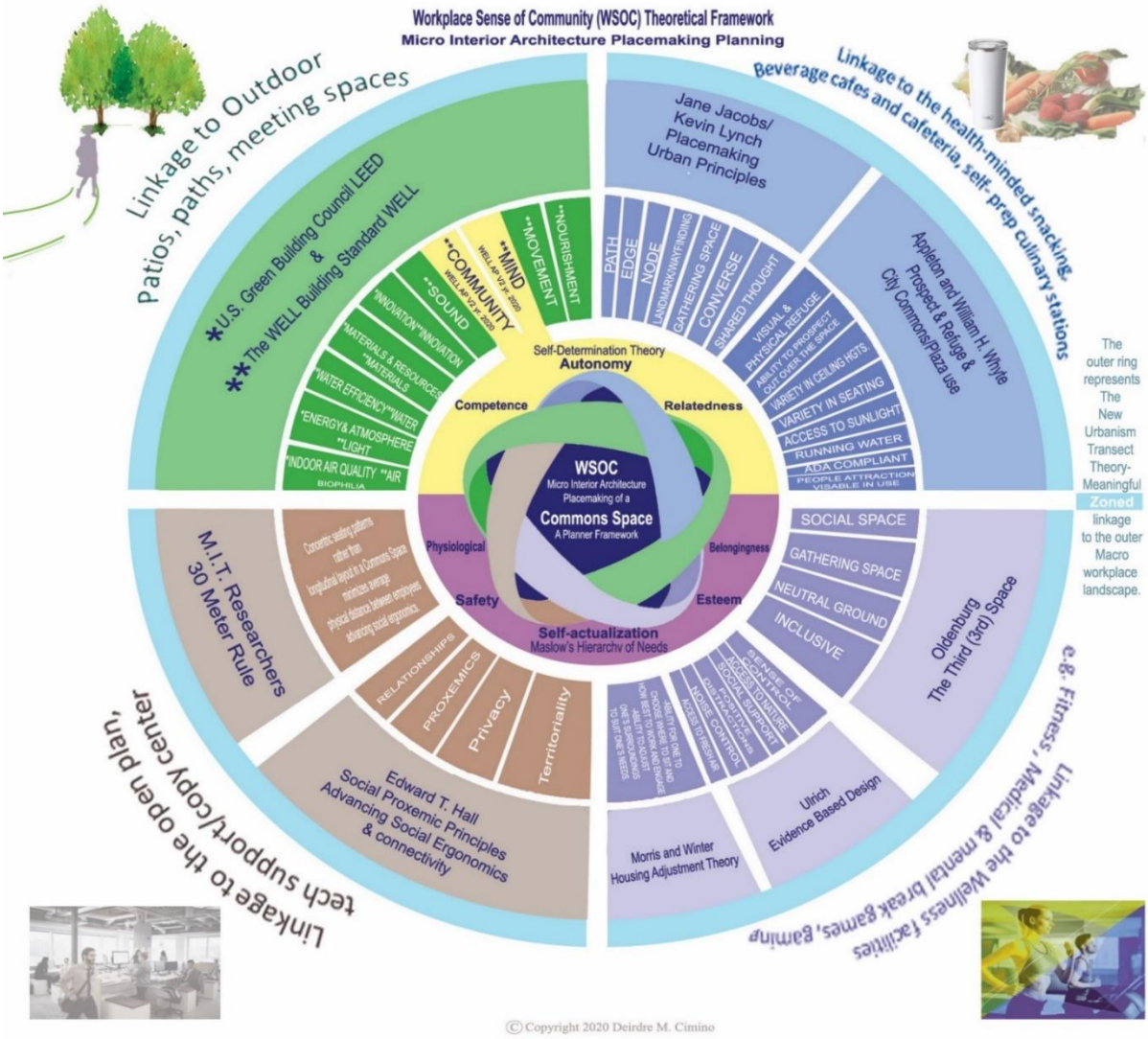


Figure 74: Workplace Sense of Community (WSOC) Theoretical Framework Guideline

CHAPTER FIVE

5. Research Methods Summary

The workplace of the 20th century emerged under regimented workstyles influenced by Taylorism from the bull pen desk configuration to long office and factory hours. The ability to add a stopwatch to assigned tasks created a collective effort in measured performance outcome resulting in businesses that employed, at times, entire communities. Continually appeasing the growing collective of employees employed, elaborately planned extensions of gratis; such as convenient services provided only steps outside of the factory floor or office building as the town of Pullman, Chicago in the 1880s or earlier religious adaptations such as the Shakers in 1774 emerged. Many of the utopian communities were purposefully insular, but the goods and products created flowed out of the communities to sustain them.

In 1985 Byron wrote on the workplace as a community: promoting employee satisfaction and commented because "…people's primary commitments lie elsewhere; the workplace will never be a true community. The workplace will be better, however, if employees show concern and respect for coworkers and if employers celebrate traditions, recognize achievement, and encourage creative thinking. Such workplace enhancement should encourage employees' participation in a shared enterprise but not substitute for workers' outside ties" (Byron, 1985).

Fast forward to the twenty-first century as freestyle, free-address, remote, nomadic work style dominates the workplace; social connectedness and 'going to the office' is shifting from serving the purpose of a scheduled meeting to prioritizing connecting with others, particularly, for the mutual benefit of face-to-face interaction because predictably no longer exists. As quoted in Chapter 2.11 of the review of literature, "By 2040 facilities will

not be owned anymore but ‘consumed.’ The real estate portfolio will more closely resemble a network of workplaces and the office or ‘HQ’ will become a ‘trophy workplace” (as cited earlier, CBRE, 2016). As transient work styles continue to rise in adoption, the ability to network and collaborate face-to-face will be key as evidenced in this research paper and extensive review of literature, the need then arises to support such interactions copacetically. To connect with others in a workplace common anchoring space, a third space, socially, or without verbal engagement, yet still in proximity of others. Byron’s commentary was relevant for the 20th century; management employed by the utopian community corporate umbrella, were unaware of looming title wave communities would experience when spontaneously challenged due to random employee strikes or downturns in profit margins taking hold. Disruption and corporate disaster ensued.

The Skywalks Lab project by Google in Toronto Canada, a “smart city” started a next iteration of total inclusive planning from AI to IoT feedback and as of most recent, a new proposition by Toyota in Japan proposed a transformation of a 175-acre site of the former Toyota factory into a “prototype city of the future.” Autonomous vehicles, innovative street design, smart home technology, robotics, along with new mobility products on the population of inhabits is planned for feedback in collected research in living. However, today, as the defined line of corporate work life and home life continues to blur at an exponential rate. A Think Tank session hosted by Perkins and Will in Los Angeles, 2019 and organized by Metropolis Magazine with key industry leaders attending, noted collectively that “Workplaces are becoming almost unprogrammable.” A panelist, Josh Wyatt, CEO of NeueHouse stated “there is certainly a war going on right now in the office world-a war for talent, and a war for space.” Wyatt compared the workplace situation to a “tsunami” further mentioning that “The office is a pressure cooker, the panelist agreed, and

designers, working with human resource managers and, in one example, therapists, need to carve out “edge space” and other amenities where employees can go to let off steam or just ride out the wave” (Metropolis, 2019).

In conclusion, the three custom instruments applied, addressed planning challenges industry must address with a compassionate and practical solution, a lens on the employee to offset workplace “pressure-cooker scenarios”. It is imperative to ideally support workplace employee behaviors and autonomous work patterns advocated by the built environment that surrounds them first, without relevance is irrational vice versa planning as this study supports; employee behaviors are affected by their surroundings. This study’s focus elevates organic and agile Interior Placemaking Architecture that best supports employee sense of community, an effective micro-level planning consideration in application of collective applied theories and principles applied to a workplace commons-anchor space.

Summary of On-site observation: The observation protocol that was custom created worked well in categorizing the behaviors engaged in as they related to the built environment. A clear indication of need and use of dedicated community spaces was observed, outside of lunch hours. What had not been taken anticipated in advance of the onsite visit, were the employees that would hum a tune as they traversed through the areas observed and, in some instances, sang under their breath. What was also not anticipated was the noticeably lighter gait in step by employees entering a dedicated community area. An interesting behavior that occurred and supports the context of the research that of: while employees did not take advantage of the upholstered seating offered adjacent to the main pantry areas, employees did stay in the immediate vicinity when engaging with others and at time physically touching the seating edges. A built environment feature that could support

additional sense of community would be if the main pantry areas had been attached to a connecting wall creating a less open area at both ends, the level (vocal pitch) of conversations may have been even higher.

Additionally, offering an alcove type seating choice in an enclosed area for both introverted as well as extroverted employee use supporting the Prospect and Refuge theory. Perhaps the one observation that was least expected, yet most affirming in the benefit a dedicated community space brought, was the visual reduction of stress and connectedness with others as observed by the female in the outer commons area who was seated with her legs crossed under her occupying a high back upholstered seating group area while engaged with another female employee-both holding purchased beverages from the coffee shop. The less formal posture assumed indicated comfort in the surroundings and functionality offered supporting the workplace sense of community.

