

# **FLEXXX**



**A STUDY OF FLEXIBILITY IN OUTPATIENT SETTINGS**

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**A FOLLOW-UP TO THE CLINIC 20XX SERIES**

**Supported By:**

**CADRE** | Center for Advanced Design  
Research and Evaluation

**HKS**

**Steelcase**

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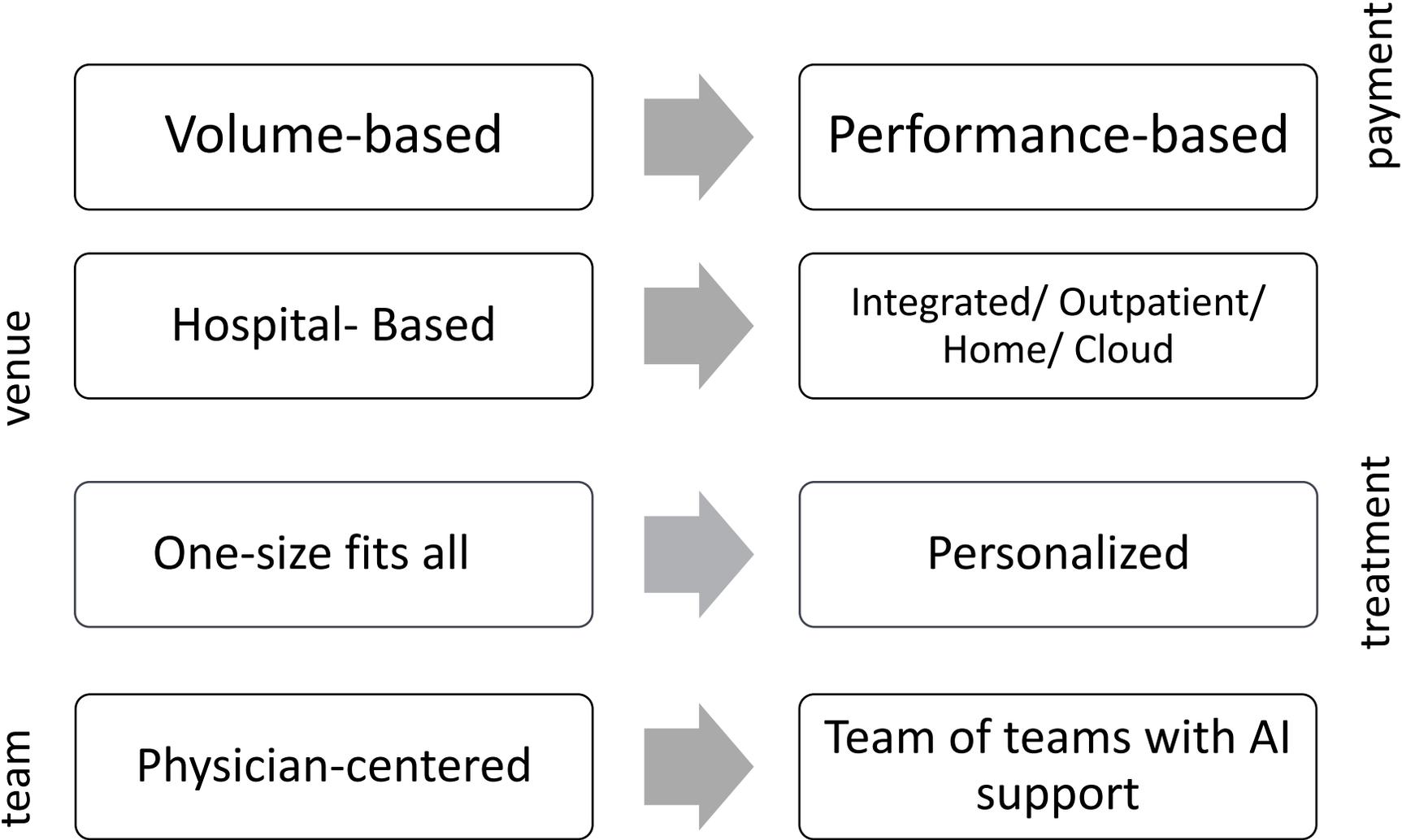
**Michelle Ossman, PhD, MSN**

Director of Healthcare Environments, Steelcase

Health

# The Challenge

# The Shifting Healthcare Landscape



**How do we design for change-  
without a crystal ball?**

Clinic 20XX: Designing for an  
Ever-Changing Present



# 05 DRIVERS

## 06 | DISASTER PREPAREDNESS?

### 01 | SYSTEM



more access.  
more accountability.

### 02 | PATIENT



chronic conditions,  
consumer expectations.

### 03 | PROVIDER



physician shortage,  
extender/team increase.

### 04 | FIELD



advanced diagnostics, precise &  
precision medicine.

### 05 | TECHNOLOGY



technology boom, big data and  
sophisticated construction

## DRIVING CHANGE

# TRENDS



## **mHealth/Telehealth**

health at hand,  
remote access



## **Care Coordination**

coordination between patients,  
providers and systems for  
efficient patient care and work  
flow



## **Population Health**

community-based, whole  
person health with regional  
health goals



## **Retail Health**

demand-focused,  
choice-based health for  
extensive and  
immediate reach

## **+ Home Health**

# RESPONDING TO CHANGE

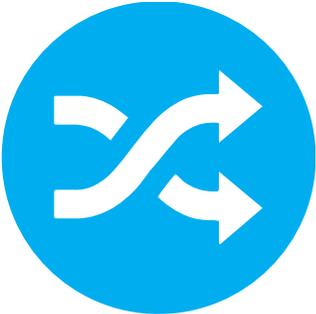
# Three Tenets of 20XX

## Connectivity



Clinics have to be positioned to have connectivity regionally to their constituents and systemically to the larger health information systems.

## Flexibility



Flexibility to adapt has to be considered at multiple scales ranging from site and building planning to wall systems and furniture.

## Sense of Place



A sense of place that promotes health and wellbeing, and is inclusive of different physical abilities and generational preferences can be a differentiator. Spending time knowing the people we are designing for is key.

## Research Objectives

To develop a framework to address flexibility in outpatient clinic settings, by looking beyond the healthcare context, in order to create change-ready facilities.

# Methodology



**What does the literature tell us?**

# Lifespans

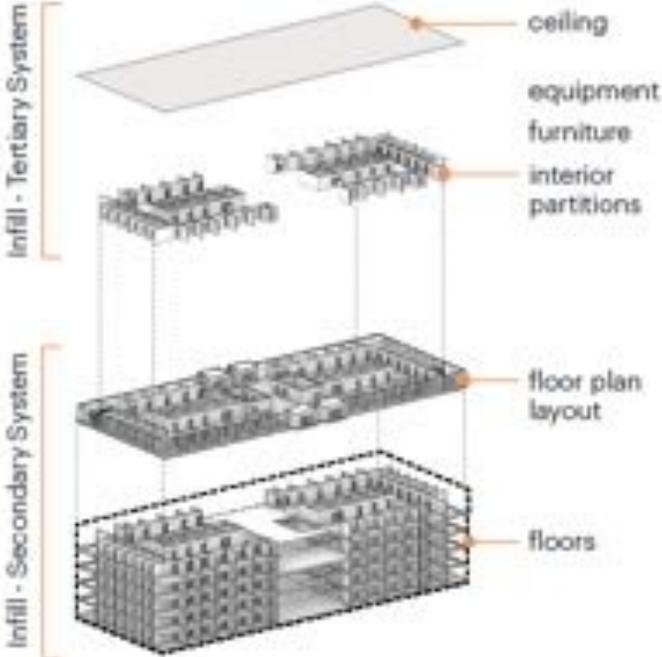
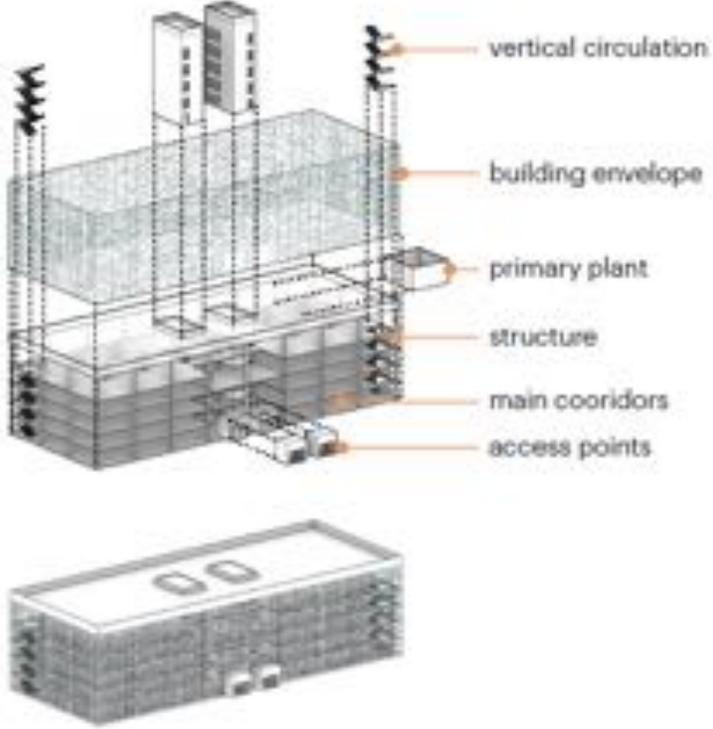
## BUILDING LIFESPAN AND SYSTEMS



Information Source: Kendall [10]

# Building Systems

## BASE BUILDING - PRIMARY SYSTEM



# Strategies

1. Master planning for future expansion
2. Loose-fit design promoting extra sq. ft. for future changes
3. Adaptable flexibility for multiple functions
4. Convertible flexibility for a new permanent use
5. Robust utilities having extra capacities for the future
6. Plug-and-play infrastructure to minimize interruption during future construction

The Joint Commission. (2008). Health care at the crossroads: Guiding principles for the development of the hospital of the future. Retrieved from [https://www.jointcommission.org/assets/1/18/Hospital\\_Future.pdf](https://www.jointcommission.org/assets/1/18/Hospital_Future.pdf)

