



THE RING



Business Plan

Prepared by: The Ring Workspaces, LLC

July, 2017

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“Excellence is an art won by training and habituation. We are what we repeatedly do. Excellence, then, is not an act but a habit”

~ Aristotle

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EXECUTIVE SUMMARY

The Ring Workspaces offers world-class co-working facilities in the heart of downtown Clearwater. These are beautifully appointed workspaces, designed using best practices from the worlds of Public Health and Engineering. The goal is to create “the healthiest workspace in the world.”

Members can work on a month-to-month or long-term basis. There are four types of memberships:

- Virtual Address
- Co-Working
- Fight Club
- Private Office

The Ring takes a multi-faceted and integrated approach to productivity which has been scientifically proven to enhance cognitive functioning, improve sleep and reduce sick building symptoms. This can lead to as much as a \$6,500 equivalent in improved productivity per person per year.

Though The Ring is the first co-working facility in Clearwater, it offers the following advantages over others in Tampa or St. Petersburg:

- **Healthy workspace:** meticulous attention to all workspace components and unique health amenities.
- **Optimal productivity focus:** the healthy environment gets productivity results for its members.
- **Technology:** technology surpasses the competition with sleep pods and a recording studio
- **Access to venture capital:** Members will have special access to fund their businesses.
- **Building ownership:** While most co-working spaces rent, The Ring partners own the space.

The co-working industry is exploding, with it sitting today at 1 Billion dollars and more than 1 Million people working this way in 2017. The Ring possesses all of the factors needed to thrive in this marketplace.

Marketing methods will include both community and online methods:

- **Community:** Public Relations, corporate outreach and events.
- **Online:** Website, Social Media, PPC and Remarketing, active video channel, e-mail.

In order to suit the unique demographics of Clearwater, The Ring will appeal to Millennials, Gen X and Baby Boomers alike. The company will operate on a lean basis, but will create employment in the City of Clearwater for young people engaged with technology.

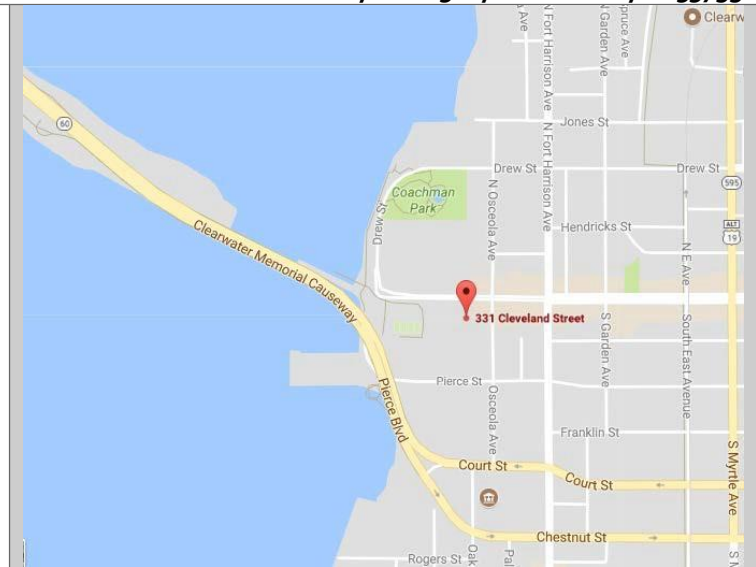
BUSINESS OVERVIEW

Business Description

The Ring Workspaces, LLC is a Florida-based limited liability company that offers state-of-the-art, destination co-working facilities that optimize human wellness, productivity, and performance using green building best practices. It is a proposed real estate venture to begin operations in the final quarter of 2017. The company was incorporated in 2016 in Clearwater, FL and is jointly owned by established real estate investor Daniels Ikajevs and his two partners, Zigrida Ikajeva and Simee Adhikari.

600 Cleveland St, Suite 300, Clearwater, FL 33755

This building is beautifully situated near the beach, creating an enviable work-life balance for its members. Clearwater's landmark Coachman Park is nearby, which hosts popular events and festivals. The building is at the heart of a newly revitalized downtown area, near many restaurants, amenities and other businesses.



History of the Business

The Ring was conceptualized by real estate experts Daniels Ikajevs and Simee Adhikari. With over 28 combined years of experience, they envisioned an innovative and integrated workspace that met the needs of today's entrepreneurs, innovators and industry leaders. Following a quiet but fast-growing industry trend of synergetic and collaborative working environments, they quickly identified an opportunity for redevelopment in Downtown Clearwater.

Daniels Ikajevs being an avid real estate developer and resident of the Downtown area, combined his passion for personal and professional growth to create a facility that allowed start-ups to mature and engage with industry experts. By touring over 90 co-working facilities around the USA and Europe, he deepened his understanding of effective space layouts and honed in on the needs of today's professionals. Inspired by the expanding market and the world-wide co-working movement, he sought to develop a similar working model. Feasibility and Profitability Studies further justified cause for development.

Simee Adhikari, a former Information Technology (IT) professional, understood the difficult toll that long office hours, and structurally unhealthy working environments could take on the body. The IT industry is one that requires commitment and offers little work-life balance. Simee eventually left the industry to advance a

career in Real Estate which presented a more flexible and physically active professional form of engagement. Observing the professional lifestyles of fellow friends and family, she foresaw an ideal opportunity to drastically improve the physical work environment. This paradigm brought about an evidence-based qualitative and quantitative approach to space development and design that has the potential to revolutionize the industry.

Establishing more than just a facility or a brand, the duo merged their personal and professional ethics and values to construct a meticulous and healthy environment that will prepare entrepreneurs for continual growth. The Ring balances the conditions for success. On one hand, clean air, green spaces and natural light create a conventionally healthy atmosphere. On the other hand, a science-based application of proven methodologies from the worlds of Public Health and Engineering for improved productivity in the workplace create an evidence-based healthy workplace. The Ring aims therefore to connect an ecosystem of like-minded, ambitious professionals in the center of beautiful Clearwater. The Ring is an elevated workspace where anyone with a passion and determination can succeed.

Company Vision and Mission

*Our mission is to create **the healthiest workspace in the world**. A healthy body **optimizes productivity**, which, for entrepreneurs, leads to **growth and profit**. The business's success will be measured using triple-bottom-line (TBL) accounting: **social, environmental and financial** – creating significant benefits **for all three**.*

- **Social:** The enterprise will benefit the community of Clearwater by creating a hub for creative and technical professionals
- **Financial:** The business will deliver a healthy profit for its owners
- **Environmental:** The facility will be built using green building best practices

Company Values

Author Simon Sinek says “People don’t buy what you do; they buy the WHY you do what you do”. Our “Why” is encompassed in our five core values:

Innovation: Utilizing findings from latest scientific research, The Ring puts the best industry practices in healthy workspaces design into motion. Cutting-edge technology is utilized to improve wellness, performance and productivity so our members can thrive.

Integration: Like two fighters in the ring, we believe that concepts that can seem at odds belong together. Body and mind are not separate concerns – instead they are integrated to reach their full potential. Technology and traditional knowledge come together to forge a new path for our members. Personal wellbeing and professional success do not have to be separate - they can be one and the same.

Inspiration: Our goal is to help our members attain their greatest potential.

Integrity: We strive to be upfront and honest in all endeavors. We understand that reputation and integrity are valuable assets.

Ingenuity: The Ring will be the industry leader and trendsetter in collaborative spaces, situated in downtown Clearwater where people like to work and play.

LOCATION

The Ring is strategically situated in One Clearwater Tower, an 11 story “Class A” office building, located in the heart of the downtown Clearwater. The building currently houses large financial, legal and insurance institutions, as well as established tech firms and NGOs. The Ring will thus be amongst a diverse cross section of Clearwater’s most prominent and respected business entities, presenting an opportunity to attract a broad demographic of customers.

Building Tenant Portfolio:

- Bank of America
- The Clearwater Chamber of Commerce
- Hill Ward Henderson PPAs
- Hub Insurance
- Interface Systems

Major Government and Private Organizations within a 10 Mile Radius:

- Clearwater City Hall
- Pinellas County Civil Court
- Church of Scientology Headquarters
- City of Clearwater Municipal Services Building
- Pinellas County offices
- Morton Plant Hospital

There is a strong demand for office space in the area driven by an underserved entrepreneurial culture embedded in Clearwater. There is an immediate need for dedicated business space that will cultivate small, middle and large scale business growth while promoting economic expansion. In addition to this rapidly growing business district, The Ring is within close proximity to world class entertainment, restaurants and a large number of luxury condominium buildings.

Key Target Markets Include:

- Island Estates
- Clearwater Beach
- Sand Key Beach
- Belleair

The Ring Workspaces will occupy the entire third floor and part of the second floor of One Clearwater Tower, having an approximate facility total of 18,000 sq. ft. In addition, there will be 1,300 sq. ft. outdoor lounge overlooking beautiful Station Square Park.

Virtual Tour

As you enter “The Ring” you will be immersed in a workspace inspired by nature. Elements such as sunlight, stone, wood, preserved moss will have a strong presence throughout the space. This unique space is difficult to convey with pictures alone, however, our artist endeavoured to create a beautiful rendering that would represent the vision as clearly as possible.



Upon entering the building, visitors and members will recognize that they are in a unique space right away. The green walls not only build a favorable atmosphere, but they also create just the right amount of humidity.



The reception desk gives a strong impression, with earthy materials and natural light.



"Fight Club" and private office members will get the opportunity to present their businesses in "The Ring" to potential Venture Capital investors.



The beautifully appointed open co-working area with private phone booths will create a conducive atmosphere for creative ideas to flow.



In Florida, the outdoors is an extension of life not found in other parts of the country. This beautiful outdoor space is one where people can work, relax, and socialize with other members.

BUSINESS GOALS AND OBJECTIVES

Short-Term Goals

- 55% office suite occupancy rate (23 out of 42 office suites rented) and 30 co-working memberships.

Mid-Term Goals

- 80% stabilized office suite occupancy rate (34 out of 42 office suites rented) and 70 co-working memberships.

Long-Term Goals

- 90% percent stabilized office suite occupancy rate (38 out of 42 office suites rented) and 90 co-working memberships.

BUSINESS MANAGEMENT

Daniels Ikajevs, Co-Founder and Chairman

Daniels Ikajevs is the co-founder and Chairman of The Ring Workspaces, LLC. He is a local Real Estate Investor and developer with over 14 years of experience in office and residential management and development. He has been an active resident and business owner in downtown Clearwater for over 7 years and is currently managing over 180,000 sq. ft. of office and retail spaces. Daniels completed internationally recognized Business Incubation Management (BIM) Certificate Program in 2017, and acquired fundamental knowledge and information resources needed to run successful co-working facilities and incubation programs. He is also the owner of the 11-story building where The Ring workspace facility will be located. Daniels is actively involved as an executive board member in Clearwater Downtown Partnership (CDP). Additionally, he also serves as the Vice President of HOA in the 156 unit Water's Edge residential building located in Clearwater.