Summary of The Image Sorting Exercise: The second of the two research methods that was administered October 4th, 2019, yielded forty-eight (48) 1:1 anonymous engagement responses between the employee and the lead researcher, the author, resulted in identical alignment of the top (3) employee preferred commons space feature, that of "Access to natural views" to the survey question (S4) I connect best with others in a dedicated community space/area that? The main culmination response was (63.09%), representing 94 out of 149 collected responses: has natural views. Since the survey was purposefully anonymous adding anonymity as such, resulted in significant open-ended response collection. There was no way to determine if the same forty-eight respondents that participated in the Image Sorting exercise (also anonymous in respondent opinion) took the survey which opened, online, seven weeks later November 18th, 2019. Therefore, the

duplication of preference “Natural views” underscored the significance in the similarity of results in population preference.

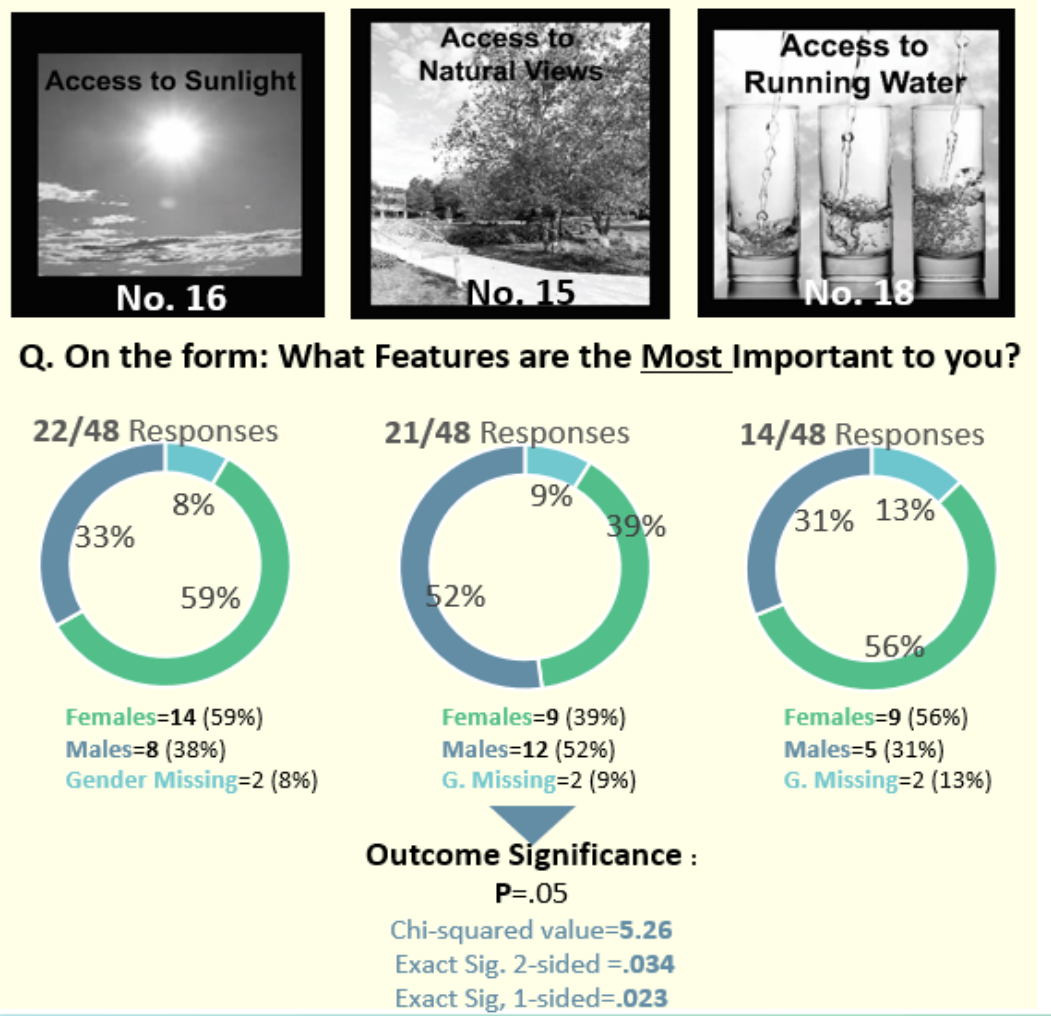


Figure 75: Image sorting exercise re-cap of results previously presented.

Q39: S4. I connect best with others in a dedicated community space/area that... (Please check all that apply

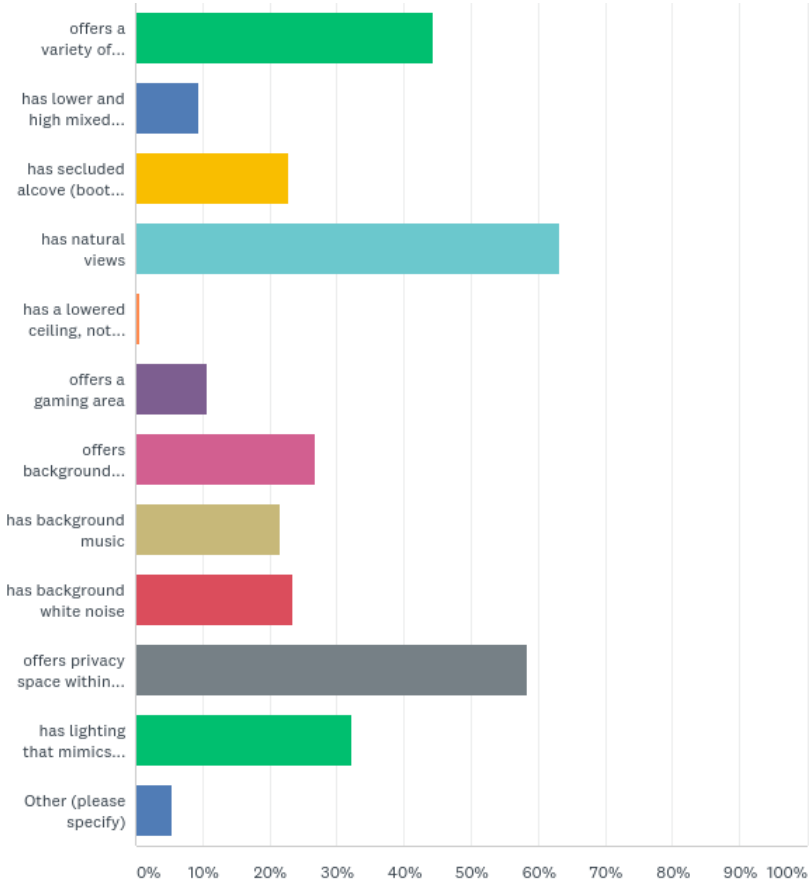


Figure 76: Analysis of Survey question S4: How respondents connect best-opinion

Summary of the Seventy-three Survey/Questionnaire: analysis' strong correlations exposed workplace sense of community to be highly significant in the dependent variable(s) against the Independent variables in the statistical findings when run through both descriptive and inferential statistics. However, it was the open-ended qualitative feedback *when coupled with the quantitative results* that yielded additional rich supportive raw data that amounted to definitive and impactful data results.

A novel planning model (WSOC) that considers a logical 'zoned' solution, such as the New Urbanism Transect Theory becomes more relevant starting with addressing the

workplace. The implications for this mixed-method study were based on the convergent validity evidence of the independent variable that of workplace sense of community correlated against the two dependent variables that of: Workplace trust and communal cultural social ergonomics resulting in outcomes that responded to the study questions initially posed.

The study's original contribution of research proposed measured for a company's 'sense of community' with a novel WSOC framework, a physical, visual guide of grounded consideration for how to best adjust and/or plan for a workplace that provides employees with an identifiable neighborhood community commons space. A diverse place of mixed-use space with the understanding that one size, one type does not fit nor satisfy all nor amenities that are not supported by logical space-planning. Additionally, to recognize that data drives design in environmental data measures, IoT, sensor-based technology may assist in the early stage data collected to best inform planning.

5.1 Recommendations for Future Research

As rhetorically posed in section 1.4 the Statement of the Problem of this paper: to propel beyond experience of design or user experience that can change with flux in workplace design set forth, the paramount need is to inherently and ideally support the employee, despite predictable change to the floorplate. Compassionate planners should inherently consider:

1. How sense of community, social ergonomics, a communal, neutral, third space can be created/designed organically as a stable, anchoring space, in the workplace that will foster and advance employee Autonomy.
2. How to plan and design for a sense of community within the built environment of the

workplace with a proposed (WSOC) Framework.

3. Key pieces of information resulting from: case study surveys, on site field observations, respondent image feature-preference sorting (methodology in set forth) that will ensure a productive space that supports a sense of community of teams and individuals effectively while advancing autonomy and improving social ergonomics for both introverted and extroverted persons.

