

Smart Buildings, Cities and Digital Twins Technology and Solutions 2021 - 2026

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Abstracts

Overview:

This research evaluates smart building technologies, players, and solutions. The report analyzes smart buildings challenges and opportunities, assesses market potential, and provides accompanying smart buildings market sizing, globally as well as regionally, and by market segment for 2021 – 2026.

It includes an analysis of technologies supporting smart building automation, IWMS, and smart workplace applications and services. Smart building technology integration areas addressed within the report include 5G, AI, data analytics, and edge computing.

This research also evaluates the smart cities market including leading vendors and strategies (such as a single vs. multi-vendor centric approach), infrastructure, solutions, applications, and services. The report analyzes market factors driving solution adoption, technology readiness and fitness for use, and other considerations.

This research also evaluates digital twinning technology, solutions, use cases, and leading company efforts in terms of R&D and early deployments. The report assesses the digital twin product and service ecosystem including application development and operations. The report also analyzes technologies supporting and benefiting from digital twinning.

Select Research Findings:

Smart building automation software and systems will reach \$19.3B in North America by 2026

AI-enabled IoT (AIoT) systems will drive IWMS efficiencies and automation to an entirely new level by 2026

Smart facility water management systems will represent an \$723M market opportunity in Europe by 2026

The key to success in the smart building market is to intelligently integrate data, systems, processes, and assets for enterprise and industrial operations

Global Asset Twinning, Component Twinning, System Twinning, Process and Workflow Twinning in support of smart cities will reach \$3.77B by 2026

Global deployment of 5G, AI, and IoT is substantially focused upon smart city solutions, representing 65%, 35%, and 55% of all total global investment for each respective technology

Smart buildings are rapidly transitioning from legacy, often proprietary wireline siloed to more standardized 5G and WiFi6 wireless solutions that leverage AI and edge computing. Intelligence buildings provide many benefits over previous structures including time and cost savings, improved integration of critical infrastructure, and many new and improved solutions such as occupancy-based energy, security, and space utilization.

Smart buildings provide improved facilities access control (security alarm, intrusion detection and overall surveillance), HVAC, lighting and other environmental controls, energy management, and overall building control. In addition, building intelligence is increasingly gained through integration of sensors, actuators and other IoT systems elements to capture data to derive AI-based data analytics.

A digital twin is a virtual object representation of a real-world item in which the virtual is mapped to physical things in the real-world such as equipment, robots, or virtually any connected business asset. This mapping in the digital world is facilitated by IoT platforms and software that is leveraged to create a digital representation of the physical asset. The digital twin of a physical asset can provide data about its status such as its physical state and disposition. Conversely, a digital object may be used to manipulate and control a real-world asset by way of teleoperation.

Digital twin solutions in smart cities are largely focused on improving the intelligence of buildings. Specific twinning solutions in this regard include: Asset Twinning, Component Twinning, System Twinning, Process and Workflow Twinning. Mind Commerce sees the digital twins market reaching \$3.77B for these solution areas in total by 2026.

Target Audience:

Commercial building network system designers

IoT network system designers for commercial buildings

Components manufacturers for IoT network systems and interfaces

Contractors that install IoT network systems in commercial buildings

Systems integrators for the IoT network systems in commercial buildings

Facilities managers responsible for commercial building networks and systems

Research Benefits:

Identify the market drivers for Smart Cities

Understand the technologies supporting Smart Cities

Understand the impact of smart cities on ICT evolution

Identify smart buildings market challenges and opportunities

Understand the smart buildings marketplace including players and solutions

Identify how key technologies such as AI and IoT support intelligent structures

Identify how integrated workplace management systems support smart buildings

Understand how virtual objects (software programs) function as an abstract of real-world things

Understand how virtual reality will support digital twinning for advanced simulations and control

Companies in Research:

ABB Group

Abundant Power

Accela

Accenture PLC

Aclara

Aclima

Advantech

Aeon Labs LLC

Aeris Communications

Affinegy, Inc

Affinity Automation, LLC

AGT International

Airspan

Airtel

Alibaba

Allegro

Allerin Tech Pvt. Ltd.

Ally

Alstom SA

Altair Engineering, Inc.

Altran

Alvarion

Amazon

Ambience Data

AMCS

AMD

America Movil

American Auto-Matrix

American Digitals

American Energy Management

AMMAMSIC Technology Corp

Amplia Soluciones SL

Analog Devices Inc.

Analytika

ANSYS

Appin Associates

Apple

Appyparking

Arista Networks Inc.