He holds an MBA with focus on Finance and Marketing. An avid traveler and car enthusiast, he has a keen interest in cutting-edge technology and modern interior design concepts. As the second largest property owner in downtown Clearwater, he is seasoned in designing and managing traditional office spaces. The Ring co-working space concept is a natural progression, which integrates his knowledge of traditional building and office operation with innovative technology and interior design concepts that is meant to revolutionize the industry.

Simee Adhikari, Co-Founder and General Manager

Simee Adhikari is the co-founder of The Ring Workspaces, LLC. She has been an Entrepreneur, Real Estate Developer, and Property Manager in the greater Pinellas and Hillsborough country for over 14 years. She holds an active Florida realtor license, specializing in luxury residential, commercial, office, and retail spaces. This gives her a broader understanding of the general real estate market, business and demographic trends, and agency regulations. She has particular interest in Green Buildings and is currently pursuing a certification course on that subject.

She is also a member of the Pinellas County Realtors Leadership Council. Simee also holds an undergraduate degree in Computer Information Systems and a Master's in Business Administration (MBA). As a technology

consultant for Rolls Royce's environmental engineering division, her role was to translate client requirements into highly technical design solutions, which was highly gratifying. However, after 4 years of working in the software industry, she decided to switch gears to Real Estate and become an Entrepreneur. Her passion is to create meaningful projects that can have a positive social, economic, and environmental impact. The Ring Workspaces is a cumulative expression of her professional expertise and personal aspiration to bring about positive change.

SERVICES

The Ring will provide first class co-working and office facilities on a month-to-month membership basis with a 10% discounted rate for longer term. The Ring will have four main offerings for entrepreneurs and virtual workers.

Virtual Address Membership

Cost: \$45 per month

This basic membership will include a dedicated mailbox with prestigious "The Ring Workspaces" address. It will also give an opportunity for the members to rent offices or conference rooms on an hourly basis.

Co-working Membership

Cost: \$99 per month

This membership category gets all of the benefits of the Virtual Address membership category plus it allows access to all common spaces in The Ring on a first come first serve basis. Members will have access to all amenities, including but not limited to the following:

- Full-time community manager
- Weekly networking events
- Lectures and classes (body, mind, spirit)
- Print, scan, fax machines
- High speed secured internet access
- Free coffee
- Ergonomic office furniture
- Access to outdoor lounge
- Kitchen and dining area
- Private phone booth
- Recording studio
- Sleeping pods
- Free parking

Fight Club Membership

Cost: \$250 per month

This membership includes all of the benefits of the Co-working membership and in addition will be granted an opportunity to pitch their business idea to an investor panel once a year during "The Ring Main Event". This membership is restricted to only 16 members who will have 24/7 access to a secured assigned desk room. Each member will have a dedicated workspace with assigned storage.

Private Office Membership

Cost: Starting at \$320 per month

This membership level will enjoy all the benefits of the Fight Club membership. In addition, they will be granted the privilege to work in a secured private suite equipped with state of the art ergonomic furniture such as:

- Stand up desks
- Herman Miller ergonomic office chairs

Day Pass

Cost: Free

A pass for one day will be made available for visitors to the city or for people who want to sample the facility.

Service Approach

The uniqueness offered by The Ring is its healthy approach to productivity. This is a multifaceted, integrated approach comprising of the elements in the chart below.



Enhanced Cognitive Functioning

According to the COGFX Study from Harvard T. H. Chan School of Public Health and the Global Environment, cognitive functioning was significantly impacted by enhanced ventilation¹:

Cognitive function scores were better in green building conditions compared to the Conventional building conditions across nine functional domains, including crisis response, strategy, and focused activity level.

On average, cognitive scores were:

¹Harvard T. H. Chan School of Public Health: <http://www.chgharvard.org/resource/impact-green-buildings-cognitive-function>

- 61 percent higher in green building conditions
- 101 percent higher in enhanced green building conditions
- CO₂, VOCs, and ventilation rate all had significant, independent impacts on cognitive function.

According to United Technologies, there were key areas in which these cognitive enhancements took place²:

The greatest cognitive function differences were seen in the areas of crisis response (73 percent higher in green-certified, high-performing buildings); applied activity level – the ability to gear decision-making toward overall goals (44 percent); focused activity level – the capacity to pay attention to situations at hand (38 percent); and strategy (31 percent).

All of these functions are key to productivity.

The Ring will be putting meticulous attention to detail in terms of creating an environment with enhanced ventilation and reduced VOC levels.

Health Benefits

While many are concerned over health, and the dangerous impact of sitting for long periods of time, the study goes on to outline further health benefits³:

Sleep quality scores were 6.4 percent higher for participants in green-certified buildings, suggesting building impact on sleep quality.

Finally, participants reported better environmental perceptions and 30 percent fewer sick building symptoms in high-performing, green-certified buildings vs. high-performing, non-certified buildings.

These health benefits mean that workers can focus on staying focused and get things done at work so after work, they can enjoy their families, their hobbies and their significant others.

Quantifying Improved Productivity

These health benefits translate into energy savings as well according to United Technologies⁴.

Following the release of The COGfx Study, which showed dramatic impacts of ventilation on cognitive function, the research team sought to evaluate the economic and environmental costs against the health and productivity benefits of enhanced ventilation in office buildings. Studying three ventilation strategies and four different heating, ventilating and air conditioning (HVAC) systems across seven U.S. cities, the team found that the indoor environment previously associated with a doubling of cognitive function test scores can be achieved at an energy cost between \$14 and \$40 per person per year and result in as much as a \$6,500 equivalent in improved productivity per person per year. When energy-

² United Technologies: <http://naturalleader.com/thecogfxstudy/study-2/better-thinking/>

³ United Technologies

⁴ United Technologies: <http://naturalleader.com/thecogfxstudy/study-1/improved-productivity-quantified/>

efficient technologies are utilized, the study found the energy costs to be between \$1 and \$18 per person per year, with a minimized environmental impact equivalent to approximately 0.03 cars on the road per building per year.”

Healthy Co-Working Spaces in Other Cities

There is strong evidence that a quiet revolution is occurring across America and beyond for people wanting healthier workspaces.



The Farm⁵, Soho, NY, is a spacious, warm interior embodying a love of nature and the principles that guide it.



Green Spaces⁶, Denver, CO, is a sustainable co-working community in the heart of Denver's RiNo Arts District.



Second Home Lisboa⁷ in Lisbon, Portugal has over 1,000 plants, which are proven to increase productivity.




⁵The Farm: <http://www.thefarmsoho.com/>

⁶Green Spaces: <https://www.greenspaces.com/>

⁷Tree Hugger: <https://www.treehugger.com/interior-design/second-home-coworking-space-selgascano.html>

COMPETITIVE ANALYSIS

DIRECT COMPETITION

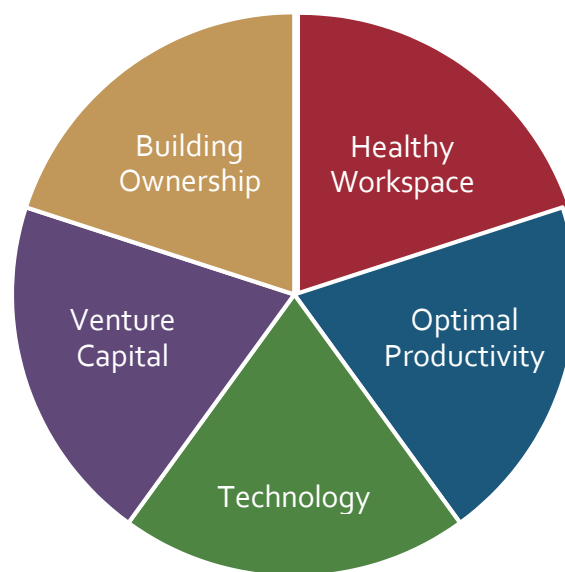
COMPETITOR	ABOUT	SERVICES/STRENGTHS	WEAKNESSES
Station House  St. Petersburg	Station House is dedicated to providing a comfortable, yet dynamic environment in which our guests can interact socially or professionally, work or co-work quietly, enjoy food, drinks and entertainment, and relax peacefully.	Co-working: Dedicated desks, conference offices, private offices, 24-hour access. Amenities: Finest coffee and tea available – this is very important to reviewers of various co-working spaces. Yoga also available. 4,000 sq. feet of event space.	Restaurant and events such as weddings make it less of a serious workspace. Entrepreneurs complain of high prices and “greedy” owners. Do not offer support for growing businesses.
Tampa Bay Wave 	Founded in 2008, Tampa Bay WaVE, Inc. is a ‘by entrepreneurs, for entrepreneurs’ 501(c)(3) non-profit helping entrepreneurs turn ideas into growing tech businesses in Tampa Bay. Today we support over 150 tech start-ups and over 250 entrepreneurs and other crazy talented techies that call Tampa Bay home.	Affordable co-working plans starting at \$100/month and a day pass for \$15/day. Accelerator growing 169 start-ups, 18 million dollars raised and 700 jobs created. This includes a mentor network, inventor network and investor forum. Events including Nerd lunch, Geek end and Python meet-up.	Strong technology focus, which may not be appealing to those in other industries. Blog and homepage of website not frequently updated, making the initiative appear abandoned from outsider.
CoWork Ybor 	In the cultural heart of Tampa, CoWork Ybor is making space for creatives to collaborate, work and share inspiration. Shared space to share ideas, work out the essentials and find support to be about your business.	Located in Ybor city, which is highly concentrated with professional services businesses with access to transit. Very affordable plans including monthly access from \$100/month, day access for \$12/day and group access for \$25/hr. Standard business amenities and branded coffee.	Targeted only to creatives, which may be off-putting to people in other industries. Does not offer special facilities such as recording studio or access to funding.

SUBSTITUTES

Working from Home: People could instead work from home. However, people who work from co-working spaces report significantly less loneliness, and significantly more productivity.

Local Coffee Shops (Starbucks, Panera Bread etc.): Workers can also choose to work in local coffee shops. However, this option may not be favorable to some, considering cost of amenities such as coffee and printing. Distracting background noise can also interrupt meetings.

COMPETITIVE ADVANTAGE



Healthy Workspace: Meticulous attention to detail to all of its workspace components including water, air, light, temperature, furniture, VOC emission, and outdoor space. Stand-up desks, health events, an outdoor lounge where members can work and socialize, makes The Ring stand out from other co-working spaces.

Optimal Productivity: Everything about the space is designed to foster optimal performance, and productivity in the members while they work.

State of the Art Technology: Technology surpasses the competition including POE lighting, high-speed secured internet, sleeping pods and a recording studio.

Venture Capitalist Funding: Access to venture capitalist funding is an incredibly valuable asset for entrepreneurs.

