Framing Smart Systems and Services Growth Opportunities

smart systems design
what are smart systems and the internet of things?

Why Is It So Important?
Global expansion; re-engineering; lean practices; mergers and acquisitions. For most companies these strategies for growth and value creation have reached the point of diminishing returns. As networks continue to integrate the physical and virtual worlds, what worked in the past to drive growth is less likely to work now or in the future...

where are the biggest growth opportunities?

How Should We Think About Framing Opportunities?
The assumption that the role of new business design and development is only about making existing products or services more attractive no longer works. We believe smart systems design needs to transcend discreet product or service innovation. Business developers need to creatively imagine fully developed systems and whole marketplaces. To discover, design and develop innovative smart systems, organizations will need new and uniquely facilitated processes...

how should our organization respond?
What Are The Success Factors?
Diverse collaborative networks will be self-organized by people who are motivated to explore and develop ideas they care deeply about. Business innovation will extend beyond ideas about new products and services to the very manner in which business is conducted.

Building new ventures for the Internet of Things requires new and very different modes of design and development – organizations will need to push the boundaries of collaboration to include many new and unfamiliar participants...
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Smart Systems and the Internet of Things Stack

Smart Systems are quickly becoming a massive, global digital nervous system connecting billions of people, tens of billions of devices, and trillions and more data points through a network of unprecedented scale.
As these intersections blend the physical with the digital, they are mediated by ongoing user interactions, business processes, technology architectures, and newly created market forces.
“User Experience” is the sum of our relationship with technology. It encompasses the practical—like which senses, gestures, and inputs we use to interact with our devices and surrounding environment—as well as the emotional: how the interaction makes us feel.
From the design of silicon to the end-user experience, the technologies of the IoT are driven by data.

Sensors, software, and networked infrastructure collect, analyze, transmit and present data for the users and devices who need it most.
Some markets adopt new technologies faster than others, but no sector of the economy is immune to the expanding influence of the IoT.

While there are similarities that apply across the board, each vertical has its own set of needs and challenges that shape the way networked technologies add value.
Integrating smart systems into business processes requires restructuring long-held assumptions about how products and services are brought to market. Collaboration between and among users, customers, developers and partners will be a minimum requirement for success.
The solutions we are describing here will have much less managerial hierarchy, command and control decisions or proprietary ownership of ideas.

These relationships will be self-organized by people who are motivated to explore and develop ideas they care deeply about.

Collaborative innovation will extend beyond ideas about new products and services to the very manner in which business is conducted.
success will increasingly go to those that effectively utilize the combined potential

Smart Systems and the Internet of Things will be built from complex interrelationships between the stack. Integrating these layers together are myriad \textbf{Interactions}.

A bi-directional link between digital user experiences and the physical world.

the interactions represent the convergence of users, devices, systems, data, and networks
re-thinking things and products as systems

Your Product / Service

INTERACTIONS
Connections (People, Processes & External Systems)

BUSINESS
Revenue Model
License & Delivery
Market Delivery
Revenue Type

RELnATIONSHPs
Formal
Informal

USER EXPERIENCE
Context
Usage
Device
Interaction

TECH
Connectivity & Device Enablement
Network Services
System Applications
Value Added Applications
Security / Data Policies

MARKET
Revenue Model
License & Delivery
Market Delivery
Revenue Type

What is the nature of relationships, interactions, requirements and dependencies between and among systems elements?

What is best path to monetization?

Where used; via what services model?

What channel partners are required?

License, transactions or what?

Who are our natural allies?

Who are we best poised with?

What is the context “in use” for device?

What are the expected usage needs?

What is the device form factor?

What is the nature of interactions?

What is the native intelligence of device and communications mode?

How are comms services provided?

What platform, device management and related functions provided?

What applications and functions are required?

How will identity mgmt, access and security work?

Which industry segments and applications provide best opportunities?

What specific use cases and apps will need to be addressed?

What is the nature of relations, interactions, requirements and dependencies between and among systems elements?

What is the expected usage needs?

What is the device form factor?

