

AMBI LABS AND RADIUS
INNOVATION & DEVELOPMENT
DRIVE SMART HOME INNOVATION
WITH AMBI CLIMATE 2



Case Study



Company: Ambi Labs

Industry: IoT

Country: Hong Kong

Employees: 30

Websites: www.ambiclimates.com

CHALLENGES

- Innovative startup needed additional expertise to ensure second-generation of breakthrough product met expectations
- Sophisticated knowledge needed to finetune placement of thermal sensors
- Limited mechanical design expertise led to flaw in product aesthetics

SOLUTION

- Radius Innovation & Development's integrated services improved all aspects of product discovery, design, development and delivery
- Radius evaluated, tested and validated new thermal sensor placement
- Radius designers offered suggestions for enhancing mechanical design while streamlining manufacturing processes

BENEFITS

- Ambi Climate 2 aesthetics feature improved product finish and quality
- Improved sensor placement yielded more accurate operation
- Strong partnership from design through manufacturing produced a higher-quality product that cost less to make

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Julian Lee,
Founder and CEO,
Ambi Labs

“Radius is all about agility, commitment and passion. We worked hard to offer Ambi Labs the best experience, which empowered them to deliver a highly innovative product to market on time and on budget.”

**Kevin Ko,
Managing Director,
Radius Innovation &
Development, Asia**

Artificial Intelligence and Intuitive Product Design Produces Unique Personalized Comfort Solution

Ambi Labs is an innovative Internet of Things (IoT) company with a mission to make homes more comfortable and energy efficient. Based in Hong Kong, the five-year old company earned widespread praise upon launching its flagship product, Ambi Climate, in 2014. A smart, connected climate solution, the product takes advantage of built-in sensors and Artificial Intelligence to help determine and sustain optimal home air conditioning.

According to Julian Lee, Ambi Labs Founder and CEO, the initial product was designed with the Asian market in mind.

“While people in Asia typically only use their air conditioners when needed, they also tend to over-cool their homes because of the high humidity,” he explains. “We wanted to address multiple factors that impact comfort, including humidity, changing weather conditions, sunlight in a room and even how a person’s metabolic cycle affects what feels hot or cold to them.”

To that end, Ambi Labs incorporated sensors to collect, detect and analyze multiple comfort factors as well as AI to learn how these factors need to be adjusted for personalized comfort. “While smart thermostats and air-conditioning controllers already are on the market, no one had attempted the AI-based model, so we’re quite unique in that way,” notes Lee. Ambi Labs also stands out in how it collects data as many AI companies pull and analyze data from publicly available sources whereas Ambi Labs was built from the ground up to collect the most useful data and then make sense of it all automatically to ensure optimal environmental comfort.

Taking a Product Breakthrough to the Next Level

After extensive consumer research, Ambi Labs launched its first AI-enhanced air conditioning comfort solution fueled by a well-funded Kickstarter campaign.

“We were quite pleased with the product launch as Ambi Climate is now used by consumers in more than 60 countries,” says Lee. “The product solved a big problem in terms of personalizing comfort in the home, but we felt there was a flaw in terms of the aesthetics.”

Initial product development efforts focused mostly on functionality, causing Ambi Labs to overlook some aspects of product design. While consumers loved how the product worked, they were less enamored with how it looked. “We underestimated the complexity of mechanical design with the first product iteration,” recalls Lee. “The results didn’t live up to our vision for the product, in terms of how the parts fit together, the quality of the industrial design and the thermal response. We needed help to achieve our ultimate vision.”

Enter Radius Innovation & Development, a premier product design and development company well-known in Hong Kong and around the world for its end-to-end approach to integrating each phase of product discovery, design, development and delivery. According to Kevin Ko, managing director of Radius Innovation & Development, Asia, a team of brand and product strategists, human factors specialists along with mechanical, implementation and quality engineers explored every aspect of the first product and before offering improvements for Ambi Climate 2.



“We performed extensive testing on product prototypes to assess the manufacturability of each mechanical component. Equally important was qualifying each part from a cosmetic and geometric perspective.”