Building Ownership: While most co-working spaces rent, the building is wholly owned by The Ring partners. This offers an opportunity to spend capital on other benefits for members, and allows room for future expansion without relocating.

INDUSTRY ANALYSIS

INDUSTRY GROWTH

Co-working is heralding in a new way of working. The co-working manifesto, signed by members of over 1,700 workspaces says the following: "Co-working is redefining the way we do work. Inspired by the participatory culture of the open source movement and the empowering nature of IT, we are building a more sustainable future. We are a group of connected individuals and small businesses creating an economy of innovation and creativity in our communities and worldwide. We envision a new economic engine composed of collaboration and community, in contrast to the silos and secrecy of the 19th/20th century economy."⁸

More than being a movement, co-working is a booming undocumented industry. According to Forbes.com, "Co-working has become ubiquitous over the last three years. The co-working market now has over 7,000 players around the globe. Co-working operators have emerged alongside the startup boom. While everyone has been reading and talking about Fintech, virtual reality and drones, this fast growing, new sub sector of the real estate market has become one of the largest startup segments, hiding in plain sight."⁹

According to the largest Co-Working Conference, Global Co-working Unconference Conference (GCUC) the industry sits at 1 Billion dollars.¹⁰

In fact, according to industry website DeskMag, more than 1 million people will be working in co-working spaces in 2017.¹¹

⁸ Coworking Manifesto: <http://coworkingmanifesto.com/>

⁹ Forbes: <https://www.forbes.com/sites/falgunidesai/2016/03/10/coworking-spaces-poised-to-enter-new-growth-phase/#5b40881a190a>

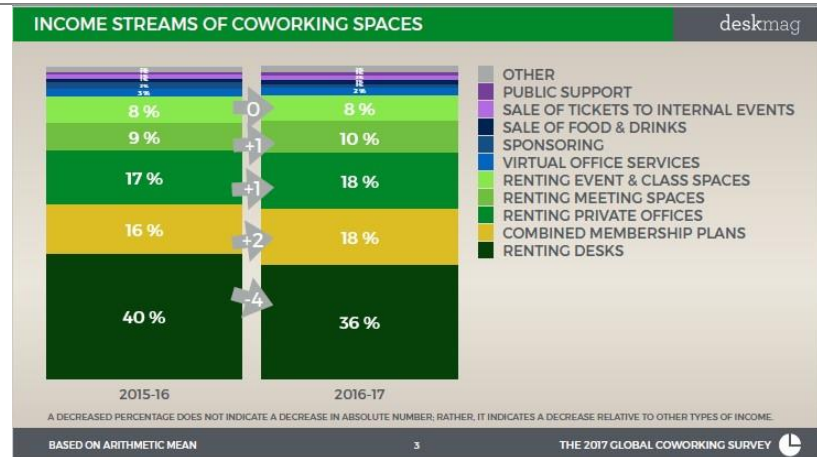
¹⁰ GCUC: <https://gcuc.co/why-coworking/>

¹¹ DeskMag: <http://www.deskmag.com/en/the-complete-2017-coworking-forecast-more-than-one-million-people-work-from-14000-coworking-spaces-s/2>

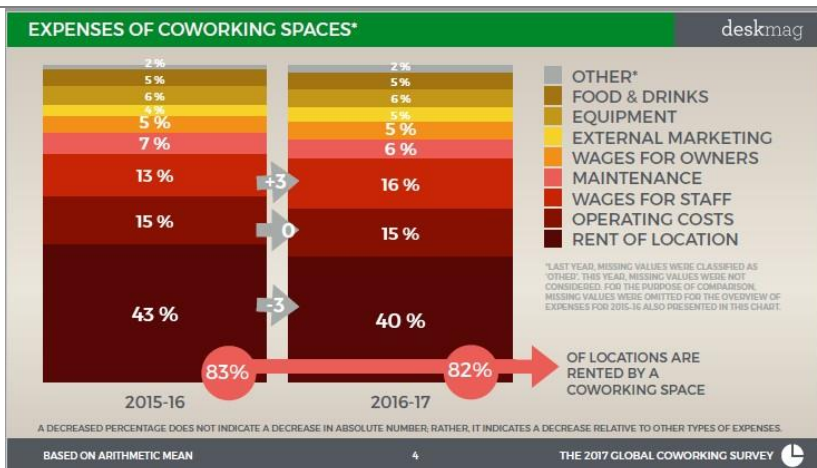
Micro-economic trends

According to the 2017 Global Co-working survey, the following economic factors are at play by individual players.

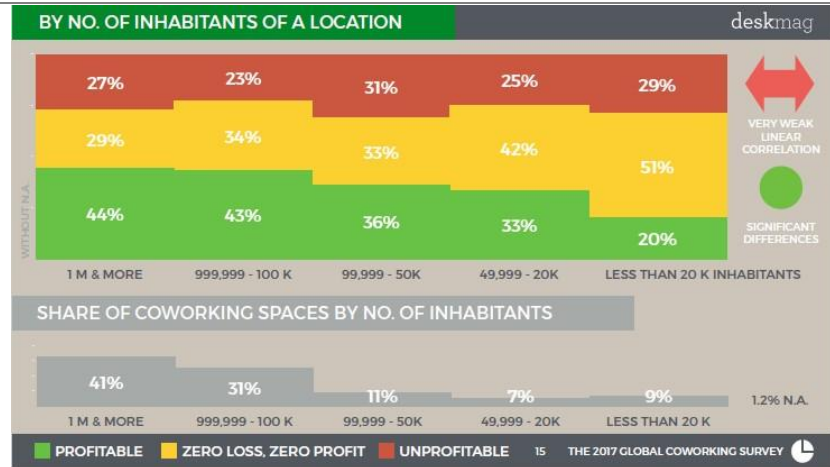
The primary source of income for co-working spaces is renting desks, though combined membership plans is slowly growing. Renting private offices, renting meeting spaces and renting event and class spaces are also significant income earners.



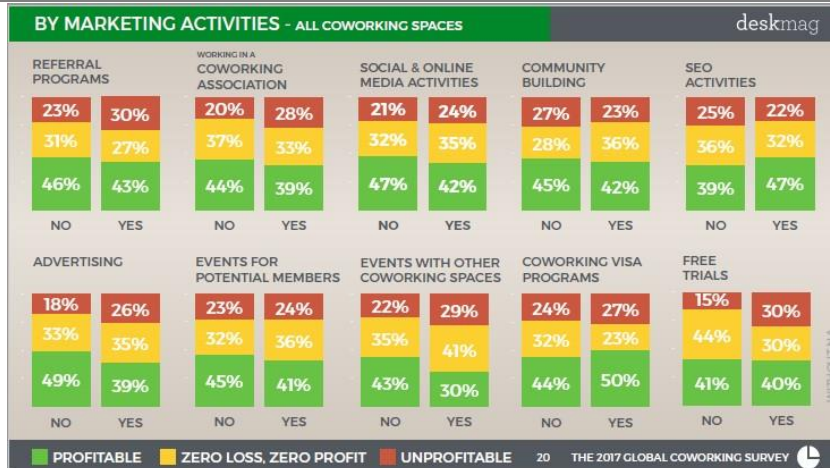
The majority of the expenses associated with co-working spaces is rental. Operating costs and wages are other significant costs for operators. As an owner of the space, The Ring is well positioned to succeed.



Co-working spaces in larger city centers tend to have better performance. The Ring will target Tampa and St. Petersburg as well through various marketing methods.



SEO and the Co-working visa program was the marketing activity for profitable spaces. The visa program is a partnership with other co-working spaces, where one membership gives access to many spaces. The Ring will focus on this as a marketing activity.

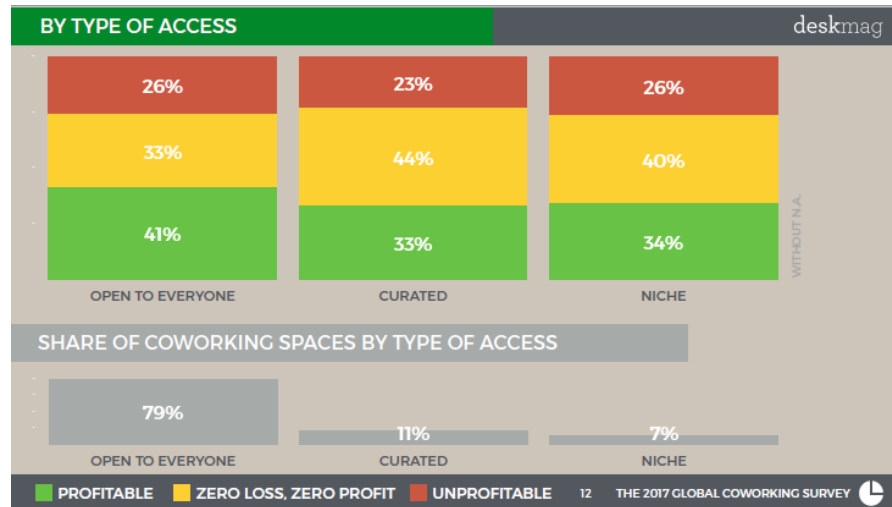


INDUSTRY TRENDS

Based on recent surveys and industry reports the following trends are emerging in the industry:

Niche Communities

Following standard industry lifecycle theory, as industries mature, niche markets begin to appear. The co-working industry is no different. According to Forbes: "Operators will target specific sectors and professional groups in an effort to build stronger community and therefore create loyalty among their renters."¹² Services offered to those in the niche include training and networking. An interesting space out of New Orleans called Landing Zone features discounts targeting veterans for example.¹³



However, the Global Co-working survey shows that communities open to all are still more profitable.