A concise method for not only advancing autonomy in the 21st century workplace but ensuring that the employee's, autonomy, well-being and ability to reach self-actualization were at the center of the dialog from pre-planning and post occupancy moving forward given the significant changing landscape of the 21st century workplace.

The defined (Workplace Sense of Community) WSOC framework on how best to plan and design for workplace Sense of Community was provided based on empirical evidence through onsite observation and established twelve theories and principles applied to the study which will guide the architectural design community as well as facility and in-house planners. That said, there are several areas future research could address:

Research area suggestion No.1: Given that "Companies can now curate a mix of different spatial typologies in order to accommodate both short- and long-term needs—and even to experiment with new working methodologies" (Interior Architects, 2019). Projected transient pathways of working call for action to respond with compassion in all planners set forth, sensitivity to people's behaviors as they are affected by the workplace-built environment which is underscored in the emergence of neuroaesthetics. Neuroaesthetics, a relatively new sub-discipline of empirical aesthetics, applies a scientific approach The importance of neuroaesthetics study in particular, democratically addressing, that the "people" make and shape the place, through the continuance of neuroaesthetics research

sensitivity applied to interior architecture, the built environment is needed and will continue to assist and guide the prioritization of interior architecture planning, the next step of consideration and planning through meaningful pedagogy.

The research set forth resulted in highly significant outcome analysis findings that have substantiated the importance of recognizing that "where one wants to go" is not without consideration in the near future, to connect and fulfill the need employees have to belong to others. There is an identifiable, growing need to consider the ways in which emerging scientific study of neuroscience, specifically, neuroaesthetics and cognition can not only influence and improve the design field but those that inhabit the space. The built environment's effect on the behaviors of workers in a commons space and their preference attributes that not only define the space but provide psychological respite for introvert personalities and extrovert personalities alike while advancing social ergonomics, in proximity, is the first step in assigning importance to future study.

Research area suggestion No.2: In the 2020, WELL AP v2 exam, a new section was prioritized and added "community". "The WELL community concept aims to support access to essential healthcare, workplace health promotion and accommodations for new parents while establishing an inclusive, integrated community through social equity, civic engagement and accessible design (International Well Building Institute, 2019). The WELL Mind concept promotes mental health through policy, program and design strategies that seek to address the diverse factors that influence cognitive and emotional well-being" (International Well Building Institute, 2019). Future research could be applied in a workplace commons space that has been designed per the WSOC framework and measured post occupancy, per new standards such as the WELL Community and also Mind categories to assess the new category importance based on first-hand experience and opinion of the

workplace employee, a sense of Community defined through the built environment will advance planning through innate, cognitive planning. Additionally, with regard to the WELL Standard Mind category added in relation to the research proposed in this study; an interesting consideration arises; to research onsite employees, post occupancy of a commons space, that connect via teleconferencing and or AI to remote employees in provided alcoves and or open table area of a commons space. Such future consideration would measure, assess, if within the commons space, the remote participant is more relaxed in their teleconferencing behavior. For example, during an executive led fireside chat or Q&A session versus the same meeting outlined conference occurring in a scheduled outer meeting space, given the knowledge that the remote participant is connecting within a commons space. It would be remarkably interesting to assess if the remote participant prefers the commons space when connecting remotely while not physically in the commons space.

Research area suggestion No.3: Jane Jacobs vison of community inclusion was far advanced in thinking, yet automated thinking was not in existence. As planners continue to define and redefine workplace environments through AI, machine learning, metrics driving design and IoT intelligence to address the needs of those inhabiting and interacting with the built environment; brain functionality of the worker and artificial brain functionality through software development will interact exponentially. If we consider the future workplace or manufacturing site as increasingly automated, the study of trust and culture becomes critical to study as employee's may feel their impact is less organic in their own autonomy as the shift more and more in all things programmed for them. Automated environments are highly likely to affect trust and culture when e.g. the internet of all things (IoT) tags individuals in use and known whereabouts 24/7. Interaction of social proxemics will evolve to interaction with automated social proxemics beyond the workplace such the relationship with

autonomous vehicles, viewed as a shared public commons space, third space or in larger environments such as manufacturing plants or public airports. Future research where it can apply to segments beyond the workplace where the three variables assigned to this study going into the raw data set collection could be expanded so it is a more universally applied in the consideration of commons space planning as compassionately planned for all segments public and private is and will be needed.

Research area suggestion No.4: Based on the dedication to the study and research, the forecasted future workplace commons space will invert, assume exponential scale and importance, translated; the commons space will become the dominant space in workplace demand as it has beckoned innovative applied micro-placemaking. The commons space will inevitably overflow to consume the entirety of the workplace landscape. Headquarters where brand identity and hierarchal management planning have prevailed in planning consideration will significantly revert, the commons space will swell in scope and use. Coupled with a growing and predicted rise in transient workstyles afforded the employee, connection to one another and their community in design will be more meaningful than ever. Consideration of how best to connect through well planned zoning e.g. services that radiate outward from the micro-placemaking planned Commons space beyond the macro-placemaking planned workplace will require a new level of Placemaking connective consideration that is not segregated nor divorced from one another. As Byron mentioned earlier that the workplace enhancement should encourage employees' participation in a shared enterprise but not substitute for workers' outside ties however 21st century planning, furthermore future research, will require meaningful outside ties to fill the void of feeling disconnected. Large information technology corporations in California, have installed services and extended planning conveniences, Snohetta’s smart-city master plan for Ford’s

Research & Engineering Center in Dearborn, Michigan plans to connect buildings, employees and neighboring communities within a singular Ford convenience “ecosystem”. However, conveniences that extend an employee workday onsite or tie in proximity to the workplace will, per Byron, interfere with one’s outside ties as employee sense of autonomy is perceived to be subconsciously controlled. Per this study, the Self-Determination theory and Maslow’s hierarchy of needs must harmoniously inform priority planning. If not, Byron’s commentary will hold true despite best altruistic efforts.

5.2 Limitations of the Study

The key constant (3) variables sought per the research question and case study were: 1. Employees who work full time with the *option* to work remotely at least one day a week. 2. An existing open plan workplace landscape. 3. Access to a functioning Commons/Community space/area or dedicated areas (for employee respondent reference). Without access to an existing open plan the survey would not have been as applicable yet, a point of reference was required for the survey respondent. A closed office environment could still produce rich survey responses in the image sorting exercise which was designed to garner employee opinion of ‘ideal’ a best planning designed commons space scenario. Ideally, there would have been one commons space-for ease of reference for the respondents or visually linked by open floor access, traverse, such as a connecting stairway & ADA elevator. More than one physical space and spread out on multiple floors; the respondent(s) had to consider the “collective” areas made available to them as the “dedicated commons space” for the purposes of the survey input and opinion. Should the workplace, employee, commons space had been lacking in specific built considerations in place, that the author proposed in the (WSOC) theoretical framework, the use of the space may have been, limited

in opinion and perspective, to lunch preparation and minimal social exchange as a location for traversing through only, which may have skewed data opinion in not having a robust point of reference of what could be made available to them in a well-planned commons space to provide insight on. Granted, such may not be the instance in other corporate satellite locations, within in the same company, but was the circumstance in the single case study headquarters (HQ) location of Malvern, PA. In which case, a future limitation of the study would be to not survey multiple locations, regions made available globally.

Additionally, the survey questionnaire respondents may have rushed through the survey without carefully reading the questions being asked of them, in anticipation, a purposeful paying-attention survey question was embedded to reduce this limitation. Limitation threats to the validity of the construct to be measured could have been participant bias e.g. only gaining access to one department type vs. a community department representation yielded a less rich raw data spectrum of results to then analyze, such was not the case. A stratified sample/analysis was able to occur. Another bias may have been that the employees existing, functioning commons/community space point of reference, prejudiced their ability to provide unbiased input during the image sorting exercise, which provided meaningful feedback, opinion toward the proposed (WSOC) framework/guideline benefiting other workplaces and employees that do not have a commons space. With regard to confounding variables, as in reaching conclusions that are biased and/or premeditated, this may have occurred in the instances whereby not having enough valid data to indicate a positive correlation, linear association, between the (two) DVs Trust and Culture and the 1 (IV) Workplace Sense of Community takes place. Such was not the case. A limitation of having only one relationship of tests scores are statistically significant e.g. Trust (DV) and (WSOC) vs. Communal Culture (DV) and WSOC (IV) not yielding an outcome below an

alpha score of .05 (given alpha set at .05) such did not occur as the results were highly significant.