What is the native intelligence of device and communications mode?
smart systems growth models and strategies
smart systems and IoT solutions are comprised of complex solutions development and delivery chains

often, multiple parallel "upstream" technology enablers are adopted by "mid'stream" OEMs and/or services providers who, in turn, deploy solutions into "downstream" vertical end use segments

while the business models for developing and delivering core technologies are relatively stable, the rapidly evolving business and revenue models for OEMs and services providers are anything but......
core smart systems technologies will impact all end use segments

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as users and customers have become more familiar with digital and IoT capabilities, they are realizing these technology innovations will push the boundaries of how products, systems and equipment are used and managed within their operations which, in turn, has increased pressure on machine builders and equipment manufacturers to embrace these capabilities. End customers in factories, hospitals, buildings and more are coming to see how these technologies work together in new and novel ways to solve operational and business problems. As a result, specification and adoption of digital and IoT enabled equipment and systems is beginning to shift towards a “shared” set of roles between end customers and their OEMs.
OEMs are uniquely positioned to capture smart systems values

**Core Enabling Technologies**
Provide horizontal technologies and tools that must be contextualized for specific industries and customers

**Machine and Equipment OEMs**
If enabled with the right tools, OEMs can help disseminate these solutions to end customers due to their application expertise and existing relationships

**End Users and End Customer Accounts**
End customers want to adopt smart services solutions, but are wary of working with tech suppliers who may not have industry expertise—OEMs can fill this role
machinery and equipment OEMs across all segments are facing dramatic changes in their business and in their competitive arenas ...
....which, in turn, is driving new impacts to their business models

**Machine Focused**
Companies with business models focused on the development and production of a single class of machines, such as metal working, off-road vehicles, medical imaging machines, and similar. Leveraging digital and IoT for:
- after market services expansion
- improve costs and efficiencies
- expand customer support

**Application-Focused Portfolio**
Companies with business models focused on inter-related product portfolios that can be integrated into applications such as smart buildings, machine control systems, and test systems. Leveraging digital and IoT for:
- easier systems integration
- expanded services/support
- help customers optimize the use of their products within systems

**Component Focused**
Companies with business models focused on components and subsystems. Leveraging digital and IoT for:
- channel enablement
- higher efficiencies
- new customer interactions

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**Mobile Equipment**
- Construction Equipment
- Mining Equipment
- Agricultural Equipment
- Mobile Mat'1 & People Handling

**Medical Machines**
- Imaging and Diagnostic Equip
- Patient Monitoring Equip
- Patient Care Equipment
- Surgical Devices

**Diversified Manufacturers**
- Food Processing Equip
- Printing
- Textile Machinery
- Glass Machinery
- Papermaking Machinery
- Plastics Machinery
- Material Handling Equip
- Robotics
- Metalworking Equip
- Electronics & Semi Equip

**Industrial Machinery**
- Mobile Equipment
- Medical Machines
- Diversified Manufacturers
OEM current state is one of confusion and excitement

many OEMs provide basic customer support services, but OEMs face open questions in expanding smart systems and services to provide new business values for customers

Challenges

What does service & support mean for me? How will definitions of service & support change in the future?

How do we create valuable services that will incentivize customers to adopt these new solutions?

How should we frame the resistance towards data ownership and security?

What services should be prioritized in development for customers?

How will the future market for services evolve? What steps must we take to support customers?
diverse challenges hindering digital and IoT adoption

although challenges vary among OEMs, the issues fall into the general categories of technology, business and customers

- **Clear Strategy To Start With...**
  Developing a clear strategy to engage internal support and quickly gain customer adoption by generating tangible value; knowing what to do and how to do it

- **Aligning the Business to Support Services**
  Moving from decades-old cultures resistant to change; becoming a service-driven organization, both structurally and culturally

- **Planning for the Future**
  Understanding and being flexible in technology and solution development today to be prepared for future technology developments

- **Managing Complex Data**
  Collecting, transforming and integrating data from complex machines and processes to enable new application values

- **Data Ownership & Security**
  Customers are increasingly aware of the value and importance of their data, and are concerned about the security of their IP

- **Poor User Experience**
  Industrial suppliers typically do not consider or emphasize user experience in the development of smart systems and services, resulting in diminished value and use of these systems

- **Lack of Consensus & Leadership Support**
  Developing a shared understanding of digital and gaining top level support

- **Fragmented Customer Requirements**
  While equipment may be easy to customize or configure to specific customer scenarios, doing the same for software and services is difficult

