ROYAL DANISH ACADEMY
STRATEGIC DESIGN AND ENTREPRENEURSHIP IBD

Det Kongelige Akademi
Arkitektur
Design
Konservering

NESTING THE FUTURE

Beijing Swift Conservation and Interactive Design

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Abstract

This project explores how innovative swift nest boxes and interactive installations can enhance public awareness and participation in Beijing Swift conservation, promoting urban biodiversity. Using the Double Diamond model, the study analyzes the swifts' ecological needs, public perception, and willingness to engage.

I conducted a survey collecting 220 valid responses and supplemented it with street interviews to gain deeper insights into public attitudes. Findings indicate that while there is broad support for swift conservation, actual participation remains low. Notably, children, students, and the elderly show greater interest and willingness to take action. Therefore, the project prioritizes engaging these core user groups through educational and interactive design, while also encouraging participation from the 25-55 age group.

Following an "animal-centered" approach, the project designed a swift nest box for installation on older buildings, integrating:

- **Solar power:** Supports a built-in swift call playback device to attract swifts;
- **Interactive light box:** Encourages children to observe and explore, sparking curiosity-driven learning;
- **Application program:** Offers educational content, conservation stories, and participation channels to raise ecological awareness.

Moving forward, the project aims to promote public space installations and encourage households to adopt nest boxes, fostering eco-conscious consumer behavior.

In collaboration with ecological experts and environmental organizations, this project integrates swift habitat needs with public education and interactive experiences, exploring how design can drive pro-environmental behavior.

Keywords: Beijing Swifts, Biodiversity Conservation, Nest Box Design, Public Interaction, Double Diamond Model, Projection Device, Ecological Education, Sustainable Development

The Beijing Swift

What is the beijing swift ?

The Beijing Swift (Apus apus pekinensis) is a subspecies of the common swift (Apus apus) found mainly in and around China, especially in Beijing. They are known for their fast flying abilities and unique roosting habits, often nesting in old buildings and high places.(wikipedia)

The relationship between the Beijing Swift and the European Swift

The Pekingian swift and the European Swift belong to the family Apodidae, but they are different subspecies. The Pekingian swift is considered to be a specific subspecies of the common swift because it differs from the European swift in morphology and habitat.(wikipedia)

European swift

Beijing swift

Picture Source:
Mursejler. Årslev Engse 12-06-2024. Foto/copyright: Lars Gabrielsen

Picture Source:
https://zh.wikipedia.org/zh-cn/%E6%99%AE%E9%80%9A%E6%A5%BC%E7%87%95

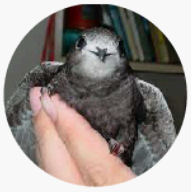
Picture Source:
https://osme.org/2017/01/tracking-studies-show-osme-region-vital-to-migratory-birds-from-east-asia/

Picture Source:
https://www.youtube.com/watch?v=3WY8EoySzo8

Picture Source:
https://yllhj.beijing.gov.cn/ztxx/lhysh/st/202208/t20220817_2794389.shtml

User Persona

In this design, I advocate for an animal-centered design approach, which is why I've chosen the Beijing Swift as the user for persona development and needs analysis. Below is a detailed persona for the Beijing Swift, reflecting its unique characteristics, behaviors, and environmental needs.



Beijign Swift

Apus apus pekinensis

About

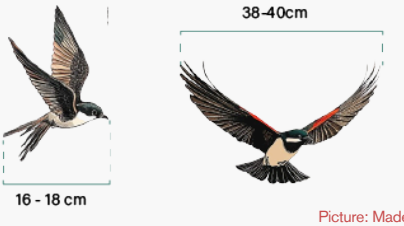
Lifespan: 5.5 - 15 years

Body length: 171 - 180 mm (adult)

Weight: 30 - 40 grams (adult)

Speed: 190km/h

Food: small insects that fly in the air



Picture: Made by AI

Habitat

Habitat: Mainly nest on tall ancient buildings such as the Forbidden City

Migration Route: They return to Beijing for breeding in mid-April every year

Behavioral patterns

Social Behavior: Beijing swifts usually travel in groups and enjoy forming large flocks while flying, displaying strong social behavior.

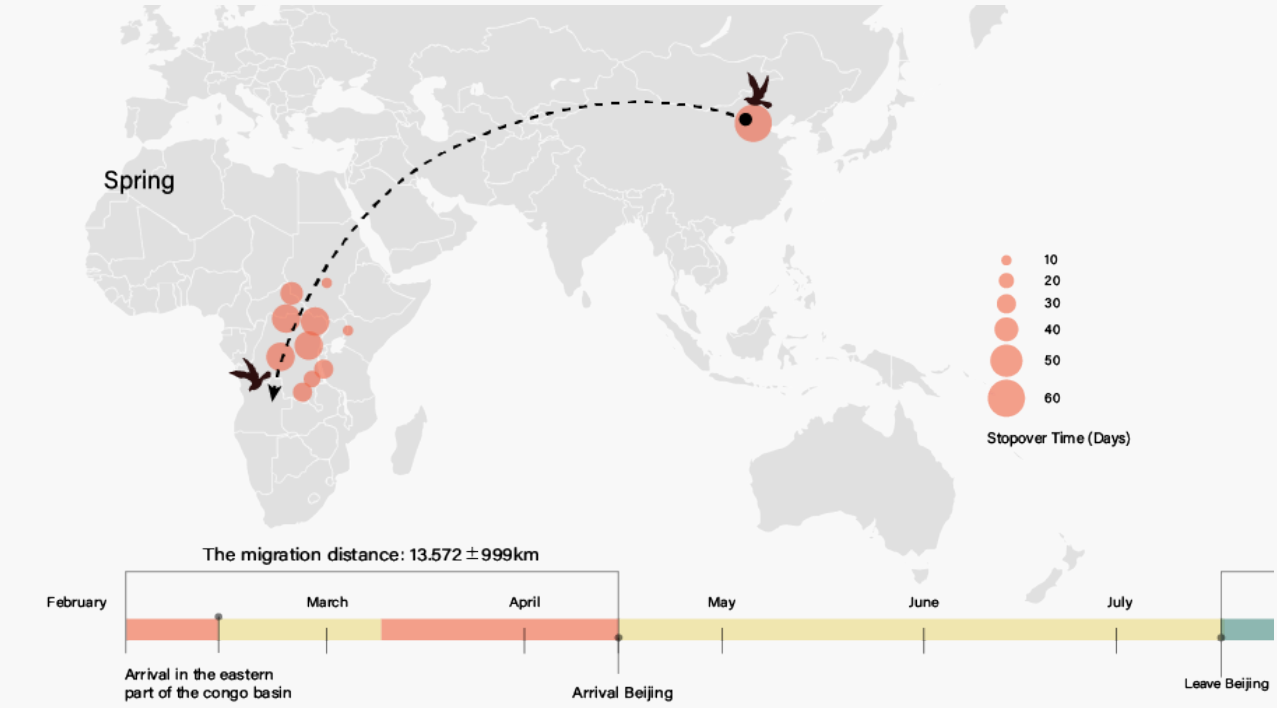
No Food: The structure of the claw is different from other birds, and once it falls to the ground there is not enough force to get it to take off again