# Frameworks

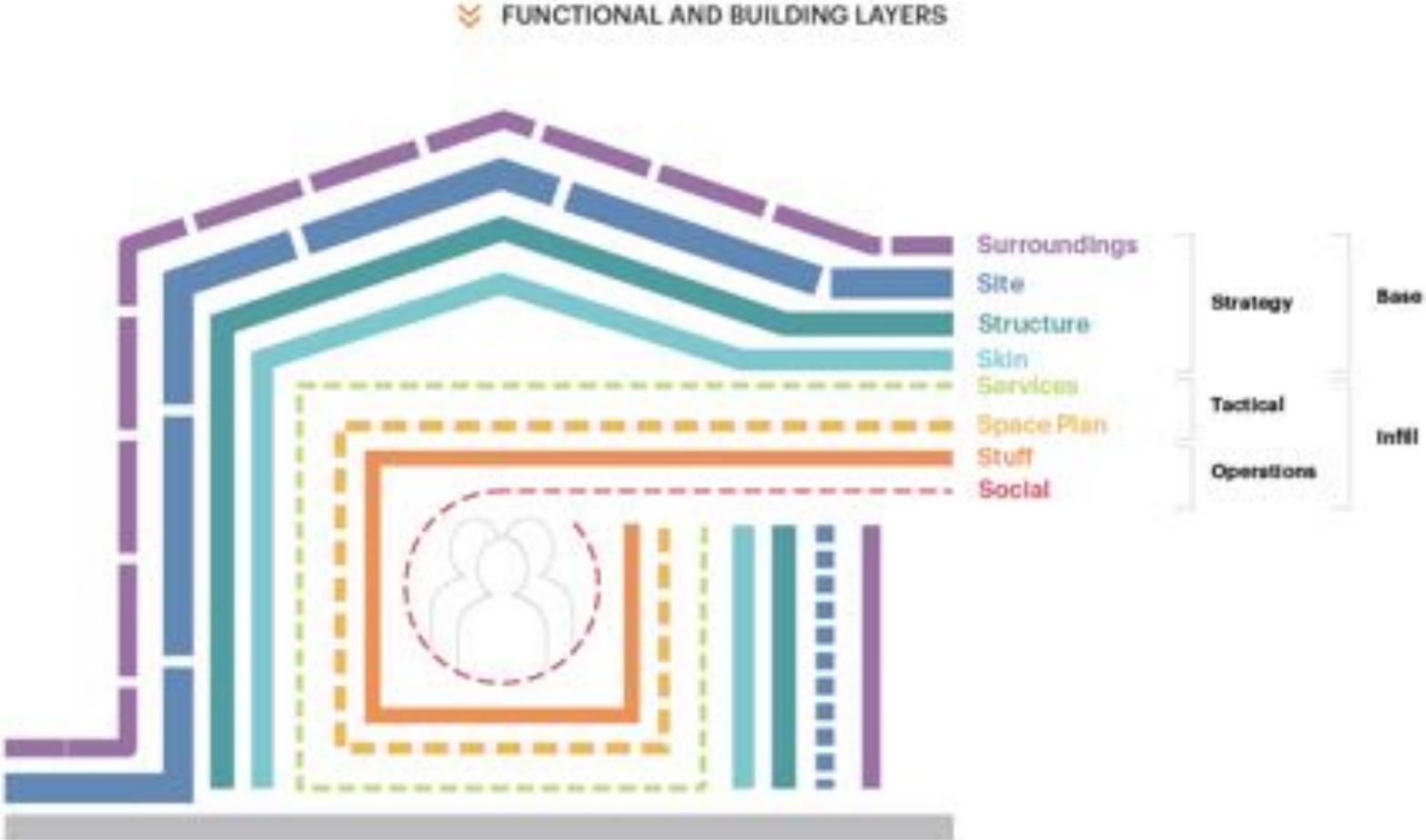
PERSPECTIVE	DEFINITION	CITATION
<b>Attributes</b>	The different attributes of flexibility such as Fluidity, Versatility, Modifiability, Convertibility, and Scalability.	Monahan, 2002
<b>Soft / Hard</b>	Hard space has limited change options from the design. Soft space has open options for the user.	Pressler, 2006
<b>Temporal</b>	The lifespan of building components such as short and long as well as: Primary (100 years), Secondary (20 years), and Tertiary (5-10 years).	Kendall, 2005
	Operational - day-to-day; fast change Tactical - months away; slow change Strategic - years away; infrastructural change	de Neufville, et al., 2008
<b>Base/Infill</b>	Primary purpose is differentiating the main macro systems of a building as the base building and the micro systems within it as the infill.	Kendall, 2000, 2011 Capolongo, 2016
<b>Building Layers</b>	Specific layers that make up the building. Referred to as shearing layers such as: Social, Stuff, Space Planning, Services, Skin, Structure, Site, Surrounding	Shuchi, 2012 Adaptable Futures, 2017

# Keeping it Simple: Four Attributes



Information Source: Monahan [14]

# Seven Layers

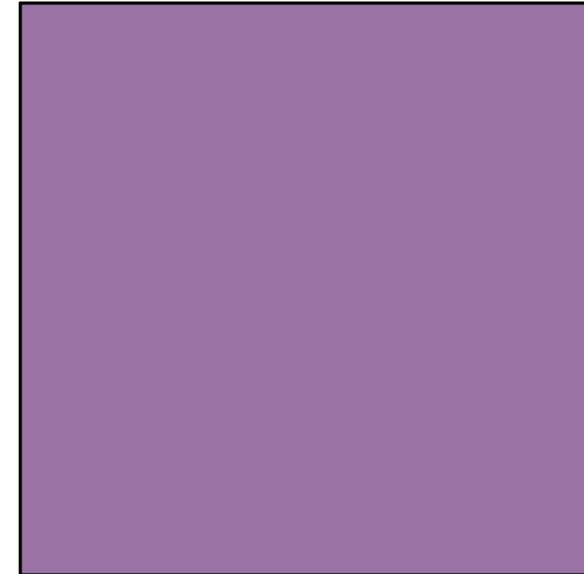


Adapted from *Adaptable Futures* [1] and *Pressler* [18]

# Versatility

“I can do different things in it”

Versatility in a building is defined as the ability or intention for a space to be used for multiple and different functions with limited or zero change to tangible building attributes, where the user has agency.



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# Versatility

Structure

## Crown Hall

(Mies Van Der Rohe)

Column free space supported by a suspended roof structure; designed for multiple uses - exhibitions, studios, lectures and events

*Image Courtesy of Taylor Chan*



# Versatility

Surroundings

## U.S. Bank Stadium

Designed as a multi-purpose venue and surrounding site, aims to enhance landscape and culture of the community

*Image Courtesy of HKS, Inc.*



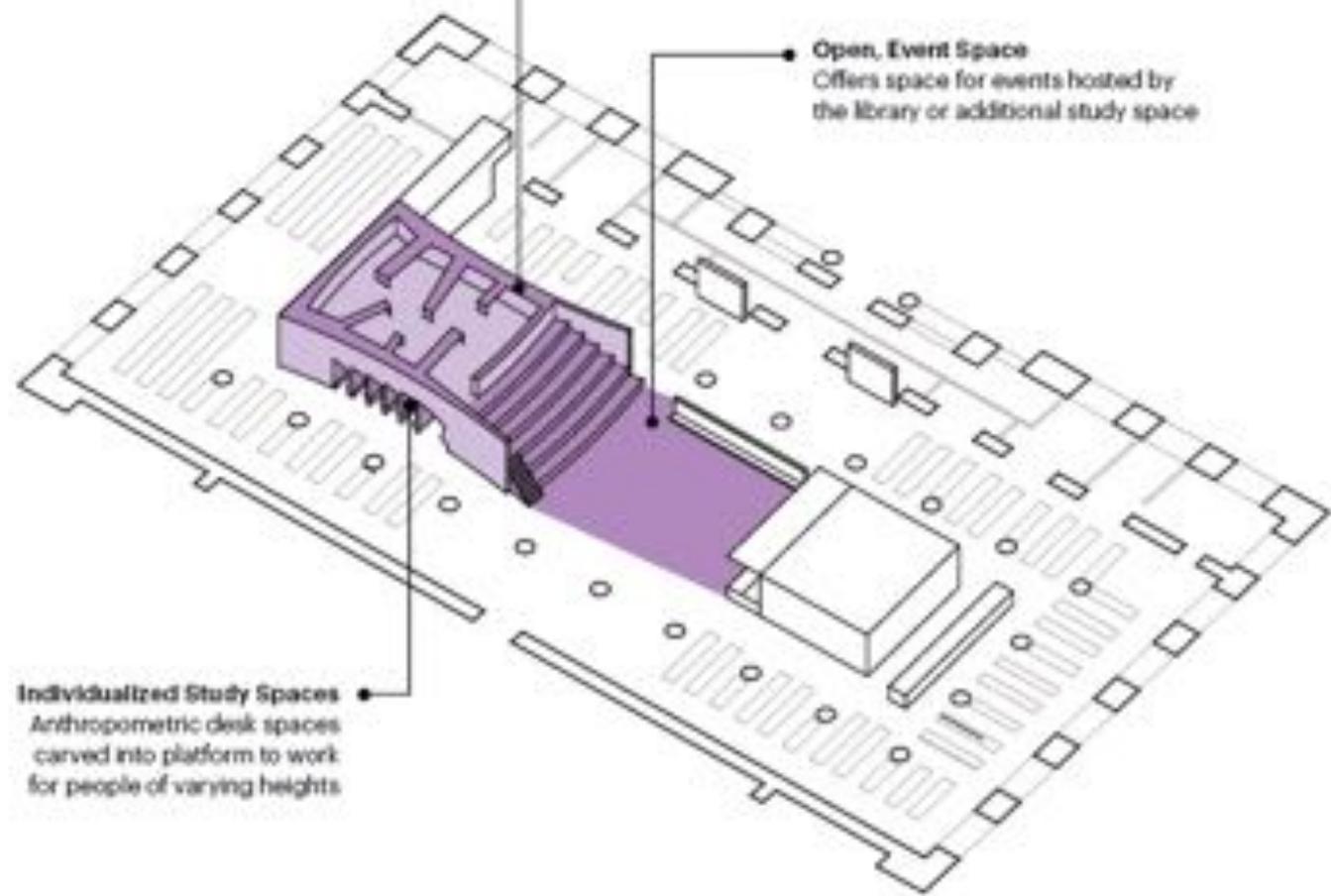
## VERSATILITY

ALLOWS MULTIPLE USES

BUILDING LAYER	EXEMPLAR
<b>Social</b> People, flow Page Courtesy of Gehl Design	<b>Muggers Centre</b> Focused on social connection and community building 
<b>Staff</b> Furniture, fixtures, equipment Page Courtesy of Westline	<b>Emboad</b> Designed for clinical needs – its approachable, refined design makes it applicable in other spaces as well 
<b>Space Planning</b> Page Courtesy of HOK, Inc.	<b>Texas Scottish Rite Hospital for Children North Campus</b> Standardized patient rooms and core work spaces that are equipped for any clinical needs 
<b>Services</b> MEP Page Courtesy of HOK, Inc.	<b>Dartmouth Medical Center at the University of Texas</b> HVAC equipment serving patient rooms installed in-corridor for interruption free maintenance and room layout changes 
<b>Skin</b> Building envelope Page Courtesy of Spanish Gardens	<b>Marshall One Gonzalez Hospital</b> Double skinned facade helps clean polluted air and is a solar gain blocker 
<b>Structure</b> Page Courtesy of Skidmore	<b>Crown Hall</b> Column-free space supported by a suspended roof structure, designed for multiple uses – exhibitions, studios, lectures and events 
<b>Site</b> Page Courtesy of HOK, Inc.	<b>UCSD North Torrey Pines Living and Learning Neighborhood</b> Open, green space allowing for various outdoor activities, prominently located on-site 
<b>Surroundings</b> Master planning Page Courtesy of HOK, Inc.	<b>U.S. Bank Stadium</b> Designed as a multi-purpose venue and surrounding site, aims to enhance landscape and culture of the community 