- **Recruiting The Right Talent**
  Finding and hiring leaders and evangelists that can help drive the development and diffusion of digital throughout the company

- **Determining Organization & Relationships**
  Walling off digital initiatives and operating independently from the mothership to drive speed and freedom has advantages, but can also just deprive new ventures of investment, capabilities and resources

- **Finding your Place in the Ecosystem**
  Finding and engaging the right partners to help fill capability gaps and add value to smart solutions, while not creating tension with current partners, channels or customers
OEMs will need to design and develop new business and operating models

**Solo Driven**

**Embedded Innovator**
- Largely focused on remote support automation & data value for specific product

**System Professional**
- Leverages services automation to feed diverse needs across product provider delivery chain

**Partner Driven**

**Solutionist**
- Builds broad support capabilities across the entire life cycle of target equipment or delivery chain

**Value Chain Aggregator**
- Collects, organizes data with aim to optimize interactions across single provider dominant delivery chain

**Open Collaboration Driven**

**Collaborator**
- Builds and extends value via collaboration with customers, channels and providers across collective delivery chains

**Community**
- Drives value via extensive multi-party systems and collaboration and by leveraging private, public, and partnered information sharing

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**Simple**

**Compound**

**Complex**
new business models are progressive; open collaboration drives innovation
Cost-Plus Pricing
Cost-Plus pricing is exactly what you think it is: Figure out the cost to deliver your offering, multiply by an acceptable margin, and set a price. In a commodity market, this might work.

Market-Based Pricing
Without adding significant value that differentiates your offering from the competition, prevailing market conditions will dictate your pricing.

Value-Based Pricing
Value-based pricing allows you the flexibility to price your offering dependent on the value you deliver to your customer- whether it is dollars saved, dollars earned, any combination of the two, or any intangible savings or benefit.

Disruptive Pricing
Transformation of this type happens when your offering is so compelling and delivers so much unique value that it literally changes the way customers experience and purchase for the entire category.

Product-Based Only
Often the easiest transition to a connected product, customer pays a one-time/up-front fee and receive connectivity at no incremental costs.

Bundled Model
This approach attempts to blend the best of both worlds - some investment up front with a modest recurring expense.

Managed Services Focused
A more common model in the age of smartphones, customers receive the product at no cost and vendor provides a complete "managed" experience.

Subscription-Centric w/Hardware
Subscription-based services with customers typically incurring some modest expense up front usually at or near cost.

Collaborative Services Focused
Builds and extends value via collaboration with customers, channels and providers across colledge delivery chains.
digital and IoT requires different modes of strategy development

- Does our go-to-market system design align well with the opportunity and market?
- Are our products, systems or services correctly spec'd and configured?
- Which value elements should we develop, which obtain by partnering and which by sourcing?
- What formal and informal relationships among allies might exist in the future?
- How do we address systemic issues with our organization's ability to fully address the new opportunity?
- Which trends, forces and disruptions likely will shape the future competitive environment?
- Which players, events and technologies should we care about?
- Are there new combinations of technologies, products, services and partners that can drive sustained differentiation?
- Does our go-to-market system design align well with the opportunity and market?
- What value elements will increase and extend the value to the customer of our core offerings?

Validated System & Solution Opportunities

Design & Architect Platform & Services

Develop Strategy & Business Model

Discover Trends, Forces & Disruptions

Identify Apps, Use Cases & Solution Concepts

Frame New Growth Opportunities

Research, Analysis & Investigations

User, Customer, Partner Interactions & Learnings

Develop Strategy & Business Model

Develop & Deploy Solution
Business model design and development needs to be truly creative .........
OEMs need new ways to interact to create new growth strategies

Most knowledge comes from human experience and expertise. Today, however, knowledge and expertise largely resides in functional silos and systems dispersed across organizations. Acting singularly, functional organizations are constrained by the resources under their control. Legacy processes and habits inhibit any natural ability to communicate and work together to solve big problems or create new solutions.

- Defining a digital and IoT vision and strategy based on understanding new and novel requirements for manufacturing and customers
- Development and acceleration for new smart systems, services and solutions
- Supported by new internal processes, skills and roles required to adopt new tech and capabilities
- Supported by building and sustaining partner and ecosystem values
smart systems design
process and methods
Recognizing the need for new methods and processes is a minimum requirement...

