Evidence of Knowledge and Experience (13.2, 14.2)

Founded in 1984, Harbor Research Inc. has more than thirty years of experience in providing strategic consulting and research services that enable our clients to understand and capitalize on emergent and disruptive opportunities driven by information and communications technology.

Our firm has been involved in the development of the smart systems and machine-to-machine (M2M) market opportunity since 1998. The firm has established a unique competence in developing business models and strategy for the convergence of pervasive computing, global networking and smart systems. Our extensive involvement in developing this market opportunity, through research and consulting, has allowed the firm to engage with clients in the technology supplier community – both large and emergent players – as well as a diverse spectrum of device OEMs and services providers as well as broad end customer interactions.

Highlights related to our experience include:

- The first comprehensive research study on the intelligent device networking and M2M arena in 1999;
- Smart systems device, equipment and software market modeling & forecasting since 2002;
- October 2005 Harvard Business Review article “Four Strategies For The Age of Smart Services” (we were the firm that “named” the concept of Smart Services);
- Over fifty white papers addressing smart device and services opportunities;
- Launch of SmartSphere in 2016, first online platform to map relationships of top companies in the IoT space, analysis of 500 players including many in the smart buildings market and custom news tracking software against Harbor’s taxonomies;
- Work with leading intelligent building constituents (Cimetrics /Analytika, Skyfoundry, Eaton Residential Business, Tridium, Optimum Energy, Johnson Controls, Pacific Controls, Jones Lang LaSalle, Samsung, Schneider Electric, Honeywell, and others);
- Work with a broad spectrum of intelligent building network equipment and silicon suppliers (Cisco, Dell, HP, IBM, Samsung, AT&T, Verizon, Intel, Qualcomm, Microsoft, etc.);
- Work with leading data and analytics, and artificial intelligence developers, and vendors including Microsoft, Brain Corporation, Glassbeam, Google, Facebook, Samsung, and IBM;
- Work with a range of players on the development of monetization models for IoT products and services, including Cisco, GE Digital, Flowservice, Rockwell Automation, Diversey, etc.
- Work with what we believe is the largest community of device manufacturers focused on developing Smart Device and Smart Services solutions;
- Collaborated with CABA in 2017 on identifying key demographics and behaviors of single and multi-tenant constituents to validate business cases and opportunities.
Evidence of Previous Experience in the intelligent buildings market, monetization models and the IoT Space (13.3, 14.3, 14.5)

Harbor Research’s recent relevant experience in the intelligent buildings market and with monetization model development includes more than fifteen engagements over the last 48 months, including the following illustrative examples:

Opportunity Assessment, Business Case and Monetization Model for Building Cleaning, Maintenance and other Facility Services

- **Client: Cleaning Chemical and Floor Cleaning Equipment Manufacturer**
  Harbor developed and designed a complete smart systems and IoT strategy for a leading cleaning chemicals and machinery manufacturer with a focus on different commercial, institutional and industrial buildings. This work included defining and ranking the IoT applications and opportunities across different building types (e.g. hospitals, hotels, retail stores, commercial offices, etc.), organizing a digital team within the client’s organization to address these opportunities, and develop a business case and roadmap, including products, services, go-to-market strategy and monetization models. Through this work, the client was able to sort through various opportunities, validate potential investment and completely define its end-to-end digital strategy for buildings.

Pricing and Monetization Model Development for Advanced Data Management and Analytics Software Offerings

- **Client: Automation and Controls Company**
  For a major US Automation and Controls company, Harbor conducted primary and secondary research that identified current business models, pricing and sales approaches for approximately twenty-five advanced data management and analytics software offerings in the industrial manufacturing and commercial buildings markets. Harbor identified key end-customer challenges, top use cases, and developed a software pricing tool that helped the client understand current software pricing models and develop a software packaging and pricing strategy for its own offerings. Harbor provided pointed software pricing, packaging and selling recommendations that will help the client monetize their software offerings.

White Paper and Marketing Materials for New Data Integration and Analytics Opportunities within the Commercial Buildings Market

- **Client: Innovative Software Supplier in the Commercial Buildings Market**
  Harbor closely collaborated with an innovative software supplier to articulate the opportunity associated with its new and differentiated buildings analytics platform. The paper focused on how value is created from machine data, the true value potential of leveraging data created by IoT-enabled buildings, the software tools required to manage and analyze IoT building data, the business models made possible by new software tools and technologies, the underlying machine data intelligence functionalities that will enable the next generation of intelligent buildings.