ARM Holdings

Ascom

Asus

AT&T

Athena Engineering, Inc

Atos

Aucotec AG

Autodesk Inc.

Autogrid

Automated Control Inc.

Ayyeka

Azavea

Azbil

Baidu Inc.

Banyan Water

Barbara IoT

Be Home247

Belimo

Bentley Systems

BlackBerry Ltd

Blynco

Bosch Software Innovations GmbH

Brandt Automation, Inc

Breezometer

Bridj

Broadcom Corporation

BT Group

Building IQ

Building Robotics

CADFEM GmbH

Cadillac Fairview

Calthorpe Analytics

Capgemini

Cavium Inc.

Central Coast Environmental Controls

China Mobile

China Unicom

Ciena Corporation

CIMCON Lighting

Cisco Systems

Citrix Systems

Cityflo

Citymapper

Cityzenith

Civicsmart

Clarity Movement Co.

Cobham Wireless

Colt

Compology

Contus

Copper Tree Analytics

CoSMo Company SAS

Cradlepoint

Crestron

CSR

Cubic Corporation

Current Analytics, Inc.

CyanConnode

Cylon

Dassault Systems

Delta Controls

Digital Twin Technologies

Dispatchr

Distech Controls

DNV GL

Double Map

DOVU

DXC Technology

E.M.S. Technologies

Eagle Energy, Inc

EATON

Eclipse Foundation

Ecova

EFT Energy

Elemco Building Controls

Elichens

Emagin

Emerson Electric Co

Emesent

Enel

Energent

Energy ETC, Inc.

EnergyCAP

Energyworx

EnerNOC

Enevo

ENGIE

Enovity, Inc.

Ericsson

eSight Energy

Evopark

EZparking

Faststream Technologies

Fathom

FEINGUSS BLANK GmbH

Filament

Flamencotech

Flowlabs

Flowserve

Fluentgrid

Forward Networks

Frazier Service Co.

GE

General Electric

Genesis Automation

Google

Gridcure

GridPoint

Hawkeye Energy Solutions

HCL Technologies Ltd

HFCL

Hitachi Ltd.

HomeLink Technologies

Honda Smart Home

Honeywell International Inc.

Horizon Controls

HPE

HTNG

Huawei

Hubbell Building Automation

IBI group

IBM Corporation

Industrial Internet Consortium

Infarm

Ingersoll Rand

Ingersoll-Rand Inc.

Inncom

Inrix

Inspira

Intel

Intelizon Energy

Intellastar

Intellias

InterLogix

Intermatic

Inventum Technologies

Invicara

Itron

J2 Innovations

Johnson Controls

Kapsch Group

KBMax

KMC Controls

Koninklijke Philips NV

KORE Wireless

Lanner Electronics

Legrand

LG CNS

Libelium

Logic Ladder

Lon Mark International

LowV Systems, Inc.

Lynx Spring

Mapillary

Maven Systems

Meter Feeder

Metrotech

Microsoft

Mindteck

Miovision

Mobike

Moovel

Moovit

National Instruments

NavVis

Near Future, LLC

NEC

Neighborland

Network and Automation Systems

NEXIA

NexTek Power Systems

Nokia

Nordsense

NTT DATA

OME

One Concern

Oorja On Move

Opendatasoft

Opusone

Oracle Corporation

Panasonic

Parkwhiz

Passport

PETRA Data Science

Phoenix Energy Technologies

Phoenix Robotix

Physical Web

Plume Labs

Pratiti Technologies

Priva

Proclivis Technology Solutions

Prodea System Inc.,

Progressive Engineering & Design

PTC

Purple

QInfra Solutions

QiO Technologies

Qualcomm Incorporated

Quality Theorem

Rachio

Ramco Electrical Contracting Corp.

RBH Access Technologies, Inc.

Reliable Controls

Remix

Ridlr

Rubicon

SAP

Sawyers Control Systems, Inc.

Schneider Electric

SenSat

Sentiance

Shenitech

Siemens AG

Sierra Wireless

Sigfox

Sight Machine Inc.

Signify

Simplifa GmbH

Smardt

Softweb Solutions Inc.

Sogeti Group

Somfy

Soofa

Spacetime Insight

Spatial Labs, Inc.

Spice Digital

Spot Hero

Stae

Streetlight Data

Sullivan & McLaughlin Companies, Inc.

Surveillance Grid Company

Swiftly

Switch Automation

Synavision

Synergetic Systems

Syska Hennessy

Sysmex Corporation

Taco Comfort

Takadu

Tantalum

TE connectivity

Telefonica

Telensa

TerraBridge Innovations in Technology, Inc.