A limitation would be not running the measures on a larger sample size had the population density been made available post data collection. Naturally, robust numbers of employees utilizing the commons/community space during the onsite observation time affected field note taking due to lack of subjects to observe, however a varied and observed amount of diverse-use activity did take place. Additionally, employees aware of the lead researcher's presence may have left the setting, not wishing to be observed in their company commons space or interact in natural behavior; such did not occur as the lead researcher wore head buds (without sound) to indicate being fully engrossed in their task. A final limitation consideration would have been not having access to a large sample size of workplace survey respondents or technical issues with the online survey administration/release itself or not completing the survey, combined with the potential limitation that is; to truly measure for workplace sense of community, such was not the instance. That said, access to large employee populations of notable Fortune 500 companies, as a secured single case study is ideal, yet challenging to secure today due to workplace security issues and access in general. However, such sample size population access yields greater analysis results certainly when measuring for workplace sense of community especially when seeking to gain access to a population that truly represents the workplace. For example, access all areas of an organization from manufacturing to leadership as well as all satellite locations surveyed where employee opinion could be gained based on diversity and generational input. This study's highly significant findings that a workplace Commons Space has a positive effect on workplace Trust and Communal workplace culture will aid in executive decision adoption of continued research.

5.3 Research Impact Discussion Conclusion

This study has empathized and brought awareness that by providing a workplace commons space, a defined anchor, based on micro-interior architecture placemaking consideration in planning, trust and communal cultural social ergonomics of an organization will be positively affected. The importance of workplace connectivity and sense of belonging and support of such, as this comprehensive review of literature underscores that paramount consideration be actively addressed in planning with merit and a compassionate lens in tying the built environment to employee behavior. As a result, advancement in social ergonomics in the workplace that benefits both the organization and the employee through a meaningful and purposefully employee defined commons space will optimally be achieved benefitting all.

Given the near future predictions of the workplace evolving towards a touchdown central headquarters location, it is critical that multiple employee generations have a physical space that provides ‘refuge’ in which to openly communicate and engage. Furthermore, given near future predictions of the workplace open plan, representing ‘prospect’ square footage, is not retreating in specification, it is therefore paramount planners design for a Sense of Community. As workplaces continue to design for open spaces and have more employees working off site than on, blending the built environment, neighborhood, with communal employee needs is a critical initiative for the mental connectedness of the employee with others they engage with. Building Community written by John W. Gardner, comments that where community exists, it confers on its members identity, a sense of belonging and a measure of security. Furthermore, Gardner mentions that Communities are the ground level generators and preservers of values and ethical systems. But for some time now we have been witnessing the disintegration of

communities-and our sense of community. Mick remarks on few existing substantive studies on the built environment. “There seems to be a general consensus among industry experts that the structure of a building and its interior play a big role influencing behavior….Human behavior is a function of the actions and attitudes of people within the environment….until now, relatively few studies have been conducted on the psychological implications of architecture” (Mick, 2018, para. 2). Focusing more on attitudes and actions can be studied using a formula: Human Behavior=f (Action x Attitude) Environment-or “Human behavior is a function of the actions and attitudes of people within an environment...the “Environment” variable can then materialize through the design thinking process” (Mick, 2018).

Gagne and Deci (2016) noted that research suggests autonomous work motivation is facilitated by environments in which jobs are interesting, challenging, and allow choice and in which the work climate is autonomy supportive. Forecasting the future workplace; has anticipated the workplace landscape to become part of a bigger community space, not a hermetically sealed box. Furthermore, such built environments will encourage spontaneous and serendipitous encounters-perhaps in spatial design, however as noted by Myerson also in the design consideration of amenities and hospitality.

Myerson and fellow industry colleagues commented in 2018, that the workplace will become more than a legacy office, the workplace landscape will become a connective destination. Myerson added “It’s not a place where you have to go; it’s a place where you want to go” (Myerson, 2018).

Pogosyan (2017) described social connection to “” stepping up on a platform and feeling like you are fully supported” (Pogosyan, 2017). Of significant mention is the advancement in Neuroscience research that states human beings are wired to feel pain when

bereft of social connection. The same can be said in evolution, as humans have been wired to feel pain when deprived of basic needs such as food, water and shelter. (Pogosyan, 2017). Additionally, we now know that brain-to-brain synchrony is neural marker for dynamic social interactions, in shared attention mechanisms (Healy, 2017), which can be applied to colleagues that engage in the workplace, thereby advancing communal cultural social ergonomics.

In *Becoming Human* by Michael Tomasello, identifies distinct and significant pathways that differentiate from primates such that when combined create the healthy identity of a child leading to adulthood, those being: communication, cooperative thinking and planning, social collaboration, cultural learning, social cognition, and the internalization of cultural norms, and the establishment of moral identity and enhanced "executive functioning." Tomasello argues, the maturation of humans evolved the ability to form socio-cultural interaction into uniquely human cognition and sociality. (Tomasello, 2019). Per the case study findings, the population of employees assumed to be least affected by the need to connect or socialize with fellow colleagues where departments that did indeed seek out the use of the space the most e.g. IT and Finance and which underscores the positive impact a commons space has in the workplace supporting a diverse-use population. That said, sensitivity to environment planning in lighting and acoustics may be the respite employees are seeking as well away from their open plan areas for introverted personality types across all departments.

For "Life without community has produced, for many, a lifestyle consisting mainly of a home-to-work-and-back-again shuttle. Social well-being and psychological health depend upon community" (Oldenburg, 1989). George Nelson espoused that Design is a response to social change. Without the consideration of the fundamental importance of a

workplace community commons space, connection to others verbally or in proximity of others, would be compromised.

It is important to keep in mind that successful "communities" happen organically, as trust is built, cultures are strengthened and flourish. As such, implementing the WSOC theoretical planning framework, requires in tandem, the mindful consideration of benefiting all employees. "Design is no longer just about creating beautiful things. It's about creating experiences that connect people to the places where they live, work, and play. This unwavering focus on the human experience is what sets us apart" (Martin, 2019).

5.4 Epilogue

The body of work researched and presented coincidentally concluded in the spring of 2020, at an unprecedented time in international mindfulness regarding the spread of COVID-19. The dialog around Sense of Community, the workplace commons space as a third space, is timely and extremely relevant. We know that humans are inherently social animals, and as such research suggests that the age of digitization is resulting in people feeling more isolated, with loneliness currently affecting one-fifth of the U.S. population. The COVID-19 pandemic has exponentially risen the levels of loneliness to unprecedented numbers.

The research in this paper advocates for the advancement of workplace cultural social ergonomics, the opposite of social distancing put in place during COVID-19. Yet, society is a community coming together in common experiences that can connect us. Sharing in relatedness brings out humanitarian good such as checking in on a neighbor by phone or online, all forms of exhibiting compassion for others. More prominent than ever, the kitchen as a critical hub in importance, for connectivity and support. It is the sense of

community that has been exhibited time and time again even at times of great duress such as post 9/11 and post 2008. The 2008 recession ignited the need for coworking and face-to-face connection; and the origin thereof has been discussed in this paper.

In a recent publication by Jamil Zaki entitled The War for Kindness: Building Empathy in a Fractured World, Zaki speaks about how behaviors such as empathy and kindness during these times can assist in allowing those remote in isolation due to quarantine gain a sense of control as it helps them to cope as a community. Additionally, COVID-19 has resulted in a social media uptick in personal conveyance of anxiety and depressive thoughts. Change is experienced by the body as a threat, it is against human nature to accept change at onset, especially as COVID impacted vast populations across the globe, humans inherently resist change.

In the Journal of Personality and Social Psychology (2018) University of Mannheim researchers studied real-life implications of the "Beautiful Mess Effect" which is evident and prevalent during the COVID-19 outbreak. Many social media channels collectively validate those that have exposed personal negative feelings and such vulnerability. Owning one's failures, while remotely, yielded significant virtual community "likes". Openness in shared experiences aids in online connectedness and underscores how providing a virtual sense of community is key in sustaining mental health wellbeing. In the same month as this dissertation was submitted, April 2020, Gensler's research and Insight group industry wrote of the importance around" Bringing community to the open office; This concept of community is helpful to keep in mind as we begin to imagine what it will be like to re-occupy the workplace following this pandemic." This study, *four years in the process*, addresses the ask of industry, in a pinpoint forecasted, delivered empathetic solution.

Based on COVID-19-like future mandated isolation, where sense of community could benefit workplace employees, the following, ***as a fifth Research area put forth*** **would be:** Pandemics affect society, relatedness in shared experience. Interestingly, prior to COVID-19 and in the review of literature, the comment expressed that many corporations that once supported and even encouraged telecommuting were beginning to pull back. As the viral concern wanes, and the remote isolation that individuals all over the globe have been asked to quarantine under lifts, the direct relevance on the benefits of "connectedness" will ebb from virtual to physical, back in the workplace. Until such occurs, within the workplace, work team leaders can arrange and support virtual team video-participation supporting local and global team connectedness-interaction, as can human resources through online mental health outreach, such as in meetings or e-learning supportive extended learning on related situational topics.