*See Appendix B for research examples*

Other example clients and engagements our team has worked on include (see Appendix E):
Monetization Models:

- **GE Digital** – Economic Analysis and Competitive Assessment of IoT Software Solutions
- **Rockwell Automation** – IIoT Software Pricing Strategy Development
- **Flowserve** – Discovering and Developing New IoT Service Opportunities
- **Cisco** – Development of Build, Buy, Partner Strategy for Cisco IoT Service Offerings

Summary of Harbor Research Project Approach (13.4, 14.1, 14.5)

**Current State of Intelligent Buildings**

The intelligent building systems market is poised to enter a new period of transformation based on the availability of low-cost, wireless IoT technologies and new services offered through innovative business models. This market is experiencing a confluence of IoT data platforms, and a range of market players are trying to determine how to capture these emerging revenue streams and drive monetization from new services. The combination of available technology with business architectures designed to support these new offerings has the potential to unleash a significant wave of disruption and new value in this evolving arena. Despite this promise, only companies that know how to properly address customer needs and monetize the data produced by IoT-enabled buildings will emerge as winners.

Emerging intelligent building systems provide a distributed control and information system that enables networks of intelligent devices to monitor and control the mechanical systems in a building and integrate data from existing BMS systems. These solutions are enabled by a new class of software tools and data frameworks that allow data to be aggregated from across the fractured vendor ecosystem. Advanced data management, analytics, AI and machine learning algorithms applied to integrated datasets are identifying and capturing new efficiency gains from building systems. These new technologies and use cases are not only changing the way that buildings stakeholders operate, but also how they co-operate.

This evolution has fundamentally changed how intelligent buildings solution providers must address the market. Despite all the excitement and hype created around IoT and intelligent buildings, service providers have to overcome a range challenges to realize the full potential of IoT. Some of the major challenges include: development of new growth opportunities that leverage data from IoT-enabled buildings, interoperability, cybersecurity, data ownership, customer needs, building a portfolio of IoT products and services for vertical markets, and monetization models for these products and services. Particularly difficult for suppliers is the ability to meet the needs of the range of constituents and stakeholders they serve.

Today’s building managers, operators and owners are seeking cost-effective and easy-to-use tools that coordinate the operation of traditional building systems with newly connected IoT systems. As these end-
customers mature, they are increasingly asking what value-added services they can enable with their IoT data. Gathering data and storing it in the cloud is not enough; new use cases such as predictive maintenance and operations visibility require tightly integrated systems that look nothing like disparate building spaces they manage and occupy today.

Monetization models in particular present a challenge for intelligent building stakeholders. Traditionally, bundled equipment, software and services contracts have been sold to major buildings customers via a largely unchanged model since automation reached the buildings venue. Now, everything is changing. IoT technologies have created the opportunity for new services and products to be deployed in intelligent buildings, but ensuring that these solutions address customer needs while also opening new revenue streams for solution providers is a challenge that has not yet been properly addressed across the market.

Most solution providers today do not know how monetization models should integrate with their overarching IoT business model, or how to properly position monetization models in the context of customer buying behaviors, top use cases, or unique market sub-segment requirements. There are also major challenges associated with the appropriate solution packaging, pricing and selling models to bring new IoT-enabled solutions to the intelligent buildings market. This has resulted in market confusion; end-customers do not know what they are getting for their money, solution providers do not know what end-customers are willing to pay for, or how offerings should be priced, packaged and deployed. Just as IoT technologies have led to a fundamentally new approach for how buildings are monitored and managed, a new approach for monetization models of IoT products and services is now required.

Research Questions to Be Answered

State of the Market: Forces and Trends

- What are the key technology, competitive, consumer and socioeconomic trends and forces impacting the intelligent buildings market today? How are these trends and forces impacting current building management and financial considerations, including lifecycle costing, financial and insurance implications and leasing benefits?

- What are the top IoT applications and use cases being adopted today in intelligent buildings? (predictive maintenance, operations visibility, building occupant health and productivity, cybersecurity, tenant engagement and interaction, and others)?

- What is the diversity of assets, devices and building systems enabling these use cases today? How will this evolve in the future?

- How is the data created by IoT-enabled buildings currently being leveraged for IoT value-added services and new and emerging revenue streams? How will the technological evolution of this space in the coming 3-5 years impact the future market direction of intelligent building monetization models?

- How are technologies such as cloud data storage platforms, IoT data exchange marketplaces, advanced data management platforms, big data analytics, artificial intelligence (AI), and edge analytics enabling new applications and business opportunities? How will these technologies integrate with legacy building management systems (BMS)?