Multiple Locations

Several regional players are expanding their locations, for example, some in the South are centred on airports for local travellers. According to Forbes: "While WeWork has been the largest provider worldwide, smaller providers are beginning to branch out into multiple locations with a membership concept allowing clients to access different sites."¹⁴

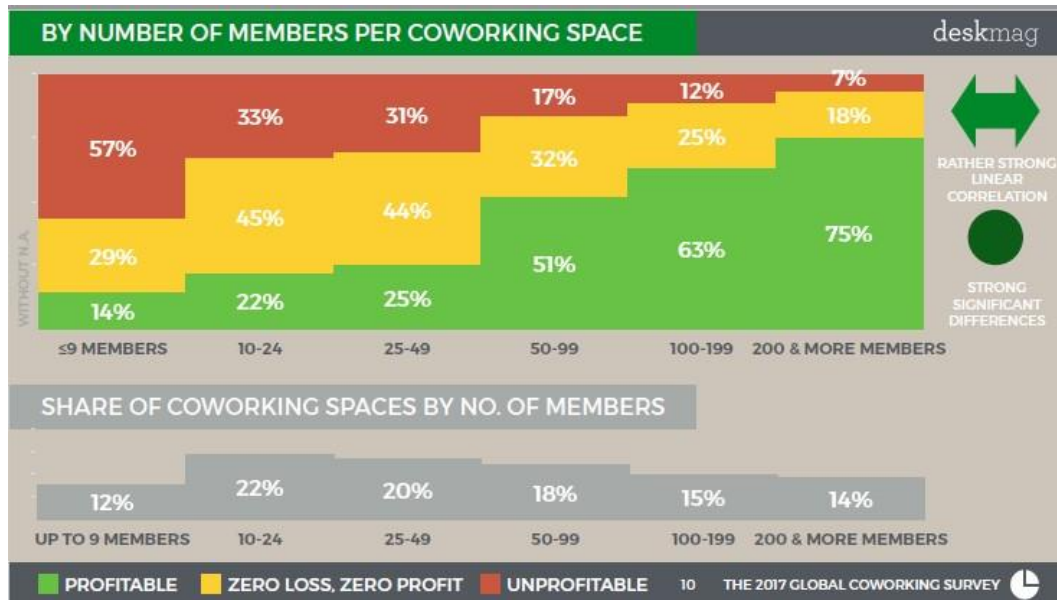
¹² Forbes

¹³ Landing Zone: <http://www.lznola.org/vetlaunch.html>

¹⁴ Forbes

Larger Spaces

According to the Global Co-working Survey, larger spaces are more successful showing the most profitable spaces with 200+ memberships.



This also allows for more event-based revenue, and "Larger spaces also enable co-working providers to negotiate more effectively with building owners."¹⁵

New Services

"To retain clients and drive more value, co-working operators are experimenting with concierge services, group discounts to local retailers, hotels and airlines and other ancillary offerings."¹⁶ For example, Galvanize, out of Denver, Colorado offers education and access to partners such as Google for Entrepreneurs, IBM and Silicon Valley Bank.¹⁷

Companies Engaging in Co-Working

An increasing number of companies are incorporating co-working into their business strategy. As said by the Harvard Business Review (HBR):

*Michael Kenny, Managing Partner of San Diego-based Co-Merge, told us, "In the past year and a half, we've seen a dramatic increase in the use of the space by enterprise employees. We have seen teams come in to use various on-demand meeting rooms. We have users from global companies of size ranging from several hundred to several thousand employees who use the space not only to allow their distributed workers to get productive work done, but also to attract employees who demand flexible workplace and work time."*¹⁸

¹⁵ Forbes

¹⁶ Forbes

¹⁷ Galvanize.com: <https://www.galvanize.com/entrepreneur#membership>

¹⁸ HBR.org: <https://hbr.org/2015/05/why-people-thrive-in-coworking-spaces>

Remote workers are also joining co-working spaces individually

INDUSTRY SUCCESS FACTORS

Sharable has identified 10 key success factors¹⁹ in terms of a successful co-working space which are placed in the first column of the chart below. How The Ring satisfies these success factors is on the column on the right.




FACTOR	THE RING
<i>Clearly Identifiable Market</i>	The target market for The Ring are entrepreneurs who care about high performance.
<i>Convenient Location</i>	The Ring is located in the heart of downtown Clearwater, close to the world-renowned beaches, restaurants, and shops.
<i>Interior Design</i>	The first thing prospective members will notice is the unique and beautiful design of The Ring.
<i>Branding</i>	The Ring brand differentiates it clearly based on clear and unique benefits, design of the interior space, and design of its logo and materials.
<i>Community Culture</i>	The Ring will have business and personal development events to build a unique community culture. This is a key difference between a shared workspace and a co-working space.
<i>Events and Education</i>	The Ring will host a variety of events such as mind-body-spirit workshops, networking mixers, yoga classes, community stretches etc., as well as allow members to organize their own.
<i>Seamless Sign-Up, Access and Billing Management</i>	The Ring is planning to invest in OfficeR&D ²⁰ , a software platform for co-working and flexible workspaces.
<i>Music</i>	Although music may be the right choice for other concepts, The Ring will choose not to include it upon launch as a conscious decision. However, music will be made available in conference rooms and events.
<i>Amenities</i>	Unique amenities such as sleeping pods, recording studio will attract people to the space.
<i>Pricing and Flexibility</i>	The Ring offers a variety of flexible membership options at competitive prices.

¹⁹ Sharable: <http://www.shareable.net/blog/the-10-step-guide-to-a-successful-coworking-space>

²⁰ OfficeR&D: <https://officernd.com/>

TARGET MARKET PERSONAS

Everyone targeted by The Ring workspaces are focused on productivity and growth. They do not take a laid-back approach to business. They are driven to succeed. These people can either be solo entrepreneurs, owners of small businesses, or workers of remote teams.

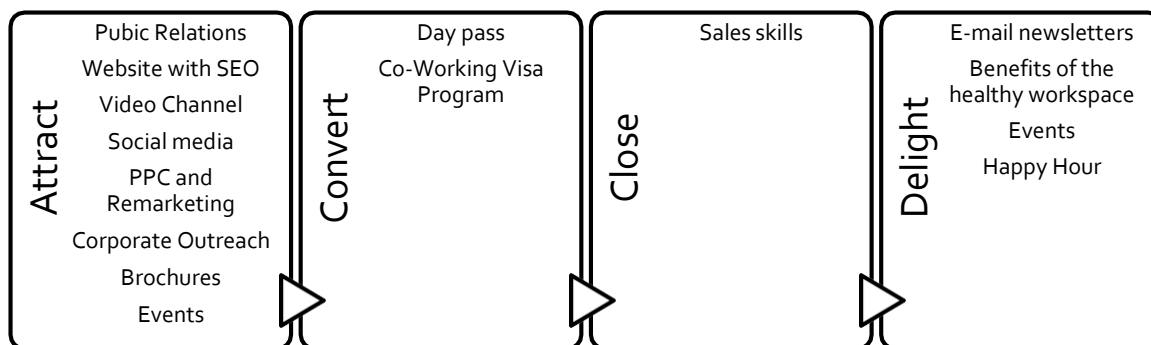
		
<p>Millennial Madison</p>	<p>Gen X Xander</p>	<p>Boomer Ben</p>
<p>Demographics: Age Group 21-34, Male and Female Split Position: Social Enterprise Entrepreneur Background: Previously worked at a PR firm Salary: \$35,000</p> <p>Goals: Wants to make a difference Build awareness for a cause she cares about Grow social and professional network Positive impact on the environment</p> <p>Hobbies: Running on the beach, her dog Membership: Fight Club Membership</p> <p>This is the standard demographic for the co-working space</p>	<p>Demographics: Age Group 35-49, Male and Female Split Position: Digital Agency Owner Background: Sales Salary: \$120,000</p> <p>Goals: Make more money to support family Willing to put in a lot of hours Healthy lifestyle Get funding for business</p> <p>Hobbies: Windsurfing, travel Membership: Executive Office Membership</p> <p>This is the person who is ready to move up from the co-working environment, but still benefit from the atmosphere.</p>	<p>Demographics: Age Group 50-68, Male and Female Split Position: Senior Consultant Background: Former Executive Salary: \$70,000</p> <p>Goals: Supplement retirement Strongly identifies with his profession Combine business with pleasurable lifestyle Enjoys an aesthetically-pleasing atmosphere</p> <p>Hobbies: Golf, home renovation Membership: Co-Working Membership</p> <p>In an effort to integrate with Clearwater's demographics, The Ring will also have events to appeal to baby boomers.</p>

MARKETING STRATEGY

OVERVIEW

This method explains how to transform strangers into promoters. Strangers are attracted to the business using online and offline methods and become visitors.

- Visitors are converted based on seeing the free introductory membership offer and become leads.
- Leads are closed based on sales skills and become customers.
- Customers see their businesses succeed and receive regular, informative newsletters, and thus become promoters. This, in turn, creates repeat and referral business.



PROMOTIONAL TACTICS

STRATEGY	TACTIC	DESIRED OUTCOME
Public Relations	The healthy aspect of the space along with the connection to Clearwater and its revitalization will be an outstanding “good news story”.	Create awareness and sales for The Ring.
Search Engine Optimized (SEO) Website	grow co-working spaces most effectively.	Increase traffic to the website and memberships. The website would be open before the location opens, to offer a pre-sale opportunity.
Active Video Channel	A recording studio will be part of the co-working space. As a result, members and the community manager can post videos regularly to the co-working space’s channel.	Video is a great social media tool, and video is overtaking text and images on the website. This will therefore attract visitors to the website, and enhance conversions. It would also establish a sense of community for members.
Co-Working Visa Program	Having a co-working visa with other co-working spaces had a positive impact on results. The Ring will therefore reach out to other spaces in Tampa and St. Petersburg to create these alliances.	Increase memberships with other spaces in the area.
Social Media Marketing	Marketing through Facebook, Instagram, and Twitter offers an opportunity to target entrepreneurial users easily. Facebook Retargeting could also be used for people who attended events and visitors to the website.	Increase memberships.
Pay Per Click Marketing and Remarketing	This would be a highly targeted Google AdWords campaign for people searching for co-working spaces near Clearwater. Remarketing through Google would also be used to	Increase memberships.

	encourage repeat visitors to the website.	
E-Mail Marketing	E-Mail marketing would be used as a relationship tool for anyone who entered information on the website.	Increase sense of community and convert leads into customers.
Corporate Outreach	Since Clearwater is home to companies like Tech Data, KnowBe4, and Honeywell. Outreach to these and other companies to have virtual teams at The Ring location would create a steady revenue source.	Ability to create a stable revenue source.
Brochures and Collateral	Brochures and collateral will be created to attract different segments of the market. These would be strategically placed at business centers, meeting points for entrepreneurs and center events.	This would be the main offline marketing activity for The Ring.
Events	Events put on by the space or by its members would be open to the public. This would offer a natural opportunity to grow awareness.	This is a benefit to the members, at the same time as allowing members of the public to view the space.

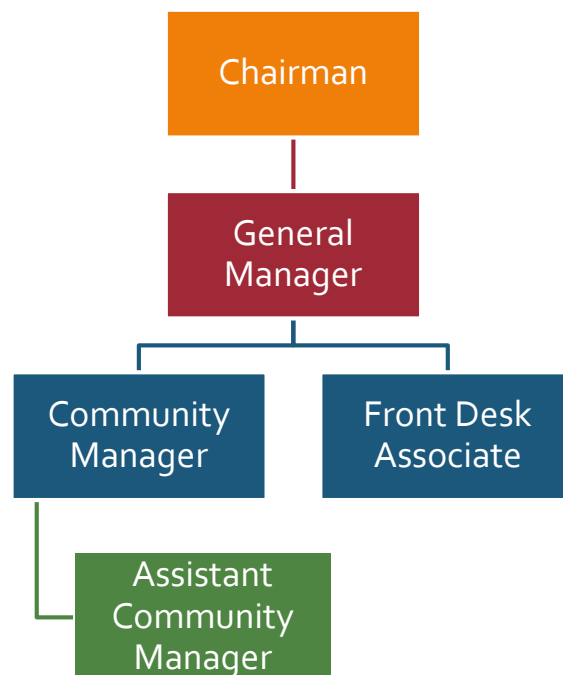
PRICE STRATEGY

The Ring will implement a "Competitive Pricing" strategy where it sets the price based on what the neighboring competition is charging. This strategy is generally used once a price for a service has reached an equilibrium and there are also substitutes available.