According to the Vice President of Brand experience and Workplace Innovation, Gale Moutrey of Steelcase; "it's not unusual for people to become frustrated and feel strained physically, cognitively and emotionally. If organizations want remote teams to collaborate effectively and drive innovation, they will need to improve the experiences so people can remain engaged and productive." Rather than asking the employee rhetorical questions such as what the corporation could or should be doing given the circumstances, corporation management must make every effort to lead meetings with thoughtful, pre-planned, community building initiatives in mind prior to the start of meetings such as: updates and team engagement opportunities. Additionally, team leaders must be mindful and respectful of introverted employees' personalities, as video conferencing may heighten anxiety, in which case, the video chat may be utilized at the beginning and end of meetings verses required participation throughout. If sensitivity, empathy, and mindful interactions in

virtual conferencing are utilized, employees will feel supported despite the remote online forum further offsetting mental decline, leading to under performance in job productivity.

Post returning to the workplace, team leaders anticipating and providing for a commons space, a third space, given social distancing no longer required, where overall company culture is again reestablished, supporting workplace cultural social ergonomics will be greatly needed. Team leaders that are mindful of the impact of the employee returning from state-wide mandatory isolation then returning to face an open-plan environment where visual awareness of empty desks fellow colleagues and coworkers may be a harsh reality due to subsequent layoffs which may add additional mental anguish. The open-plan, post 2008, once established for less cost invested and visual convenience aiding in collaboration will conversely manifest into a visual reminder of the abrupt pandemic disruption. This will require a respite, transition, space for employees to cope and convene, alongside returning colleagues. While the body of research did not measure for employees in the workplace with ADD, ADHD or the Autism Spectrum Disorder (ASD), the commons space may provide solace to those trying to cope upon returning to work as well.

The commons space will act as a compassionate remedy, a micro placemaking community-neighborhood. Such may be in the original workplace-space, prior to COVID-19 or a pop-up tertiary third place, a built-out hybrid workplace solution, post remote working protocol. Per this research, a commons space would be sought to offset COVID-19, workplace disruption. To empathetically permit employees, who seek the commons space, to regain the normalcy of work-life in a forgiving, less exposed setting such as the open plan, that best supports individual autonomy in mental wellness rehabilitation of adjustment for employees and teams alike will be a needed respite. Furthermore, if not anticipated and provided, whereby the continuation of remote, isolated, established work is favored as a

long-term workstyle post COVID-19; communal cultural social ergonomics and organizational trust will be negatively impacted. Until the re-establishment of one's work routine, colleague relationships and chart of work, the workplace commons space will be a valued in-place physical nexus advocate.

APPENDICIES

APPENDICES

Appendix A: Protocol Checklist Form

Custom Designed form: Commons/Community Space/Area, Behavior of Employee Use/Observation checklist. *Note: No portion or portion(s)of the instruments/tools may be used and/or reproduced without the expressed permission of the author.*

Custom Designed: Commons/Community Space/Area
Behavior of Employee Use/Commons Space/Area/Observation/Protocol Checklist Form

Lead Researcher: Deirdre M. Cimino, Ph.D. Candidate, Michigan State University |
Case Study Corporation Name: ________________________________
Case Study Address: ________________________________
Date of Observation: ________________________________
Start Time: ________________________________
End Time: ________________________________

Estimated Age Range of employees in the Commons/Community Space/Area:
Young Adult (18-25 years) ________________ **Adult (25-64 years)** ________________ **Senior (65+)** ________________

Upon Entry/Purpose of use:

1. Does the employee **appear to be confused as they enter the space (e.g. not the area they were looking for-wayfinding confusion)?**
(F) ☐☐☐
(M) ☐☐☐

2. Does an employee enter the space for the **purpose of showing off the space to others?**
(F) ☐☐☐
(M) ☐☐☐

3. Did the employee **arrive with a group?**
(F) ☐☐☐
(M) ☐☐☐

4. Does the employee utilize the **space for exercise?**
(F) ☐☐☐
(M) ☐☐☐

5. Did the employee **use the space for a social gathering with others?**
(F) ☐☐☐
(M) ☐☐☐

6. Did the employee utilize the space for a **one on one meeting?**
(F) ☐☐☐
(M) ☐☐☐

7. Did the employee **utilize the space for isolated use/them self?**
(F) ☐☐☐
(M) ☐☐☐

8. Did the employee **look up at any time to a friend and/or acquaintance who greeted them?**
(F) ☐☐☐
(M) ☐☐☐

Use of physical Built-Environment/Proximity/Use:

9. Did the employee **prefer to sit next to a window?**
(F) □□□
(M) □□□

10. Did the employee **seek out enclosed seating (e.g. alcove/banquette)?**
(F) □□□
(M) □□□

11. Did the employee **walk past the commons area to access the outdoors in proximity**
(F) □□□
(M) □□□

12. Did the employee **operate and/or open windows for fresh air?**
(F) □□□
(M) □□□

13. Does the employee at any **time adjust for the sunlight?**
(F) □□□
(M) □□□

Snack/Preparation/Use:

14. Did the employee **move towards the beverage counter first?**
(F) □□□
(M) □□□

15. Did the employee **bring their own beverage and/or snack to the area to then eat/drink?**
(F) □□□
(M) □□□

16. Did the employee **access the space for fresh running water?**
(F) □□□
(M) □□□

17. Does the employee at **any time prepare a snack or beverage?**
(F) □□□
(M) □□□

Isolated/Respite use:

25. Did the employee **put earbuds and/or headphones on?**
(F) □□□
(M) □□□

26. Does the employee **appear to meditate and/or close their eyes for a period of time (e.g. short rest/nap)?**
(F) □□□
(M) □□□

Additional Commons space/area observation notations:

27. Is the employee **handicap, in a wheelchair, utilizing surface that is surface ADA accessible?**
(F) □□□
(M) □□□

During time in the Commons Space/Area:

19.Did the employee's tone/pitch become louder in a relaxed setting of the commons area? **Yes☐ No☐**

20.Did the employee operate and/or open windows for fresh air? **Yes☐ No☐**

21.Did the employee adjust outside media (e.g. flatscreen(s), entertainment and/or news)? **Yes☐ No☐**

22.Did the employee check their phone often? **Yes☐ No☐**

23.Did the employee look up at any time to a friend and/or acquaintance who greeted them? **Yes☐ No☐**

24.Does the employee at any time adjust for the sunlight? **Yes☐ No☐**

25.Does the employee at any time prepare a snack or beverage? **Yes☐ No☐**

26.Does the employee utilize the space for exercise? **Yes☐ No☐**

27.Does the employee appear to meditate and/or close their eyes for a period of time (e.g. short rest/nap)? **Yes☐ No☐**

28. Did the employee change their seating during their time in the Commons Space/Area? **Yes☐ No☐**

Additional observations:

29.Does there appear to be a variety of seating that allows the employees to configure at will? **Yes☐ No☐**

30. Is the employee handicap, in a wheelchair, utilizing surface that is surface ADA accessible? **Yes☐ No☐**

Approximate time spent in the Commons Space/Area: 10 minutes or **Less☐** 10 minutes or **More ☐**

Additional Commons space/area observation notations: (Regarding # _____)

Appendix B: IRB Approved Community/Commons-Employee Image Preference Sorting Exercise

Sample of the twenty images shown to case-study employees one on one.

Image Sorting: Employee Preference Feedback Form:
Preference of (A) Dedicated Commons Space/Area attribute(s)/Features.

Lead Researcher: Deirdre M. Cimino, Ph.D. Candidate, MSU
Case Study Corporation Name: Saint-Gobain/CertainTeed Corporation
Case Study Address: 20 Moores Rd, Malvern, PA 19355
Date of Observation: October 4th, 2019
Start Time:1 PM
End Time: 4 PM

Noted: Employee Department/represented: _____

Participant: **Male☐** **Female☐** **Other☐**

Age Range:
Young Adult (18-25 years) ☐ **Adult (26-64 years) ☐** **Adult (65+) ☐**

What is the **Most Important** Commons Space/Area **feature, consideration** in your opinion?
(Simply **write in the corresponding feature image #** in the box)

MOST IMPORTANT #S

What is the **Least Important** Commons Space/Area **feature, consideration** in your opinion?
(Simply **write in the corresponding feature image #** in the box)

LEAST IMPORTANT #S

Qualitative/Open-ended Question:

Q1. **What feature** in a workplace dedicated commons/community space/area would you like to see **that has not been represented?**

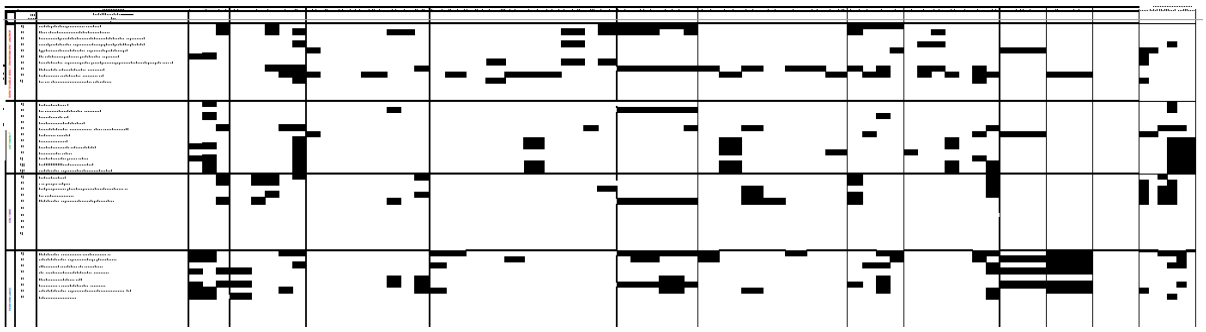
Your Feedback: _____

Q2. How important is **having an employee dedicated community/commons space, in the workplace to you**? (please circle your response)

1=**Not** at all important, 2=**Somewhat** important, 3=**No difference**, 4=**Very** important, 5= **Extremely** important

Appendix C: Survey Excel Spreadsheet

Expanded view of the twelve capture/grounded Theory/Principles: infused into seventy-three custom designed survey questions for added validity (illustrated below: sampling). Theories (rows across top) Questions (applied in column view) an up-close view-below of the first top left section the SDT theory.