- How are digital signage, smart advertising, IoT data exchange platforms and other emerging hardware and software technologies enabling new service innovations for tenants, along with new business opportunities and revenue streams within intelligent buildings?
• How are technology suppliers, OEMs, building operators and developers addressing data ownership, privacy and cybersecurity concerns? Will this have a direct impact on intelligent building monetization models?

• What are the barriers to adoption and challenges that exist for IoT technologies in intelligent buildings? What are the technical barriers and challenges associated with monetization models for intelligent buildings?

• What are the requirements for interoperability across the diverse set of systems and devices within intelligent buildings? How does interoperability impact the monetization of IoT solutions within intelligent buildings?

• What is the device demographic market size and forecasted IoT hardware and software revenue for the intelligent buildings market from 2018 – 2023? How does this revenue opportunity differ by market segment and application?

Customer Needs, Adoption and Buying Behaviors and Requirements

• What IoT applications and use cases are driving the largest business opportunities in which market sub-segments today (sub-segments include commercial, institutional, medical, retail and other types of intelligent buildings). How do these applications and use cases address key customer needs and pain points? How do intelligent building constituents go about leveraging the data created by their IoT-enabled buildings in order to enable these use cases?

• Which features and functionalities of advanced data management and analytics systems, including cloud data storage, edge analytics and AI technologies, are enabling the adoption of IoT applications in the intelligent buildings market? How will continuing technology integration and interoperability lead to the implementation of increasingly complex and valuable applications in the future?

• Across sub-segments of the intelligent buildings market, are there differences in technology adoption, buying behavior or system requirements? What do customers value the most and what are they willing to pay for these solutions? How should monetization models be developed to address this range of characteristics?

• Who owns the data produced by IoT-enabled intelligent buildings? What are the current views in the marketplace from key stakeholders on cybersecurity, data ownership and privacy? What are the ethical and legal implications and how could this impact adoption?

• How do building owners and operators interact with building tenants, and what does this mean from an intelligent buildings value-added services adoption and monetization perspective? Who are the actual end-beneficiaries of these solutions?

• How much are building owners, operators and tenants willing to pay for IoT products and service innovations? How do they prefer to pay for these solutions (perpetual licensing, annual subscriptions, pay-per-use, pay-per-asset, etc.)? How much should they pay for these products and services (installation service costs and product discounting are factored in)? How will the future market direction of pricing evolve in the context of IoT products and services?

Market Structure: Value Chain, Ecosystems and Related Opportunities

• Who are the key established players across each of the following identified segments: hardware and software technology manufacturers and suppliers, OEMs, integrators and installers, service providers, developers, buildings and facility operators?
• Who are the key hardware and software innovators creating disruption in the intelligent buildings market? How are they differentiating themselves?

• What new acquisitions, investments, partnerships and ecosystems are developing in the intelligent buildings market?

• What are the strengths and weaknesses of the identified monetization models in the market today? Which models are the most successful today, and how will this change in the future?

**Developing Monetization Models for Intelligent Building Products and Services**

• What are new and emerging revenue streams enabled by IoT technologies today? How can IoT data be leveraged to create new revenue, and how can this revenue be multiplied through technology integration and interoperability?

• What are the key monetization models available to companies in the intelligent buildings market, and what are the key factors that need to be considered for these monetization models (factors include an examination of monetization within the larger context of a business model, how to enable key use cases in a manner that generates revenue, value propositions, end-customer willingness to pay, and solution packaging, pricing and selling)?

• How should technology suppliers, OEMs, building developers, and building owners/operators position themselves to profit from the data created by intelligent buildings? What steps are necessary for these key intelligent building personas go about monetizing new IoT technologies and services within intelligent buildings?

• How will these new monetization models impact building management and financial considerations (including life-cycle costing, financial and insurance considerations, and leasing benefits)?

• How should companies participating in the intelligent buildings space educate, position, and message products and services that leverage these new monetization models to target user segments based on buying behaviors and other key factors?

• Once a monetization model is developed, what go-to-market designs are needed to bring a profitable solution to market? What is the current go-to-market delivery and services delivery system, and how will this evolve?

**Proposed Research Process and Methodology**

Harbor Research is proposing a collaborative project methodology to conduct a market analysis, survey research and industry expert/thought leader interviews for CABA’s Intelligent Buildings Council, including a methodology and supporting work scope to analyze the trends and forces, customer needs, use case opportunities, risks, and ecosystem formation around Internet of Things technologies as it relates to the intelligent buildings industry. The objective is to provide the current state of IoT product and solution monetization within intelligent buildings, analyze the landscape of key stakeholders, identify value propositions for technology suppliers, service providers, integrators, building owners and operators and OEMs, and discuss future requirements, value propositions and monetization opportunities as they relate to the intelligent buildings market. In addition, and where appropriate, we would plan to incorporate inputs from study sponsors and CABA constituents in the intelligent buildings market study.