Smart systems design is a new discipline that lies between the fault lines of existing disciplines.

Today, with the emergence of connected products and information-based services, even more complexity has arisen in the design of systems and services as well as in the core of the product. Because networks add yet more complexity to the process and because just about everything will get connected, we strongly believe this environment requires combinations of several disciplines and methods in order to fully address the nature of smart connected business opportunities.

Convergence of design, strategy and innovation processes is creating a new smart systems design process.

Design, as well as strategy, is concerned with creating values and making them visible, not to mention profitable. Business strategy and design today need to extend to the experience that customers will have with connected products, services, spaces or a mix of these and, therefore must integrate the processes and systems that are behind these experiences with decisions related to both design and strategy.

The convergence of design with strategy and related innovation processes will inevitably lead to a new integrated set of processes, methods and disciplines -- the advent of what we are calling Smart Systems Design.
we need a radically new frame of reference...that leverages the convergence of design, strategy and innovation processes

How can we better understand customer experience through the user’s eyes and through the creativity of multiple parallel participants?

How can we drive empathy, participation and motivation? How can we put human sensibilities and behaviors at the center of the solution?

How can we better understand the value of data and information coming from products, systems and people?

How can an organization turns its workers, partners, and customers into believers and contributors? How can we solve really big problems or create unique new offerings?

How can we move beyond a conventional view of technology where all tangible and intangible skills and assets including people, brands, technologies, relationships, and processes are fully leveraged?

How can we deliberately organize to anticipate technologies that are disruptive or sustaining in nature...innovation that creates new (and unexpected) opportunities?
its also about doing things differently........

developing new smart systems and services innovation requires abandoning traditional protocols; critical success factors include..

1 **Designing New Experiences & Systems:**
By looking at the customer experience through the user’s eyes and through the creativity of multiple parallel participants, players can gain a deeper appreciation of the viability of their offering. Domain knowledge provides a rich context in which to address new opportunities and it also minimizes the time investment to get new business development teams moving forward.

2 **Organizing Clever Combinations of Smart Systems Technology:**
Companies can deliberately anticipate sustaining technologies .......innovation that creates new (and unexpected) opportunities can be systematically developed by leveraging cross-industry perspective to solve problems in radically new ways.

3 **Rapid Experimentation & Business Systems Innovation:**
Success will depend upon understanding and choosing new or modified business models and acting quickly. Continuous experimentation is a must as new opportunities will often fail and re-form as learning grows.

4 **Extending Skills Through Relationships, Ecosystems and “Strange Bedfellows”:**
Seemingly superior offerings can often fail because there is little understanding of how to participate or incentivize to participate at all. Inviting users’, customers’ & partners’ participation facilitates an acute understanding of the customer experience and the potential business system to support the solution. New solutions will increasingly be comprised of coalitions of self-motivated participants that pursue a common goal, not mere subcontractors tied to “command and control” schemes.

5 **Aligning The “Business Architecture” With The “Technology Architecture”:**
For the first time in the evolution of networked businesses, these two “architectures” must be viewed in close proximity. The two thrusts need to be mutually supportive without inhibiting one or the other. However, trying to coordinate and leverage the respective roles of technology architecture and business architecture often creates contention. We see the continuously evolving relationship between these two dimensions as fertile ground for innovation. They need to be interwoven and mutually supportive. In fact, we believe success in either increasingly goes to the company that effectively utilizes the combined potential of both.
designing radically new systems and experiences...

assuming that the role of technology is only about making existing products or services more attractive no longer works; players need to creatively imagine fully developed systems and whole marketplaces

The Interactions & Relationships Between & Amongst Devices, People & Systems
Will Drive Future Differentiation - Not Just Features & Isolated Capabilities
organizing clever combinations of smart systems technologies & capabilities
rapid experimentation and customer innovation & collaboration becomes defacto

leveraging discovery and experiential processes fosters communications across traditional functions and creates work streams that cross disciplines and boundaries to drive new value
extending skills through relationships and ecosystems.
aligning the “business architecture” with the “technology architecture”…

Trying to coordinate and leverage the respective roles of technology architecture and business architecture often creates contention.