**Multi-purpose, Elevated Platform**  
 Large furniture piece carved for different functions, like studying, with large steps offering auditorium seating

**Open, Event Space**  
 Offers space for events hosted by the library or additional study space

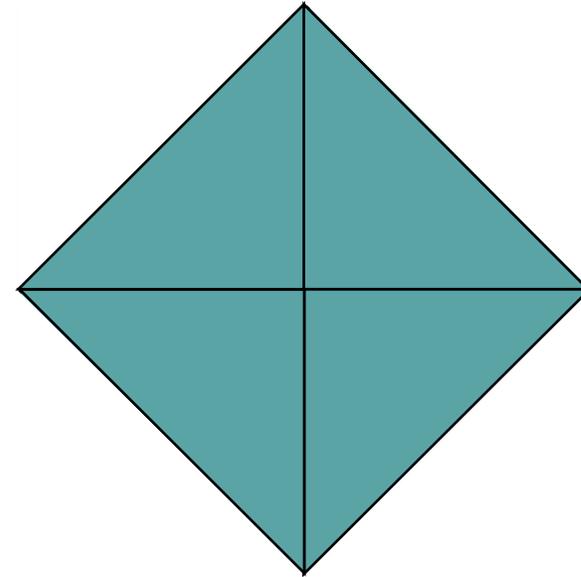


**Individualized Study Spaces**  
 Anthropometric desk spaces carved into platform to work for people of varying heights

# Modifiability

“I can change it”

Modifiability in a building is an attribute that welcomes interaction from the user to physically change to a desired function within the space.



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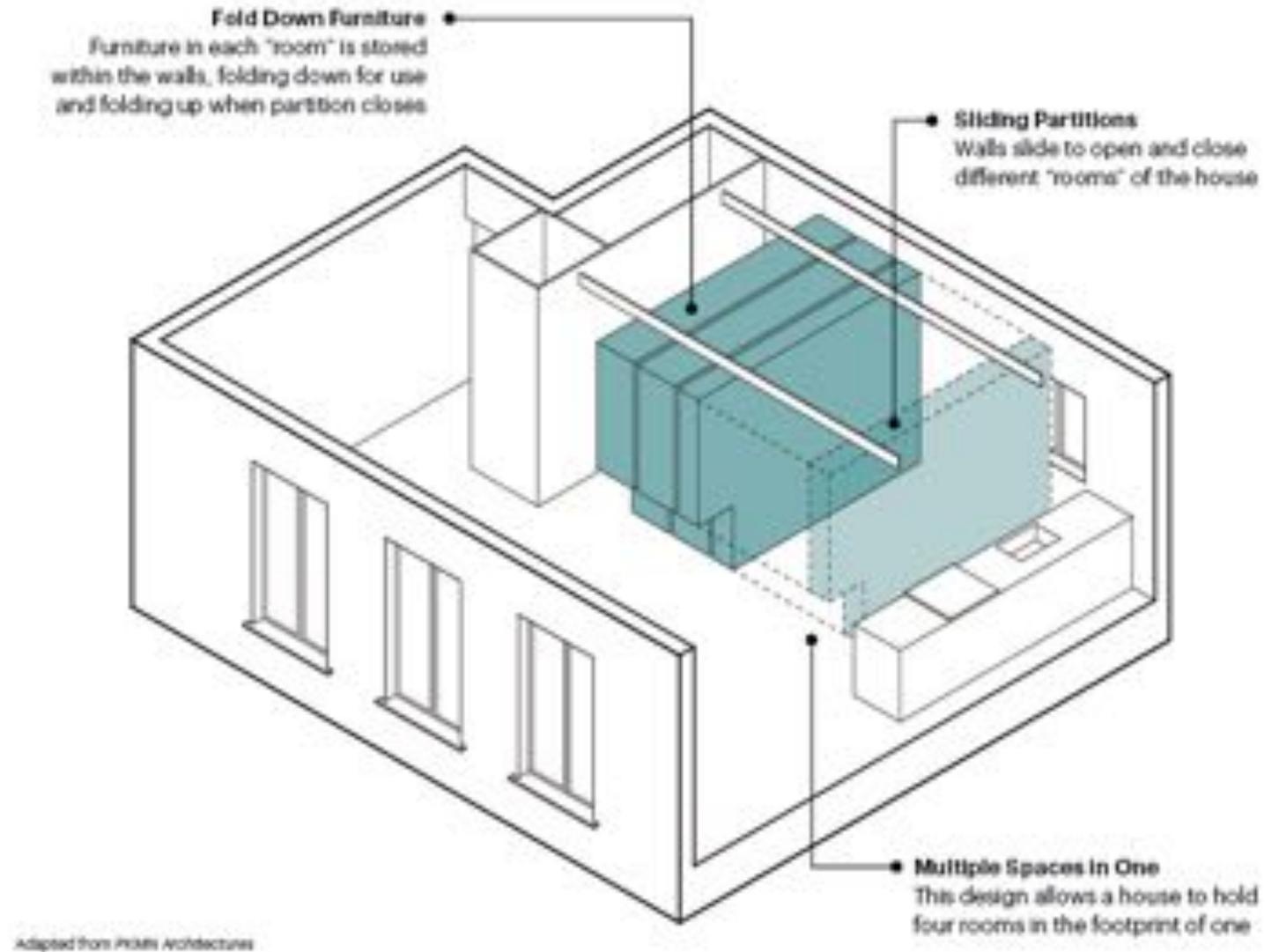


# Modifiability

“I can change it”

“All I Own House”

By PKMN Architectures



# Modifiability

Stuff

**Norton Women's & Kosair  
Children's Hospital (NICU)**

Mobile walls for desired privacy



*Image Courtesy of HKS, Inc.*

# Modifiability

Skin

## Al Bahr Towers

(architect: AHR)

Computer-controlled, dynamic screen system, responding to the movement of the sun to avoid solar gain and glare

*Image Source: Getty Images*



# Modifiability

Site

## ProMedica Corporate Headquarters

This campus has an open, adjacent, green space that can host farmer's markets, festivals, temporary art installations, and movies in the park

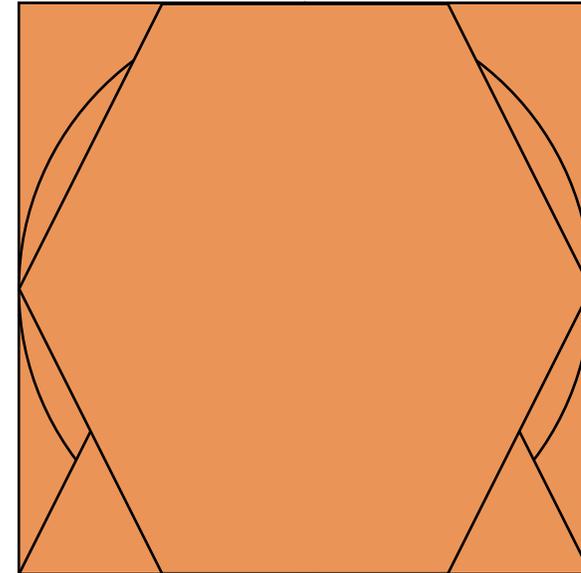
*Image Courtesy of HKS, Inc.*



# Convertibility

“It can change”

Convertibility in a building is defined as the ability to replace the infill, while keeping the base building the same, in order to adapt for a new purpose.



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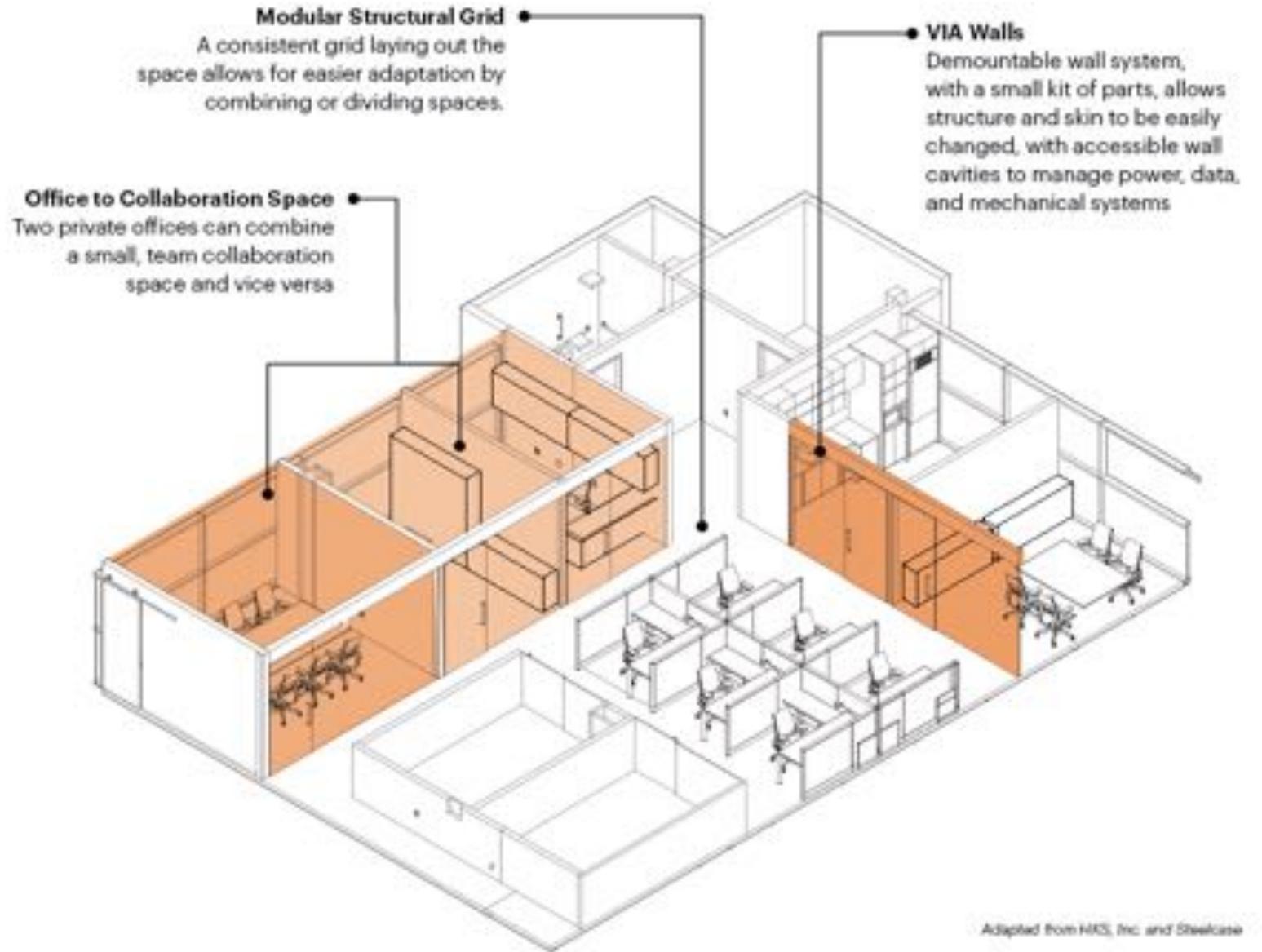
# Convertibility

“It can change”

Phoenix Children’s Hospital  
Administration Building

Design by HKS, Inc.