Harbor would leverage heavy involvement from senior staff members including President Glen Allmendinger and Project Manager Evan Woollacott. Evan would assist with both the primary and secondary research efforts from which key IoT applications and monetization models for intelligent
buildings would be surfaced. Glen would oversee the entire project, and provide specific insights on players, business models and other market dynamics by tapping into his IoT and intelligent buildings market experience and contact base. To define and develop monetization models for products and software within intelligent buildings, Harbor would undertake the following activities:


- Conduct interviews with CABA membership thought leaders as well as thought leaders in Harbor Research’s community and network.

- Create a foundational framework for understanding monetization of intelligent buildings, from which the Steering Committee and Harbor Research can collaborate, including:
  - Initial set of customer pain points, barriers to adoption and potential monetization models to be validated or disproved by survey participants to inform the future intelligent buildings market direction.
  - Trends and forces shaping the intelligent buildings market and associated monetization models, BMS technology integration and interoperability within intelligent buildings, the impact of advanced data management and data analytics technologies on this market, as well as the evolution of cybersecurity, data ownership and privacy in the monetization of data created by IoT-enabled buildings.
  - Market application map and framework that addresses connected assets, building automation systems, and IoT-enabled hardware and software solutions within the intelligent buildings market landscape including but not limited to (predictive maintenance, operations visibility, occupant health and productivity, cybersecurity, tenant engagement and interaction, digital signage and advertising, and others).
  - Portrayals that address relevant application requirements with regards to services, security, data analytics, systems, and processes for building operators and technology suppliers based on top identified use cases within the target market.
  - Ecosystems of existing players (technology suppliers, OEMs, network providers, software vendors, building developers, facility operators, construction firms, etc.) and emerging players in the intelligent buildings industry to identify roles in the value chain.
  - Portrayal of technology integration and interoperability considerations resulting from implementation of new technologies such as cloud data storage, IoT data exchange marketplaces, advanced data management, big data analytics, artificial intelligence, and edge analytics enabling new applications and business opportunities.
Monetization of Intelligent Buildings

Technical Proposal

16 March 2018

- Identified impact of advanced data management and analytics systems, including cloud data storage, edge analytics and artificial intelligence technologies as it relates to end-customer requirements within intelligent buildings, and assess the functions and features required to address top applications and customer needs.

- Identification of how new IoT value-added services and associated monetization models will impact building management and financial considerations (including life cycle costing, financial, insurance, and leasing benefits).

- Market sizing model and forecast for intelligent devices, IoT hardware, software and services revenue for the intelligent buildings market from 2018 – 2023, identifying the most attractive market sub-segment and use case opportunities.

- Identification of new and emerging revenue streams, service innovations for tenants and value-added services enabled by IoT technologies today, and the monetization model factors (including business models, use cases, value propositions, solution packaging, pricing and selling, willingness to pay, ecosystem development and others) associated with these revenue streams.

- Initial set of recommendations for how companies participating in the intelligent buildings market including (technology suppliers, OEMs, building developers and building operators) should position themselves to enable new monetization models; to be validated or disproved by interview and survey participants.

- **Proposed Project Methodology:** Design a research process design to validate and analyze the proposed market concepts and hypotheses using surveys and in-depth interviews (Section 13.5, 14.1):

  **Market Survey**
  - Harbor will administer online survey questionnaires to market participants and end-customers, along with supplemental in-depth interviews of market participants. The survey will include 1,500-2,000 respondents divided between the following segments: building tenants and occupants, intelligent building operators, intelligent building owners, and intelligent building developers (additional breakouts of survey respondents among these groups to be determined by Harbor and the CABA Intelligent Buildings Council (IBC) Steering Committee). The surveys will be distributed across agreed upon sub-segments and demographics in the United States and Canada (this will allow Harbor to establish a detailed respondent data set and to provide a statistical summary and analysis of research findings). The survey will be designed in conjunction and cooperation with the CABA IBC Steering Committee. Harbor will plan to explore the use of a preference-based survey approach to understand user priorities and desired monetization models. In addition, the survey would address technology requirements, top technology features and functions required to leverage data created by IoT-enabled buildings, ranking of IoT application needs, identification of buying behaviors, adoption hurdles/timing, user pain points, willingness to pay, and preferred modes of interaction and support between suppliers and adopters.