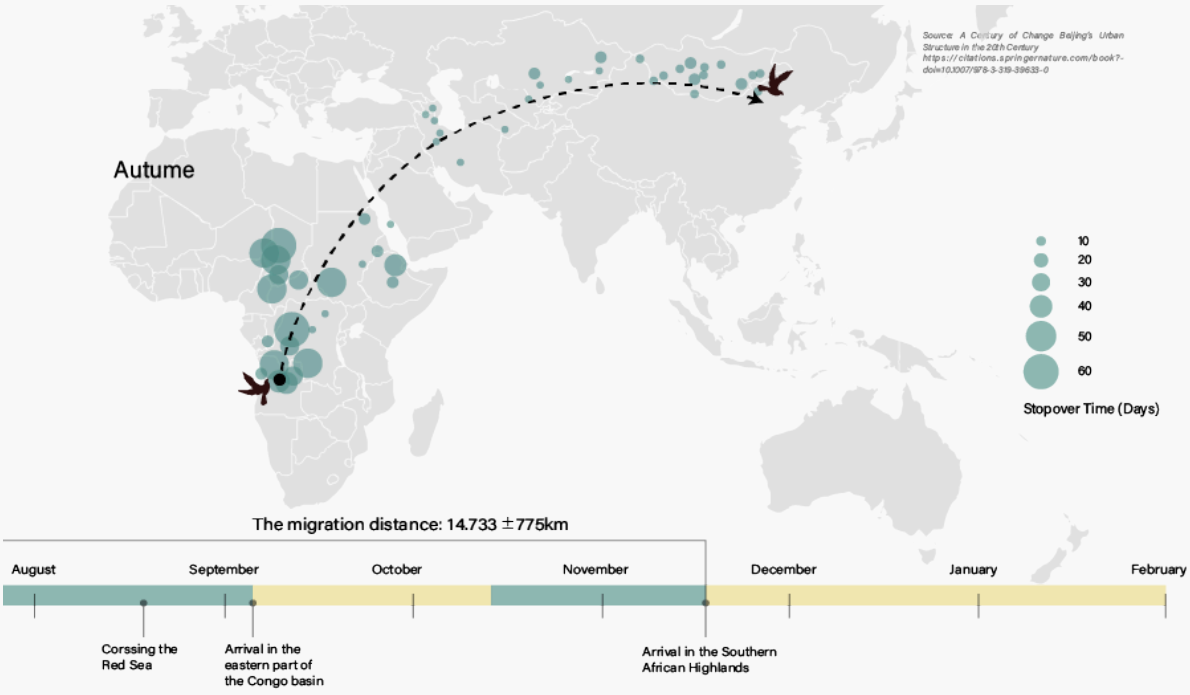
Breeding Habits: Choose suitable nesting sites during the breeding season, usually in high buildings, where both parents care for the young.

Data Source: Felo

Picture Source: Mursejler. Årslev Engsø 12-06-2024. Foto/copyright: Lars Gabrielsen

The migration route of Beijing swifts





Picture Made by Tianshuo Zhao

Data Source: Zhao, Y 2022
https://movementecologyjournal.biomedcentral.com/articles/10.1186/s40462-022-00329-2#citeas

Contents

Introduction & Motivation

The ongoing loss of global biodiversity poses a significant challenge to the sustainable future of humanity. With the rapid advancement of urbanization, landscapes and habitats worldwide are undergoing dramatic changes, making the conservation of urban biodiversity an urgent priority. Against this backdrop, this report uses the conservation of the Beijing Swift (Apus pekinensis, hereinafter referred to as "the swift") as a starting point to explore how my two years of living in Copenhagen, Denmark, and my insights into harmonious coexistence between humans and nature can be applied to urban biodiversity conservation strategies in China's megacities, addressing ecological challenges brought about by urbanization.

Denmark is renowned for its commitment to sustainable development and innovative design, embedding biodiversity conservation into its public policies and urban development strategies. The 2022–2025 Copenhagen Biodiversity Strategy (Teknik- og Miljøforvaltningen, 2023) exemplifies this approach, emphasizing ecosystem restoration, green infrastructure, and community engagement as core pillars of urban biodiversity conservation. Among the ten animal species listed in this strategy's appendix as priorities for conservation in Copenhagen, the swift caught my attention. In China, urban expansion and population growth have led to the demolition of numerous old buildings, which previously housed a large population of Beijing Swifts (a subspecies of the Danish Swift). The destruction of these buildings has caused a significant decline in their numbers due to the loss of nesting sites. （China Green Times, 2021）

Although China has made notable efforts in environmental protection and ecological restoration in recent years, the Beijing Swift continues to face multiple challenges, including habitat loss, air and water pollution, and the inability to forage due to declining biodiversity. （China Green Times, 2021） These challenges prompted me to explore critical questions such as: How can urban biodiversity be enhanced? Can the conservation of the Beijing Swift serve as an entry point to raise awareness among urban residents about the importance of urban biodiversity?

In the following sections, I will outline the primary challenges of urban biodiversity conservation and clearly define the research question. Additionally, I will discuss my design process, user research, methodology, stakeholders, and connections to social responsibilities (SDGs). This research, grounded in interdisciplinary collaboration and design thinking, uses swift conservation as a case study to raise biodiversity awareness through educational initiatives targeting children, promote behavioral change, and encourage active participation in conserving swifts and other urban wildlife, thereby enhancing urban biodiversity. Finally, I will provide a comprehensive overview of the design process and product definition for this strategic approach.

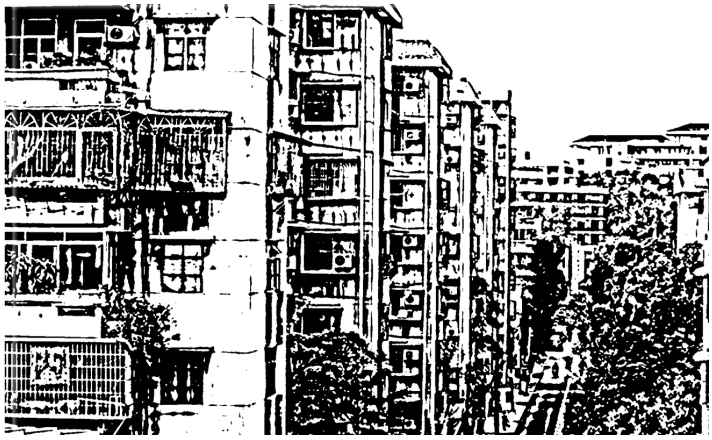
Problematization

The rapid expansion and development of cities worldwide are severely encroaching on wildlife habitats, posing significant threats to numerous species due to habitat loss and population decline. Birds, being highly sensitive to environmental changes, often respond quickly to shifts in their surroundings by migrating to new habitats. In this regard, the Beijing Swift (Apus pekinensis) in China has been particularly affected.

In the early 20th century, the population of Beijing Swifts peaked at approximately 50,000. However, as urbanization intensified, their habitats gradually diminished, leading to a sharp decline in their numbers. By the year 2000, the population of Beijing Swifts had plummeted to around 3,000 (Beijing Daily, 2003).

In recent years, thanks to a series of conservation measures, the population of Beijing Swifts has shown signs of recovery. Statistics from 2023 indicate that their numbers have increased to over 11,000 (CCTV News, 2023). Nevertheless, traditional conservation efforts have proven inadequate in addressing these complex ecological challenges. This urgent situation calls for proactive measures that go beyond conventional strategies.

By fostering cross-sector collaboration among communities, governments, and design professionals, it is possible to develop comprehensive solutions. Such efforts can not only mitigate the threats faced by the Beijing Swift but also significantly enhance urban biodiversity and promote harmonious coexistence between humans and nature.



Picture Source: Tianshuo Zhao

Research Question

How can strategic design be used to promote the development of urban biodiversity?

Can the protection of the Beijing Swift serve as a starting point to raise public awareness and participation, thereby fostering urban biodiversity?

Design Challenge

In rapidly developing cities in China, the issue of urban biodiversity loss is becoming increasingly severe. How can innovative design interventions effectively engage citizens and decision-makers, helping them recognize the significance of protecting the Beijing Swift and supporting urban biodiversity conservation efforts through tangible actions? This challenge requires design solutions that are not only ecologically functional but also appealing and feasible for implementation in complex urban environments.

Relevance

This project aims to provide innovative solutions for urban biodiversity conservation in China, particularly addressing the urgent challenge of biodiversity loss due to rapid urbanization. By integrating cultural context and technological methods, the project uses the protection of the Beijing Swift as an entry point and develops strategies targeting different user groups: stimulating children's curiosity and desire to participate through education and interactive activities, and engaging older adults (55 years and above) through their emotional memory of the Swift, encouraging them to take action. The ultimate goal is to create an influence chain that spans multiple generations, raising awareness of the protection of the Beijing Swift and promoting broader participation, providing a scalable methodology for urban biodiversity conservation.

