Creativity, Work and the Physical Environment

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A new century is a pivot point for visionary new ideas, and within that context, the role of creativity in business has been a topic of growing interest and debate. In his 2001 book The Art of Innovation, Tom Kelley, general manager of IDEO, proposed that innovation was on its way to becoming a centerpiece of corporate strategies and initiatives.

He also debunked the myth that companies need "creative geniuses" to become more innovative and competitive. Instead, said Kelley, teamwork is a route to tapping into everyone's creativity and making innovation a way of life for any business. A year later, in The Rise of the Creative Class, Richard Florida took an even more radical approach when he predicted that creativity would become a fundamental economic driver and soon determine how the workplace is organized, which companies would prosper or disappear, even which cities would thrive or decline.

Such ideas were easily dismissed at the time as interesting but largely irrelevant. Instead of focusing on their organization's creative output, most business leaders were obsessed with near-term goals such as productivity, efficiency, cost-cutting and reducing waste. Although ahead of their time, Kelley, Florida and other leading voices successfully reframed how we now think about creativity — not as an inherent gift of a few, but as a fundamentally human talent: something we all share.

Inspired by these thought leaders and our close collaborations with IDEO, the IIT Institute of Design and the Stanford d.school, Steelcase has explored behaviors of creative work and ways to support it for over a decade through the integration of people, place and technology. We deeply believe that the future of work will be creative, and that this future is already well underway.

We've come to understand that creativity — the innate human ability to generate ideas, solve difficult problems and exploit new opportunities — is the fuel for innovation, now and in the years ahead. Many of today's most pressing business problems require creative thinking to solve them, and creativity is an essential ingredient for business growth. Being agile is critical in a world that is changing so rapidly it's been labeled the "Fourth Industrial Revolution" by renowned economist and author Klaus Schwab. "We stand on the brink of a technological revolution that will fundamentally alter the way we live, work and relate to one another," he states. "In its scale, scope and complexity, the transformation will be unlike anything humankind has experienced before."

More than ever, we see that supporting creativity at work by integrating place and technology is an important challenge and opportunity to create value for business and society.

Why Now?

While many underlying forces are shaping today's need for creativity in business, we have identified three fundamental drivers:

The continued rise of complexity in business and organization
The growth of technological capacity and development of powerful personal devices has escalated globalization and interconnectedness. The way work gets done in large organizations is no longer through a hierarchy where orders are cast down and deliverables are passed up through the ranks. Organizations are now complex adaptive systems, with distributed control and decision-making, connectivity between various parts, and interconnected evolution over time (Holland, 2014 and Mitchell, 2011). An effective system must always be changing based on the interactions of its elements – which for most businesses include employees, customers, competitors, offerings and the tools and technologies that support work. The ability to respond, react, make decisions and solve problems to advance the organization is enabled through individual and collective creativity that is attuned to even subtle changes in the system.

The increasing necessity of networked collaboration
The growth of interconnectedness means that the biggest problems facing businesses can no longer be solved by a single team or single function. Increasingly, they are so-called "wicked problems" — difficult to solve due to incomplete, contradictory or changing requirements. As a result of the near-constant deluge of wicked problems, we are seeing organizations integrate more design thinking processes in their operations, and design thinking is increasingly taught in business schools (Brown, 2009) and more matrixed organizations are emerging to encourage cross-functional collaboration (Gallup, 2017).

The people that can best cope with the pressures of complex work are those that practice creative problem-solving in their everyday work. They routinely ask questions that take them beyond what they already know: What are some new ways of thinking about this old problem?

How might we identify new approaches to creating value given the changing ecosystem of our business? Who do we need to engage to solve this problem? How can we effectively orchestrate our collaboration?

The coming age of artificial intelligence

Among the many emerging technologies that are changing the business landscape such as the Internet of Things, nanotechnology and material science, the field of artificial intelligence is particularly influencing the need for more creative work. Advances in A.I. are progressing at a pace that is surprising even to scientists working in this domain. As it takes over more process-based and task-based work activities, dystopians predict massive waves of job loss as humans are replaced by machines (Susskind and Susskind, 2016), while more optimistic futurists predict A.I. will create more jobs than it replaces (Frank, Roeherig, and Pring, 2017). While it is difficult to predict exactly how it will play out, there is no question that A.I. will become increasingly integrated and fundamentally restructure work and jobs. Brynjolfsson and McAfee (2014) argue we are entering the "Second Machine Age" where "digital advances are doing for mental power — the ability to use our brains to understand and shape our environment — what the steam engine and its descendants did for muscle power." While creative A.I. will take some time to get out of R&D labs and into the workplace, in the next five to ten years we expect to see process-based A.I. expand in the office and knowledge work shifting to more fully leverage what are still the uniquely human skills of creativity: complex decision-making and emotional intelligence.