WSOC Survey :				Self Determination Theory (SDT)		
	Question	Measure	SURVEY QUESTION	Competence	Autonomy	Relatedness
		CAT	Gender:F/M/ Identify as other Write in_____			
		NOMINAL	Age			
SENSE OF BELONGING/COMMUNITY	S2		What reason(s) do you go into your workplace (company office)?	■		
	S3		When you go into your workplace (company office) do you seek out a particular space to re-connect with co-workers/work at?			■
	S4		I connect best, with others, in a workplace area that has:	■		■
	S5		Where do you feel the common social space is best located?			
	S6		I enjoy being with co-workers in a social setting at work.			■
	S7		Do you perceive yourself as an extrovert?			■
	S8		I can engage in collaboration more freely in the dedicated community space/area.			■
	S9		My workplace provides a sense of community.			■
	S10		I can freely socialize in the dedicated community space/area with co-workers.		■	
	S11		Being a member of my workplace makes me feel good.			■
	S12		I feel I can be myself at work.	■	■	
	S13		How many times in a given month do you bring in food to share with coworkers in the dedicated community space/area?			
	S1		How do you define Sense of Community?			■

Appendix D: IRB Approved, Custom Designed Workplace Sense of Community (WSOC) Survey

Administered online through Survey Monkey with: Example of General Code book ranking scale entered into SPSS. 73 questions.

Note: No portion or portion(s)of the instruments/tools may be used and/or reproduced without the expressed permission of the author.

MICHIGAN STATE
UNIVERSITY

Advancing Employee Social Ergonomics though a Sense of Community in the Workplace.

As the lead researcher and local Ph.D. Candidate within the School of Planning, Design and Construction at Michigan State University, I am conducting research on: ***Workplace Sense of Community***.

This survey is designed to solicit your confidential input on your company's culture, personal autonomy, collaborative communication channels and day-to-day working environment.

Your honest answers are appreciated. *The survey questionnaire is fully anonymous*, and your individual responses will not be identified.

Your participation is requested in an online survey that should take *less than 45 minutes to complete*.

The survey will be used for data analysis purposes only and will be kept entirely confidential. Participation in this survey should be an enjoyable experience and your participation in this study may contribute to: how best to design and plan corporate ***Common Social Areas/Spaces***.

Your participation in this study is voluntary. You are free to answer any question or stop participating at any time. Completing the survey will provide the most meaningful outcome.
You will receive a gift card for $5.00 for your willingness and participation.

If you have questions about this study, please contact me, the researcher, Deirdre Cimino at: Ciminode@msu.edu, 610-357-7884

If you have questions or concerns about your role and rights as a research participant you may contact, Michigan State University's Human Research Protection Program at 517-355-2180, Fax 517-432-4503, or e-mail irb@msu.edu or regular mail at 4000 Collins Rd, Suite 136, Lansing, MI 48910.

Thank you for considering taking part in this important study.
Sincerely,
Deirdre M. Cimino
Ph.D. Candidate, Michigan State University

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Saint-Gobain/CertainTeed Corporation Employee:
Please take a moment to check the following:

By checking "I agree to participate" below, I confirm that I have read this form and agree to participate.

☐ I agree to participate

☐ I decline

Pre-survey instructions: Overview to Saint Gobain-CertainTeed employees:

Thank You for taking the time to respond to this survey/questionnaire.

The survey is measuring *Workplace Sense of Community*, **(a dedicated community space/area is one where you can feely socialize, gather, work away from an assigned or non-assigned work desk area such as:**

The outer Commons area*, outside the main company cafeteria* (when the yellow doors are closed)
The company outdoor patio area
The first floor Coffee Shop (Starbucks)

Your floor's Main Pantry

Your floor's Satellite Pantry

(Please note: For the purposes of this survey these areas will be referenced as "**Dedicated Community Space/Area**")

Your anonymous input will best inform future corporate workplace planners, worldwide, on how to design and plan for an employee Commons space/area in the built environment of the workplace. The survey is comprised into sections that range from the physical built space/use to basic demographic input. Your responses will help with valuable research to make a positive difference in corporate/workplace planning-worldwide.

1.00 = "Strongly agree"
2.00 = "Agree"
3.00 = "Neither agree nor disagree"
4.00 = "Disagree"
5.00 = "Strongly disagree"

1.00 = "Extremely important"
2.00 = "Very important"
3.00 = "Somewhat important"
4.00 = "Not so important"
5.00 = "Not at all important"

B1. Excluding lunch hours: In your building, where do you go to grab a snack, socialize,
team collaborate or work (privately) other than your assigned workstation? (Check all that apply) Categorical (nominal=names)

Code each response for: 1= Yes checked 0 Zero=Not checked

☐ My floor's Satellite Pantry area
☐ My floor's Main Pantry common community/social area/break area
☐ The Coffee Shop/Starbucks (outside the cafeteria on the first floor)
☐ The Company Cafeteria-Outer commons open space/area
☐ A different floor to socialize with colleagues
☐ Outside of work
☐ Other, write-in_____

B2. In the dedicated community space/areas: What refreshments are available to you throughout the workday? (Please check all that apply) **Categorical (nominal=names)**

Code each response for: 1= Yes checked 0 Zero=Not checked

☐ Hot beverages
☐ Cold beverages
☐ Smoothies
☐ Freshly made meals to order
☐ Health minded snacks
☐ Candy
☐ Other, write-in **STRING**_____

B3. Approximately how far is your workstation from the nearest dedicated community space/area?

Ordinal (ordered progression of value responses)

1☐ **0-9 feet**
2☐ **10-20 feet**
3☐ **21-30 feet**
4☐ **31-40 feet**
5☐ **more than 50 feet**
6☐ **"-"**

B4. What time of day do you utilize a dedicated community space/area? (check all that apply) Categorical (nominal=names)

Code each response for: 1= Yes checked 0 Zero=Not checked

- ☐ Before I start work
- ☐ In-between meetings
- ☐ Before lunch
- ☐ During lunch
- ☐ After lunch and before the end of my workday
- ☐ After my workday ends
- ☐ All day
- ☐ Not at all

B5. How many hours a day do you spend WORKING in a dedicated community space/area? Ordinal (ordered progression of value responses)

1☐ Less than 1 hour a day

2☐ More than 2 hours a day

B6. How many times a day do you SOCIALIZE in a dedicated community space/area? Ordinal (ordered progression of value responses)

1 ☐ less than 1 hour a day

2 ☐ more than 2 hours a day

B7. What do you like the *most* about the dedicated community space/areas?