Technology plays a key role in this project. Signage is used to attract public attention, with QR codes directing users to an app platform where they can learn about Swift's behavior, migration stories, and conservation methods, thus sparking interest and action. The app features educational content, interactive games, and a user-sharing platform, promoting joint learning among children and parents, and strengthening the connection between humans and nature. This design not only provides an interactive platform for biodiversity conservation but also lowers the threshold for spreading ecological protection knowledge and increasing public participation and awareness.

In addition, the project explores an ecological product that aligns with the daily lives of urban residents —the Swift nest box. The nest box adopts a modular design for easy installation and maintenance and can be mounted on building exteriors, providing a safe nesting environment for the Swift. Using a non-profit business model, the project focuses on education and public welfare, promoting collaboration between communities, government support, and public involvement, establishing a connection between urban residents and nature, and fostering a sense of identity and responsibility towards sustainable development.

The significance of this research lies in providing an actionable path for urban biodiversity conservation through strategic design methods. By combining education, technology, social memory, and action mobilization, the project achieves an organic integration of ecological protection and sustainable development, offering innovative solutions for improving urban ecosystems and new pathways for public engagement, ultimately contributing to the enhancement of urban environmental quality and biodiversity.

Relationship with UN Sustainable Development Goals (SDGs)

Sustainable Development Goal 15: Life on Land

The project's design interventions not only helped to restore degraded urban ecosystems, but also helped to curb biodiversity loss by raising awareness of biodiversity conservation through public participation. This approach is highly aligned with the focus of Sustainable Development Goal 15 to take urgent and important measures to prevent habitat loss and protect biodiversity.

Sustainable Development Goal 11: Sustainable Cities and Communities

The project aims to promote sustainable urban development by increasing public participation and action on biodiversity conservation. This will not only strengthen the ecological resilience of cities, but also support Sustainable Development Goal 11, in particular its target of inclusive, safe, resilient and sustainable cities. Through design innovation and community engagement, the project provides new insights into future urban design and policy, helping cities better respond to environmental challenges, especially in the context of rapid urbanization.

Picture Source: https://www.globalgoals.org/goals/

Stakeholders

Related protection organization

China Bird Watching Association:
A non-governmental organization dedicated to bird conservation, monitoring and raising public awareness and awareness of birds in China, including the Beijing Swift. The person in charge of the organization led me to participate in the statistical activity of swifts on the spot, and provided the research results of the data and statistics of swifts observed by the team members in the past five years, which was not published by Occupy Time.

Animal Research scholars:
Scholars and researchers who focus on the behavior, ecology, and conservation of urban wildlife, including bird species such as the Beijing Swift. Through interviews with them, I have provided more scientific insights and data on the design, and provided guidance and effective protection strategies for my final design. It helped me to have a deeper understanding of the current problems and difficulties in urban biodiversity conservation.

City dweller

Children and students（Under 25 years old）
This group is critical to fostering long-term awareness and engagement in biodiversity conservation. Through the questionnaire survey, it is found that 30% of the questionnaire participants come from children and students, and their interest in educational projects, interactive activities and hands-on experience is significantly higher than that of 25-55 years old CYTs.

Young and middle-aged (25-55 years old)
This demographic group represents the active labor force of the city. However, street interviews revealed that they did not show much interest or involvement in the protection of swifts or urban biodiversity.

The elderly population (Over 55 years old)
Interviews revealed that many elderly people have an emotional or nostalgic connection with Beijing swifts and other native wildlife. So there is a real movement towards swift conservation. Education campaigns, memory-sharing activities and conservation initiatives can therefore not only help to raise awareness, but also encourage their participation in biodiversity efforts, helping to create a sense of community responsibility and bringing more people to participate.

Method

This study employs a combination of methods, integrating literature review, case studies, stakeholder interviews (Appendix I), surveys (Appendix II), street interviews, user analysis, competitor analysis, and expert feedback. Drawing on insights and experiences from both Denmark and China, this methodology aims to provide a scientific foundation for developing feasible strategies and design interventions. The research is divided into two main phases: exploring the context of biodiversity conservation in Denmark and interacting with stakeholders in China, while incorporating user feedback and iterative design processes. The approach seeks to facilitate effective knowledge exchange and integration between the Danish biodiversity conservation practices and the Chinese cultural context (see Design Process - Double Diamond Model section for details).

Theory

This research is grounded in various theoretical frameworks and design models, aiming to propose innovative and feasible design interventions to address the challenges of urban biodiversity conservation in megacities like Beijing.

Animal-assisted Design (AAD)

Animal-centered design emphasizes prioritizing the needs and preferences of animals in the design process, aiming to create environments that align with animals' behaviors and ecological characteristics. By understanding the nesting, foraging, and migration patterns of animals, designers can create suitable habitats for them, such as common nesting areas under eaves or bridges (Piedmont Farm Animal Shelter, n.d.).

Animal-centered Design

Animal-aided design is an approach that considers the needs and behaviors of animals to create environments conducive to their health and flourishing. By integrating perspectives from animal ethics and ecology, designers create spaces that support natural animal behaviors and habitats, while also fostering positive interactions between humans and wildlife (Studio Animal-Aided Design, n.d.).

Retrofitting

Retrofitting is a design strategy that involves improving or upgrading existing structures or systems to enhance their functionality, efficiency, or sustainability. In the context of urban biodiversity conservation, retrofitting can involve modifying built environments to better accommodate wildlife habitats, such as installing bird-friendly features in megacities. (William Craft et al., 2017)

Ten Principles for Creating Good Habitats

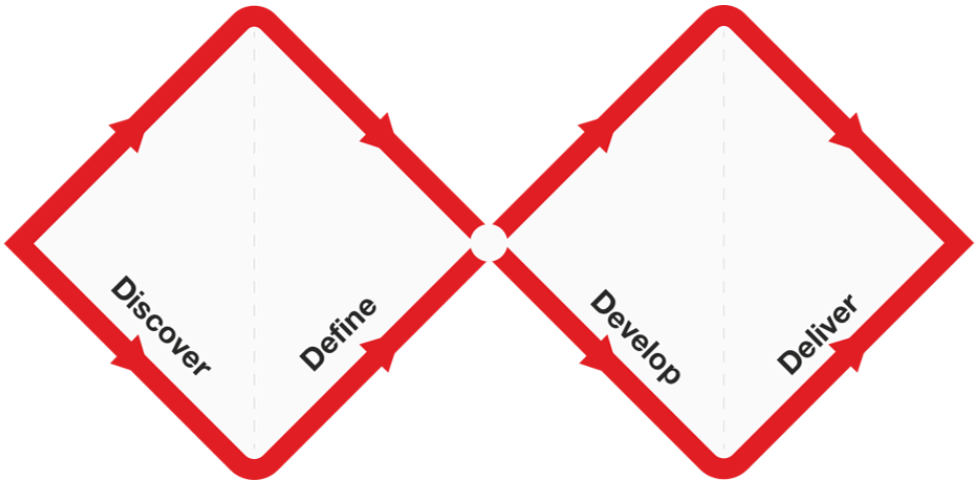
This theoretical framework presents ten key principles for designing environments that support coexistence between humans and animals, as well as five essential elements of good habitats: breeding areas, living spaces, foraging areas, interaction spaces, and the connections between these areas (Lund, 2024, pp. 100-101, 104-107). These principles provide detailed guidance for this project, ensuring the design considers the survival needs of the Beijing Swift while promoting a symbiotic relationship with humans.

The Double Diamond Model

The Double Diamond model, developed by the UK Design Council, consists of four phases: Discover, Define, Develop, and Deliver. This model emphasizes an iterative, user-centered design process to address complex problems and drive innovation (UK Design Council, 2005). In this research, the Double Diamond model provides a structured framework for the design process, ensuring that problems are explored and solutions are developed through repeated validation and refinement, meeting both user and ecological requirements (UK Design Council, 2005).