Why Creativity is More Crucial Than Ever

By 2020 more than one-third of the desired core skill sets of most occupations will be comprised of skills that are not yet considered crucial to the job.

61%
Leaders that don't think their company is creative*****

77%
Workers who believe creativity will be a critical job skill in the future*

65%
Kids entering school today will be doing jobs that currently don't exist***

52%
CEOs plan to hire more employees, but the skills they consider most important are those that can't be replicated by machines**

72%
Workers who believe that their own future success depends on their ability to be creative*

69%
Employees who say they are not living up to their creative potential****

* Steelcase Creativity and the Future of Work Survey, 2017,
** The Future of Work Report, World Economic Forum, 2017,
*** 20th CEO Survey, PWC, 2017, ****Adobe State of Create 2016,
***** Forrester, The Creative Dividend, 2014.

The Creative Shift

In addition to the macro drivers causing businesses to prioritize creative work, we have identified changing behaviors and expectations that reinforce the need for this evolution.

Creativity Is a Process

Seminal thinkers like Kelley and Florida prompted a shift from the belief that creativity is an action of highly gifted people, to the notion that creativity is a process in which anyone can engage. As problems become increasingly complex, creativity can no longer be viewed as purely an artistic pursuit, but rather a way of thinking and a set of new behaviors that can be applied to a wide range of issues, leading to new ways of working. In the past, work was driven by efficiency goals and was broken down into smaller segments with a high degree of specialization (Taylor, 1911). To achieve speed and eliminate redundancy, the process was intentionally linear, and ideally projects moved from one area to another in a direct progression (see diagram on opposite page). Today, complex problem-solving requires a multidisciplinary exploration of unknown territory, agility and iteration, divergent and convergent thinking. The creative work process is fluid and often messy — embracing frequent dead-ends and failures that become part of a learning cycle.

Creativity Is the New Productivity

Creativity is emerging as an important dimension of productivity. As efficiencies are optimized through more sophisticated digital technologies, gains in productivity will be driven through the ability of teams and companies to effectively solve problems and create value through collective creativity. As work becomes more challenging, there's growing recognition that people's performance is highly dependent on the quality of their physical, cognitive and emotional wellbeing at work. It's becoming clearer that a strong sense of wellbeing and purpose can optimize an individual's ability to think creatively and become more engaged.