VIA Wall System by Steelcase



Adapted from HKS, Inc. and Steelcase

# Convertibility

Stuff

Modular casework installed on a rail system, allowing cabinetry to be moved, changed, and reconfigured with minimal dust and disruption

*Image Courtesy of Steelcase*

**Convey by Steelcase**



# Convertibility

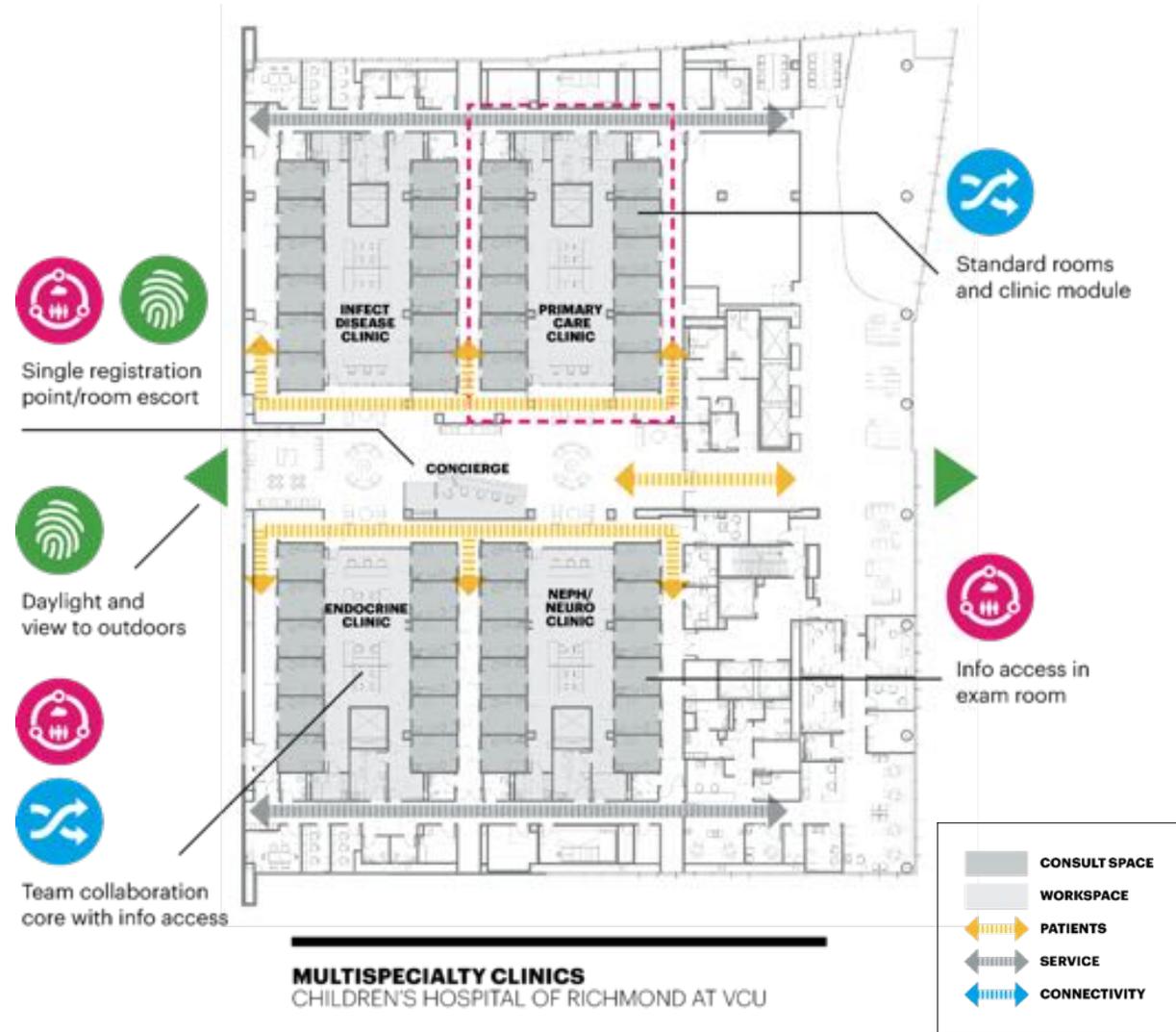
Space Planning

## Children's Hospital of Richmond

Clinic modules are zoned with a consistent layout, allowing for various specialty clinics with little construction



Image Courtesy of HKS, Inc.



# Convertibility

Services

## AirFRAME by SLD Technology

Prefabricated, modular OR ceiling,  
integrating air diffusion and lighting,  
allowing for changing light and boom  
layouts

*Image Courtesy of SLD Technology*



# Convertibility

Structure

## UT Center for BrainHealth

Existing, vacant building gutted to

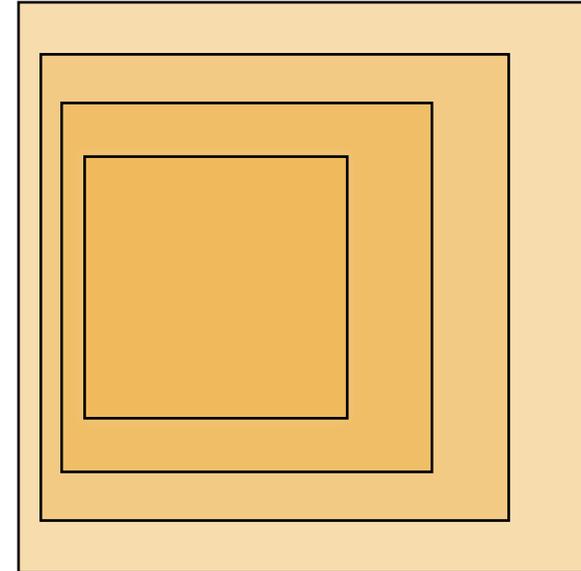
Reinvent to the Center for Brain  
Health



# Scalability

“It can grow or shrink”

Scalability is defined as the attribute that allows a building to expand or contract according to changing demands.



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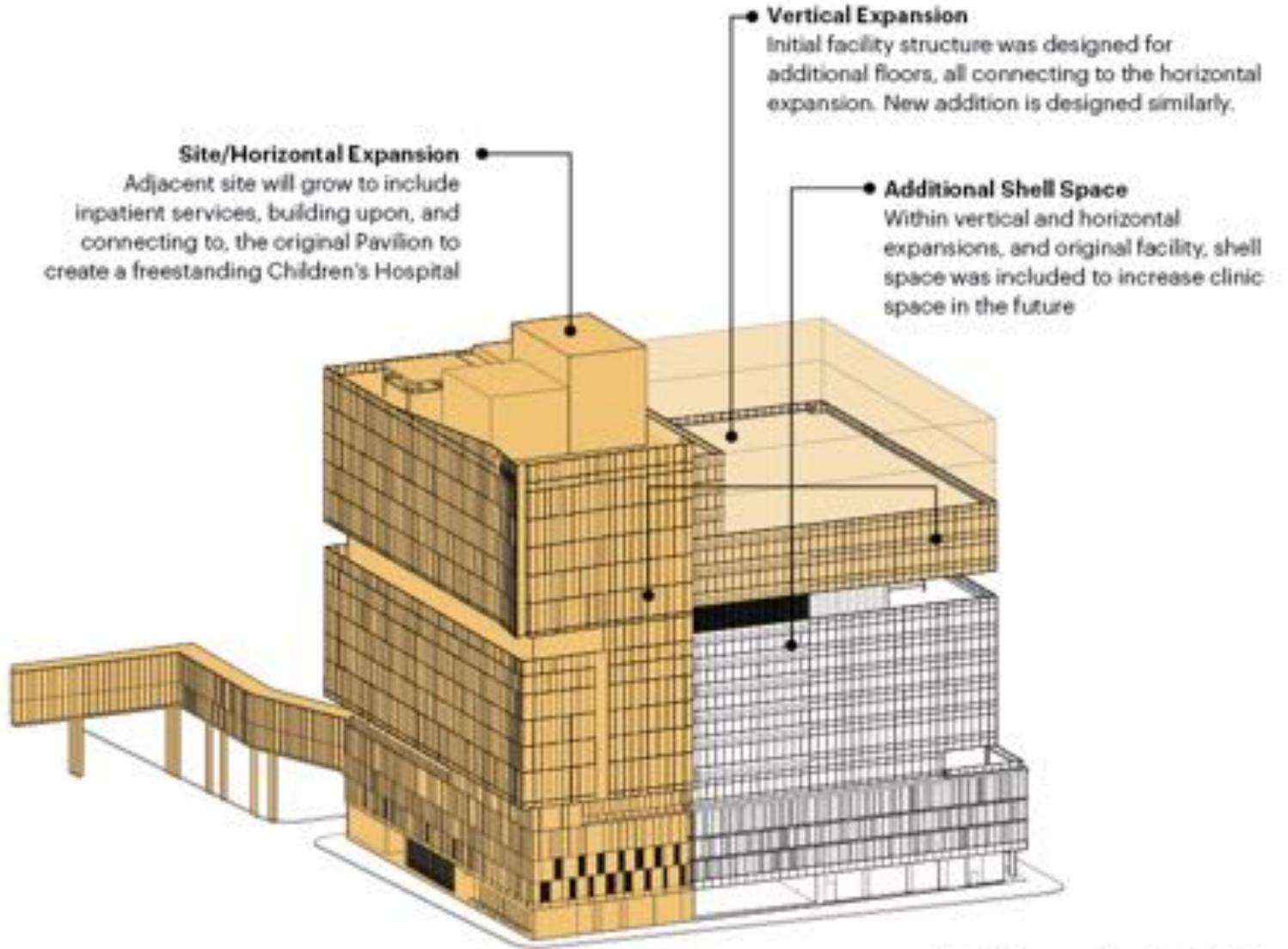
# Scalability

“It can grow or shrink”

Children’s Hospital of

Richmond Pavilion

By HKS, Inc.



Adapted from conceptual rendering by HKS, Inc.