Thermo-Trol Systems, Inc.

TIBCO Software

Toshiba

Toshiba Corporation

Tractebel

Trafi

Trane

Transit Labs

Transit Screen

Transloc

Trend Controls

Tridium

Trilliant

Understory

Unilectric

United Technologies

UrbanFootprint

Urbee

UrsaLeo

Utilidata

Valor Water Analytics

Vantage

Varentec

Veniam

Veolia

Verdigris Technologies Inc.

Verizon

Viconics

Videonetics Technologies

Virtalis Limited

Visualiz

Vodafone

Volocopter

Vykon

Watersmart

Wind River

Wipro Limited

Worldsensing SL

XanTech

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Zenysis

Zerocycle

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- 8.8 Aeris Communications
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- 8.11 Airtel
- 8.12 Alibaba
- 8.13 Allegro
- 8.14 Ally
- 8.15 Alstom SA
- 8.16 Altair Semiconductor
- 8.17 Alvarion
- 8.18 Amazon
- 8.19 Ambience Data
- 8.20 AMCS
- 8.21 AMD
- 8.22 America Movil
- 8.23 Amplia Soluciones SL
- 8.24 Analog Devices Inc.
- 8.25 Apple
- 8.26 Appyparking
- 8.27 Altran
- 8.28 Arista Networks Inc.
- 8.29 ARM Holdings
- 8.30 Ascom
- 8.31 Asus
- 8.32 AT&T
- 8.33 Atos
- 8.34 Autogrid
- 8.35 Ayyeka
- 8.36 Azavea
- 8.37 Baidu Inc.
- 8.38 Banyanwater

- 8.39 Barbara IoT
- 8.40 Bentley Systems
- 8.41 Blackberry Ltd
- 8.42 Bosch Software Innovations GmbH
- 8.43 Breezometer
- 8.44 Bridj
- 8.45 Broadcom Corporation
- 8.46 BT Group
- 8.47 Blyncsy
- 8.48 Calthorpe Analytics
- 8.49 Capgemini
- 8.50 Cavium Inc.
- 8.51 China Mobile
- 8.52 China Unicom
- 8.53 Ciena Corporation
- 8.54 CIMCON Lighting
- 8.55 Cisco
- 8.56 Citrix Systems
- 8.57 Cityflo
- 8.58 Citymapper
- 8.59 Civicsmart
- 8.60 Clarity Movement Co.
- 8.61 Cobham Wireless
- 8.62 Colt
- 8.63 Compology
- 8.64 Contus
- 8.65 Cradlepoint
- 8.66 Cubic Corporation
- 8.67 CyanConnote
- 8.68 Dassault Systems
- 8.69 Delta Controls
- 8.70 Dispatchr
- 8.71 Double Map
- 8.72 DOVU
- 8.73 Elichens
- 8.74 Emagin
- 8.75 Emerson Electric Co
- 8.76 Enel
- 8.77 Energyworx

- 8.78 Enevo
- 8.79 ENGIE
- 8.80 Ericsson
- 8.81 Evopark
- 8.82 EZparking
- 8.83 Fathom
- 8.84 Filament
- 8.85 Flamencotech
- 8.86 Flowlabs
- 8.87 Fluentgrid
- 8.88 GE
- 8.89 Getmy Parking
- 8.90 Google
- 8.91 Gridcure
- 8.92 HCL Technologies Ltd
- 8.93 HFCL
- 8.94 Hitachi
- 8.95 Honeywell
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- 8.107 Kapsch Group
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- 8.110 LG CNS
- 8.111 Libelium
- 8.112 Logic Ladder
- 8.113 Mapillary
- 8.114 Maven Systems
- 8.115 Meter Feeder
- 8.116 Metrotech

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- 8.118 Mindteck
- 8.119 Miovision
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- 8.139 Purplewifi
- 8.140 QInfra Solutions
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10.0 SMART CITY MARKET SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

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10.3 Automotive Companies

10.4 Broadband Infrastructure Providers

10.5 Communication Service Providers

10.6 Computing Companies

10.7 Data Analytics Providers

10.8 Immersive Technology (AR, VR, and MR) Providers

10.9 Networking Equipment Providers

10.10 Networking Security Providers

10.11 Semiconductor Companies

10.12 IoT Suppliers and Service Providers

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- 3.3 Altair Engineering, Inc.
- 3.4 Amazon Web Services
- 3.5 ANSYS
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- 3.25 General Electric
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- 3.27 Hitachi Ltd.
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