Creativity Is an Iterative Process

Linear Work

Segmented tasks completed in a progression
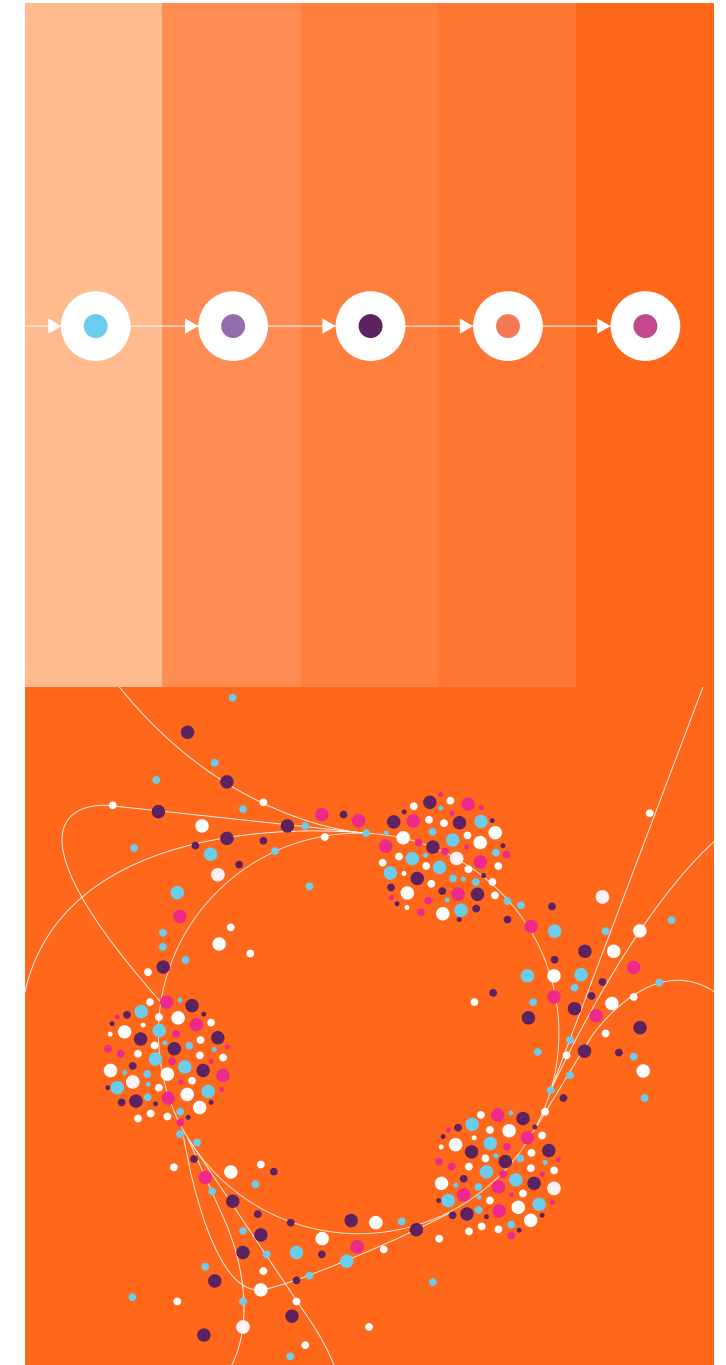
Creative Work

People and ideas diverge, converge and iterate

Seventy-two percent of people at work today believe their future success depends on their ability to be creative.

Steelcase Creativity and the Future
of Work Survey, 2017

Creativity Is Fulfilling

Second, trends indicate that the future workforce will be a cadre of makers, hackers and creative thinkers. This means businesses will need to think differently to attract and retain them. Recent Steelcase research shows that 72 percent of people at work today believe their future success depends on their ability to be creative. Millennials are already bringing stronger expectations for choice and control to the workplace, and they are placing higher value on self-expression, comfort, social connections and gaining a strong sense of purpose from their work. Looking further ahead, Gen Z is growing up in a fluid world of interconnectedness and breaking the mold on disciplinary distinctions by mashing up math and science with art — a trend we see continuing to grow as more schools are developing STEAM programs (Science, Technology, Engineering, Art and Math). They are also mastering basic skills of coding and multimedia content creation in middle school, and developing social and emotional intelligence as part of their secondary school curriculum.

Creative Thinking

Creativity is an inherent human capability and an evolutionary advantage that has set us apart from all other species. Neuroscience research has validated that creative thinking involves different areas of the entire brain.

As a result of these discoveries, we can now identify correlations between the interrelated neurological phenomena involved in creative thinking and the multi-stage models of the creative process previously created by social scientists and process designers. In her book, Your Creative Brain, Shelly Carson explains that we cycle through multiple brain modes while engaging in creative thinking:

Absorb
Broad and open attention

Envision
Visualize and imagine

Connect
Generating ideas

Stream
Improvise and flow

Reason
Rational problem-solving

Evaluate
Judging and categorizing

Social Psychologist Graham Wallas' seminal four-stage model of the creative process created in the 1920s provides a similar model: Prepare (build foundational knowledge of a domain); Incubate (allow time for ideas to germinate); Illuminate (insights emerge through gradual build-up of mini-insights); and Verify (act on ideas).

Definitions and models differ, but most researchers concur that although creativity is often exclusively associated with divergent thinking – i.e., generating many ideas or alternative solutions to a problem – it also requires convergent thinking, i.e., assessing possibilities and deciding on the best solution to execute. Design processes have been modeled on this ebb and flow for decades, and it is familiar to anyone with training in design thinking.