# Scalability

Structure

## University of Texas MD Anderson Cancer Center Alkek Tower

Oversized columns allowed for eight  
floor vertical expansion; expanded  
floorplates

*Image Courtesy of HKS, Inc.*



# Scalability

Surroundings

## Field Hospital (Level III) by Weatherhaven

Portable, medical shelters linked to interconnector kits, which link to a central corridor to create larger facilities

*Image Courtesy of Weatherhaven*



# FleXX Framework



Kitchen Table



Delv City



Shipping Container



International Space Station

## VERSATILITY

I can do different things in it

## MODIFIABILITY

I can change it

## CONVERTIBILITY

It can change

## SCALABILITY

It can grow or shrink

LEVEL OF USE



EXAMPLES

- + multi-purpose space
- + built-ins with multiple uses

- + mobile furniture
- + moveable partitions
- + rolling equipment

- + demountable partitions
- + reconfigurable walls

- + structure
- + MEP

TIME FRAME



COST



STATE CHANGE



Adapt between states

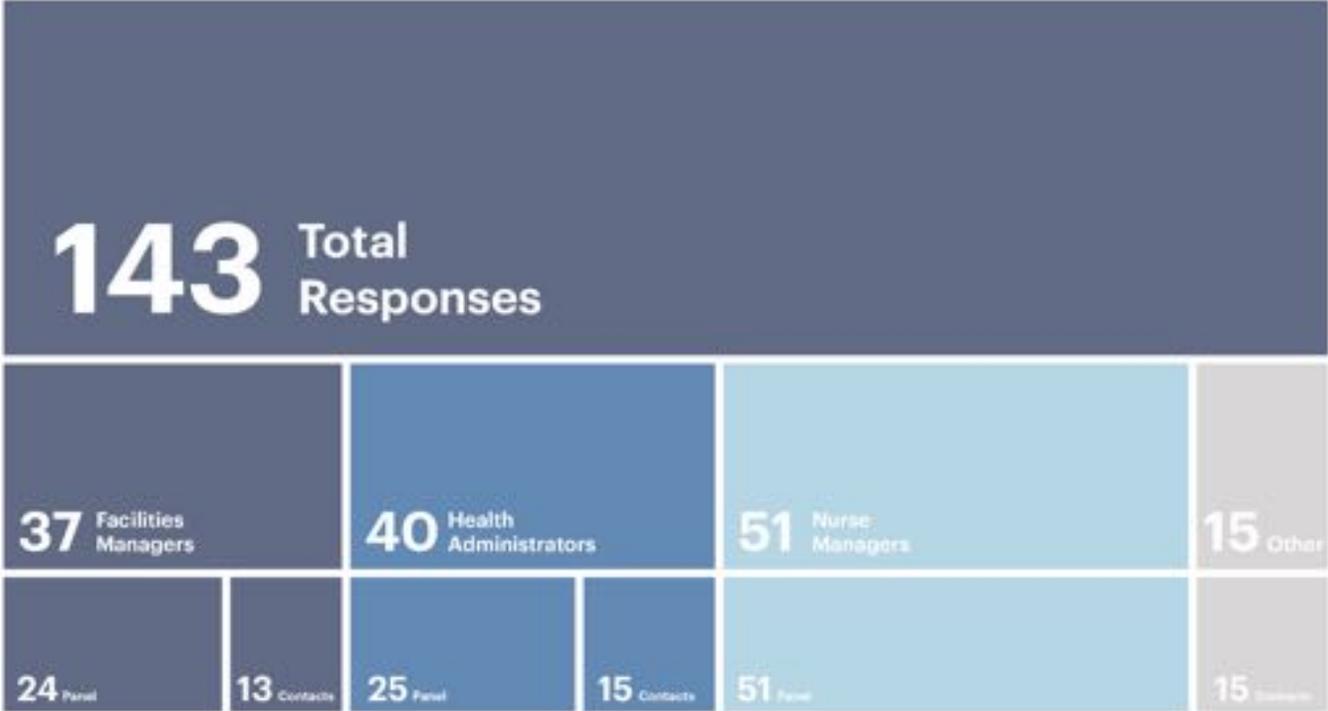


Adapt to a new state

# But what do stakeholders think?

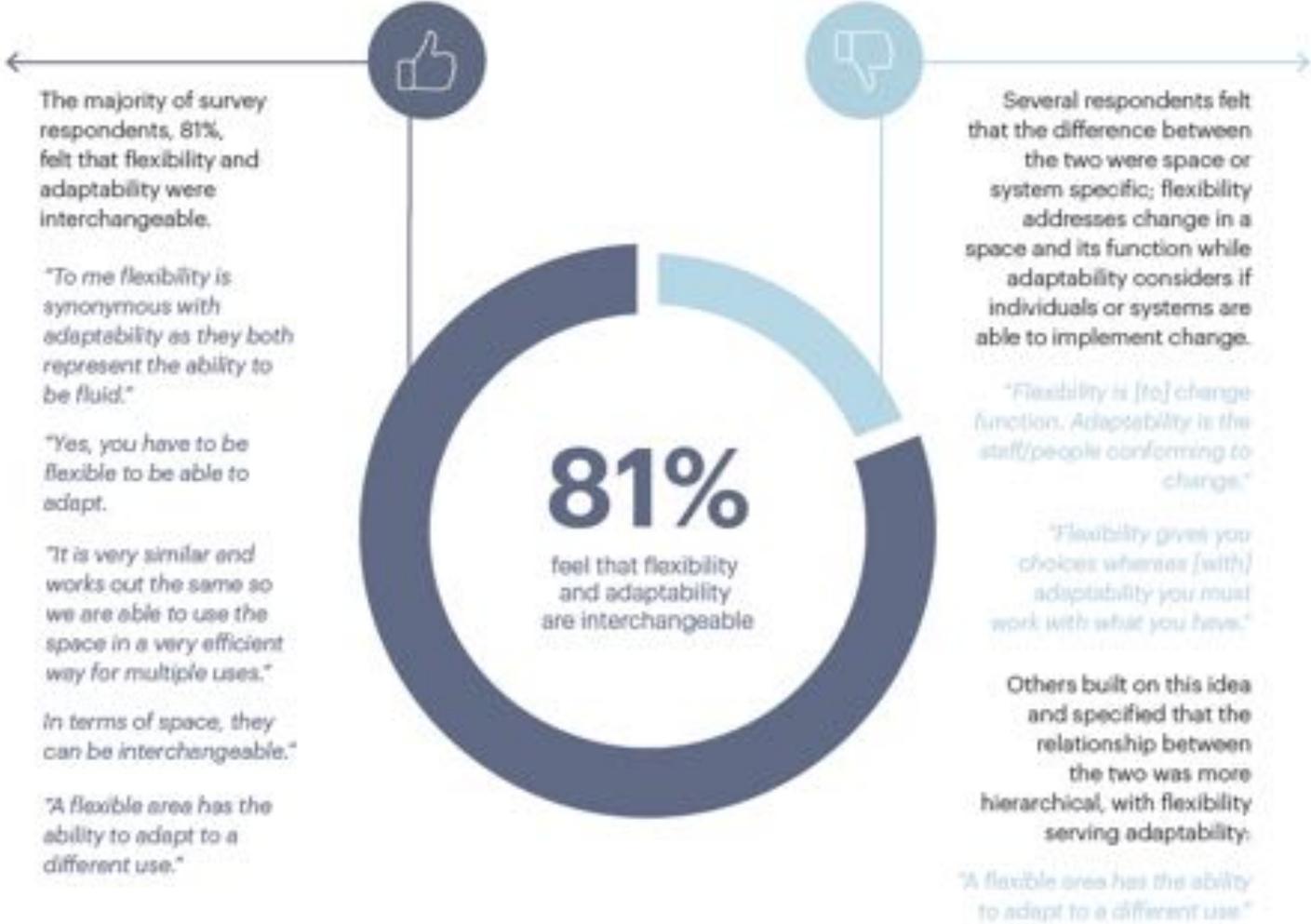
Health Administrators  
Nurse Managers  
Facility Managers

# About the Survey





# Are flexibility and adaptability interchangeable?



# How do nurse managers define flexibility?



Operations. Culture.

# How do health administrators define flexibility?

"Flexibility allows an organization to respond to market/customer needs quickly and seamlessly."  
-Health Administrator

"The ability to simply modify the built environment to shape the future."  
-Health Administrator

"Flexibility is the ability to rapidly adapt to constantly changing demands of the healthcare environment."  
-Health Administrator

"It means being able to change in an ever-changing environment."  
-Health Administrator

Organizational.  
Strategic.

"The ability to flex staff and supply spend."  
-Health Administrator

"Ability to adapt space to meet needs of population it serves."  
-Health Administrator

"In an effort to provide optimum care with challenges around space and time we need to be creative in space allocation, provider availability and staffing."  
-Health Administrator

# How do facilities managers define flexibility?

"Being flexible to me means being able to adapt our system and culture to changing demands of our customers and the ability to integrate new technologies into our business."  
-Facilities Manager

"Buildings are expensive, we must sweat the asset through more efficient usage."  
-Facilities Manager

"Ability to adapt new technologies, best practices, and changes in healthcare, with minimal capital expenditure."  
-Facilities Manager

Spatial.  
Planned.