  **In-Depth Expert Interviews**
  - Harbor will conduct parallel supplemental interviews (approximately 30-40) with marketplace stakeholders, including product OEMs (HVAC systems, HVAC control
equipment, power quality & standby systems, lighting, digital signage and advertising, etc.), technology suppliers (BMS systems), IoT platform and application providers, and service providers. In addition, related specialist technology providers leveraging AI, advanced data management, edge analytics, and IoT data brokering technologies will be targeted. Interviews will comprise of a mix of telephone and in-person interactions based on a discussion guide designed in cooperation with CABA. These interviews will work to understand how technical requirements and user needs are shifting, along with how these marketplace stakeholders see product and service monetization models evolving in the intelligent buildings, including differences across segments, applications, stakeholders and regions.

- Harbor will then employ a “Delphi-like” methodology/approach, based on the above survey, to conduct a review of research results with a balanced cross-section of thought leaders and industry specialists/experts (approximately 15-20 people) to further validate results and provide a balanced coverage and perspective.

- Based on the above research and survey work, Harbor will conduct an analysis associated with product and services monetization models to identify opportunities and solutions available to drive revenues in the intelligent buildings space for all key industry participants. This analysis will include:
  - Identification of new and emerging revenue streams in intelligent buildings enabled by IoT technologies;
  - The role and positioning of monetization models within the broader context of business model development;
  - Development of a framework identifying the major business and strategic considerations for monetizing IoT data from intelligent buildings, and how these considerations come together to produce a monetization model;
  - Identification of how the available IoT monetization models should be leveraged in intelligent buildings, including the differences across technologies, use cases, market sub-segments and supplier types;
  - Recommendations for how technology suppliers, OEMs, building developers, building operators and building construction firms should position themselves to enable new monetization models and capture additional revenue from their assets through IoT;
  - Identification of the necessary steps for these key intelligent building personas go about monetizing new IoT technologies and services within intelligent buildings;
  - Discussion of how new monetization models will impact current building management and financial considerations, including lifecycle costing, and financial, insurance and leasing benefits;
  - Identification of ecosystem participants, and service delivery structures for delivery of new IoT-enabled products and services within intelligent buildings.

- This analysis will allow Harbor to articulate a clear set of recommendations for key industry participants focused on developing new monetization models to address the intelligent buildings market.
Project Engagement Team (13.4, 14.2, 14.3)

We bring to this project substantial industry experience, and a team with relevant expertise in connected product solutions for the Internet of Things. Senior staff will oversee and manage this research effort as well as participate in a focused and applied manner on the scope, design and execution of this research program.

Glen Allmendinger - President and Founder

Glen Allmendinger is the Founder and President of Harbor Research, a strategy consulting firm with offices in Boulder, Colorado and Zurich, Switzerland. Since the firm’s inception in 1984, Allmendinger has worked closely with a broad spectrum of telecommunications, information systems, electronics and automation and equipment manufacturing companies in North America, Europe, and Asia. These companies range in scope from small, entrepreneurial start-ups to major multi-national corporations. His project direction and consulting has assisted these firms in the development of corporate and business unit strategies, new product, market and service opportunities, and new core capabilities.

Allmendinger has consulted to the National Research Council on technology and competitiveness as well as emerging technologies for social wellbeing. He is a member of IEEE, ASME, and ACM and has worked closely with several industry trade associations including CABA. He has worked on DARPA-funded research focused on advanced analytics and sensing systems technology and was a key participant in the planning and development of the National Center for Manufacturing Sciences. Allmendinger received his BA from New York University, and completed graduate studies at MIT’s Center for Advanced Media Studies.

Evan Woollacott – Consultant/Project Manager

Evan is a Project Manager & Consultant at Harbor Research. He specializes in the coverage of Digital technologies and how these new mechanisms contribute to the accelerating growth of IoT and Smarter Services across a variety of industries, including smart cities, smart home, connected buildings, healthcare and others. Evan works with clients of Harbor Research to help them better understand today’s evolving technological ecosystems and the impact which these new dynamics will have on a company’s business model. Evan’s ability to bridge together qualitative and quantitative analysis in understanding market forces provides clients with a deeper understanding of their strategic initiatives and the implications they will have on the market place.

Walter Scheib – Senior Associate

Walter Scheib is a Senior Associate at Harbor Research. Walter supports Harbor’s smart systems research projects and consulting engagements, including go-to-market strategies, product portfolio analysis, customer use cases and segmentation, competitive analysis, and environmental scans. Walter focuses on data management and analytics technologies and their applications within the industrial manufacturing, commercial and residential buildings, smart cities and healthcare markets.