Scientific research has also shown strong links between creative cognition and affordances in the physical environment (Chan and Nokes-Malach, 2005; Lipnicki and Byrne, 2005). Physical surroundings, movement and posture can neurologically influence your creative capacity. Environmental cues that frame "long views" can trigger new ways of thinking: Broad vistas, high ceilings and having the ability to move through different physical perspectives can prime your brain to make new connections and see things in new ways. Exposure to nature and sunlight releases endorphins in the brain that improve your mood and diffuse your attention, supporting your ability to flow across many different ideas and imagine alternative approaches. The importance of natural views was confirmed in a recent global study we conducted involving 2,800 employees of large organizations. We learned that the top request for improving the quality of informal and casual settings in the workplace was for more views of nature and greenery, supporting their impact on emotional and cognitive wellbeing.

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Decoding Behaviors and Needs

The recent advances in neuroscience help us understand the behaviors and needs of people doing creative work. In divergent modes, creativity is primed through exposure to diverse sources of information and perspectives.

For example, teams want to seek out new inputs, talk to experts in related fields and gain awareness of developments and emerging trends in relevant topic areas. They then need to discuss and share ideas with each other. But there is also individual work in the divergent modes where people need time to reflect, think and incubate ideas. Sustained focus doesn't always lead to solutions, and creating mental and physical distance from a problem allows the brain to continue making unconscious connections, which then emerge into our consciousness through new, sudden insights. This movement between individual work and collaborative work is just as critical in the convergent modes, as individuals need time alone to imagine and explore new ideas and teams need time together to share and iterate possibilities, to collectively determine the best solution and plan for implementation.

By synthesizing the findings of scientific research with our own qualitative and quantitative research, we have gained new insights into the behaviors and needs of people who do creative work:

Creativity flourishes in an environment rich with ideas.

- Interactions between individuals, groups and content can inspire new ideas, encourage individuals to socialize their ideas and help teams constructively assess ideas together.

- When people experience emotional and physical comfort, they feel the freedom to express themselves authentically, build trust with each other and come together as a collective. Trust acts as a "social lubricant" encouraging more ideas to be shared and debated, with no one holding back.

Co-creation tools and technologies enable the process.

🔸 Every individual on a team should feel empowered to share their ideas and participate equally. A diverse set of tools, both digital and analog, can enable all voices to be heard in the mix and empower everyone to edit and author ideas.

🔸 It's important to make both individual and collective-thinking visible. Teams need to array, annotate and assemble diverse sets of content in order to look across ideas, make new connections and explore emergent relationships. This helps the group engage in flow together and energizes their ability to build a coherent solution out of disparate ideas

The rhythms of divergent/convergent thinking and collective/individual work must be supported.

🔸 Immersed in creative thinking, teams often move through the process without explicit markers to chart their journeys. Creating ambient awareness of the distinct rhythms between "Me and We" and convergent and divergent thinking can help groups move through the process more constructively.

🔸 Social rituals punctuate the journey and help teams form bonds. Informal social interactions, collective reflection and collective celebration need to be supported in a creative space as much as the more intensive moments of content creation.

🔸 Creativity requires time alone as well as time together. Intervals of physical and mental separation from a group enables individuals to connect their thoughts in new ways and allows for spontaneous insights to emerge. In later stages of the process, individual focus work is critical for building out visions and executing plans.

Making the Shift

Fostering creative behaviors in an organization requires making decisions to resolve tensions that may exist in the corporate culture. The physical environment can help reinforce the shift toward a more creative culture.

FROM	TO	
Hierarchy *Structure + decision making*	**Network** *Collaboration + problem solving*	Creativity requires collective efforts across an organization, elevating the importance of network over hierarchy. Organizations that traditionally flow work and decisions through hierarchy find it difficult to capitalize on the full potential of creativity as a key capability.
Creative Role *Assigned to specific people or teams*	**Creative Capability** *An organizational capability for all*	Employees and organizations often view creativity as a talent some individuals have or a role to be assigned to a handful of teams. Today's complex problems require that everyone in the organization develop a creative mindset.
Technology as Status *An earned luxury*	**Technology as Tool** *An essential tool for all*	Speed of change, complexity of problems, networked and distributed collaboration, rapidly evolving technology – all these factors require organizations to shift from investing in technology as a perk for leaders to recognizing it as an essential tool for all employees.
Rules-Based Culture *Top-down management*	**Culture of Empowerment** *Matrixed network + leadership*	The marketplace, employee demographics and problems companies are facing are all rapidly changing and demand that the workplace do the same to unleash the creative capabilities inherent in workers and work today. To support this demand, organizations need to let go of the rules-based culture of the past and focus on providing a culture of empowerment.