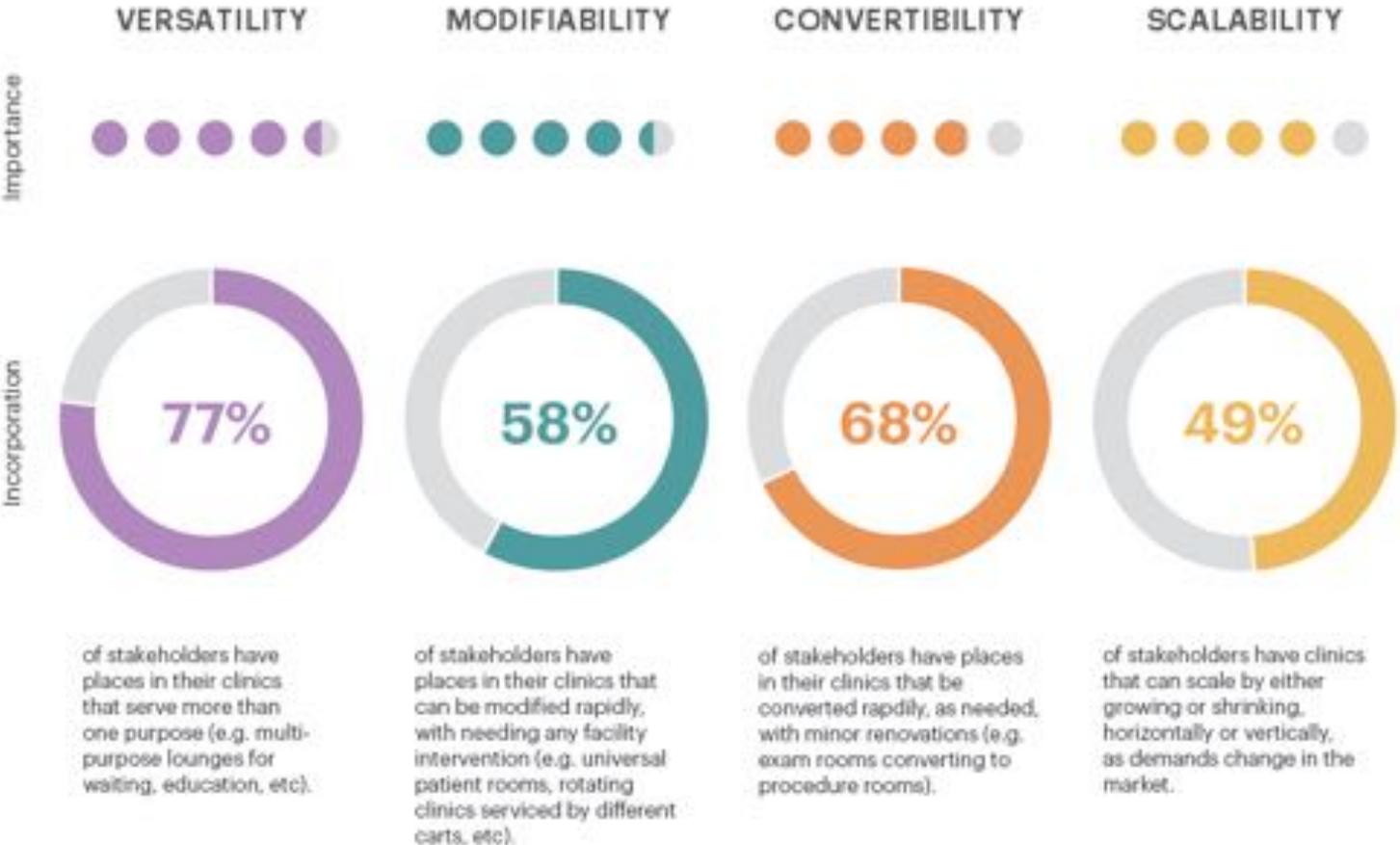
"Flexibility in facility planning means that the spaces we plan will be multi-purpose and serve multiple functions."  
-Facilities Manager

"If it can change, it will change.  
Plan accordingly."  
-Facilities Manager

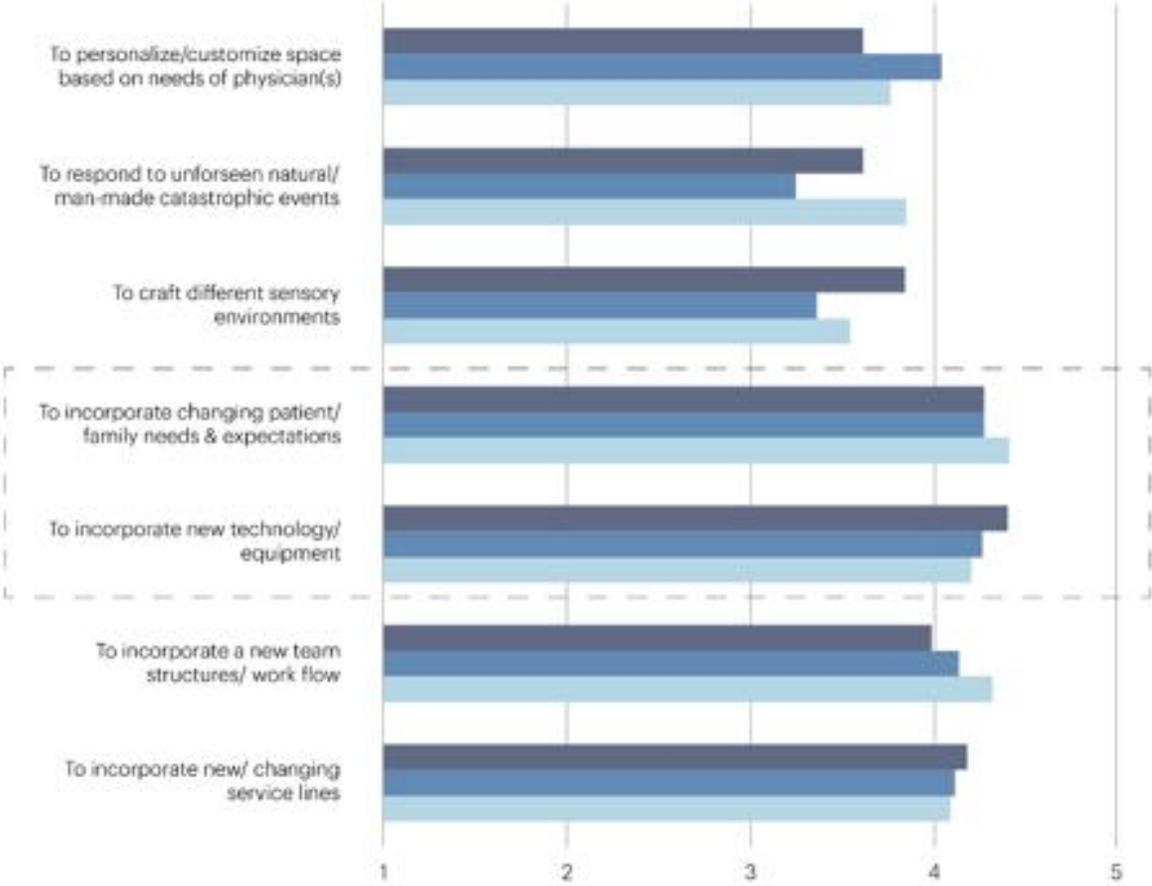


**“Be” Flexible “To” Adapt**

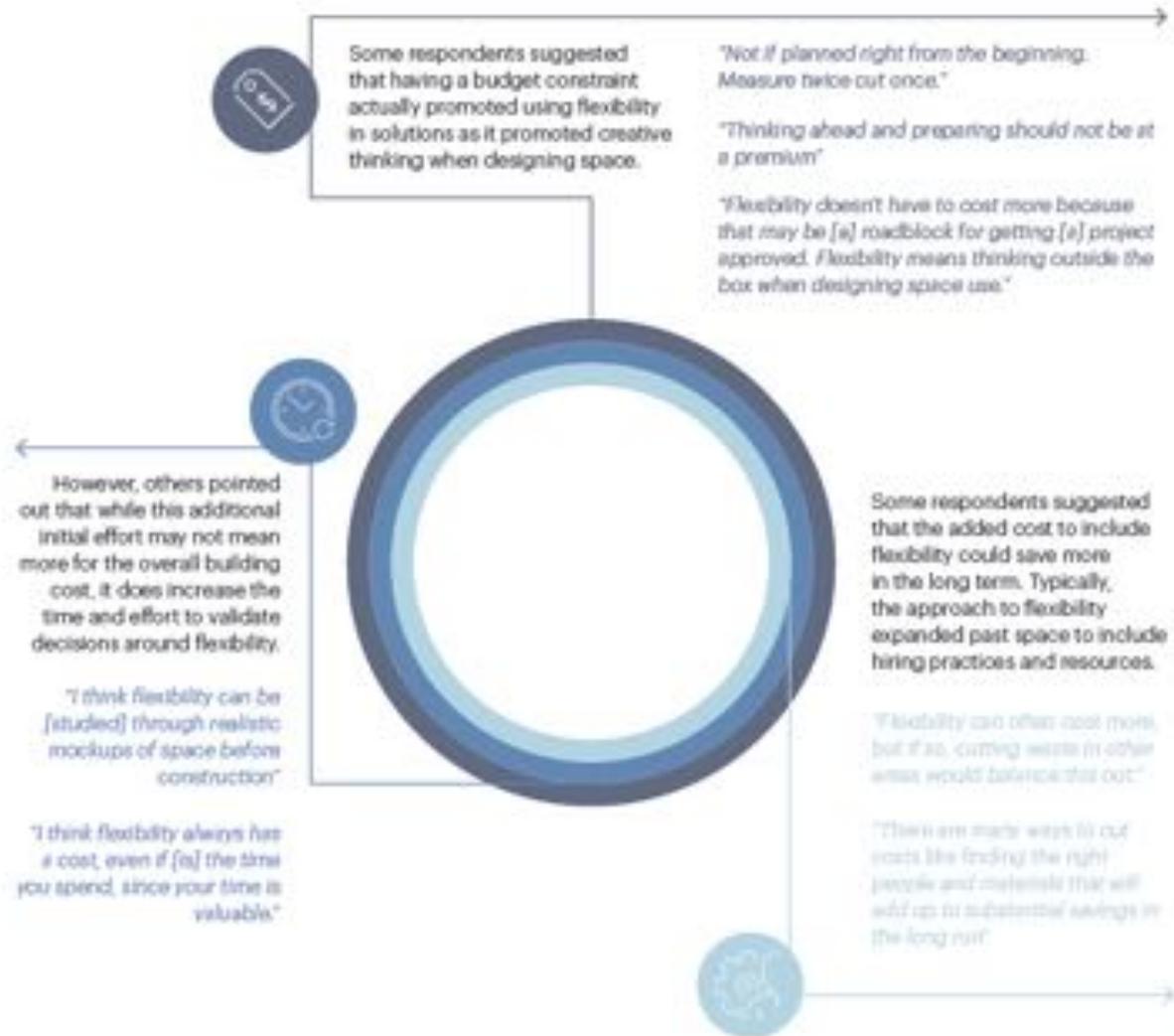
# Importance of Attributes of Flexibility