Design Process

The design process uses a double diamond model, divided into exploration and problem definition phases, and development and solution delivery phases. In the initial stage, the research focused on the extensive collection of conservation data related to biodiversity, gradually narrowing the focus to swift conservation, and finally the Beijing swift conservation as a starting point, aiming to stimulate public interest in swift conservation and conservation action through design.
Define the user group and value proposition of the product through user research, questionnaire survey and street interview, and analyze and plan the product. Finally, the design scheme is constantly iterated to enhance the display effect and usability of the design. This process ensures that design interventions not only meet the needs and preferences of users, but also effectively address the challenges of urban biodiversity conservation. The two-drill model introduces the whole process from problem finding to design implementation in detail, and provides theoretical support and feedback basis for the final design scheme.



Picture Source: The Double Diamond by the Design Council

Discover

Dig multiple ways to find the core problem

In the exploratory phase, this study takes Copenhagen, Denmark, and Beijing, China as the research background, and highlights the differences and challenges in addressing urban biodiversity change in the two cities. Taking Beijing as an example, this study collected urban residents' awareness and attitudes toward biodiversity change through questionnaires street interviews, and in-depth interviews with experts. Through this research, the main problems faced by Beijing in the face of urban biodiversity change have been identified. The problems faced by swifts living in Beijing are identified through the analysis of swifts, and how to gradually improve the biodiversity of Beijing through the protection of swifts is further discussed. In addition, this study also draws on Copenhagen's successful experience in biodiversity conservation to explore whether it can provide a reference for Beijing's ecological protection strategy.

Personal interviews

In my personal interview, I interviewed four experts in the field of urban biodiversity in China, including: Wu Caiyan, a scholar who studies the spatial distribution of urban biodiversity in China (Personal Interview, June 13, 2024); Professor Zhang Yong, an ornithologist (Personal Interview, June 15, 2024); Professor Zhao Xinru, a zoologist who is also the most authoritative expert on the protection of the Beijing swift in China (Personal Interview, July 4, 2024); and Fu Jianping, president of the China Bird Watching Association(Personal Interview, July 5, 2024). Based on the interviews, I summarized the questions and challenges repeatedly mentioned by the interviewed experts.

Urbanization and landscape fragmentation

The advance of urbanization has led to the fragmentation of natural landscapes and reduced environmental connectivity, which has had a significant impact on the living space of animals.

Insufficient green design: In urban planning, greening is more for aesthetic and neatness considerations than for animal habitat requirements. Many urban plants are chosen based on visual effects, ignoring their contribution to local biodiversity.

Lack of awareness of species: Some species are not suitable for survival in Beijing, but have been introduced into the park because of their appearance or symbolic significance, resulting in a mismatch with the local ecosystem. （Xinru Zhao Personal Interview, July 4, 2024）

There is insufficient awareness of biodiversity among citizens and governments

Urban residents and governments pay more attention to the functional benefits of greening, such as suppressing dust, cleaning the air, preventing disease, etc., and lack a deep understanding of the meaning of biodiversity. (Caiyan Wu Personal Interview, June 13, 2024） In the urban planning recommendations conference held by the government, the suggestions of urban biodiversity suggested by relevant experts have insufficient influence and are rarely adopted into urban planning decisions. （Xinru Zhao Personal Interview, July 4, 2024）

The dynamic relationship between economic development and environmental protection

Environmental problems are likely to intensify in the early stages of economic growth. However, with the advancement of technology and the guidance of policies, green development can be achieved, and the balance between economic prosperity and environmental protection can be finally achieved. Birds, especially the Beijing Swift, can be used as indicators of urban ecological health due to their characteristic of eating only airborne insects, and changes in their habitat reflect the overall state of the ecosystem.（Xinru Zhao Personal Interview, July 4, 2024）

Lack of awareness of scientific observation methods

During the survey, it was found that many bird lovers joined in the annual observation and statistics of swifts. The experts divided the area within the Second Ring Road of Beijing in the form of a grid, and required multiple volunteers to synchronously count swifts at the same time, but due to their lack of awareness of scientific observation, the volunteers' cooperation in the observation was not high. As a result, the data is not accurate enough. （Xinru Zhao Personal Interview, July 4, 2024）

The actual number of people participating in the protection of swifts in Beijing is low

Through an online questionnaire, 94% of respondents showed an interest in swifts and 96% expressed a willingness to participate in conservation actions. However, the actual willingness to participate contradicted the survey data, so I conducted a further street interview to find out why. By classifying the population into student children under 25 years old, middle-aged and young people between 25 and 55 years old, and elderly people over 55 years old, it is found that most people are willing to participate. However, when it comes to placing the swift nest box in the drama building where they live, the student children group shows a higher interest, and the elderly group shows a higher enthusiasm for actual participation.

Beijing swift breeding area is insufficient

Due to the demolition and protection of ancient buildings, the breeding areas of swifts have been greatly reduced, which is an important factor leading to the decrease of swifts. Secondly, due to the frequent use of pesticides, the reduction of food sources in the swifts' feeding areas is the most important and urgent problem at present. (Yong Zhang Personal Interview, 15 June, 2024) It is necessary to prioritize the protection of breeding grounds and feeding areas, gradually optimize the living areas, interaction Spaces and regional connections, coordinate short-term measures and long-term planning, balance costs and benefits, and promote the full implementation of swift protection actions. （Xinru Zhao Personal Interview, July 4, 2024）

Beijing Swift and the contradiction of building maintenance

With fewer breeding areas, many Pekingese Swift nests in old buildings built in the 1990s. Due to the long age of these buildings, cracks appear, and swifts use these cracks as breeding and resting places. (Jianpin Fu, Personal Interview, 5 July, 2024)However, when cracks in the building are repaired, the swifts' nests are removed, making it impossible for them to find their nest when they return the following spring, which can lead to their death. Failure to repair cracks may lead to building safety hazards, which brings great challenges for swift protection and building repair. (Ming Ma, 2021)

Online Survey & Street Interviews

An online survey was conducted to assess public knowledge of the Beijing Swift, conservation willingness, participation levels, and preferences for nest box design and installation locations. The survey received 220 responses, of which 213 were valid. The survey included multiple-choice, multiple-answer, and open-ended questions, with sections on:

- Awareness and understanding of the Beijing Swift.
- Attitudes and support for swift conservation.
- Preferences for nest box design and installation.
- Interest and willingness to participate in conservation efforts.

Key Findings:

- Awareness: 58% of respondents knew about the Beijing Swift, but had limited understanding of its habitat and migration patterns.
- Conservation Attitude: 80% supported the installation of swift nest boxes in the city, with 74% preferring locations near parks or ancient buildings.
- Participation Interest: 94% expressed interest in the Beijing Swift, and 96% were willing to engage in conservation activities. However, actual participation intentions were lower, indicating a gap between interest and action.

Picture Source: Tianshuo Zhao Made by Wenjuanxing

Street Interviews

To further explore the discrepancy between interest and actual participation, street interviews were conducted in Beijing, using random sampling. Interviews involved 18 participants from different groups: 6 students/children, 6 working adults, and 6 elderly people. The questions focused on:

- Interest in or awareness of urban biodiversity.
- Perception of the Beijing Swift's role in biodiversity.
- Willingness to participate in swift conservation activities.
- Willingness to install a nest box on their building.
- Interest in participating in swift observation activities.

Discussion

The survey and street interview results provided a comprehensive view of public attitudes and behaviors:

- Working Adults: There is a significant gap between high support and actual participation, influenced by practical constraints such as time, energy, and economic factors.
- Children and Students: While they show high interest and potential, targeted measures need to be designed to overcome barriers, such as school support or parental involvement.
- Elderly: They show the highest engagement in both knowledge acquisition and practical involvement, representing a valuable community resource for conservation efforts.