Designing for Creativity

Based on extensive prototyping of spaces, we have identified three core design principles to support creativity behaviors and needs. These principles recognize that space and technology can best support creative work when they are designed as a holistic, integrated system.

1. Create Emotional Connection

Ambient inspiration and thoughtful design elements inspire thinking and foster team culture. Providing for physical and emotional comfort though posture, proximity and meaningful design elements affirms the importance of individuals.

- Build a welcoming environment and personal connection to space with authentic design elements, artifacts and materiality that inspires.

- Design for physical and emotional comfort though posture options and comfortable proximity to other people (eye-to-eye) and content sources.

- Design spaces that encourage people to visually explore multiple solutions by experimentation and engagement with integrated technology.

- Consider posture relative to the work mode – i.e. standing height for generative meetings so people can easily flow between work surfaces and interaction with wall-integrated technology.

Creative Tensions
Creative work requires an ebb and flow between different modes of work, states of mind and perspectives. It's not about "either/or" choices but the need to balance and support both.

Group Collaboration *Exposure to diverse perspectives*	**Individual Focus** *Reflection + incubation*	When companies think of creativity, they think idea generation, brainstorming and group collaboration, often overlooking the critical role of individual focus in the creative process.
Ideas *Divergent thinking, idea generation*	**Action** *Convergent thinking, implementation and iteration*	Organizations need to break the stigma that creativity is only about visionary, ingenious, wacky ideas. Creativity is becoming a fundamental way in which individuals and organizations solve problems in order to put their creative ideas into action.
Immersion *Living and breathing the problem*	**Distance** *Mental rejuvenation + external inspiration*	The creative process requires employees to find a balance between deep immersion in a problem and moments of distance from that problem.
Optimize *Solve existing problems better*	**Evolve** *Solve complex problems in new ways*	Historically, as organizations grow they optimize their business, focusing on better ways to solve known problems. The speed of change and complexity of problems demand that employees also solve new, complex problems every day.

2. Nurture Creative Confidence

All employees should be empowered to tackle complex problems regardless of hierarchy or geography. Equal access to spaces, tools and technology encourages equal participation.

- Provide co-creation tools, such as large-scale computing devices, that allow everyone to contribute to and interact with content.

- Integrate technologies that help speed the visualization process and offer interactive ways to evaluate ideas together.

- Support making ideas visible and persistence of information by leveraging vertical planes with postable, writable surfaces adjacent to technology to guide the creative process.

- Enable privacy and control over the environment to provide a "safe haven" where new ideas can incubate.

3. Build a Fluid Ecosystem

A variety of spaces support individuals and teams as they cycle through the creative process, hosting moments of individual exploration, cognitive resting, social connection, co-creation and evaluation.

- Provide seamless connectivity between spaces to support the flow of information and experiences from tools-to-tools and space -to-space. This means cloud-based platforms for individual and team tools so spaces can be either shared or owned, and content can move with people as they transition from space to space.

- Build an ecosystem with options so people can choose where and how to work. A range of spaces and devices is necessary to support the diverse stages of creative work.

- Scale the ecosystem with separate spaces or zones for specific individual, team and organizational needs.

A Creative Spaces Ecosystem

Focus Studio
Maker Commons
Ideation Hub
Duo Studio
Respite Room

To help organizations accelerate the shift to more creative work, Steelcase and technology leader Microsoft partnered to develop an interdependent ecosystem of five environments purposefully designed for creative work.