Prior to joining Harbor, Walter was an energy Policy Analyst for Energetics, Inc. There, he supported the Department of Energy’s Office of Energy Efficiency and Renewable Energy on residential and commercial building energy initiatives. Walter gained additional renewable energy policy experience from previous jobs with The Denver Mayor’s Office of Sustainability, The Wilderness Society, and Greenberg Quinlan Rosner, all of which involved the development of energy policy at the Federal and local levels. Walter also has a Master of Arts degree in Geography from the University of Denver, where he focused on urban studies, sustainability and residential energy efficiency. His thesis research examined energy efficiency and renewable energy adoption behaviors of homeowners in Boulder County, Colorado using GIS spatial analysis, statistical analysis and survey research.
Jacob Crawford – Associate

As an Associate at Harbor, Jake assists in developing research and content for Harbor’s client engagements and services. Jake has broad experience across multiple markets including energy, retail, defense, healthcare, biotechnology and pharmaceuticals.

Jake joins Harbor from a fellowship program in Washington, D.C., where he worked to support Atlantic Media’s publications through corporate strategy development and audience analytics. Prior to Atlantic Media, Jake also worked at Strategic Financial Services, specializing in technology sector research, Atlas Entertainment and Transposagen Biopharmaceuticals. He received his bachelor's degree in Economics from The University of Chicago.

Harbor Research Profile (14.4)

An internationally recognized research, technology, and business development consulting firm, Harbor Research has predicted, tracked, and driven the development of the Internet of Things since our inception in 1984. While our history is long, our strategy is simple: capture and create value by combining accurate data discovery and analysis with creative systems-thinking. It is this mindset that has given us the privilege of working with some of the greatest companies in the world. Today, we continue to work with C-level executives and top management of some of the world’s most consistently successful companies and innovative startups. In the same way that the market has flexed and grown over the years, our services and experience have grown to make us the premier service organization you see today. We work with clients in a variety of ways including consulting, advisory, research and content development, thought leadership and workshop facilitation.

Project Timetable, Including Interim and Final Stages (13.6, 14.6)

<table>
<thead>
<tr>
<th>Activity</th>
<th>Anticipated Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research Setup and Kick-Off</td>
<td>March 2018</td>
</tr>
<tr>
<td>Secondary Research</td>
<td>April – May 2018</td>
</tr>
<tr>
<td>Primary Research</td>
<td>April – June 2018</td>
</tr>
<tr>
<td>Analysis and Reviews</td>
<td>June 2018</td>
</tr>
<tr>
<td>Draft Report and Delivery</td>
<td>July 2018</td>
</tr>
<tr>
<td>Final Report and Delivery</td>
<td>July 2018</td>
</tr>
<tr>
<td>Final Funders Webinar (1.5 – 2 hours) with all the funders to highlight the findings of the research</td>
<td>August 2018</td>
</tr>
<tr>
<td>Individual Steering Committee Organization Webinars (1 hour each), one (1) webinar for each organization on the Steering Committee</td>
<td>August 2018</td>
</tr>
<tr>
<td>Public Webinar (1 hour) to all CABA contacts to present the high level executive summary findings only. This occurs after four (4) month embargo period</td>
<td>December 2018</td>
</tr>
</tbody>
</table>
APPENDIX A: Signed RFP Form (13.8)

AWARDING OF CONTRACT

As this project is based on a competitive bidding process, only one (1) contract will be awarded, and it will be offered to the bidder whose proposal is deemed by the Steering Committee, Council Executive Committee and CABA to provide the best value. More than one (1) vendor can be selected if a joint proposal is submitted and selected.

Should the total cost of the selected vendor’s proposal exceed the available total project budget, CABA and the Steering Committee may work with the vendor to achieve optimization of project scope, research objectives and methodology in accordance with the available project budget.

Once the project is awarded the vendor and CABA will work together to create an official contract, this contract will be signed by both the vendor and CABA prior to the commencement of the research project.

Important Guide: Given the collaborative nature of the research, participation and funding levels of previous Landmark Research studies have allowed for a total budget of between $90,000 - $110,000 USD. This will be the estimated budget for this research project. We encourage prospective bidders to be creative in deriving their scope, objectives and cost of the research to provide maximum value. Any options or alternatives suggested will be welcomed and considered.

Glen Allmendinger
President
Harbor Research, Inc.

Date: 16 March, 2018
APPENDIX B: Sample Research (14.3)

- Pricing and Monetization Model Development for Advanced Data Management and Analytics Software Offerings—Select Slides below

Software Packaging, Pricing & Delivery Models

A combination of delivery methods, software architectures, and financial models is affecting industrial software pricing. Enterprise IT infrastructure and applications has shifted towards subscription and use-based pricing models, while industrial operations applications continue to be sold largely through perpetual user- and plant-based licenses.