Ranking/Ordinal (ordered-progression of value responses)

- ☐ The ability to socialize/connect with others
- ☐ The flexibility to work in a relaxed atmosphere
- ☐ Variety of food/beverage choices
- ☐ Ability to work in an area other than in my assigned workspace
- ☐ Ability to comfortably speak/meet with my manager.
- ☐ Being outside on the patio on a nice day
- ☐ Being able to meet with my team

☐ Other (write-in) **STRING**_____

B8. I would use a dedicated community space/area more if? (Please check all that apply)
Categorical (nominal=names) Code each response for: 1= Yes checked 0 Zero=Not checked (Blue employee feedback added post Image sorting exercise)

- ☐ It was closer to my main workstation/desk
- ☐ I had a Feeling of being less exposed such as seated in a booth/alcove seating
- ☐ If there were more outlets/charging stations
- ☐ If there were a quiet area to rest/nap-nap pods
- ☐ If there were docking stations/large screens to work
- ☐ If there were a private room within the space/area to make personal/private meetings calls/or Mother's space
- ☐ Separate Childcare facility within walking distance to the community space/area
- ☐ Massage chairs
- ☐ Lighting that imitates natural sunlight
- ☐ Excellent variety of beverages, caffeinated and non-caffeinated
- ☐ Ability to prepare ones' food, cooking equipment storage
- ☐ if there was more comfortable seating
- ☐ There was more seating for group/ team meetings
- ☐ Water features

- ☐ Other (write-in) **STRING** _____

B9. My company makes an effort to create a comfortable workplace

(ordered progression of value responses)

- 5 ☐ Strongly Disagree
- 4 ☐ Disagree
- 3 ☐ Neutral
- 2 ☐ Agree
- 1 ☐ Strongly Agree

A1. How do you define Autonomy? (please write-in NA if you do not know)
Write-in: _____

STRING VARIABLE

A2. How important is it to *you* to have a dedicated community space/area? Likert-**Ordinal (ordered-progression of value responses)**

5☐ Not important
4☐ Somewhat important
3☐ Not applicable
2☐ Very important
1☐ Extremely important

A3. I work remotely at least 1 day a week. Categorical (nominal=names)

__1___ Yes, **__0__**No **(Dichotomous) Categorical (nominal=names)**

A4. Do you have an assigned seat/desk/workstation?
_1__ Yes**__0_**No **(Dichotomous)**

If "Yes", to what extent are you allowed to personalize your workspace? (Please check all that apply) **Categorical (nominal=names) Code each response for: 1= Yes checked 0 Zero=Not checked**

For each response code: 1=Yes (checked) 0=No (<u>not</u> checked/left blank)

1☐ No personalization possible
2☐ Minimal mixed personal items
3☐ Family related images only
4☐ Personal & office related recognition of achievement
5☐ There is no limit
6☐ Not sure of company policy

If "No", When you use a shared workstation, is it always clean and ready to use?
__1___ Yes, **__0__**No **(Dichotomous) Categorical (nominal=names)**

A5. Do you feel the dedicated community space/area accommodates employees with disabilities?

___1__ Yes, **__0__**No **Categorical (nominal=names)**

If "No", How can it be improved?
(write-in-**STRING**_____

A6. My workstation proximity to co-workers is? (select one) Categorical (nominal=names)

1☐ Too close
2☐ Close
3☐ Just the right distance
4☐ Far apart
5☐ Too far apart

A7. Is having access to natural sunlight important to you? (Dichotomous) Categorical (nominal=names)

☐ Yes =1
☐ No =0

A8. I have the ability to control sunlight at my workstation. (e.g. shades, blinds) Categorical (nominal=names)

☐ Yes =1
☐ No =0
☐ Not applicable =3

A9. I have access to fresh air at my workstation. (e.g. operable window or door) (Dichotomous) Categorical (nominal=names)

☐ Yes =1
☐ No =2

A10. I have the ability to control the temperature at my workstation.

(Dichotomous) Categorical (nominal=names)

☐ Yes =1
☐ No =2

A11. In the dedicated COMMUNITY SPACE/AREAS (that are available to you) do you have a view to the outdoors? Categorical (nominal=names)

☐ Yes =1
☐ No =0

C1. How do you define Workplace Culture? (please write-in NA if you do not know)
Write-in: _____

STRING VARIABLE

C2. I feel that I am an important part of my workplace culture. Likert-**Ordinal (ordered-progression of value responses)**

5 ☐ Strongly Disagree
4 ☐ Disagree
3 ☐ Neutral
2 ☐ Agree
1 ☐ Strongly Agree

C3. My company places a lot of emphasis on having a culturally diverse work environment. Likert-**Ordinal (ordered-progression of value responses)**

5☐ Strongly Disagree
4☐ Disagree
3☐ Neutral
2☐ Agree
1☐ Strongly Agree

C4. My company has a strong sense of workplace culture. Likert-**Ordinal (ordered-progression of value responses)**

5☐ Strongly Disagree
4☐ Disagree
3☐ Neutral
2☐ Agree
1☐ Strongly Agree

C5. The dedicated community space/areas are where co-workers gather for celebrations (e.g. birthday parties, team events) Likert-**Ordinal (ordered-progression of value responses)**

5☐ Strongly Disagree
4☐ Disagree

3☐ Neutral
2☐ Agree
1☐ Strongly Agree

P1. The dedicated community space/areas allow me to work in a less stressful environment. Likert-**Ordinal (ordered-progression of value responses)**

5☐ Strongly Disagree
4☐ Disagree
3☐ Neutral
2☐ Agree
1☐ Strongly Agree

P2. I seek out the dedicated community space/areas to change my physical work location. Categorical (nominal=names)

1☐ I do not leave my workstation/desk
2☐ 1 time a day
3☐ 2 times a day
4☐ 3 times a day
5☐ more than 3 times a day

P3. I feel less productive around my open-desk workstation due to distractions.
Likert-**Ordinal (ordered-progression of value responses)**

5☐ Strongly Disagree
4☐ Disagree
3☐ Neutral
2☐ Agree
1☐ Strongly Agree

P4. I find I am more productive while working in a dedicated community space/area.

Likert-**Ordinal (ordered-progression of value responses)**

5☐ Strongly Disagree
4☐ Disagree
3☐ Neutral
2☐ Agree

1☐ Strongly Agree

P5. Do you speak with your management in the dedicated community space/area? (Please check all that apply) **Categorical (nominal=names) Code each response for: 1= Yes checked 0 Zero=Not checked**

☐ Via online/Skype/emails/messaging

☐ In private meeting rooms

☐ At my team lead's desk/workstation

☐ In a dedicated community space/area

P6. I feel I have more effective informal meetings in a-dedicated community space/area than at my open desk area. Categorical (nominal=names)

5☐ Strongly Disagree
4☐ Disagree
3☐ Neutral
2☐ Agree
1☐ Strongly Agree

P7. I seek out a dedicated community space/area to have confidential conversations away from my desk. Categorical (nominal=names)

5☐ Strongly Disagree
4☐ Disagree
3☐ Neutral
2☐ Agree
1☐ Strongly Agree

P8. My job encourages creativity/innovation. Categorical (nominal=names)

5☐ Strongly Disagree
4☐ Disagree
3☐ Neither agree nor disagree
2☐ Agree
1☐ Strongly Agree

S1. How do you define Sense of Community? (please write-in NA if you do not know)

Write-in: _____

STRING VARIABLE

S2. What reason(s) do you go into your workplace (company office)? Check all that apply

Categorical (nominal=names) Code each response for: 1= Yes checked 0 Zero=Not checked

☐ I work remotely, full time, and do not go into the workplace.
☐ To connect/socialize with co-workers
☐ Required onsite meetings
☐ I like my workplace environment
☐ I am required to be at the office.

☐ Other, write-in **STRING**_____

S3. When you arrive at the office what type of space do you seek to reconnect with colleagues? Categorical (nominal=names)

☐ the open work area at an unassigned desk.
☐ A dedicated community space/area
☐ A private conference/meeting room
☐ Assigned desk

☐ Other, write-in_____

S4. I connect best with others in a dedicated community space/ area that: (Please check all that apply) Categorical (nominal=names) Code each response for: 1= Yes checked 0 Zero=Not checked

☐ offers a variety of beverages/snacks
☐ has both high and low ceilings
☐ that is secluded alcove (booth) seating, but in a social area
☐ has natural views
☐ has a lowered ceiling, not overly exposed
☐ offers a gaming area

☐ offers media on a television
☐ has background music
☐ offers privacy space within to have a conversation
☐ has lighting that mimics natural sunlight

☐ Other (write-in**)** **_____(STRING)**

S5. I enjoy being with co-workers in a social setting at work.

Likert-**Ordinal (ordered-progression of value responses)**

5☐ Strongly Disagree
4☐ Disagree
3☐ Neutral
2☐ Agree
1☐ Strongly Agree

S6. I consider myself an extrovert.

Likert-**Ordinal (ordered-progression of value responses)**

5☐ Strongly Disagree
4☐ Disagree
3☐ Neutral
2☐ Agree
1☐ Strongly Agree

S7. I can engage in collaboration more freely in ~~a~~ dedicated community space/area.

Likert-**Ordinal (ordered-progression of value responses)**

5☐ Strongly Disagree
4☐ Disagree
3☐ Neutral
2☐ Agree
1☐ Strongly Agree

S8. My company provides a sense of community.

Likert-**Ordinal (ordered-progression of value responses)**

5☐ Strongly Disagree
4☐ Disagree
3☐ Neutral
2☐ Agree
1☐ Strongly Agree

S9. I can freely socialize in a dedicated community space/area with co-workers.

Likert-**Ordinal (ordered-progression of value responses)**

5☐ Strongly Disagree
4☐ Disagree
3☐ Neutral
2☐ Agree
1☐ Strongly Agree

S10. The dedicated community spaces enhance our company culture.

Likert-**Ordinal (ordered-progression of value responses)**

5☐ Strongly Disagree
4☐ Disagree
3☐ Neutral
2☐ Agree
1☐ Strongly Agree

S11. I feel I can be myself at work.