An Ecosystem of Spaces and Devices

People need an ecosystem of interrelated places and devices to support the different stages and activities of creative work. A diverse ecosystem includes mobile and integrated technology, as well as spaces designed for individual "me" work and "we" group work.
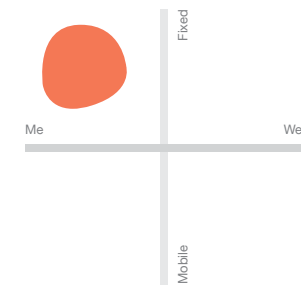
Fixed

Focus Studio

Ideation Hub

Duo Studio

Me — We

Places

Maker Commons

Respite Room

Mobile **Technology**
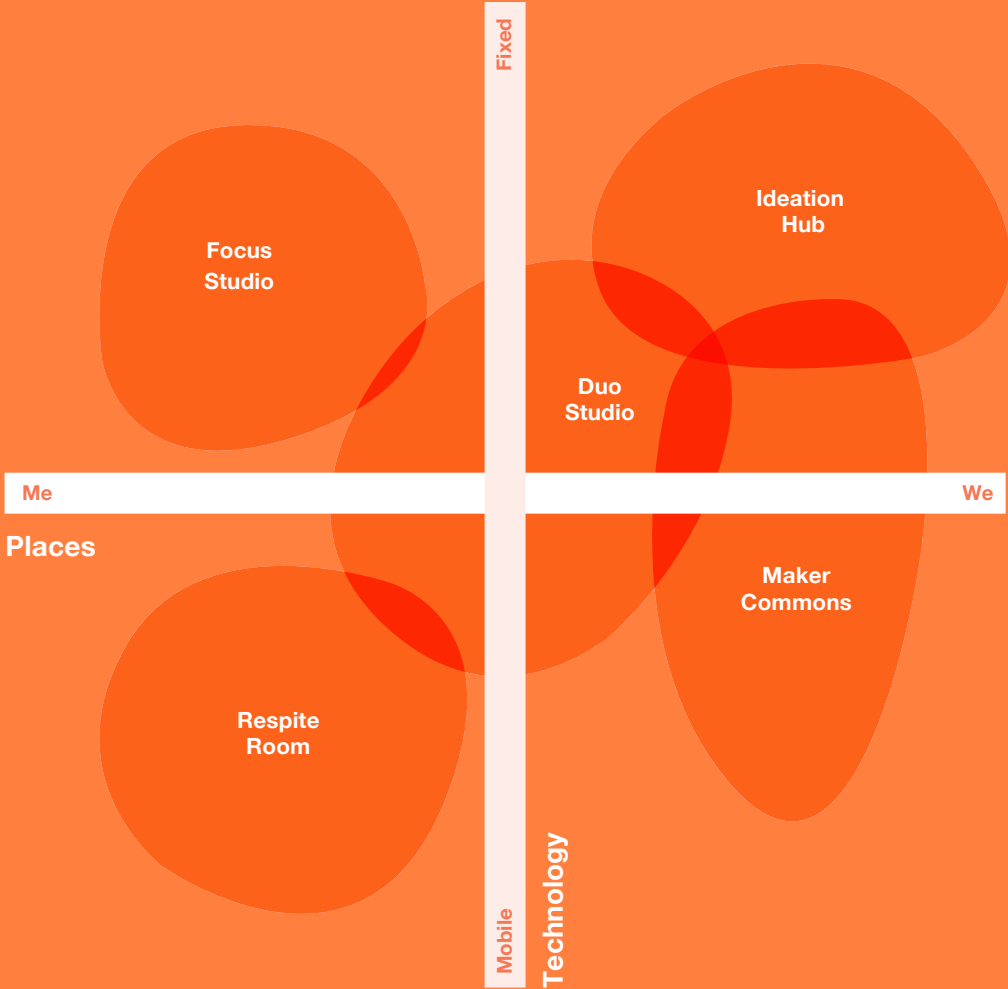
Focus Studio

Maker Commons

Ideation Hub

Duo Studio

Respite Room

Focus Studio:
owned or shared enclaves that allow an individual user to focus and get into flow; the space may also support a visitor for a short-term collaboration session.
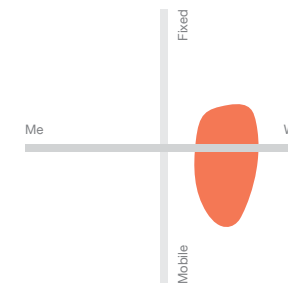
Maker Commons:
open, social spaces that encourage idea generation and sharing, allowing creative experiences to flow from collaboration and focus into informal and serendipitous exchanges.