OPERATIONAL SUMMARY

Company Organization

The company would be lean, but would also create employment within Clearwater for young professionals engaged in business, technology and service based industries, they will also be mentored by two Real Estate and Business Owners striving to make a difference in the downtown community. Overall, individuals working at The Ring would have an opportunity to grow as the company grows. New positions and roles are also expected to grow as the entity grows.



Chairman

Person: Daniels Ikajevs

- Promote and oversee the highest standards of corporate governance within the Board and the Company.
- Be a sounding board and mentor to the Director of Operations and Business Development.
- Enhance the overall effectiveness of the team.

General Manager

Person: Simee Adhikari

- Building valuable partnerships
- People Management

- Fundraising (investment, sponsorship)
- Growth Strategy
- Filling in for any gaps in staffing needs
- Policy/Procedure Development
- Managing Operations Staff
- Systems Maintenance

Community Manager

Person: TBD

- Membership Sales Strategy
- Hosting member gatherings (lunches, happy hours etc.)
- Member Policy Development and Enforcement
- Creating the space "vibe"
- Member Communication Strategy
- Billing Dispute Resolution
- Facilities Management
- Member Signups
- Member Communication
- Tours
- Introducing new members to the community and facilitating connections
- Some facilities maintenance
- Keeping space tidy throughout the day

Front Desk Associate

Person: TBD

- Screening for members/ non members
- Greeting guests and informing members of guest arrival
- Accepting packages and sorting mail
- Opening and closing space daily
- Keeping kitchen area up (brewing coffee, loading/unloading dishwasher, etc.)

Assistant Community Manager

Person: TBD

Once the facility is at full capacity, and Assistant Community Manager will be hired to assist the community manager in the execution of duties associated their role.





Implementation Plan

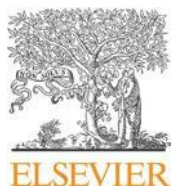
Tasks	TIMELINE (Weeks)																				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Financial Grant Approval																					
Attain Building Permits																					
Finalize contract with GC																					
Order Furniture in Time for delivery and installation																					
Install VAV, duct, air terminals and Co2 and Air quality Sensors																					
Install network cabling, Poe Lights and complete electrical grid																					
Completed Plumbing																					
Purchase Printers, Coffee Machine, TV's, Telephones and supplies																					
Develop Website, CRM and payment system																					
Pre-sale promotion begins																					
Set Up Social Media Accounts																					
Marketing and Advertising																					
Floors Installation Complete																					
Overall Construction complete																					
Recruitment of Community Manager and Front Desk																					
Grand Opening																					

SWOT Analysis

SWOT ANALYSIS	
STRENGTHS <ul style="list-style-type: none"> • High performance environment • State of the art amenities • Facility ownership • Access to venture capital 	WEAKNESSES <ul style="list-style-type: none"> • Access to capital to fully fund renovations • Two floors may be inconvenient to navigate – this can be resolved through communications and signage • Downtown is currently quiet – will therefore try to draw members from nearby cities as well
OPPORTUNITIES <ul style="list-style-type: none"> • Increasing entrepreneurship culture around the world • Clearwater recognized as among the top 25 beaches in the world – this positions the city as one that draws people who love health and natural spaces 	THREATS <ul style="list-style-type: none"> • Clearwater known as “best place to retire” – The Ring will appeal to a Baby Boomer market as a result • Entry of new competition – this is why The Ring strives to be unique from the beginning • Technology may become obsolete. As a result, the team will keep an eye on emerging technologies

Appendixes

Appendix 1: COGFX Study



Contents lists available at [ScienceDirect](#)

Building and Environment



The impact of working in a green certified building on cognitive function and health



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abstract

Thirty years of public health research have demonstrated that improved indoor environmental quality is associated with better health outcomes. Recent research has demonstrated an impact of the indoor environment on cognitive function. We recruited 109 participants from 10 high-performing buildings (i.e. buildings surpassing the ASHRAE Standard 62.1e2010 ventilation requirement and with low total volatile organic compound concentrations) in five U.S. cities. In each city, buildings were matched by week of assessment, tenant, type of worker and work functions. A key distinction between the matched buildings was whether they had achieved green certification. Workers were administered a cognitive function test of higher order decision-making performance twice during the same week while indoor environmental quality parameters were monitored. Workers in green certified buildings scored 26.4% (95% CI: [12.8%, 39.7%]) higher on cognitive function tests, controlling for annual earnings, job category and level of schooling, and had 30% fewer sick building symptoms than those in non-certified buildings. These outcomes may be partially explained by IEQ factors, including thermal conditions and lighting, but the findings suggest that the benefits of green certification standards go beyond measurable IEQ factors. We describe a holistic “buildingomics” approach for examining the complexity of factors in a building that influence human health.

Indoor environmental quality

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1. Introduction

Thirty years of public health science and building science have demonstrated that buildings play a key role in shaping our health [1e5]. Buildings have the capacity to create conditions that are harmful to health or conducive to health: they determine our exposure to outdoor pollutants, by either facilitating entry of particles of outdoor origin indoors, or acting as a barrier and removing them through enhanced filtration [6]; they govern exposure to chemicals of concern, such as volatile organic compounds (VOCs), flame retardants and polyfluorinated compounds, which can be ubiquitous or nonexistent, depending on the decisions we make

regarding building materials and products [7,8]; buildings

either protect us from noise or contribute to the problem through the introduction of indoor sources, poor noise insulation, or poor acoustical design [9,10]; they can induce eye strain or improve alertness through impacts on circadian rhythm, depending on the lighting system [11,12]; buildings can protect us during heat events, or create environments that magnify the problem through solar heat gain [13,14]; and buildings can either wall us off from nature or connect us to it [15,16].

The scientific literature around buildings and health has identified the foundations of a healthy building including factors such as ventilation, air quality, thermal comfort,

noise and lighting, and this body of research has served as the basis for green certification standards to define their indoor environmental quality (IEQ) guidelines. A review of

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Construction 2012, BCA Green mark for new non-residential buildings v4.1 2013, and DGNB New Office v2012 - demonstrates the approach of these certification standards toward IEQ. All of the rating systems offer credits for thermal comfort, indoor air quality (IAQ) and

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lighting; all but LEED NC 2009 have credits for acoustics; and Green STAR v3 and LEED NC 2009 have credits specifically for ventilation. However, building owners and developers can opt for certain credits, and IEQ represents only 4e20% of the total score a building can obtain. Of the reviewed rating systems, only LEED NC 2009 has mandatory IEQ credits, for minimum IAQ performance and environmental tobacco smoke control [17].

The adoption rates of the optional IEQ credits in LEED NC 2009 give an indication of how building owners are prioritizing certain aspects of IEQ [17]. We extracted the data and found that the vast majority of projects obtain credits for low-emitting adhesives, paints and flooring systems (Table 1). Increased ventilation is much less widely adopted, despite strong evidence for health and performance benefits of higher ventilation rates [18,19]. While some credits are preferentially adopted and others not, buildings that seek LEED NC 2009 obtain on average 9 of the 15 possible IEQ credits, not including the required fundamental commissioning credit under the energy and atmosphere credit category.

The literature suggests that these credits translate into improved IEQ. Our previous review of green buildings and health identified 17 studies and found that, overall, occupants report better IEQ and fewer health problems in these buildings compared to non-certified buildings. These studies found lower levels of VOCs, formaldehyde, allergens, nitrogen dioxide, and particulate matter in green buildings, which have been separately shown to impact health. Six of the reviewed studies tracked the health of occupants in addition to IEQ, and all six found

leading, global green-building standards LEED New Construction 2009, Green Star Office v3, BREEAM New

improvements in the green buildings [20]. These include reduced asthma and allergy symptoms in offices [21]; reduced respiratory symptoms, fewer sick building symptoms, and better self-reported well-being in public housing [22e24]; and fewer medical errors and decreased mortality in hospitals [25]. Of these studies, Newsham et al. used an approach similar to this study by recruiting green and conventional office building pairs and measuring IEQ. They found an improvement in IEQ, a reduction in symptoms, and better reported sleep quality in the green

buildings [26]. A follow up paper by Colton et al. published since the time of our review found that in addition to fewer asthma symptoms, hospital visits and school absences were reduced in the green certified public housing development [27]. Comparisons of buildings in poor condition to green buildings provide an opportunity to see the biggest potential effect, but may falsely attribute benefits to certification.

As part of our efforts to determine the factors that drive better human health in buildings, we previously conducted a study in a controlled setting to investigate several IEQ factors e ventilation, CO₂, and VOCs e and their impact on cognitive function scores. We found significant impacts on human decision-making performance related to all three of these factors (Allen et al., 2015). Others have also found independent effects of ventilation, CO₂ and VOCs on cognitive function and other physiological responses at levels

Table 1

commonly found in indoor environments [19,28e31]. In this current study, we looked at buildings that are high-performing across these indicators of IEQ and investigated the potential for additional benefits of green certification on cognitive function, environmental perceptions, and health.

2. Methods

2.1. Study design - Overview

Workers from 10 office buildings in five U.S. cities (two buildings per city) were recruited to participate in a week-long assessment. 12 participants were initially recruited

from each building. Participants completed surveys about their health and environmental perceptions and took a cognitive test on the Tuesday and Thursday of the assessment. All buildings are high-performing buildings, defined as buildings surpassing the ASHRAE Standard 62.1e2010 minimum acceptable per person ventilation requirement and with low (<250 mg/m³) TVOC concentrations; however, six of the buildings were renovated to green via the LEED certification framework while the remaining four did not seek green certification during renovation [32].

2.2. Participant and building recruitment

The building assessments took place in urban areas of the following cities: Boston, Massachusetts (9/29/2015-10/2/2015); Washington DC (10/26/2015-10/30/2015); Denver, Colorado (11/9/ 2015-11/13/2015); San Jose, California (11/30/2015-12/4/2015); and Los Angeles, California (12/14/2015-12/18/2015 and 2/1/2016-2/5/ 2016). In each city, the buildings were matched strictly by tenant and loosely by age and size (Table 3). In the first four cities, the buildings were also matched by the dates of assessment, and the buildings were recruited such that one building was LEED-certified and the other not. The goal of matching was to select two highperforming buildings in each city that were as similar to each other as possible with the key distinction being that one pursued LEED certification. In the last city, Los Angeles, two green certified buildings were recruited and the assessments occurred on different dates due to an earlier enrolled building dropping out of the study prior to the assessment; a second building was subsequently recruited. The study team visited each building prior to the assessment to: 1) perform a an initial assessment of the heating, ventilation and air conditioning (HVAC) systems, 2) ensure that the building classification as high-performing was valid, and 3) recruit participants.