The continuously evolving relationship between these two dimensions is fertile ground for innovation. They need to be interwoven and mutually supportive. Success in either increasingly goes to the company that effectively utilizes the combined potential of both.
to conceive and design smart systems, organizations need an integrated approach...

**SYSTEMS DESIGN**

We believe design needs to transcend discrete product or service innovation. Assuming that the role of design is only about making existing products or services more attractive no longer works. Business designers need to creatively imagine fully developed systems and whole marketplaces. Companies need to envision the design role as one that can address product, service and business systems.

**RELATIONSHIPS**

Problem solving for new Smart Systems opportunities must address tough questions: how can an organization turn its workers, partners, and customers into believers and contributors? How can we make changes that can impact multiple functions and organizations and ultimately solve really big problems or create unique new offerings? We are firm believers in the human element - the community as a manifestation of the system and vice versa. Behaviors of users, customers, teams, functions, leadership, all need to be considered. Understanding empathy, participation, motivations - putting human sensibilities and behaviors at the center of the solution is key.

**SKILLS**

Companies need to move beyond a conventional orientation to technology skills and knowledge. Organizations need a disciplined process focused on optimizing all tangible and intangible skills and assets including people and competencies, brands and positioning, technologies and intellectual property, alliances, relationships and business and operational processes.
smart system design
client cases
the Internet of Things demands that we think about opportunities as....
...systems not products....

Innovators like Thomas Edison and Steve Jobs understood the value of “systems thinking” ..... each understood the value of product innovation and the business system that has created entire industries around their products. Their genius lies in the ability to look beyond discrete innovations and conceive of entirely new smart systems experiences that become new marketplaces.
smart systems design is driven by a core set of critical questions……
client case: customer needs analysis for platform and interaction design

A well known manufacturer of power distribution devices and energy management equipment and systems came to Harbor looking to better understand customer experience and requirements for a potential new "connected" services offering. Our team worked closely with their technologists and support organization to facilitate a group of customer and user participatory design workshops to enhance and validate their development plans and road maps.

INQUIRY

Use Cases
What key elements in the design of the customer’s “connected” experience should we be focusing on? What new connectivity, content, or data values can our client uniquely leverage? How will these new capabilities impact our customers?

Defining Platform & Interaction Requirements
What connected products and services are already in the market today and how are they applied? What will the requirements be for a data management/service delivery platform solution? How will stakeholders and users interact with these new systems? How can we make user experience a differentiating element in our offerings?

Validating Opportunities
Using a workshop approach, we helped client gain direct inputs from users and stakeholders to quickly iterate its assumptions driving this program. We were able to give client the confidence to make new investments in core sensing and platform technologies and help build a road map and roll out program.

INVESTIGATIONS

We talked with internal staff as well as industry experts and developed a short list of target participants who were not familiar users of our clients products and services.

We hosted in-depth design sessions with users, having them evaluate the concepts including creation of their own mock-ups and selection of mock-ups they valued most.

We organized multiple participatory design workshops based on a set of use cases we developed with the client.

We functionally validated key elements of the system and refined client’s view of customer benefits and related economics/values as well as presentation organized for developing support with senior management.

IMPACT

Our work encompassed the entire product development and user experience: from research to interaction design to platform selection.

We conducted extensive field research to understand what users, stakeholders and operators monitored in use. We prototyped platform usage and interactions that received data from sensors, and detailed requirements for a system and platform for managing equipment, users, and communications remotely.
client case: heavy equipment manufacturer validates user needs and data values

Excavators can do more than just move dirt. With the addition of GPS, telematics, and other technology, these machines are now also information devices, producing and releasing vast amounts of data about what they know. One of the world’s largest manufacturers of heavy machinery, asked Harbor to perform in-depth research throughout China to understand the business value of this information and how it might be used.

**Field Research**
We conducted dozens of stakeholder interviews and performed field research in nine cities throughout the country to make certain that our insights were grounded in real-world needs and possibilities.

**Persona and User Mapping**
Our research revealed a complex landscape in which social constructs, such as national identity and personal relationships, were as important to the business as the value of the information.

**Validating User Needs**
We found that the data captured by our client’s machines proved to be of great interest to potential new customers and markets, such as resale and insurance.