[Diagram showing software selling & pricing dimensions and deployment methods]
IoT Software Pricing, Selling and Monetization Models

Selling, pricing and monetization models remain relatively unsophisticated today

Sources of Value Creation from Across Customer Operations

All elements of a customer’s cost of operations must be considered for monetization of product offerings
Pricing in the Context of Market Development & Strategy

There are overarching capabilities beyond just pricing models that suppliers must consider when deciding how to price and sell IoT software offerings due to the various customer circumstances that will be encountered and the skills required through the sale.

- Harbor Research Smart Buildings Market Opportunities Report (2017)—Select Slides below

Building Solutions – Evolving Market Role & Positioning

Combining energy solutions services capabilities with enterprise information and control can drive a very unique market position - strategy that can be pursued in phased development…
How Should We Think About Systems, Platforms and Managed Services Values....

Platform Architecture And Standards Fosters
The Exchange of Meaningful, Actionable
Information Between Two Or More Sub-
Systems, Including:
- Energy management
- Asset management
- Maintenance and repair staff
- Supply chain support
- Enterprise integration

Smart Buildings Market Opportunity Scale

While Commercial buildings represent the largest current opportunity, Residential is almost as large and is not well served today. This is especially true for Multi-Dwelling Units where commercial technologies and consumer technologies have not naturally coalesced.

2016 Buildings Smart Systems Revenue by Building Type and Device Segment ($32.396M)

- Commercial & Institutional
  - Other: $14,921M
  - Life Safety, Surveillance & Security: $3,819M
  - HVAC & Large Appliances: $7,066M
  - Electrical Power Distribution & Quality: $3,118M
  - Lighting: $5,727M

- Industrial
  - Other: $2,740M
  - Manufacturing: $5,098M
  - HVAC & Large Appliances: $1,004M
  - Electrical Power Distribution & Quality: $412M

- Residential
  - Other: $14,754M
  - Energy Management: $5,769M
  - Security Management: $1,743M
  - Supply Chain Management: $2,079M

Residential Smart Systems Market 2016 by Value Added Application ($1.401M)

- Other
  - Asset Management: $396M
  - Customer Support: $247M
  - Database & Analytics: $191M
  - Energy Management: $110M
  - Energy Management: $333M
  - Energy Management: $539M
  - Mobile & Cloud Services: $185M
  - Security Management: $134M
  - Supply Chain Management: $75M
  - Single Tenant: $87M
  - Multi Tenant: $526M
## APPENDIX C: Mandatory Requirements and References

<table>
<thead>
<tr>
<th>RFP Reference</th>
<th>Requirement</th>
<th>Reference Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>13.2</td>
<td>Evidence of knowledge and experience of personnel of current theory and practice in the intelligent building discipline by providing short relevant biographies of all personnel who it is proposed will participate in the project. The vendor’s project leader must have a minimum of 10 years relevant experience.</td>
<td>1</td>
</tr>
<tr>
<td>13.3</td>
<td>Evidence of previous experience in the intelligent building by providing examples of relevant projects prepared for three (3) separate clients within the preceding 48 months. References may be required from these three (3) clients, only if requested by CABA. References are normally not required.</td>
<td>2</td>
</tr>
<tr>
<td>13.4</td>
<td>A summary of how the vendor proposes to perform the project and the relevant experience of the proposed staff.</td>
<td>3-10, 10-11</td>
</tr>
<tr>
<td>13.5</td>
<td>Identify size of the sample size of both the interviews and surveys</td>
<td>8-10</td>
</tr>
<tr>
<td>13.6</td>
<td>Acceptance of deliverables as identified in the Terms of Reference/Prospectus and proposed schedule.</td>
<td>11, Appendix F</td>
</tr>
<tr>
<td>13.7</td>
<td>The vendor must be a member of CABA or agree to become a member of CABA (US$800) (before the RFP is reviewed).</td>
<td>Submitted</td>
</tr>
<tr>
<td>13.8</td>
<td>RFP Signature - Bidders must complete, sign (end of Section 17) and return this RFP form prior to the closing date.</td>
<td>Appendix A</td>
</tr>
<tr>
<td>13.9</td>
<td>Costs must be in USD. A fixed price including a full cost breakdown as per Section 16, “Financial Proposal” must be provided.</td>
<td>See Financial Proposal</td>
</tr>
<tr>
<td>13.10</td>
<td>The Financial Proposal must be submitted as a separate package (PDF document) to the Technical Proposal (NO FINANCIAL INFORMATION MAY APPEAR IN THE TECHNICAL PROPOSAL).</td>
<td>See Financial Proposal</td>
</tr>
</tbody>
</table>
## APPENDIX D: Rated Requirements and References