After obtaining permission from the building owner, building management and tenant, 12 participants were

recruited to participate in a five day health assessment in each building. Final

participant numbers by building are presented in Table 3. As mentioned previously, the same tenant was used in each city to ensure similar work functions, and all of the companies employ primarily knowledge workers (i.e. administrative, professional, technical and managerial positions). Asthmatics were excluded during recruitment. We did not restrict recruitment to select areas of each building to limit potential selection bias, but we are unable to demonstrate that our participants are representative of the building population. The study protocol was reviewed and approved by the Harvard T.H. Chan School of Public Health Institutional Review Board. All participants signed informed consent documents and were compensated \$100.

2.3. Building assessment

The building assessment consisted of three parts. First, the study team conducted an inspection of the building systems along with the building engineers from each facility. The study team recorded the type and condition of the systems, how they are typically operated, and the frequency of building commissioning tasks such as changing the filters. Second, the study team characterized each test space. The test spaces were defined by the unique ventilation zones in which the participants were located. The baseline assessment of the test spaces characterized the building, office and cleaning materials in the space; the air supply and exhaust strategies; and the environmental controls such as operable windows and thermostat set points. On each cognitive testing day, a separate assessment was conducted of the ventilation rates, noises, odors and occupancy in each test space. Lastly, the building manager was provided a survey asking about general building information, building policies, and utility costs. All elements of the building assessment were adapted from the EPA BASE study [33]. These elements were designed to assess the building as a whole rather than just the IEQ of the participant's workstations. The building

Credit	% Adoption	Credit adoption rates for select optional IEQ credits in 5490 LEED New Construction 2009 certified buildings (USGBC, 2016).
EQc2: Increased ventilation	40.9%	
EQc4.1: Low-emitting materials - adhesives and sealants	86.5%	
EQc4.2: Low-emitting materials - paints and coatings	94.4%	
EQc4.3: Low-emitting materials - flooring systems	79.1%	
EQc4.4: Low-emitting materials - composite wood and agrifiber products	58.6%	
EQc5: Indoor chemical and pollutant source control	40.7%	
EQc6.1: Controllability of systems e lighting	66.4%	
EQc6.2: Controllability of systems - thermal comfort	39.1%	
EQc7.1: Thermal comfort e design	79.4%	
EQc7.2: Thermal comfort e verification	59.2%	
EQc8.1: Daylight and views e daylight	19.5%	
EQc8.2: Daylight and views e views	38.3%	

assessments did not intend to validate the certification of building; therefore, we cannot say whether the green certified buildings still meet the criteria for certification nor whether the non-certified buildings would classify as a green certified building had they gone through the certification process at the time of the study. We anticipate that the organizations responsible for the non-certified buildings would seek certification if it was possible since the same organizations did obtain certification for the green certified buildings in our study.

2.4. Environmental assessment

A complete characterization of the IEQ in each test space was conducted on each cognitive testing day. Each participant was outfitted with a Netatmo Weather Station (Netatmo, BoulogneBellancourt) in their cubicle to measure temperature, humidity, carbon dioxide concentrations in parts per million (ppm), and sound levels (in decibels) every 5 min for each participant. The units were tested with 400 and 1000 ppm CO₂ calibration gas before and after the field campaign. If the sensor had drifted, the CO₂ data was adjusted first by the offset from the 400 ppm reading and second by a scaling factor to match the 1000 ppm reading of the instrument to 1000 ppm. This process corrected both the intercept and slope of the collected data to match experimentally derived values. The CO₂ data was then used to produce ventilation (cfm of outdoor air per person) and air exchange rates (ACH) for each participant-day of the study. For ventilation rate, the 90th percentile CO₂ concentration during occupied hours was taken as the steady-state concentration of CO₂ using the method described by Ludwig et al., and for air exchange rate, the decays curves of CO₂ were analyzed using the tracer gas method described in ASTM Standard E741-11 [34,35]. Briefly, when test spaces changed from fully occupied to unoccupied, the rate of decay of occupant generated CO₂ can be used to estimate air exchange rates using the validated methodology set forth by ASTM. These approaches have some limitations; for example, air from other zones with elevated CO₂ levels can bias air exchange rate calculations and assumptions about occupant CO₂ generation rates may be inaccurate.

Air sampling was performed for 62 common VOCs and 14 common aldehydes in each building in the test space with the most participants present during each cognitive testing day. VOCs were collected using summa canisters according to EPA method TO-15. Aldehydes were collected on an 8-h

integrated active air sample (0.4 L/min flow rate) according to EPA method TO-11. ALS Analytical Laboratories conducted the analyses of these samples (Cincinnati, OH). 25 VOCs and four aldehydes were not detected in any of the samples. Each test space was also equipped with at least one commercial sensor package (FengSensor, Tsinghua University, Beijing) to measure the same parameters as the Netatmo as well as light levels in lux and particulate matter less than 2.5 mm in diameter (PM_{2.5}) in mg/m³. These sensors were installed on the first day of the assessment (Monday) and collected on the final day of the assessment (Friday).

2.5. Health assessment

Participants were provided a Basis Peak Watch (Basis an Intel Company, San Francisco) for the duration of the assessment, which tracked the participants' heart rate, skin temperature, galvanic skin response, physical activity (i.e. steps and calorie expenditure) and sleep patterns (i.e. sleep duration, tossing and turning, number of interruptions). The participants also completed a series of questionnaires over the course of the study. The first was a baseline survey about their perceptions of their work environment and health. The second survey was completed each study day at the end of the workday, a total of five times for each participant, which asked about their environment and whether they experienced any of 19 sick building syndrome (SBS) symptoms on that day. A followup survey was completed on the final day of the study asking questions about the previous week, such as satisfaction with noise, lighting, thermal comfort and odors in their cubicle. These surveys were adapted from the EPA BASE study as well and used in our previous research on green buildings [30,33].

Cognitive function was assessed using the Strategic Management Simulation (SMS) software on Tuesday and Thursday at approximately 15:00. The participants completed two different scenarios to avoid potential learning effects, and the frequency of each scenario was balanced between green certified and non-certified buildings. The SMS tool is a validated, computer-based test that measures higher-order decision making ability across nine domains of cognitive function, ranging from basic activity levels to strategy. The SMS tool, and how to interpret scores in each cognitive domain, has been extensively described in the literature [36e38]. Briefly, the SMS tool immerses the participant in a 1.5 h long real-life

of which preceded a cognitive testing day. The average Sleep Score was 83.1% with a standard deviation of 19.7%. Sleep Scores and thermal comfort were added to the model in Equation (1) to test their effect on cognitive function. Analyses were performed using the open-source statistical package R version 3.2.0 (R Project for Statistical Computing, Vienna, Austria). 3. Results

The non-certified buildings and green certified buildings had similar air quality; the low CO₂, low TVOC and high ventilation rates indicate that the buildings were high-performing at the time of the assessment (Fig. 1). The ventilation rates exceeded the ASHRAE 62.1e2010 standard for 84% of participants, which could mitigate the buildup of airborne contaminants. The green certified buildings were on average brighter (374 lux vs. 163 lux), louder (51.8 dB vs. 48.9 dB), and drier (38.4% vs. 45.9%) than the non-certified buildings; however, only the difference in relative humidity was statistically significant (Fig. 1). Differences in humidity may be driven by the ventilation strategies in the green certified buildings, which more frequently had variable air volume ventilation systems and energy recovery ventilators (ERVs). In the cases when outdoor humidity was high, buildings with ERVs had lower indoor humidity levels.

Between-subject analyses were necessary to compare participants in different building classifications. Table 2 shows the demographic information for the participants in each building classification: the matching criteria resulted in the two groups having similar job classifications, gender and ages. The green certified buildings had a slightly larger percentage of white/ Caucasian participants and participants with a college or graduate degree. These buildings also had more participants at both the lower and higher end of the range of annual earnings. We added these variables as predictors to the cognitive function models to test if they influenced baseline cognitive abilities. While some of these variables had non-significant associations with cognitive test scores, the effect estimate of building classification did not change when these parameters were added to the model, indicating that the findings are not a result of residual confounding.

The impact of building classification on each domain of cognitive function is summarized in Fig. 2. On average, participants in the high-performing, green certified buildings scored 26.4% (95% CI: [12.8%, 39.7%]) higher on the SMS cognitive test than those in the high-performing,

non-certified buildings (p-value < 0.001). Cognitive scores were statistically significantly higher for 7 of the 9 domains with the largest impacts on crisis response, applied and focused activity level and strategy. No differences in scores were seen for basic activity level or information seeking. For the average scores, the model's R² was 0.28, indicating that 28% of the variability in cognitive function scores is explained by the building classification alone.

Of the IEQ parameters assessed in the buildings, the largest differences were seen for relative humidity. The non-certified buildings were more frequently outside the ASHRAE Standard 55 thermal comfort zone than the green certified buildings due to their higher humidities (Fig. S1). Both building classifications had participant-days where the building was too cold to comply with

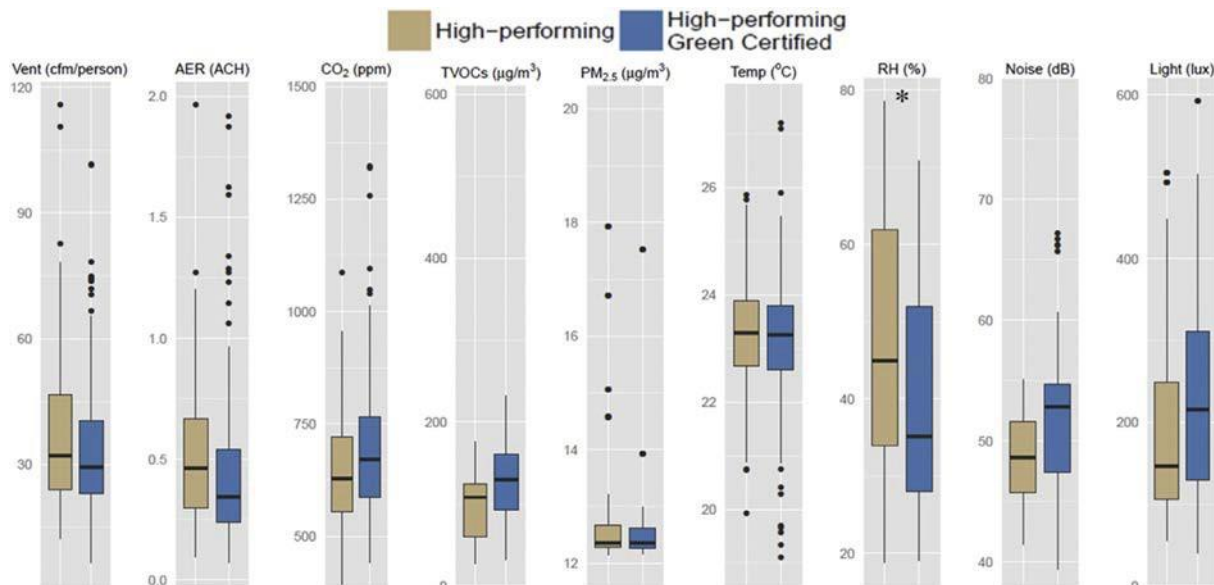


Fig. 1. Boxplots of indoor environmental quality (IEQ) parameters in high-performing, non-certified buildings and high-performing, green certified buildings. Vent, AER, CO₂, Temp, RH and Noise are measured by the Netatmo in every workstation each day, TVOCs are measured with summa canisters in every test space each cognitive testing day, and PM_{2.5} and Light are measured by the Feng Sensor in every test space each day. An asterisk (*) denotes that the building classifications are statistically significantly different from each other for that IEQ parameter after adjusting for clustering by building.