**Tony Wong,
Program Manager,
Radius Innovation &
Development**

“Our philosophy is to look at every consumer touch point and then determine how we can create the best possible user experience overall,” says Ko. “We looked at Ambi Climate holistically, not just at the product but also how it worked within the entire ecosystem.” This led to a thorough examination of product aesthetics and thermal sensor

placement, resulting in ideas for enhancing both product quality and temperature accuracy.

“We quickly turned to Radius to help us design the second-generation of our product,” adds Lee. “Their long history of product design, backed by an excellent customer portfolio and seamless alliance with Jabil on the manufacturing side, gave us confidence they could help us take both product functionality and aesthetics to the next level.”

Integrated Product Design & Manufacturing Experience

After a careful alignment of requirements and parameters for Ambi Climate 2, the team worked on several design refinements to validate optimal sensor placement. “Thermal sensors are critical because they really affect the product’s performance,” says Tony Wong, program manager for Radius Innovation & Development. “We used the latest computer-aided design and modeling tools to simulate heat transfers and better understand the device’s thermal behavior, so we could finetune sensor placement.”

Radius completed a series of design iterations to validate the repositioning of the temperature sensors. Each design was tested using the latest Computational Fluid

Dynamics (CFD) simulators to determine a theoretical best fit before moving forward with a physical prototype. “We performed extensive testing on product prototypes to assess the manufacturability of each mechanical component,” says Wong. “Equally important was qualifying each part from a cosmetic and geometric perspective.”

An engineering workshop was conducted to address all aspects of Ambi Climate 2’s mechanical design. “Radius focused on the quality of the output and the flow lines, in terms of where the injection ports should be placed, which required in-depth expertise that we simply didn’t have access to otherwise,” says Lee. “They really helped us immeasurably in improving overall product quality and aesthetics.”

With Ambi Labs’ first-generation product, there were visible screws and flow lines in the plastic that needed to be eliminated to achieve the desired level of product quality. To that end, Radius designers refined the vents, so they would work well for heat dissipation without exposing the interior of the product. Radius also minimized seam lines and streamlined the flow of injection ports in the plastic, which led to a sleeker look and feel.

As part of Radius’ end-to-end services, the team verified design integrity and quality

through the entire engineering build and testing process. As the product design and development arm of Jabil, one of the world's most technologically advanced manufacturing solutions providers, Radius goes well beyond the realm of most product ideation firms to ensure optimal manufacturability while lowering cost and risk.

For Ambi Labs, Radius identified ideal suppliers and then helped coordinate critical aspects of the manufacturing process. "The Radius team was almost in daily contact with our team," Lee recalls. "They constantly went back to check on how things were going and offered recommendations on how to make further refinements to streamline manufacturing.

It really helped to have a seasoned partner like Radius to help drive our product forward, so we could meet all our deadlines."

Partners in Product Innovation

Best-of-class processes and open lines of communications ultimately drove the successful development of Ambi Climate 2. "Radius was very responsive in making recommendations, which helped us proactively identify potential problems," says Lee. "They constantly worked with us to collaboratively explore different ways to improve product manufacturing and assembly."

Adds Ko, "Radius is all about agility, commitment and passion. We worked hard to

offer Ambi Labs the best experience, which empowered them to deliver a highly innovative product to market on time and on budget." The result: A higher-quality product that costs less to make. Ambi Labs plans to pass those savings along to consumers. "Users really love the design and are so pleased with how it looks," notes Lee. "We're getting high marks on industrial design, quality feel and finishing as well as how well everything in the product fits together."

As creative contemplation begins on new Ambi Climate products and accessories, it's clear that Radius will play a role in the future. "We're very excited to see how Radius will help us deliver our next-generation product," concludes Lee.

About Jabil

Jabil is a digital product solutions company providing comprehensive electronics design, production and product management services to global electronics and technology companies. Offering complete product supply chain management from facilities in 27 countries, Jabil provides comprehensive, custom solutions to customers in a broad range of industries. Nypro, a Jabil company, specializes in medical devices, with a global footprint of ISO13485 and FDA registered facilities, manufacturing many of the most recognized medical brands for major healthcare and wellness companies. Jabil common stock is traded on the NYSE under the symbol, "JBL". Further information is available on Jabil's website: jabil.com.