**Platform Road Map**
By investing in data architecture, collaborating with key stakeholders, and developing new and targeted products and services, our manufacturing client could avoid some unforeseen pitfalls and accelerate growth.

The result: a new platform and underlying data architecture with user interfaces that provided a quick overview of the system’s performance, with the ability to dig deeper into the numbers using a “bubble up, drill down” approach allowing diverse users to easily evaluate states, usage and diagnose problems on their own. User needs analysis approach combined with a future-proofed design helped create a sustainable design for the client to take to market.
client case: hygiene chemicals manufacturer and services provider develops digital and IoT strategy

A leader in hygiene and cleaning chemicals wanted to embrace digital and IoT technologies to help differentiate new solutions for customers. Being uncharted territory for the client, our team worked closely with their business leaders, technologists, and services management to understand future user needs, new business models, solution packaging, pricing and monetization as well as establish an IoT architecture and platform strategy, including the development of new data management and analytics capabilities.

INQUIRY

Anticipating Future Customer Needs - Scenario Planning
How will this market likely evolve? How will IoT change customer needs, buying behaviors and requirements? What will be the impact on the market, competitive structure and the existing suppliers if our client develops a family of new digital and IoT solutions? How can we utilize future scenarios to guard against the unexpected?

Digital Strategy Development
Which internal projects are worth funding, what are the business cases, which technologies should we source and which should we develop directly? How should we organize a new digital and IoT initiative? Who should be involved? How should our digital and IoT team align itself with the existing organization; what should be their role, mission and objectives? What critical investments should we be considering?

Platform Requirements
What products and services are already in the market today and how are they applied? What will the requirements be for data management/service platform solutions? How can we leverage data sciences and analytics to address new optimization opportunities?

Strategies and Business Models
What business models are likely to be adopted and which ones will be most successful? How will revenue models evolve? How can we accelerate adoption rates and how can these tactics play into a broader strategy? What business case framework, methodology and metrics should we utilize to focus on the best opportunities?

Road Map
What investments should we prioritize: platform innovations, data architecture and analytics, collaboration with key stakeholders, etc. for development of new services? How can we organize our skills, capabilities and functional organizations to accelerate our market development for new solutions?

INVESTIGATIONS

We conducted a focused assessment of future customer needs and requirements and utilized them in scenario planning workshops to build a view of future market needs and requirements.

Given the key requirements, we analyzed the competitive landscape and determined potential maneuvers for differentiated solutions and market development requirements.

We then identified key platform and architecture requirements, including addressing the development of supporting business cases and revenue models for different solutions configurations.

To help make these strategies a reality, we created a comprehensive implementation plan outlining the phases or both technical and market development involved, and the likely future adoption cycles based on deep modeling. Based on this modeling, we helped build an investment plan, skills acquisition strategy and organizational model to help support market roll out.

IMPACT

By first helping our client to form a digital and IoT strategy team and charter, we assisted in organizing over 15-20 disparate projects and unifying a digital strategy process to evaluate which projects were worth investing in.

Subsequently, developing an architecture, platform and technical development and sourcing partner strategy helped the organization to put its arms around the many and diverse and confusing technologies required.

In parallel, developing a business case methodology and project selection process increased confidence in the organization that the best projects and programs were being developed.

The combination of the above processes has accelerated the market development of a suite of new solutions within targeted customer segments.
client case: transforming industrial operations in hot dip galvanizing with internet of things strategy

The largest after-fabrication galvanizing business in North America with 40+ plant locations wanted to reduce the subjective nature and overly manual processes in their operations. Considered one of the leading galvanizing businesses in the world, leadership wanted to overcome the barriers to adopting Industrial Internet of Things technologies and completely re-think the relationship between new digital technologies and their operations.

Identifying Obstacles
We conducted interviews with stakeholders to determine most critical needs, requirements and hurdles to adoption. Emphasis focused on barriers to new technology adoption.

Pilot Plant Program
Our research indicated best approach would be to pilot a master operating platform for all plants (40+ facilities) in a target plant first, including:
- Dynamic machine and production monitoring, control, and automation
- Real-time product visibility
- Digital order entry, order life-cycle tracking, and automated invoicing

Integration and Transformation
Successfully piloting and integrating new IoT technologies with existing systems helped eliminate need for “rip-and-replace” implementation. This allowed client to be able to deliver today’s most advanced technology and sensors to optimize & automate operations and enable future innovation.