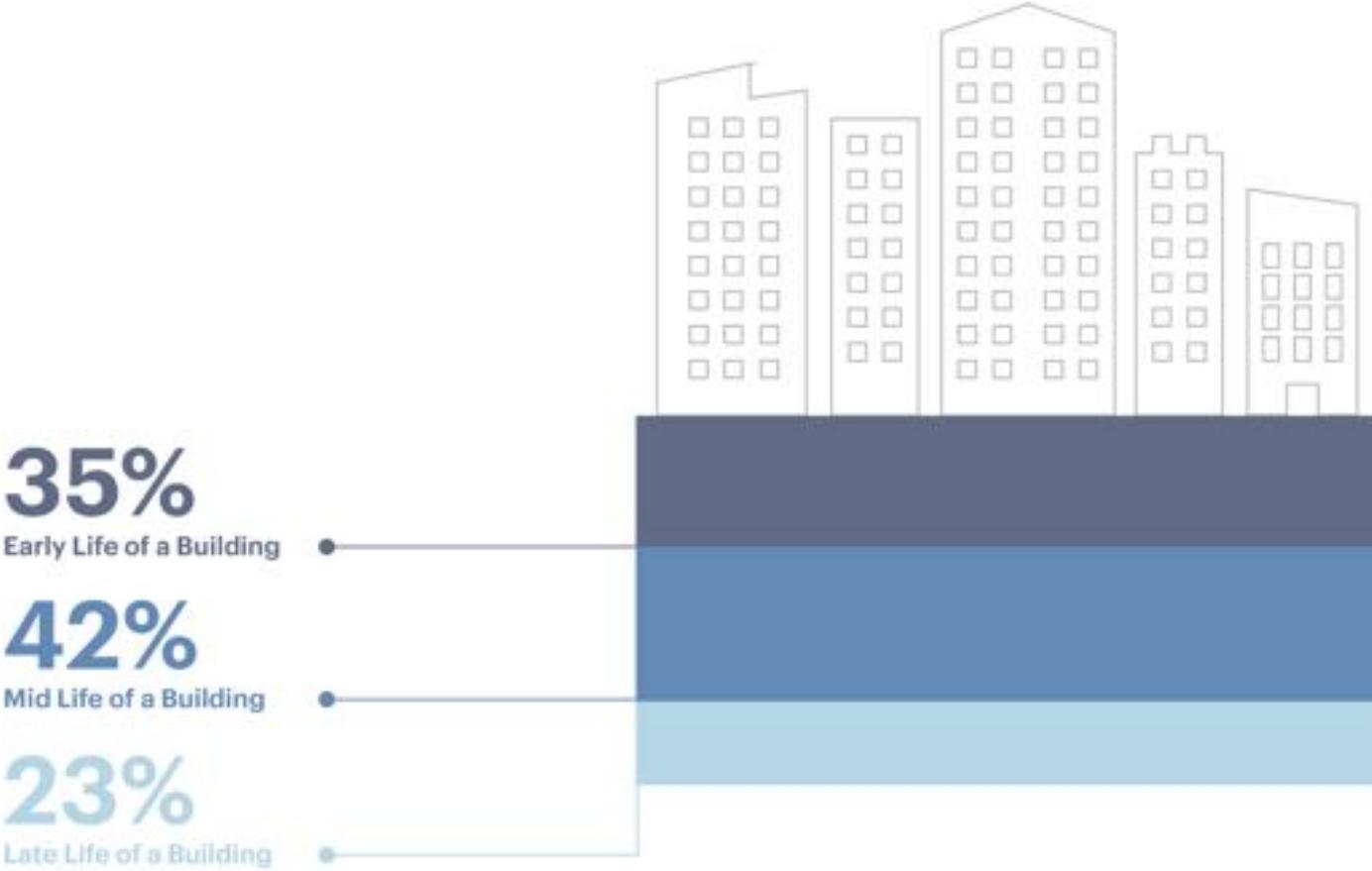
# What drives the need for flexibility?



# Does flexibility have to cost more?



# When is flexibility expected to be used during a building's life?



# How is ROI for flexibility investments recognized? Over what period of time?



## People



Improved employee experience



Increased patient satisfaction



## Place



Flexibility can be used with little cost or modifications



Planned flexibility is being utilized and is functional



## Process



Increased efficiency and improved outcomes



Increased patient volume / organization growth



## Logistics



Desired measures are met

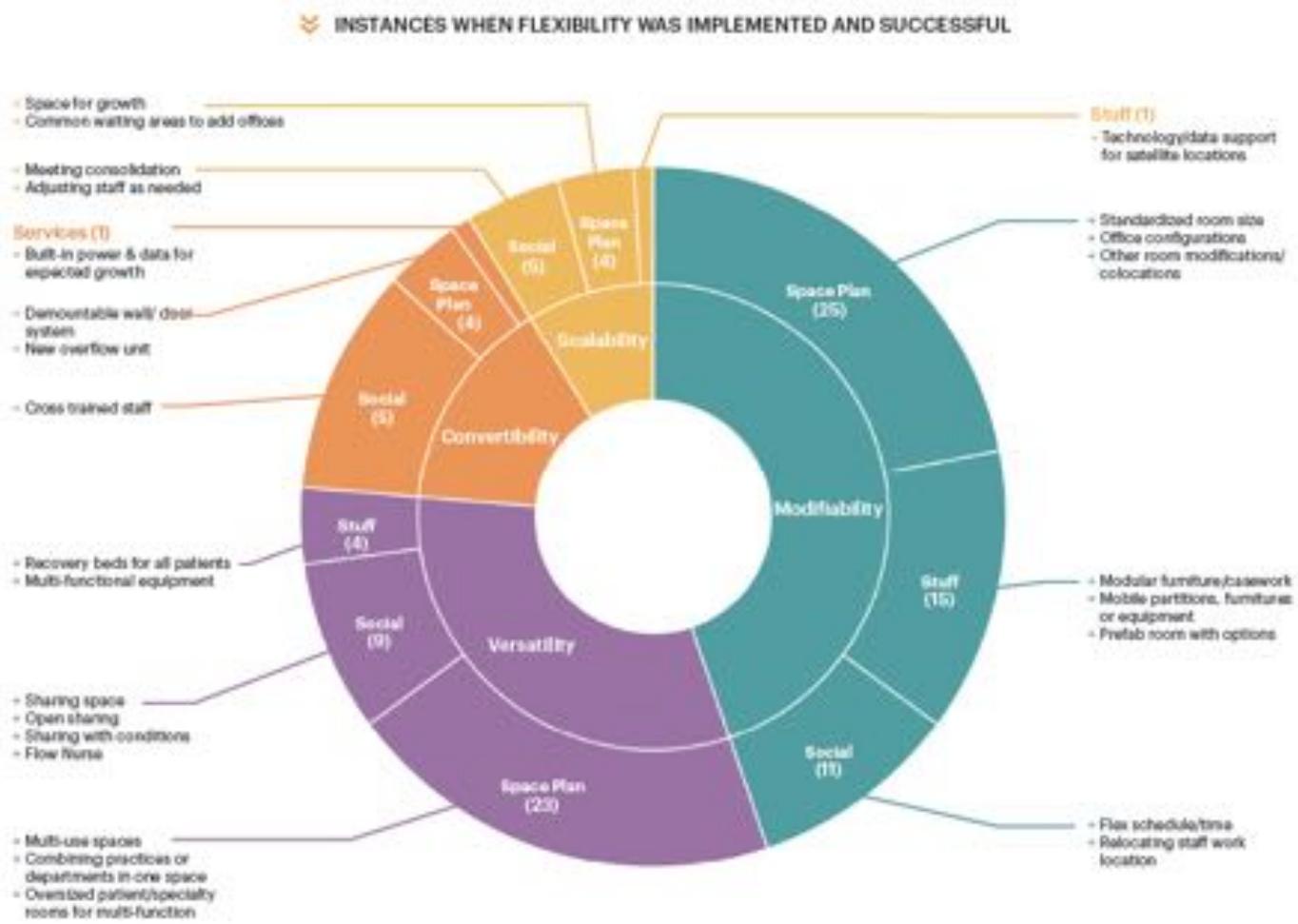


Improved bottom line

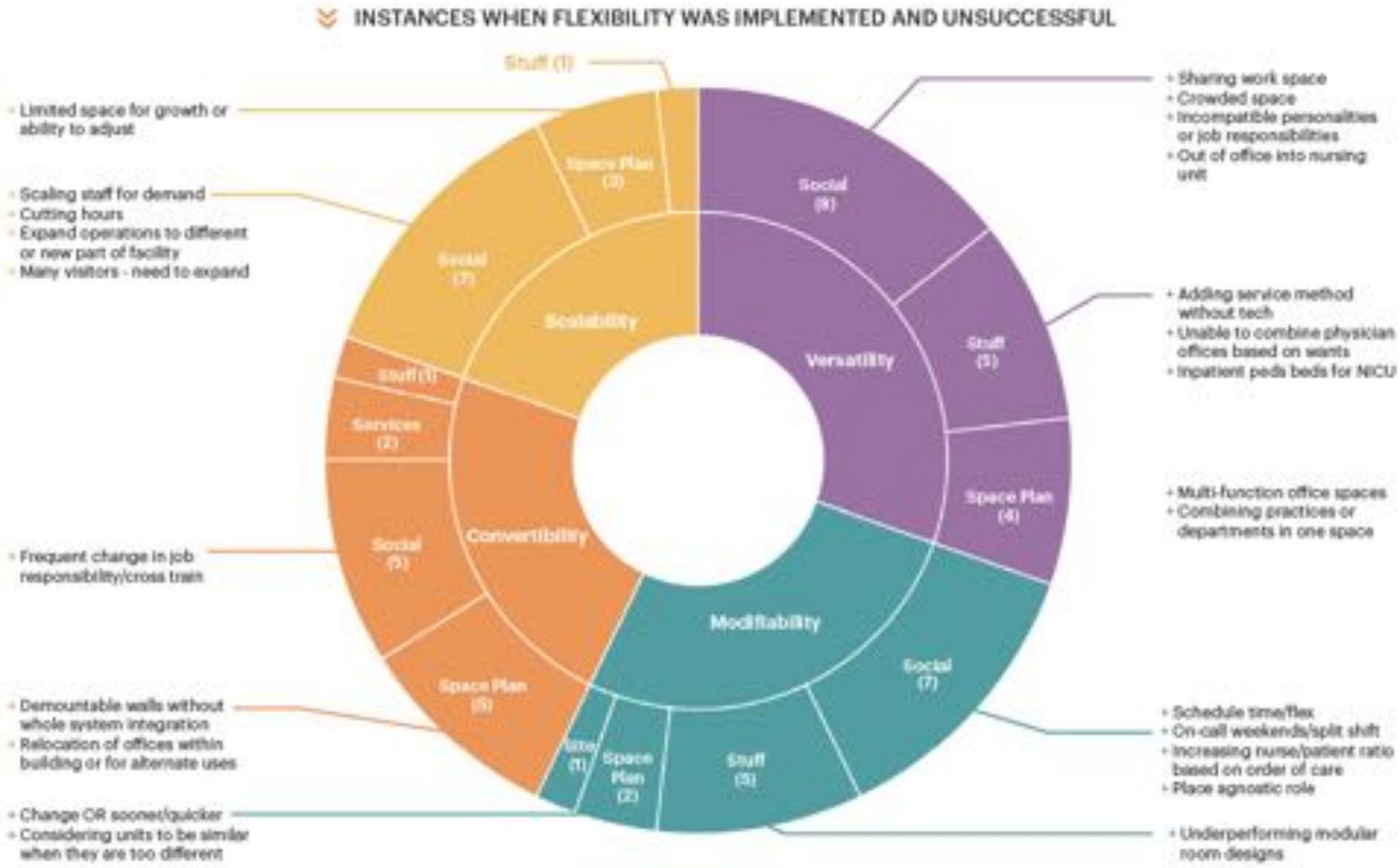
# Can we “over-invest” in flexibility?