ASHRAE Standard 55. After controlling for building classification, participants scored 5.4% higher on the cognitive tests, averaged across the nine domains of cognitive function, on days when they took the SMS test within the thermal comfort zone than when they

Total Annual Earnings <\$50,000

	34%	13%
\$50,000-\$75,000	21%	41%
\$75,000-\$100,000	10%	21%
\$100,000-\$150,000	27%	18%
>\$150,000	7%	8%

* Includes 2 participants in green certified buildings and 1 in non-certified buildings who did not complete the baseline survey.

took it without (Fig. 3). This finding is not statistically significant at the 95% confidence level.

Previous night's sleep was also associated with cognitive function scores. A 25% increase in Sleep Scores was associated with a 2.8% increase in cognitive function scores. Sleep quality was influenced by day-time exposures in the office: participants in the green certified buildings had 6.4% higher Sleep Scores than those in the non-certified buildings. This may be in part a result of higher light levels in the green buildings; a 300 lux increase in illuminance during the day was associated with a 2.9% increase in Sleep Scores that night. However, these findings are not statistically significant (Fig. 3).

In addition to improved cognitive function scores, participants in green certified buildings reported better environmental perceptions and fewer symptoms than those in non-certified buildings. Participants in green certified buildings were generally more satisfied with daylighting and electrical lighting in their workspace, and less frequently reported the temperature being too hot or too cold, the air movement being too much or too little, the air being too dry or too humid, and the presence of chemical, tobacco and other odors (Fig. S2). These

Table 2

Demographic breakdown of participants in each building classification.

	High-Performing Green Certified	High-Performing Non-Certified
Number of Participants ^a	69	40
Gender Male	55%	54%
Female	45%	46%
Age 20-30	39%	28%
31-40	21%	33%
41-50	21%	15%
51-60	18%	15%
61-70	1%	8%
Ethnicity		
White/Caucasian	70%	56%
Black or African American	6%	10%
Asian	7%	8%
Latino	7%	13%
Other	9%	13%
Highest level of Schooling		
High School Graduate	0%	10%
Some College	12%	26%
College Degree	63%	49%
Graduate Degree	25%	15%
Job Category Managerial	22%	10%
Professional	45%	54%
Technical	6%	18%
Secretarial or Clerical	18%	15%
Other	9%	3%

perceptions are linked to varying degrees to the monitored IEQ in the spaces. For example, relative humidities were 15.9% higher when participants reported the air was too humid and 9.3% lower when they reported the air was too dry. Importantly, for the same change in monitored IEQ conditions, participants in the green certified buildings report a larger improvement based on environmental perceptions. Lastly, participants in the non-certified buildings reported 0.5 (30%) more symptoms each day than those in the green certified buildings. Symptom counts are higher when participants report an issue with environmental conditions. Environmental perceptions and total symptom counts were not associated with cognitive function scores when introduced into the mixed effect models.

4. Discussion

Previous research by our team, and others, has identified

Table 3

Building characteristics of the 10 high-performing buildings included in the study.						
City	Type	Size (sq. ft)	Year of Construction	Type/Year of Certification ^a	Ventilation Strategy ^b	Number of Participants
Boston	Non-Certified	<50,000	1929	NA	CV, RC	12
Boston	Certified	<50,000	1929	LEED EB v3 Platinum in 2012	VAV, SP	12
DC	Non-Certified	>500,000	1935	NA	VAV, RC	11
DC	Certified	>500,000	1917	Pending	CV, SP	12
Denver	Non-Certified	50,000e100,000	1938	NA	CV, RC	8
Denver	Certified	50,000e100,000	1938	LEED CI v3 Silver in 2011	CV, RC	12
San Jose	Non-Certified	50,000e100,000	1971	NA	CV, RC	9
San Jose	Certified	>500,000	1934	LEED EB v3 Gold in 2015	VAV, RC	12
Los Angeles	Certified	<50,000	1953	LEED EB v3 Platinum in 2013	VAV, RC	11
Los Angeles	Certified	<50,000	1929	Pending	VAV, RC	10

^a EB ¼ Existing Buildings, CI ¼ Commercial Interiors.
^b CV ¼ Constant Volume, VAV ¼ Variable Air Volume, SP ¼ Single pass with energy recovery ventilator, RC ¼ Partial recirculation with reheat.

IAQ as a key driver of cognitive function. In particular, CO₂, TVOCs, and ventilation all have independent impacts on cognitive function, even at levels deemed to be acceptable by the relevant codes and standards [19,28,29,39]. Many office buildings on the market now fit the classification as high-performing by surpassing the ASHRAE Standard 62.1 ventilation requirement and having low TVOC concentrations (<250 mg/m3). The findings of this study indicate that even among high-performing buildings that meet these IEQ criteria, additional benefits to cognitive function and health may be achieved by seeking green building certification. Participants in high-performing, green certified buildings had better environmental perceptions, 30% fewer sick building symptoms, 26.4% higher cognitive function scores and 6.4% higher Sleep Scores than participants in the high-performing, non-certified buildings even after controlling for annual

earnings, job categories, and level of schooling. The reduction in self-reported symptoms and improvements in environmental perceptions support previous research in green buildings [23,24,27,30,42]. Participant's environmental perceptions do track actual IEQ conditions, but participants in green certified buildings are more likely to have a positive response even when IEQ conditions are the same. This observation, along with participants reporting more symptoms when they report problems with environmental conditions, highlights the limitations of using subjective metrics when assessing building performance or occupant wellbeing. For the cognitive function results, some of the domains that had the largest differences in scores (crisis response, information usage, and strategy) are the most highly correlated with other measures of productivity such as salary at age [36]. This aligns with Allen et al. that found these same domains to be the most impacted by CO₂, TVOCs and ventilation. By

comparison, lowering TVOC concentrations from ~580 mg/m3 to ~40 mg/m3 caused a 61% increase in cognitive function scores in that study compared to 26.4% increase from working in a green certified building in this study.

While much of the effect of green certification on cognitive test scores is unexplained, the effect may be partly attributed to several IEQ parameters. The green certified buildings were generally less humid than the non-certified buildings, and as a result a larger proportion of participants in these buildings were in the thermal comfort zone defined by ASHRAE 55 (Fig. S1). Participants outside this thermal comfort zone scored 5.4% lower on the cognitive simulations, but the finding was not statistically significant. The detriments to cognitive function align with previous research on

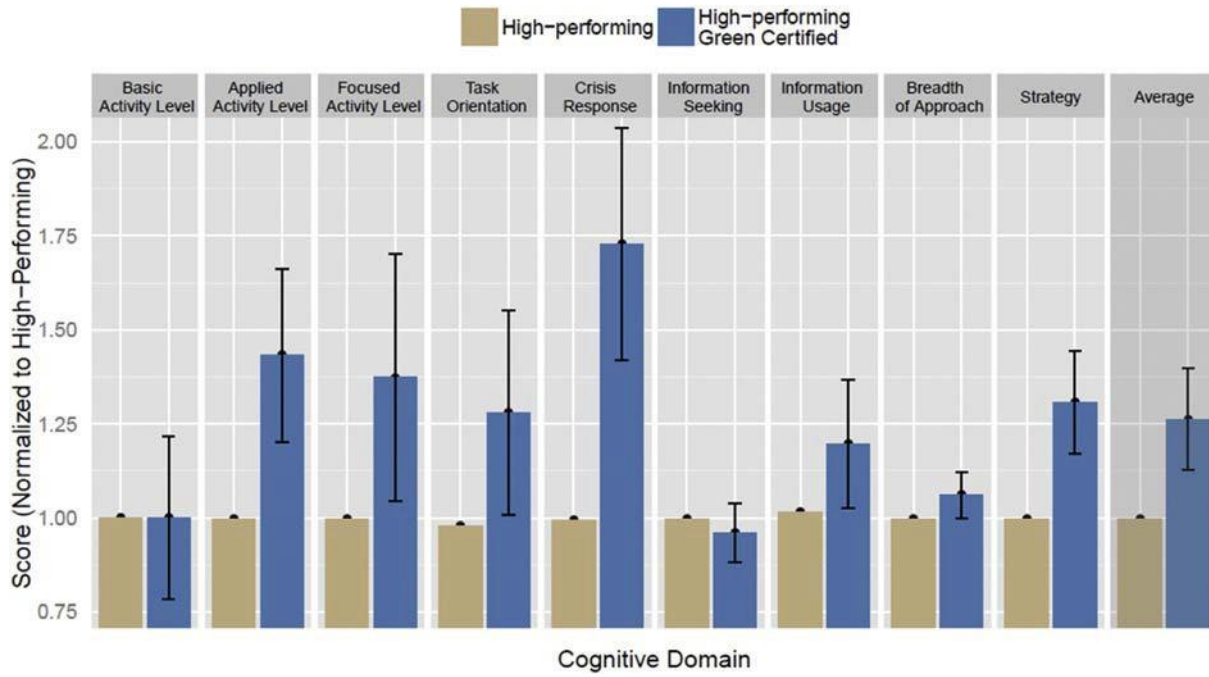


Fig. 2. Cognitive scores and 95% confidence intervals for each domain of the SMS tool after controlling for participant, normalized to high-performing buildings, for participants in high-performing and high-performing, green certified buildings.