<table>
<thead>
<tr>
<th>Section</th>
<th>Description</th>
</tr>
</thead>
</table>
| 14.1 | The proposed methodology will be an analysis of:  
1. How the proposal will achieve the stated objectives  
2. The breadth and depth of the proposed work  
3. Effectiveness of the methodology  
4. The innovativeness of the approach  
5. Ability to reach non-traditional stakeholders  
6. The understanding of the issues pertinent to the project  
7. Include the sample size for both the surveys and in-depth interviews  
8. Include the proposed segmentation of the sample groups (surveys and in-depth interviews)  
9. The ideal project will have a North American focus (both Canada and the United States)  
10. Optional: Additional related research reports, research subscriptions or other material may be used to strengthen the proposal. | 3, 8-10 |
| 14.2 | The relevant knowledge and experience of the vendor’s proposed staff in the intelligent building field and in performing studies of this nature. The vendor must indicate the proposed involvement of the senior staff assigned to the project. | 1, 10-11 |
| 14.3 | The vendor’s previous experience in the intelligent building field and in conducting research projects requiring consultation with a broad cross-section of the industry. Previous research will be reviewed. | 2-3, 10, Appendix B, Appendix E |
| 14.4 | Corporate profile (convincing record of fulfilling contracts on time and on budget, depth of personnel capability and other resources). | 11 |
| 14.5 | The vendor’s knowledge of the intelligent building industry both in North America and worldwide (if applicable). | 2-4 |
| 14.6 | Timetable, including interim and final stages. | 11 |
| 14.7 | **Financial Rating** – Total price and detailed cost breakdown. | See Financial Proposal |
APPENDIX E: Additional Intelligent Buildings Experience (14.3)

Additional relevant work includes:

- Worked with CABA to develop an opportunity assessment within Connected MDUs, conducting a survey of 1,500 MDU owners, technology suppliers and service providers in the space, including 60 in-depth interviews to validate research findings. The engagement summarized the top IoT application and use case opportunities among primary buyers of technologies in the space, supported by a 5-year smart systems forecast model.

- For a large silicon player, Harbor defined and developed a software architecture for competitive analysis of IoT platforms. This research examined twenty-five supplier and OEM platform providers in the IT, Telco and OEM markets to validate and segment monetization and pricing models.

- For a leading connected lighting solution provider, Harbor defined new and expanded smart services and IoT solutions as well as building the business case required to support this critical growth initiative. Harbor clearly articulated alternative strategies and solutions available to the company and defined clear steps and a program of actions to fully prosecute the market opportunity.

- For the software branch of a leading industrial and energy OEM, Harbor analyzed of the costs and economics of asset performance management in support of asset health, productivity, optimization, and compliance and integrity. Harbor developed a market model that broke down the costs of data management and analytics tools, and located gaps the company’s software may not address currently and can be added to the product roadmap.

- For the largest manufacturer of electrical products in North America, we conducted user survey research as well as competitor, peer and alliance candidate direct interviews to uncover unmet customer and user needs for new and evolving “connected” energy management and services opportunities.

- For the global leader in network infrastructure equipment, Harbor conducted an analysis of managed services opportunities in connected residential multi-dwelling and commercial properties, including market sizing, competitor analysis, alliance development analysis and go-to-market design.

- For a venture-backed startup, conducted an analysis of consumer energy services offerings to help target candidate developer alliances as well as partnership opportunities with utilities and related services providers.
APPENDIX F: Acceptance of Deliverables and Project Time Line (13.6)

Harbor Research accepts the terms laid out in the RFP delineating the project deliverables as well as the total elapsed time line for the study.

Certification:

1. “We hereby certify that all the information provided in all the attached bios/resumes, particularly as this information pertains to education achievements, experience and work history, has been verified by us to be true and accurate. Furthermore, we hereby certify that, should we be awarded a contract and unless the Research Director is notified in writing to the contrary, the personnel offered in our proposal shall be available to perform the tasks described herein, as and when required by the Project Authority.”

2. “We hereby recognize and certify that CABA will be the owner of the final deliverables and that no revenue sharing arrangements on subsequent report sales will be made with the selected consultancy/research vendor.”

Section 1.2 Adherence

This proposal adheres to the following guidelines provided:

- We hereby offer to sell and/or supply to the Continental Automated Buildings Association (CABA), for terms and conditions set out herein, the supplies and/or services listed herein and/or any attached sheets at the price(s) set out therefore.
- We hereby certify that the price quoted is not in excess of the price charged anyone else, including our most favored customer, for like services.