Fixed

Me   We

Mobile
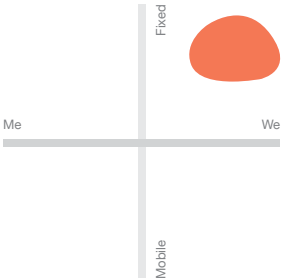
Ideation Hub:
setting that supports
a team's generative
collaboration sessions
in enclosed and
open spaces.
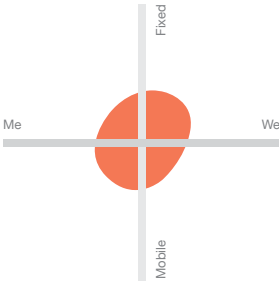
Duo Studio: a shared space for individual focus and paired co-creation; each space invites others in for a quick review and rapid iteration.

Me   We

Fixed

Mobile
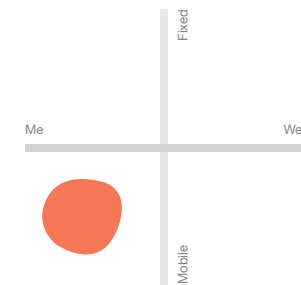
Respite Room:
a private space that allows users to balance active group work with moments of solitude or relaxation to improve their wellbeing or let ideas incubate before sharing with a larger group.

Creativity is
the innate
human ability to
generate ideas,
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It is the fuel
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Creating a Culture of Creativity

Place shapes behavior, and behavior over time is culture. Intentionally designed physical space has the power to drive the attitudes, behaviors and levels of performance that people and organizations need to thrive.

The demand and desire for creativity at work is stronger than ever before. To meet this imperative, people need an ecosystem of places and technologies that holistically and dynamically support the many activities that comprise the creative process.

Everyone has innate creative capabilities. Unlocking these capabilities is fundamentally about unlocking the potential of people. When creativity is supported, it becomes a habit. The result can be strong business growth that results from people who discover a deepening sense of purpose and personal fulfillment as they work creatively to help their organizations succeed.

References

Adobe, State of Create 2016.

Kelley, T. (2001). T*he Art of Innovation: Lessons in Creativity from IDEO, America's Leading Design Firm*, New York, NY, Random House

Brown, T. (2009). *Change by Design: How Design Thinking Transforms Organizations and Inspires Innovation,* New York, NY, Harper Collins

Brynjolfsson, E. and McAfee, A. (2014). *The Second Machine Age: Work, Progress and Prosperity in a Time of Brilliant Technologies*, New York, NY, W.W. Norton & Co.

Carson, S. (2013). *Your Creative Brain: Seven Steps to Maximize Imagination, Productivity, and Innovation in Your Life*. San Francisco, Jossey-Bass.

Chan, J. and Nokes-Malach, T.J. 2016. "Situative Creativity: Larger physical spaces facilitate thinking of novel uses for everyday objects," *Journal of Problem Solving*, Vol 9(1), Article 3.

Florida, R. (2002, 2014). *The Rise of the Creative Class*. Cambridge, MA. Basic Books .

Frank, M., Roehrig, P., and Pring, B. (2017). *What To Do When Machines Do Everything:How to Get Ahead in a World of AI, Algorithms, Bots, and Big Data*, Hoboken, NY, John Wiley & Sons

Gallup, State of the American Workplace, (2017).

Holland, J. (2014). *Complexity: A Very Short Introduction*. Oxford, UK, Oxford University Press.

Lipnicki, D.M. and Byrne, D.G. 2005. "Thinking on Your Back," Cognitive Brain Research, 24: 719-722.