This also aligns with the Amager Beach Nature Center strategy, where children's participation in conservation activities led to their parents joining in learning and exploration. This approach can be a guiding model for fostering intergenerational engagement in biodiversity conservation.

Define

In-Depth Analysis and Iteration

Based on the extensive information collected during the discovery phase and the identified issues, I conducted a deeper analysis and further refined the project during the development stage. By performing a competitive analysis of existing swift nest designs (Appendix - Competitive Analysis), alongside insights from earlier surveys and street interviews, as well as an analysis of potential conservation areas, I clarified the core design concept and redefined the design challenge and problem.

On this foundation, I formulated a solution strategy, dividing it into short-term and long-term strategies.

- Short-term strategy: This includes user profiling, defining use scenarios, and analyzing the business model canvas to ensure the design's practical feasibility and clear goal orientation in the early stages.
- Long-term strategy: This focuses on broader ecological conservation needs and public participation mechanisms to ensure the project can have a profound social and environmental impact in the long run.

Product Strategy:
User-Centered Ecological Education and Conservation

Core Concept

The design is user-centered, continuously identifying problems, solving them, and verifying the results. The goal is to protect the Beijing Swift, educate the public, and enhance urban biodiversity. The strategy is developed in phases to meet the needs of different user groups (both human and animal) while achieving product goals.

Core Value Proposition and Design Challenges

Core Value Proposition

By combining ecological conservation with emotional engagement, the design aims to enhance the protection of the Beijing Swift and promote public awareness and participation in urban ecosystems. This sustainable design approach encourages users to connect emotionally with the birds and the urban environment, fostering a sense of responsibility for biodiversity.

Design Challenges

- Attractiveness: How can the signage or design spark curiosity among users without disturbing those who are not interested? The challenge is to create an engaging design that appeals to a wide audience while not being intrusive.
- Usability: Is the swift nest box easy to install and maintain? How can we lower the operational threshold for elderly users, making the product more accessible to a wider demographic?
- Educational Effectiveness: How can we use an app or other methods to efficiently spread awareness about swift conservation? The challenge here is to ensure that the educational content is engaging and easy to understand, encouraging participation
- from various age groups.

Short-Term Strategy

1. Goals

- Engage as many interested users as possible.
- Education is provided to interested users to increase their knowledge of the city's biodiversity. To make a change in action.

2. Specific Action Plan

(1) Product Development and Optimization

- Nest Box and Signage:
  - Complete the design of core functionalities for the nest box and signage (modular, easy to maintain, eco-friendly materials).
  - Optimize the installation difficulty of the nest box and the effectiveness of information delivery on the signage, specifically targeting children and elderly users.
- App and Online Interaction:
  - Develop the basic functionality of the app, including:
    - Swift conservation knowledge
    - Interactive education (e.g., mini-games)
    - User sharing platform
  - Collect user feedback to adjust the app interface and functionality logic, ensuring it’s engaging and easy to use.

(2) Market Promotion and Educational Activities

- Collaborate with local birdwatching associations in Beijing to host offline events (e.g., birdwatching experiences, swift nest box installation demos).
- Partner with schools to incorporate swift conservation topics into natural science curricula.
- Publish short videos on social media platforms (e.g., WeChat, Douyin) to tell swift conservation stories and increase brand exposure.

(3) Establish Partnerships and Sales Channels

- Collaborate with community property managers, developers, government agencies, and wildlife protection organizations to install nest boxes and signage in pilot communities. Each pilot should install at least 10 swift nest boxes, as swifts are social birds.

Launch the first batch of nest boxes and accessories on e-commerce platforms (e.g., Taobao, JD.com) for early user sales.

User Segmentation

Through research and analysis, the core users have been segmented into the following two groups:
Children and Students under 25:

- Needs: Curiosity about nature and ecology, eager to acquire new knowledge through interaction and observation.
- Behavioral Characteristics: Tend to engage in activities that are both fun and educational, and enjoy sharing their experiences.
- Design Strategy: Use QR code signage to guide users in interacting with information about swifts, while fostering conservation awareness through an engaging and educational approach.

Elderly Group (60 and above):

- Needs: Emotional connection with swifts, desire to take practical action (such as installing nest boxes) to improve the living environment of birds, and a wish to relive old memories.
- Behavioral Characteristics: Value practicality and convenience, prefer simple and easy-to-use products.
- Design Strategy: Provide nest boxes that can be directly installed on building surfaces to reduce installation difficulty and align with the motivation and capabilities of elderly users.

Business Model Canvas

Key partners
关键合作伙伴

What are your key partners to get competitive advantage?

Government and environmental organizations: Support advocacy and promotion.

Schools and communities: pilot product applications.

E-commerce platforms and logistics companies: driving product sales and distribution.

Key activities
关键活动

What are the key steps to move ahead to your customers?

Continuous user demand research and design optimization.

Organization and implementation of online and offline education promotion activities.

Nest box production and after-sales service.

Key resources
关键资源

What resources do you need to make your idea work?

Team of ecology and design experts.

Production supply chain and community education resources.

Online content development team.

Value Propositions
价值主张

How will you make your customers' life happier?

Swift-centered: The nest box design needs to conform to the life habits of swifts, be unobtrusive and not easily disturbed by human activities.

Modularity and sustainability: The modular design of the nest box reduces maintenance costs and increases service life.

Emotional arousal and participation in protection: Design a convenient nest box to help elderly users achieve protective behavior for swifts.

Ecological education and public engagement: Provide fun signs and apps to help children and students learn about swifts.

Customer relationships
客户关系

How often will you interact with your customers?

Simple installation guide and regular maintenance service are provided.

Online interactive community to enhance user stickiness.

Provide offline swift protection, observation, science popularization and other activities.

Channels
渠道

How are you going to reach your customers?

Offline channels: Work with environmental organizations to promote signage and nest box installation solutions through ecological education activities.

Online channels: Sell simplified nest boxes and related accessories through e-commerce platforms.

Customer segments
客户群体

Who are your customers? Describe your target audience in a couple of words.

Core users: bird lovers, including children and students (under 25 years old) and senior citizens (over 60 years old).

Extended users: eco-organizations, schools and community developers.

Cost Structure
成本结构

How much are you planning to spend on the product development and marketing for a certain period?

Product design and research and development costs.

Nest box manufacturing and maintenance costs.

Cost of education and extension activities.

Revenue Streams
收入来源

How much are you planning to earn in a certain period? Compare your costs and revenues.

Swift nest box sales revenue.

Paid subscription function for education APP.

Benefits from projects with eco-housing developers.

Picture Source: Tianshuo Zhao Made by Miro

SWOT Analysis

Strengths

- Products with ecological protection and education as the core, in line with the national policy direction.
- The user layer is clear, the design is strong.
- Modular design facilitates maintenance and improves user experience.

Weaknesses

- The cost of market education is high, and public awareness needs to be improved.
- Child and student users rely on parental support for purchasing decisions

Opportunities

- National policies support the conservation of urban ecological diversity.
- With the popularization of online education and interactive technology, the market potential of educational ecological products is huge.

Threats

- The onslaught of competing products (such as other bird protection nest boxes).
- The limited participation of consumers in ecological protection may affect the market size.

Picture Source: Tianshuo Zhao Made by Miro

Long-term strategy

Goal

Establish ecological protection and education systems to promote long-term public participation; Promote swift protection nationwide; Strike a balance between ecological protection and economic development.

Specific Action Plan

1. Product and service upgrades

- Develop smart nest boxes that support real-time monitoring and interactive features such as dynamic projection display of swift data.
- Launch a Swift science documentary, online courses, deepen the APP points mechanism, and guide public participation.
- Organize community activities for children to visit nesting boxes and participate in handmade activities to enhance intergenerational interaction and love of nature.

2. Social cooperation and policy promotion

- The coalition government will develop swift protection policies, such as nesting box installation codes and ecological corridor construction.
- Establish a long-term cooperation mechanism between schools, enterprises and communities to jointly promote swift protection.