Likert-**Ordinal (ordered-progression of value responses)**

5☐ Strongly Disagree
4☐ Disagree
3☐ Neutral
2☐ Agree
1☐ Strongly Agree

S12. How many times in a given month do you bring in food to share with coworkers in a dedicated community space/area? Interval/ordinal

4 ☐ 0 times a month
3☐ 1-2 times a month

2☐ 3-4 times a day

1☐ 5 or more times a month

R1. How much time during a workday, do you spend at another location other than your assigned workstation to work? Interval/Ordinal

1☐ 0% of my time

2☐ 1-25% of my time

3☐ 26-50% of my time

4☐ 51-75% of my time

5☐ More than 75% of my time.

R2. When you arrive at your workplace, WHY do you seek out a dedicated community space/area? Categorical (nominal=names) Code each response for: 1= Yes checked 0 Zero=Not checked

(Please check all that apply)

☐ I transition easier.

☐ I seek out a more social environment to work in

☐ I prefer to meet colleagues there first.

☐ I prefer to work in a location less open. (e.g. a booth)

☐ For beverage or snack.

☐ I do not seek out a dedicated community space/area when I arrive in the office.

☐ Other (write-in) **STRING**_____

R3. I get my best work done in a workplace area that:

(Please check all that apply) Categorical (nominal=names) Code each response for: 1= Yes checked 0 Zero=Not checked

☐ is near people I need to work with

☐ is near beverages/snacks

☐ that is secluded, but in a social area

☐ is near a water feature

☐ is near a window

☐ has a lowered ceiling, not overly exposed

☐ has a social buzz but is not decipherable.

☐ has docking stations

☐ has charging stations

☐ has a place to have private conversation meetings

☐ has moveable tables and chairs

☐ other (write-in) _____**(STRING)**

R4. Do you wear/headphones/earbuds at your workstation?

_1__ Yes, **__0_**No **(Please check all that apply) (Dichotomous)**

If "Yes", do you wear headphones/earbuds at work…**(Categorical (nominal=names) Code each response for: 1= Yes checked 0 Zero=Not checked**

☐ To remove distractions

☐ For work related purposes e.g. conference calls

☐ To let others know I do not want to be engaged in a conversation.

Other (write-in)
STRING_____

R5. Do you wear/headphones/earbuds in a dedicated community space/area?

__1_ Yes, **_0__**No **(Please check all that apply) (Dichotomous)**

…**(Categorical (nominal=names) Code each response for: 1= Yes checked 0 Zero=Not checked**

If "Yes", do you wear headphones/earbuds at work…

☐ To remove distractions

☐ For work related purposes e.g. conference calls

☐ To let others know I do not want to be engaged in a conversation.

Other (write-in) **STRING**_____

R6. What is your biggest open desk workstation impediment? (Please check all that apply) …**(Categorical (nominal=names) Code each response for: 1= Yes checked 0 Zero=Not checked**

☐ Too loud

☐ Artificial lighting (too dim or too bright) and/or glare

☐ Too close to coworkers
☐ Over exposed/too open
☐ The workstation panels block the visual ability to connect with others
☐ Availability
☐ too much sunlight

☐ (write-in) _____

R7. How important is the ability to move/arrange seating in a dedicated community space/area to you? Likert-**Ordinal (ordered-progression of value responses)**

5☐ Not at all important
4☐ Somewhat important
3☐ No difference to me
2☐ Very important
1☐ Extremely important

R8. How important is having a frequently used/open corridor near a dedicated community space/area to you? Likert-**Ordinal (ordered-progression of value responses)**

5☐ Not at all important
4☐ Somewhat important
3☐ No difference to me
2☐ Very important
1☐ Extremely important

R9. How important is having a form of media (e.g. television, music) on in the background to you while working in a dedicated community space/area such as a local news or sports? Likert-**Ordinal (ordered-progression of value responses)**

5☐ Not at all important
4☐ Somewhat important
3☐ No difference to me
2☐ Very important
1☐ Extremely important

R10. How important is having a dedicated community space/area outdoors?

Likert-**Ordinal (ordered-progression of value responses)**

5☐ Not at all important
4☐ Somewhat important
3☐ No difference to me
2☐ Very important
1☐ Extremely important

T1. How do you define Trust in the Workplace? (please write-in NA if you do not know)

Write-in: _____

T2. My opinion counts in my company. Likert-**Ordinal (ordered-progression of value responses)**

5☐ Strongly Disagree
4☐ Disagree
3☐ Not applicable
2☐ Agree
1☐ Strongly Agree

T3. I can trust people in my company. Likert-**Ordinal (ordered-progression of value responses)**

5☐ Strongly Disagree
4☐ Disagree
3☐ Not applicable
2☐ Agree
1☐ Strongly Agree

T4. I can trust people in my company's community space/area. Likert-**Ordinal (ordered-progression of value responses)**

5☐ Strongly Disagree
4☐ Disagree
3☐ Not applicable
2☐ Agree
1☐ Strongly Agree

D1. What is your age group? Continuous numerical **variables-** qualitative variable

Ordinal (ordered progression of value responses)

1☐ under 21
2☐ 21-30
3☐ 31-40
4☐ 41-50
5☐ 51-60
5☐ 61 plus

What department best describes where you work? (Categorical (nominal=names)

1☐ Customer Experience
2☐ Consulting
3☐ Facilities
4☐ Ceilings
5☐ Marketing
6☐ Supply Chain
7☐ Human Resources
8☐ L.G. Logistics
9☐ Total Rewards
10☐ Legal
11☐ IT-Information Technology
12☐ Insulation
13☐ Gypsum
14☐ Credit Services
15☐ Customer Service
16☐ Executive leadership Level
17☐ Quality
18☐ Finance
.00☐ Other (write-in) **STRING**_____

D3. How Long have you been working in this present office location? Ordinal (ordered progression of value responses)

1☐ 0-6 months
2☐ 7 months to 1 year
3☐ More than one year

D4. Your ethnicity is? (Categorical (nominal=names)

1☐ American Indian or Alaskan Native
2☐ Asian or Pacific Islander
3☐ Black or African American
4☐ Hispanic or Latino
5☐ White / Caucasian
6☐ Prefer not to answer

D5. How do you identify your gender as? (Categorical (nominal=names) qualitative variable

1 ☐ Female
2 ☐ Male
3 ☐ Other

D6. Are you disabled? (this is helpful to know so that all Commons spaces plan for compliance) (Categorical (nominal=names)

1☐ Yes
0☐ No

D7. Please us the space below for additional comments or suggestions: Your feedback is anonymous. Your comments will be collected and edited to protect your identity. OPEN-ENDED (STRING)

_____
_____
_____
_____

END OF SURVEY----------

CURRICULUM VITAE

Dr. Deirdre M. Cimino, Ph.D., holds appellation and affiliations with: NCIDQ#10705, LEED GA, ASID, IIDA, EDRA and is an IDEC Associate. Deirdre is an accomplished designer, educator, and advocate of higher education design students, holding degrees from top nationally recognized C.I.D.A. recognized programs during her academic pursuit. Obtaining an Associate's Degree in Interior Design from the Fashion Institute of Technology, Manhattan, New York, Deirdre then graduated early, while working full time as a designer for a top 100 New York architecture giant while maintaining a student status in Massachusetts where Deirdre completed a Bachelor of Fine Arts in Interior Design with a minor in Art History from the University of Massachusetts at Amherst, MA. In 2012.

Deirdre received a Master of Science degree in Interior Architecture + Design from Drexel University, Philadelphia, PA. and was recognized as the Thesis Faculty Award Recipient for "outstanding, innovative and creative work" based on: Recent-Past-Architecture on outer Cape Cod, MA, a convergence of Modernist theory and adaption. The thesis work investigated the New England vernacular style of architecture compared to early mid-century modernist summer structures built by original Bauhaus founders and colleagues that dotted the sandy pine dunes. A proposed, expansive, and novel historic preservation satellite campus site, for Harvard's Graduate School of Design (GSD) to be located at the Salt Pond National Visitor's Center on Cape Cod was presented. Fostering a sense of community with local faculty and graduate students who are advocates of modernist recognition and preservation. Both Deirdre's graduate degrees focused on community.

Deirdre has a career in design that has included acting design lead for notable architectural firms, principal of her own incorporated design firm, founder of a 501c3 nonprofit, Design and Learning Application Strategist for Herman Miller, Inc. while

remaining a dedicated advocate inspiring, teaching and informing on all aspects of interior architecture with over twenty-two consecutive years in higher education as an adjunct professor. Deirdre has mentored numerous students during their undergraduate and graduate thesis work and has consistently given back to the design community volunteering and serving on boards such as ASID and assuming roles such as President-Elect of the Pennsylvania Each Chapter of ASID 2019, 2020.

Dr. Cimino is an innovator and inventor of a U.S. Patent, additionally having held three registered trademarks, an avid interior architecture design industry blogger who has written and illustrated a children's book for charity along with the donation of numerous creative works: her original paintings.

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