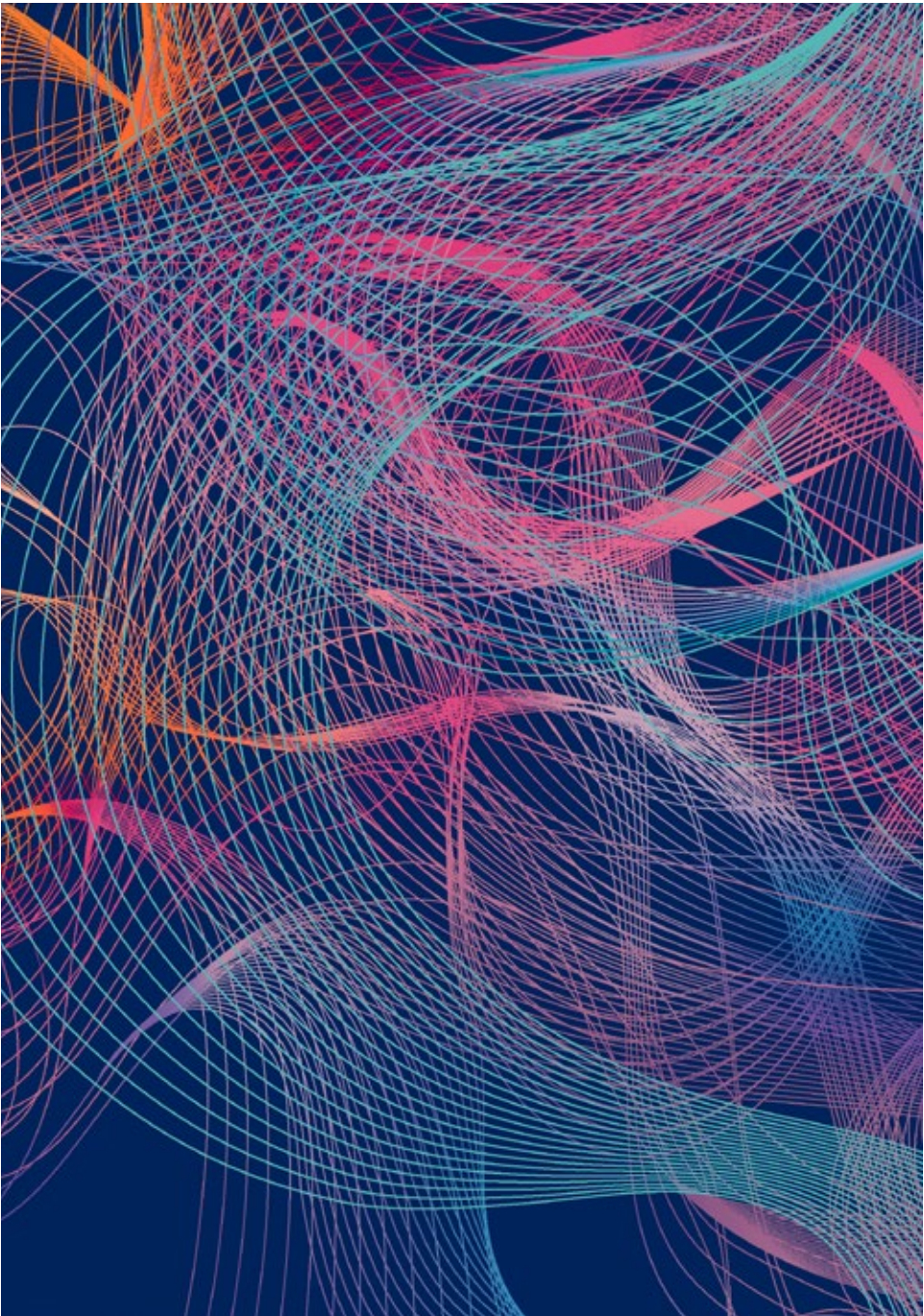Mitchell, M. (2011). *Complexity: A Guided Tour*. Oxford, UK. Oxford University Press.

Rittel, Horst, and Melvin Webber; "Dilemmas in a General Theory of Planning," pp. 155–169, Policy Sciences, Vol. 4, Elsevier Scientific Publishing Company, Inc., Amsterdam, 1973. [Reprinted in N. Cross (ed.), Developments in Design Methodology, J. Wiley & Sons, Chichester, 1984, pp. 135–144.]

Steelcase studies:
Wellbeing: A Bottom Line Issue, 360 Magazine (2014)
Steelcase Creativity and the Future of Work Survey, 2017
Ancillary Survey, 2017

Susskind, R. and Susskind, D. (2017). *The Future of the Professions: How Technology Will Transform the Work of Human Expert*s. Oxford University Press.

Taylor, F. (1911). *The Principles of Scientific Management*, New York, NY, Harper & Row.

Wilson, J.H. and Bataller, C. "How People Will Use AI to Do Their Jobs Better," *Harvard Business Review*, May 2015.

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