3. Ecological network and data platform

- Build a swift protection data platform to support scientific research and public observation.
- Development of ecological health assessment tools, using swift population changes as ecological indicators.

4. Sustainable business model

- Promote nest box rental services to reduce user costs and ensure maintenance.
- Develop swift-themed cultural and creative products to enhance economic benefits.
- Establish a conservation fund to attract corporate sponsorship and public donations.

Develop

Experimentation and Iteration

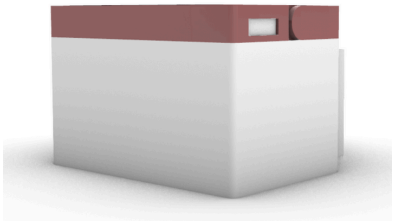
During the design and development stage, I conducted four iterations of my design, making adjustments and optimizations through the repeated cycle of definition and development. The core of the work entailed in-depth studies of the living habits, migration routes, and existing protection measures of the Beijing Swift. Simultaneously, by integrating public feedback, expert suggestions, and ecological needs analysis, the design plan was constantly iterated and refined.
During this process, I conducted in-depth interviews with ornithologists, architects, and ecologists on multiple occasions to ensure that the design of the nest boxes could meet the ecological requirements of the swifts. The feedback provided by these experts played a critical role in optimizing the design of the nest boxes, particularly in aspects such as material selection, maintenance methods, and public education models.

The final design drew references from multiple research outcomes. For example, based on the summary from the Action for Swift website, the recommended size for the entrance of the nest box is a rectangle or oval of 28mm × 65-75mm to prevent the invasion of other larger-sized birds. (Action for Swifts) As the Beijing Swift is slightly larger, the entrance was designed as an oval of 32mm × 70mm. Moreover, based on the research by the Bristol Swifts team, it was discovered that swifts prefer nest box designs with an entirely black interior and a small wind deflector. (Bristol Swifts, 2017) Incorporating the research of John Stimpson, a roof design sloping downward at 30 degrees was adopted, which not only successfully attracts swifts but also effectively prevents the invasion of other birds such as sparrows and mynas. Simultaneously, referring to the successful case of Rutland Swift Boxes where the entrance was set at the bottom, it further assisted me in determining the design plan of the nest box. (Action for Swifts)

Version 1

Version 2

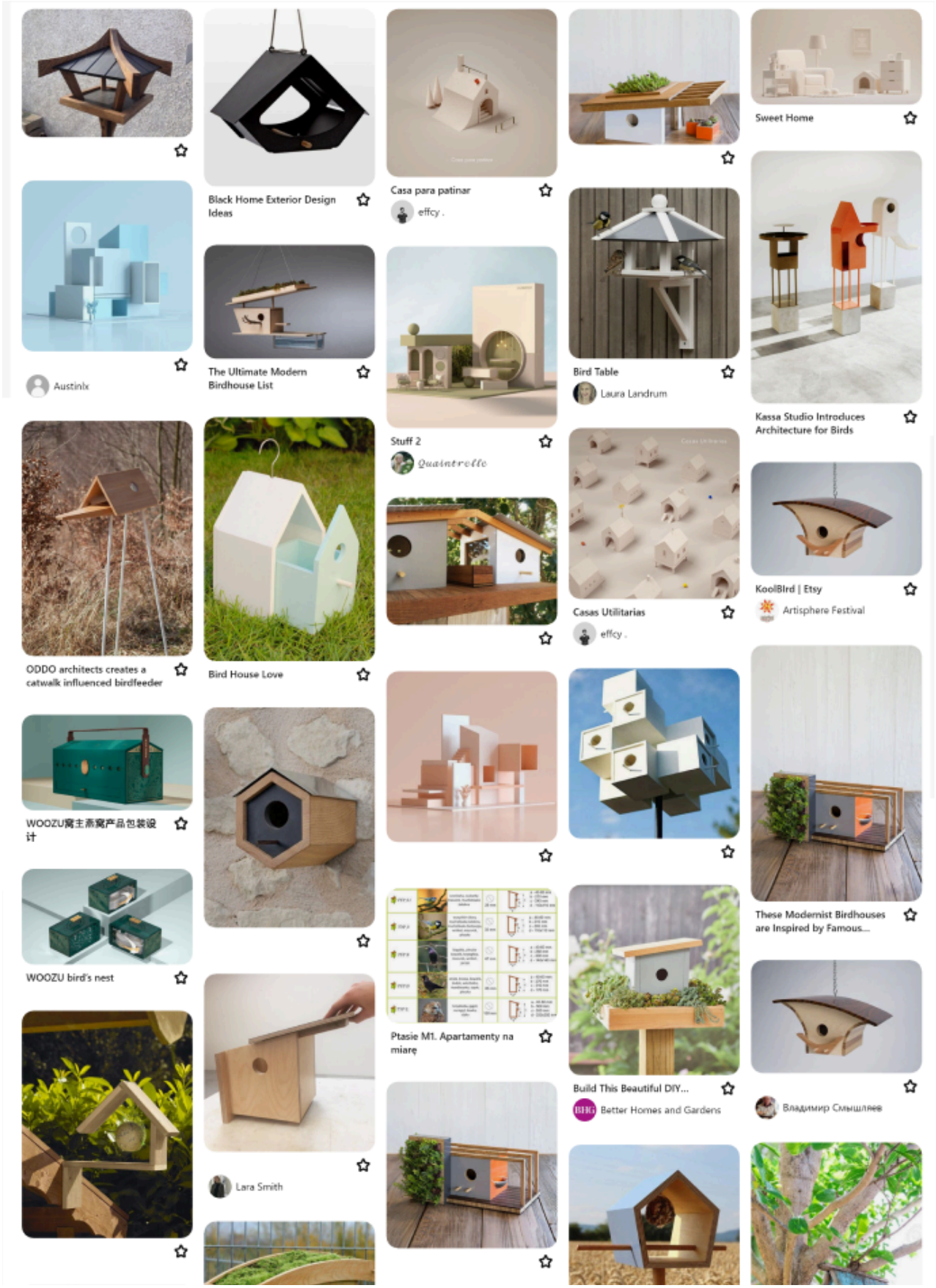
Version 3



Final Version

Source: Tian Shuo Zhao

Moodboard



Picture Source: Pinterest (https://www.pinterest.com/Zlvy70/animal/)

Delivery

Short Term Product strategy core details

1. Nest box product strategy

- Modular design: The overall size of the nest box is 400mm long, 250m high and 200mm wide. The nest box structure is divided into two parts, the upper part contains solar panels and lighting devices, and the lower part is a swift habitat area, which is easy to repair and replace parts.
  - Upper design: length 401mm, width 200mm, height 50mm, including solar panels, audio equipment, networking module.
  - Sound equipment: During the breeding season (April-May), 80-100 decibels of high-fidelity swift calls are played every morning and evening to attract swifts to build nests.
  - Lower design: The lower part is the living area of the swift, with a length of 400mm, a width of 200mm and a height of 200mm.
  - Interior design: The interior of the nest box is painted in black, and a windscreen is set at the entrance
  - Entrance design: The entrance is a downward opening rectangle, and the size is 32mm×70mm oblong entrance to ensure the smooth entry and exit of swifts.
- Environmentally friendly materials: The use of plastic wood, a kind of wood chips and recycled plastic mixed material, to ensure the product's water resistance, heat preservation, durability and sustainability.
- Easy to install structure: optimized hook design, convenient for users to disassemble and repair.

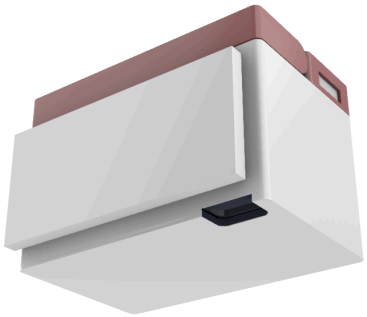
2. Sign interaction strategy

The ground signs attract curiosity: the signs are simple in design, with swift form and migration data as the core information, and the two-dimensional code is used to guide users to download apps or browse protection knowledge.
Gamified content: Children scan the signs to enter the mini-game, learn about swifts and stimulate curiosity.