# When has flexibility been successful?



# When has flexibility NOT been successful?



# When do successful and unsuccessful instances of flexibility compare?

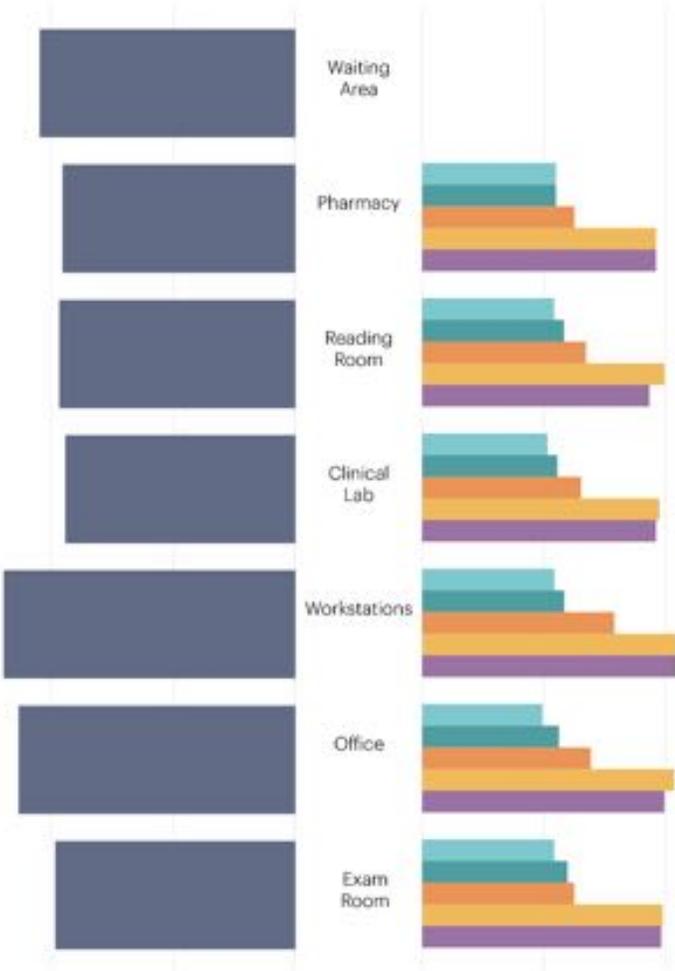
<p>"We created split shifts within the department to cover heavy patient loads and lunch breaks."</p> <p>-Health Administrator</p>	<p>"I established a new position called 'flow nurse' to increase patient and staff satisfaction with the workflow."</p> <p>-Nurse Manager</p>	<p>"Removed existing office cubicles to create a flexible 'big room' that can handle large planning meetings and flex to provide hoteling spaces."</p> <p>-Facilities Manager</p>	<p>"Our outpatient clinical modules are identically provisioned, making each module 'agnostic' to the specialty using it."</p> <p>-Nurse Manager</p>
<p>"Our organization implemented an on-call system that required nurses to be on-call for a full weekend at a time and it was too overwhelming."</p> <p>-Nurse Manager</p>	<p>"Attempting to have staff change responsibilities day to day, they did better when responsibilities don't change routinely."</p> <p>-Nurse Manager</p>	<p>"We tried to 'share' space with two other disciplines - did not work well. Complaints from nursing/providers."</p> <p>-Health Administrator</p>	<p>"Same sized exam room, offices and support spaces. Unfortunately, this requires more space overall, increasing operational cost and staff walking time"</p> <p>-Facilities Manager</p>

# Do stakeholders use standards?



# How are modular solutions used?

MODULAR SOLUTIONS USAGE IN CLINIC SPACES



- Prefab Room
- Prefab Exterior
- Demountable Walls
- Workstations
- Cabinets

# How important are disaster and climate change preparedness?



# Flexibility beyond buildings



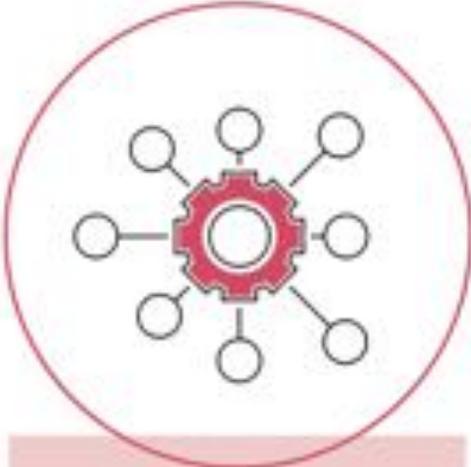
### TIME FLEX

Related to flexibility in scheduling, hours of operation and staffing.



### ROLE FLEX

Related to flexibility in roles and responsibilities of staff.



### RESOURCE FLEX

Related to using resources - such as equipment, furniture, supplies, amenities, and even space - flexibly.

# Illustrating flexibility in practice

## TIME

- + Shared rooms
- + Flex hours
- + Split-shifts
- + Self-scheduling
- + Cross-trained staff



## ROLE

- + Supervisory roles for more employees
- + Cross trained staff



## RESOURCE

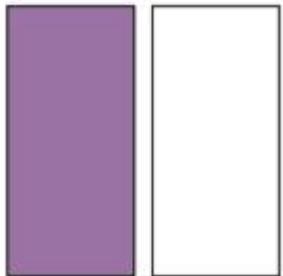
- + Multi-functional equipment
- + Smaller/mobile equipment
- + Leasing instead of buying equipment



# Illustrating flexibility in practice

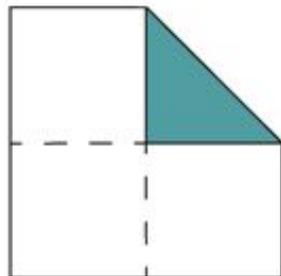
## VERSATILITY

- + Open hall spaces
- + Multi-use spaces
- + Flex lab spaces
- + Shared spaces
- + Grouping of specialties
- + Removing partitions



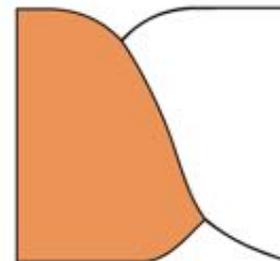
## MODIFIABILITY

- + Supervisory roles for more
- + Movable partitions
- + Rotating check-in spaces
- + Modular furniture
- + Ability to add beds
- + Standardization



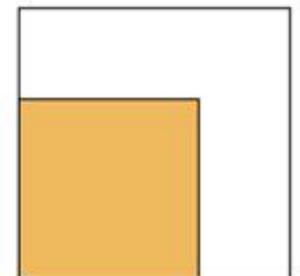
## CONVERTIBILITY

- + Hybrid OR
- + Modular walls
- + Storeroom to pathology lab
- + Early MEP planning



## SCALABILITY

- + Shell space
- + “Blow out” walls
- + Oversized structural members
- + Early MEP planning



**Buildings must “be” flexible in order “to” adapt.**

**FleXX**

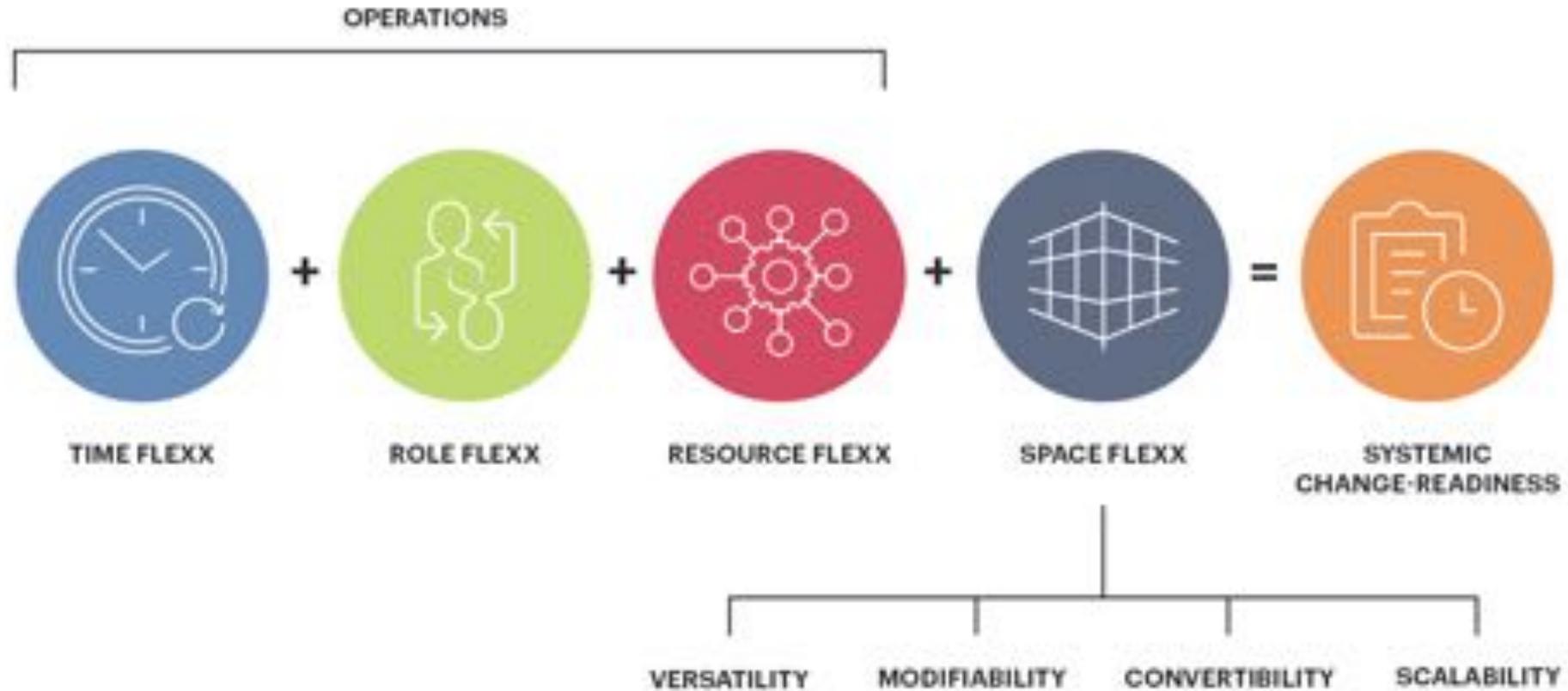
*to adapt by  
being flexible*

Flexible environments enable operational, functional, demographic, climate, and market changes over time with optimal capital expenditure, allowing the building to be used as a strategic asset.

# Mobilizing Flexibility needs a Strategic Plan



# Flexibility must be systemic- and go beyond space



FULL REPORT CAN BE DOWNLOADED AT:

<http://www.cadreresearch.org/flexx>

<http://www.cadreresearch.org/flexx>

CADRE | Center for Advanced Design  
Research and Evaluation

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Steelcase

**Q&A**

**Request for examples and  
critique**