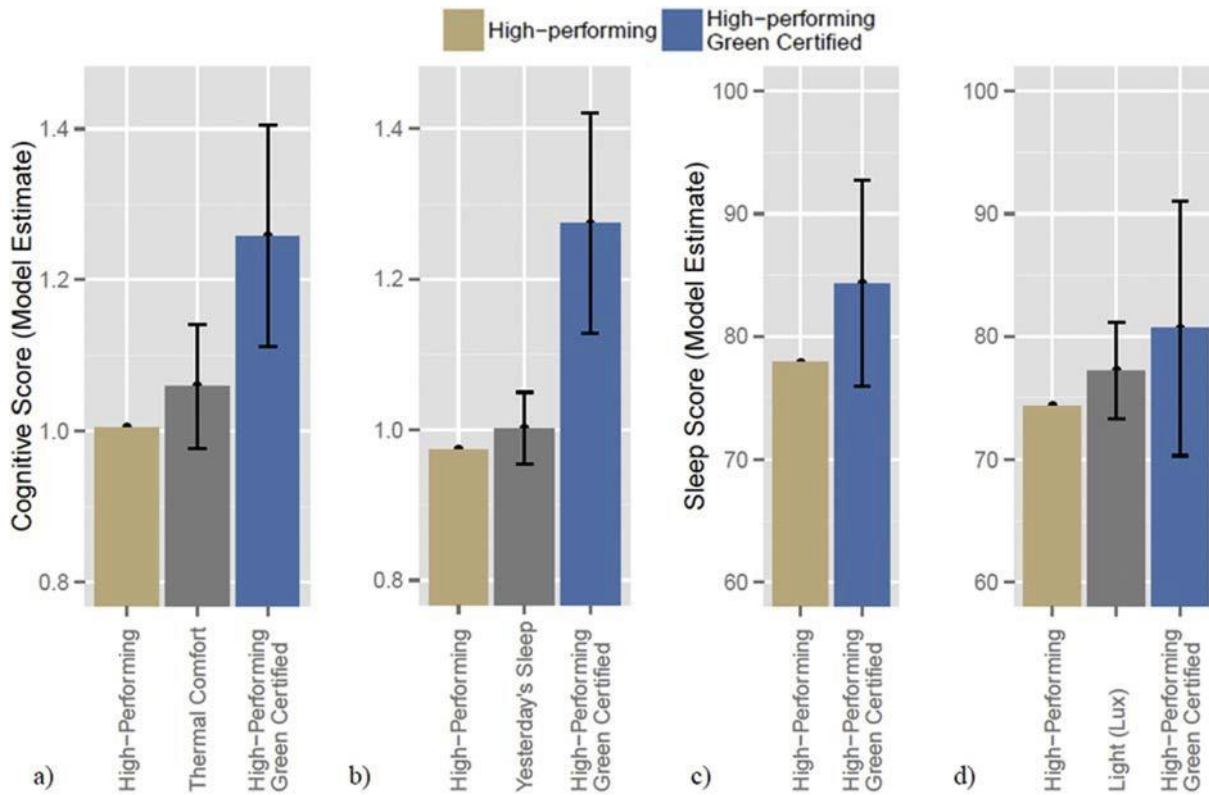


Fig. 3. Effect of a) thermal comfort on cognitive function scores, b) yesterday's sleep on cognitive function scores, c) building classification on Sleep Scores, and d) light levels on Sleep Scores, using generalized linear mixed effect models with 95% confidence intervals, treating building and participant as random effects. The effect size for thermal comfort is comparing cognitive scores from tests taken by participants within the ASHRAE Standard 55-2013 comfort zone to those without. The effect sizes for yesterday's sleep and light correspond to a 25% change in Sleep Score and 300 lux change in illuminance respectively.

thermal conditions and performance. In a review of 24 papers, Seppanen et al. found that work performance was optimized at temperatures within the ASHRAE Standard 55 zone, and that the benefits were seen using various different indicators of cognitive function ranging from simple cognitive tests to objectively reported work performance [43]. The impacts on the SMS tool indicate that high order decision-making may also be affected by these exposures.

Not surprisingly, our study suggests that previous night's sleep is a driver of cognitive function scores. More interesting is that better Sleep Scores were associated with better lighting conditions in the building. This is biologically plausible, considering previous research linking exposure to daylighting or blue-enriched lighting before sleep to sleep repression. Warmer light colors, such as those at dusk, trigger the body to release melatonin, which has a fatiguing effect, and late-night screen use can delay or suppress the release of melatonin [44]. Similarly, a larger contrast between daytime light exposures and nighttime light exposures leads to a larger amplitude in daily melatonin secretion cycles [45]. Daylighting and blue-enriched lighting during the day helps align the body's circadian rhythm and improve sleep quality at night [12]. This effect was observed in our study: brighter lighting in the office during the day was associated with higher Sleep Scores at night, and participants in the green certified buildings, which were generally brighter, had 6.4% higher Sleep Scores than those in the non-certified buildings. This finding supports previous research by Newsham et al. on sleep quality in green buildings [26].

Investigating real-world office buildings, as opposed to a simulated environment, posed several limitations on the study. First, the case-control study design required between-subject comparisons. To minimize baseline differences in cognitive function, we matched the buildings by tenant and job categories. Adding annual earnings, level of education, and job category to our models did not influence the effect size of building classification on cognitive function scores, nor were these factors statistically significantly associated with cognitive scores. Second, the environmental conditions were variable between buildings and could not be modified by the study team. The variability in exposures also limits the ability for the factors we did measure to produce a quantifiable effect. Third, missing data for some outcomes, such as sleep, reduced the power of those analyses. Fourth, while the sample size of participants was sufficiently powered, factors that vary on building level, such as ventilation system type, have a sample size of 10 and were underpowered. With this sample size we were not able to identify which individual green credits were drivers of better performance, nor were we able to obtain the same level of building-related design data from the non-certified buildings (precisely because they did not go through the certification process). As such, it is possible that green certification in our study may simply be a proxy for more relevant indicators of building performance. Fifth, we assessed the IEQ of the workstations of our participants, which may not be representative of the building as a whole. During our building assessment, we did not observe major differences in building systems, operation or maintenance for areas of the building in which we did not have participants. As the buildings were all high-performing, the results of the study may not be representative of conventional or problem buildings. In addition, the study population is representative of the general population of knowledge workers and may not be generalizable to other worker populations.

The findings in this study hint at the complexity of understanding all of the building related factors that can influence human health and performance. The measured IEQ variables only accounted for part of the impact of green certification on productivity and health. Other aspects of the green certification process such as commissioning of building systems, 3rd party reviews of IEQ performance, and the commitment to sustainability and health of owners and building managers may play a role in how occupants perceive and perform in a building. Here, we advocate for a holistic, "buildingomics" approach. Omics research describes efforts to understand the totality of a given research field, currently best exemplified by genomics research

and the ambitious undertaking of the Human Genome Project. This has spurred a set of related omics research areas: transcriptomics, proteomics, metabolomics, epigenomics. And, in the field of exposure science, the relatively new and equally challenging efforts to characterize human exposures over the course of a person's lifetime as the exposome [46]. We now propose "buildingomics" to capture the complexity of the research of health in buildings. "Buildingomics" is the totality of factors in indoor environments that influence human health, well-being and productivity of people who work in those spaces. The primary challenge is that buildings serve a variety of purposes and the potential exposures span several fields of study; thus multi-disciplinary teams that include building scientists, exposure scientists, epidemiologists, toxicologists, materials scientists, architects, designers, and social/behavioral scientists are necessary to characterize all the building-related factors that influence health in buildings.

5. Conclusions

Our findings show that in high-performing buildings additional benefits to health and productivity may be obtained through green certification. In a sample of 10 high-performing buildings, participants in green certified buildings had 26.4% higher cognitive function scores, better environmental perceptions and fewer symptoms than those in high-performing, non-certified buildings. This outcome may be partially explained by IEQ factors, including thermal conditions and lighting, but the findings suggest that the benefits of green certification standards go beyond measureable IEQ factors. Building-level factors may play an important role in occupant health and cognitive function yet have been largely overlooked. We describe the need for a holistic, "buildingomics" approach to studying the drivers of human health and performance in buildings.

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Appendix A. Supplementary data

Supplementary data related to this article can be found at <http://dx.doi.org/10.1016/j.buildenv.2016.11.041>.

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Appendix 2: Tampa Bay Times Article

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Investor buys 11-story office building in downtown Clearwater

 Charlie Frago, Times Staff Writer
Tuesday, October 1, 2013 5:06pm
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CLEARWATER— A Latvian-born Water's Edge penthouse condo resident made a splash last year when he bought retail space at the base of the tower. Now he's expanding his reach downtown, snapping up the 11-story Bank of America building on Cleveland Street.

Daniels Ikajevs, 32, didn't immediately return a call for comment on the \$7.3 million purchase. But downtown boosters and city officials believe that local ownership of the landmark property at 600 Cleveland Street is good news for downtown.

Clearwater's City Council appears poised to strike a deal to help Ikajevs better market his new property.

"We're certainly hopeful that Ikajevs becomes more of a permanent owner, as opposed to a 'lease-up and sell' transitional owner and is more involved in the overall strategy for downtown," said Rod Irwin, assistant city manager for economic development.

Irwin said Ikajevs bought the building from a Texas bank that specializes in buying foreclosed properties and attracting enough tenants to make them attractive buys. Right now, the 145,000-square-foot office building is about 70 percent leased.

Ikajevs "seems to be interested in becoming a player in downtown development," said Irwin.

One hurdle was adequate parking. On Monday, the City Council advanced a plan to lease 78 spaces in the city-owned Garden Avenue garage across the

street to Ikajevs for \$2,500 a month. In exchange, the city will get after-hours and weekend access to about 50 surface lot spots owned by Ikajevs.

The final vote is scheduled for Thursday's council meeting.

Ikajevs' latest buy is just the tip of the iceberg for downtown, said Bill Sturtevant, chairman of the Clearwater Downtown Partnership.

"We've got major, major investors who have taken a very strong interest in downtown. It's what we've all been waiting for," Sturtevant said.

As many as four other investors are looking at downtown parcels. They like what they see, especially the year-end opening of a refurbished Capitol Theatre, but want some answers on limited parking options, Sturtevant said. He declined to identify the other investors.

Possible new tenants for the Bank of America building include a "blend" of tech firms and support services for the tech industry, Irwin said.

Downtown planners and boosters hope to expand a tech sector that already employs several hundred workers. In June, the City Council picked a developer to build hundreds of high-end apartments and retail space in Prospect Lake, just east of downtown. They hope the development will help keep the young, highly-paid workers spending their leisure time and money in Clearwater instead of commuting to Tampa or St. Petersburg.

Earlier this year, Ikajevs bought 10,000 square feet of ground-floor retail space in Water's Edge next to City Hall, where he said he planned to open a gelato shop. The shop hasn't opened yet.

Ikajevs also bought five storefronts along the 500 block of Cleveland Street, the former home of Peter Gillham's Nutrition Center. He told the *Tampa Bay Times* at the time that he hoped to renovate and lease the storefronts in time for the Capitol Theatre's opening, now slated for December. They are still shuttered.

A native of Latvia, a Baltic nation formally controlled by the Soviet Union, Ikajevs has lived in the area for more than a dozen years. He told the *Times* in April that because he is foreign-born and interested in buying downtown property, people often assume that he is a Scientologist. Ikajevs said he doesn't belong to the church.

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