3. Education and communication strategies

Develop educational content for different age groups:
Kids: Interactive apps and offline activities that teach and play.
Elderly: Provide easy to understand popular science content and nesting box installation guide.
Spread conservation ideas through social media and community events to encourage public participation.

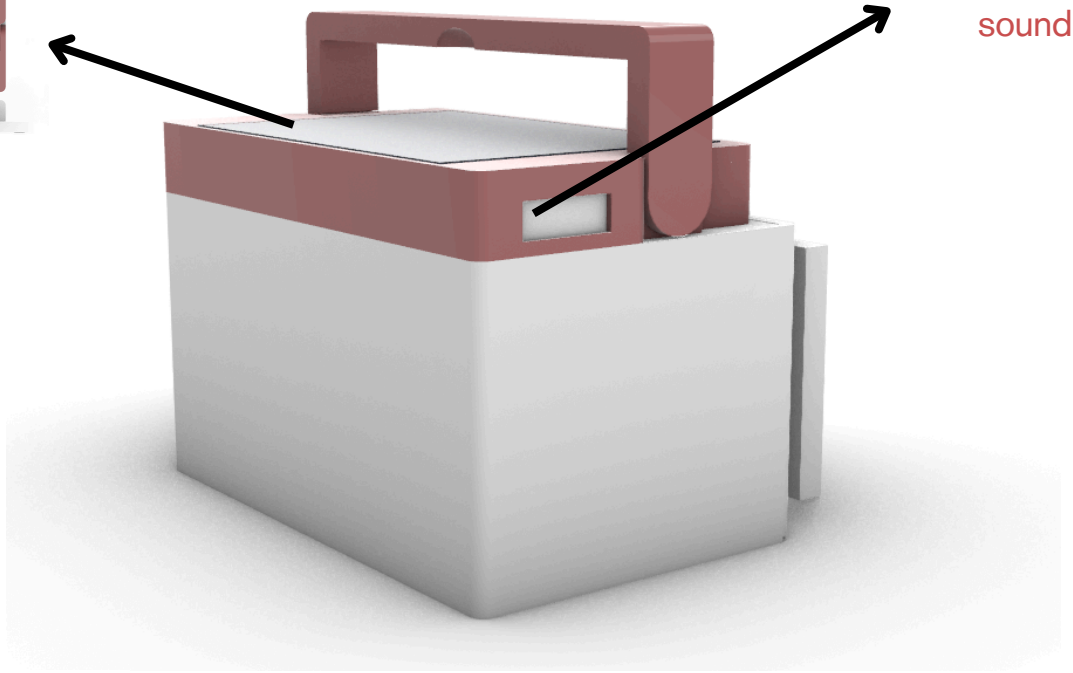
Internal structure of the nest box

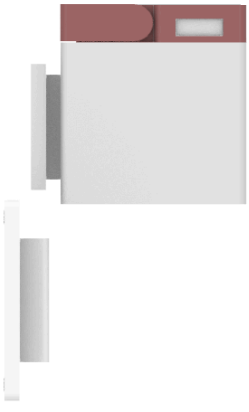


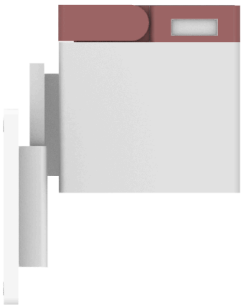
Bottom entrance
designed for swifts

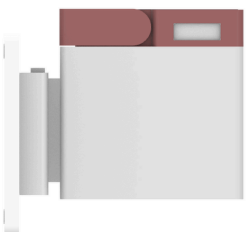