Platform Road Map
By planning and investing in next gen platform and data architecture, collaborating with key stakeholders, and developing new sensor and data acquisition capabilities, our client has significantly and cost effectively upgraded capabilities and technologies for galvanizing operations and established a blueprint for plant roll outs and future innovations.

The result: our client realized significant improvements in throughput, safety, quality, raw materials utilization, on-time deliveries and customer satisfaction.

The IIoT program has been rolled out to over 20 facilities and has increased quality levels, resource management and utilization ultimately leading to a consistent increase in operating profits at each plant.
client case: market analysis and modeling to support IoT and platform strategy development

A leader in silicon technology was looking to validate a new opportunity that could enable them to disrupt the Internet of Things arena much as they had previously disrupted the mobile phone and device market. We used our Smart Systems and IoT quantitative forecast model to help uncover the scale of opportunity across select markets, venues and application segments and used this understanding to co-develop scenarios that could predict the long-term value creation opportunity for our client.

**Network Architecture Evolution**
How does information flow around the networks in these applications and markets? What topologies and protocols are in use; which will win in the future?

**Standards Adoption**
What standards do we believe will be used in key markets? Which ones are already established? Which standards are emerging and which ones show promise? What do we believe the timing will look like for the adoption of these networks and what factors will most impact adoption timing?

**Scenario Planning**
How will this market likely evolve? What will be the impact on the market, competitive structures and the existing suppliers if our client develops a disruptive strategy? How can we utilize future scenarios to guard against the unexpected?

**Platform Requirements**
What products and services are already in the market today and how are they applied? What will the requirements be for data aggregator / service platform solutions?

**Strategies and Business Models**
What business models are likely to be adopted and which ones will be most successful? How can our client accelerate adoption rates and how can these tactics play into a broader strategy?

**Risk Assessment**
What are some potential disruptive strategies? What will be the impact on the market, competitive structures and the existing suppliers if our client develops new unexpected network technology? What are the risks for the client and how should they be weighted?

By providing our client with a creative combination of strong data modeling and creative insights we were able to better inform their strategic decisions and the potential risks.

Given the complex nature of the new tech adoption environment, the scenarios that we created helped our client make and balance important decisions that could generate long-term value and allow them another chapter of market leadership.
client case: portfolio expansion acquisition analysis and due diligence

Recently, we engaged with an industrial communications provider who was looking to make a series of acquisitions to help them drive growth and expand into the smart connected systems space. After being recently acquired by a private equity firm, it was vital that the acquisition targets were well coordinated and could generate significant returns and synergies.

### INQUIRY

**Targeting Candidates**
Based on our understanding of the Smart Systems and Services market and the market’s likely future states, which candidates will make the best targets?

**Screening For Strategic Factors**
How will economic indicators, regulations, application opportunities, and technology development combine to impact our clients future market and acquisition decision-making criteria?

**Product Portfolio**
In order to create the most value, what should our clients end product portfolio look like? In terms of scope, breadth and depth, how does our client stack up against that their competitors pre and post acquisition?

**Technology Synergies**
How does the short list of candidates potentially extend existing capabilities within our client? What are the strengths and weaknesses that can be enhanced and supported?

**Target Candidate Due Diligence**
How does our client's target candidate stack up against their competitors and peer group in the marketplace? How do their customer bases, product mix, financial situation and market positions align?

### INVESTIGATIONS

1. **Healthcare**
   - Service Equipment
   - Hospital Equipment
   - Commercial Financial Services
   - Patient Diagnostics
   - Patient Case
   - Patient Care

2. **At Term - Complexity in Customer Touch Points Risks**
   - Create client profile
   - Customer journey
   - Customer experience
   - Customer insights

3. **We conducted in-depth assessment of the acquisition candidate companies comparing the group to it peer companies in the market as well as to existing capabilities in our clients portfolio**

4. **Finally, we organized and presented the information to ensure our client, the private equity firm and their bankers had a comprehensive framework of information from which to make their acquisition decisions and also to help support their company integration program post acquisition**

### IMPACT

With the target analysis complete our client successfully acquired the candidate as recommended and is now well-positioned to expand their customer base, generating significant ROI, and insulate themselves against potential threats from competitors.

At the end of the project, our client not only had the information that allowed them to make an informed decision, but under our counsel, they were able to understand the breadth of information that was required to make a complicated decision and, most importantly, act upon it in a very compressed timeline.
client case: market, player and technology tracking and briefings

Being a large, established leader in networking technologies, our client was interested in understanding how key Internet of Things innovations could impact their business. As part of a broader research subscription, they could participate in our on-going market and player tracking services and couple these to briefing forums with thought-leaders and innovators to build a view of the future that helped the client understand potential competitive scenarios and identify key opportunities to pursue.

**INQUIRY**

**Technology and Player Tracking**
What new technologies and disruptive capabilities will customers value? What elements in a Smart Systems and Services offering will drive sustaining value?

**Customer Drivers and Use Cases**
What key elements in the design of the customer’s “connected” experience should we be focusing on? What new connectivity, content, or data values can our client uniquely leverage?

**Market Modeling, Sizing and Dimensioning**
What new markets and types of applications should our client be looking to address in the future? Which segments will drive innovation and/or disruption in connected services?

**New Business Models**
What evolving business system and business model design elements can be leveraged to our client’s advantage? How will these elements impact our client’s business model and go-to-market strategy?

**Ecosystem Partners**
Who are our client’s natural allies in a Connected Services model? Who is poised in the future to help develop this opportunity? How might the ecosystem evolve and how could this impact our client?

**Validating Growth Opportunities**
How can our client quickly iterate its assumptions driving this program to learn more? Are there any ecosystem participants that could help our client best understand the potential for future customer and marketplace impact?

**INVESTIGATIONS**

1. We configured a defined set of technologies and players and utilized our research services platform and tracking services to build a knowledge base for the client focused on high impact market intelligence.

2. From our base of research and client work, we organized use cases and business model portrayals to help the client understand new growth and disruption opportunities. These were presented virtually to diverse internal staff constituents.

3. We leveraged our deep market understanding and the firm’s Smart Systems architecture and forecast model to help the client pinpoint specific customer, segment and application targets and size/scope these for further evaluation.

4. By providing an outsiders perspective, we were able to help our client generate new insights about where the most attractive growth opportunities were and what capabilities were required to penetrate and develop these opportunities.

Additionally, we were able to establish an on-going market intelligence and player tracking system for the client’s organization to help diverse staff functions keep up with rapidly changing market conditions.

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value created from our new model is informed by community interactions...

The relationships and interactions we help foster serve as a context for deep insight and more value creation. Every relationship building event, every workshop and platform project, regardless of its focus, is enhanced by the range and depth of these relationships.

Harbor seeks out clients whose strategic and business development mode shows a desire to drive disruption and manage change effectively, both in their organization and through their relationships in the marketplace. These are the forward looking competitors who can benefit most directly from the breadth of knowledge and process skills embodied in Harbor.
our approach is simple: help clients create and capture value by combining accurate data discovery and analysis with strategy development and creative systems-thinking

We plan and build new businesses and growth opportunities by leveraging deep analysis, thoughtful interactions and unique systems and business model design and development tools

Harbor Research Inc. has nearly 30 years of experience supporting new business creation and development. We continually strive to generate deep insight into what drives value creation and competitive advantage in our clients' businesses and the economy as a whole. Harbor helps companies outperform their peers and rivals by instilling innovation into the core of their business development processes. We help client's foster creative thinking, facilitate diverse perspectives and unconventional insight and, most importantly, we directly participate. The result is increased certainty around vital new business decisions.

We work collaboratively to help clients come to confident answers today while also building their capabilities for the future - we are passionate about creating lasting impact. We believe that innovation can be driven from systematic methods and that enduring capabilities and processes can be built to reduce the risks associated with new growth ventures. Every solution we propose is informed by a combination of real world experience and unique processes and methods that are tailored to the dynamics of your organization.

To discover, design and develop innovative smart systems, organizations must consider all the elements involved and the context they fit into. The benefits that will flow from the recognition that traditional strategy and product development protocols will not meet the needs of a connected business are nearly infinite.