sound

Solar panel

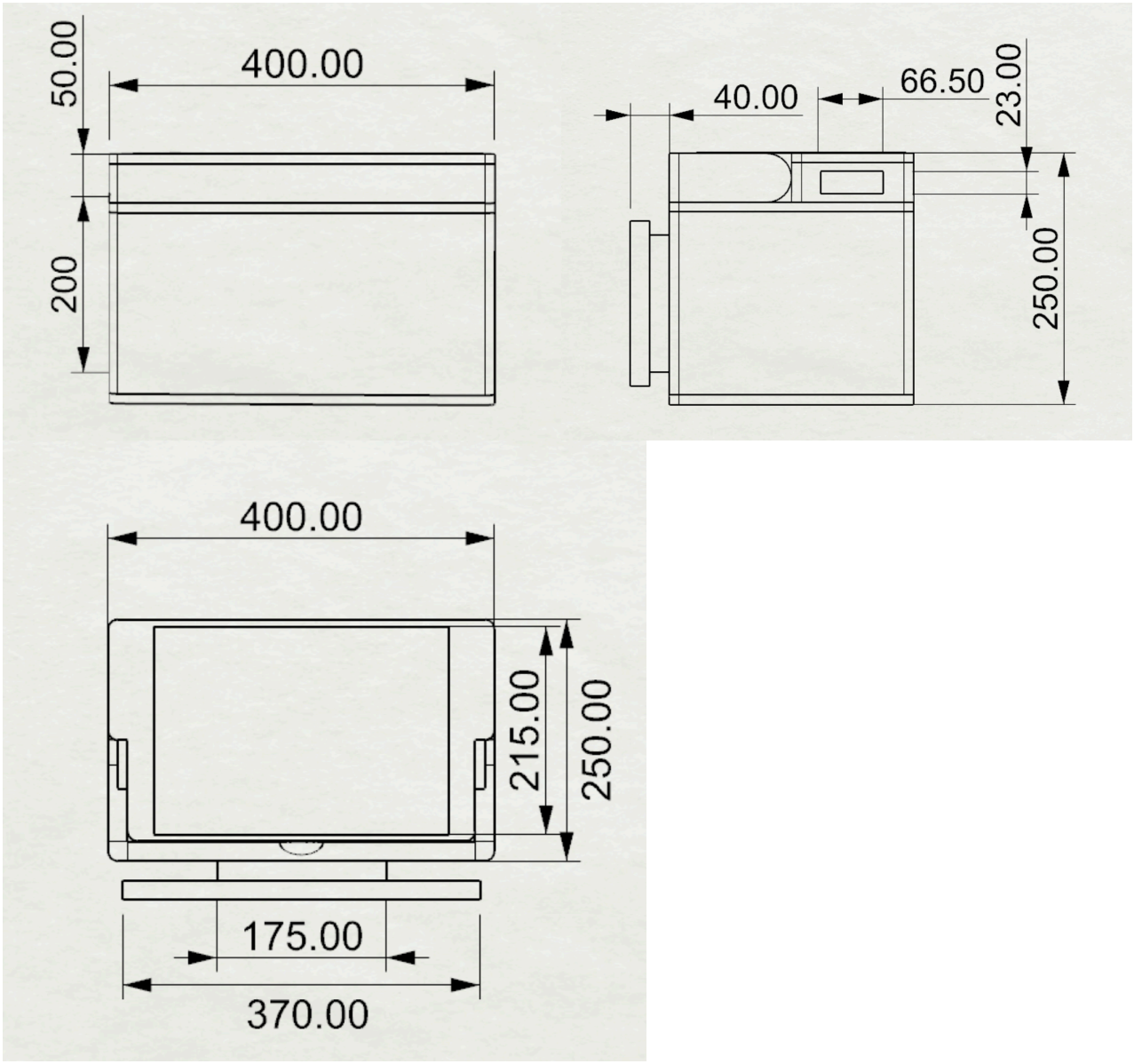




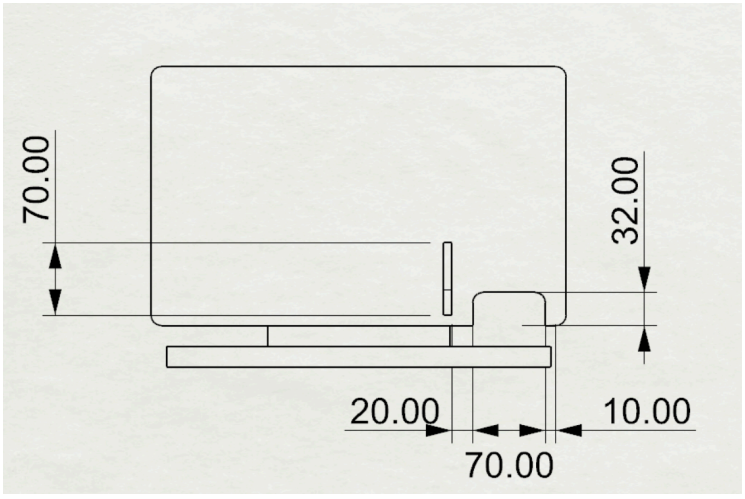


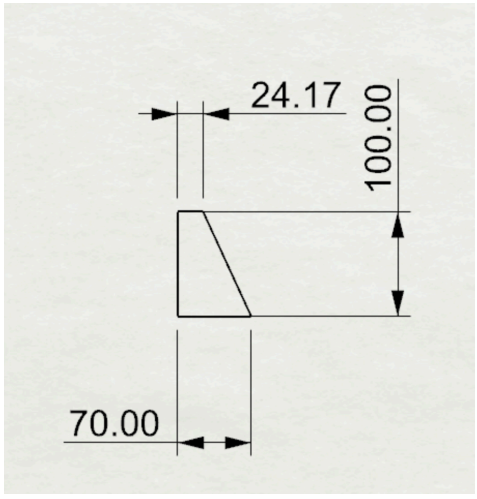


Three views of the exterior of the swift nest box



Dimensions of the inside of a swift nest box



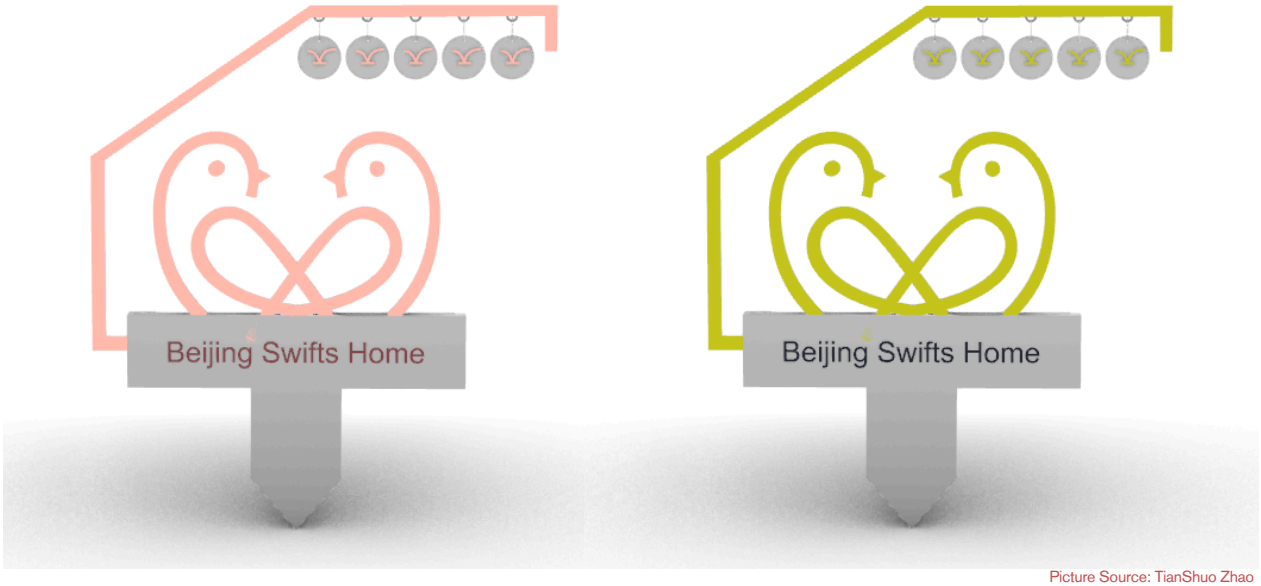


More different color schemes for different buildings

Building Picture Source: Tiehexijiedong

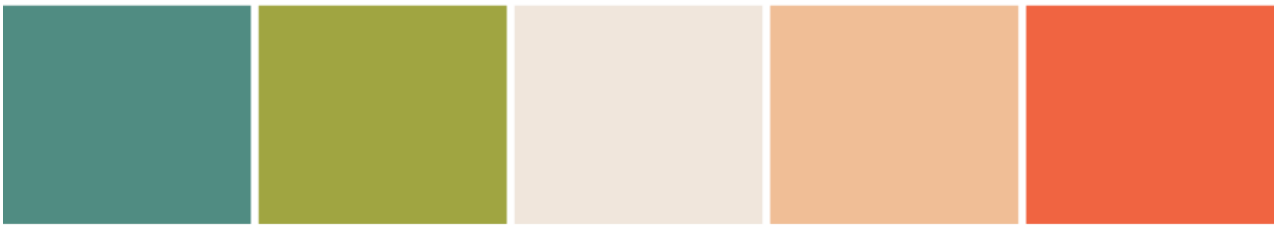
Picture Made by Tianshuo Zhao

Interactive lighting



Picture Source: TianShuo Zhao

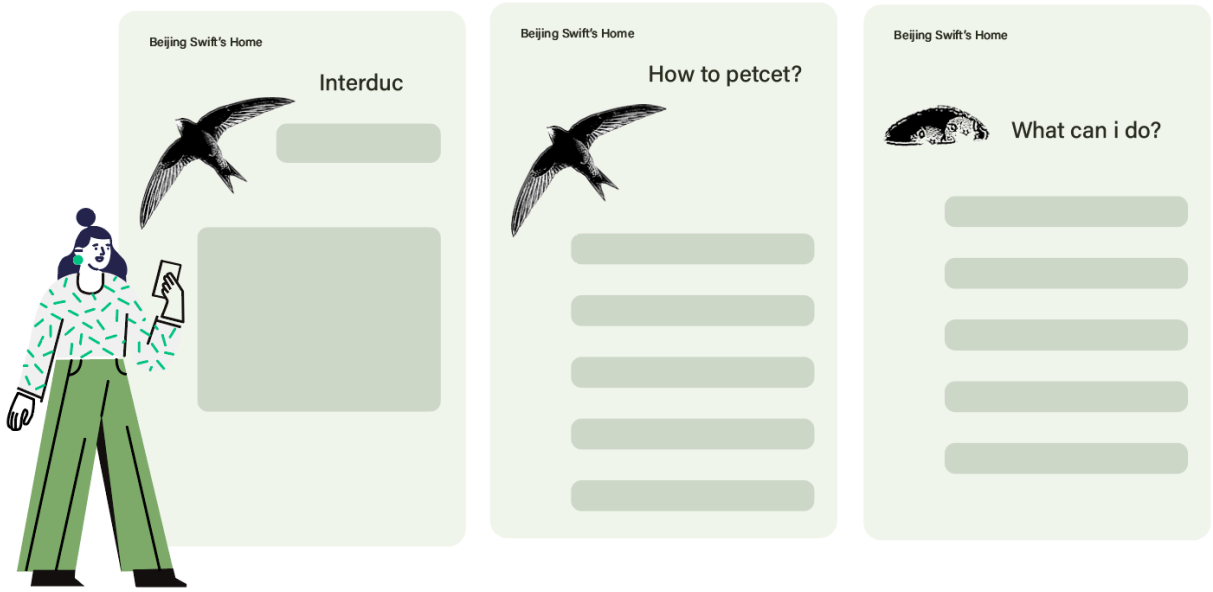
Cover design and color matching

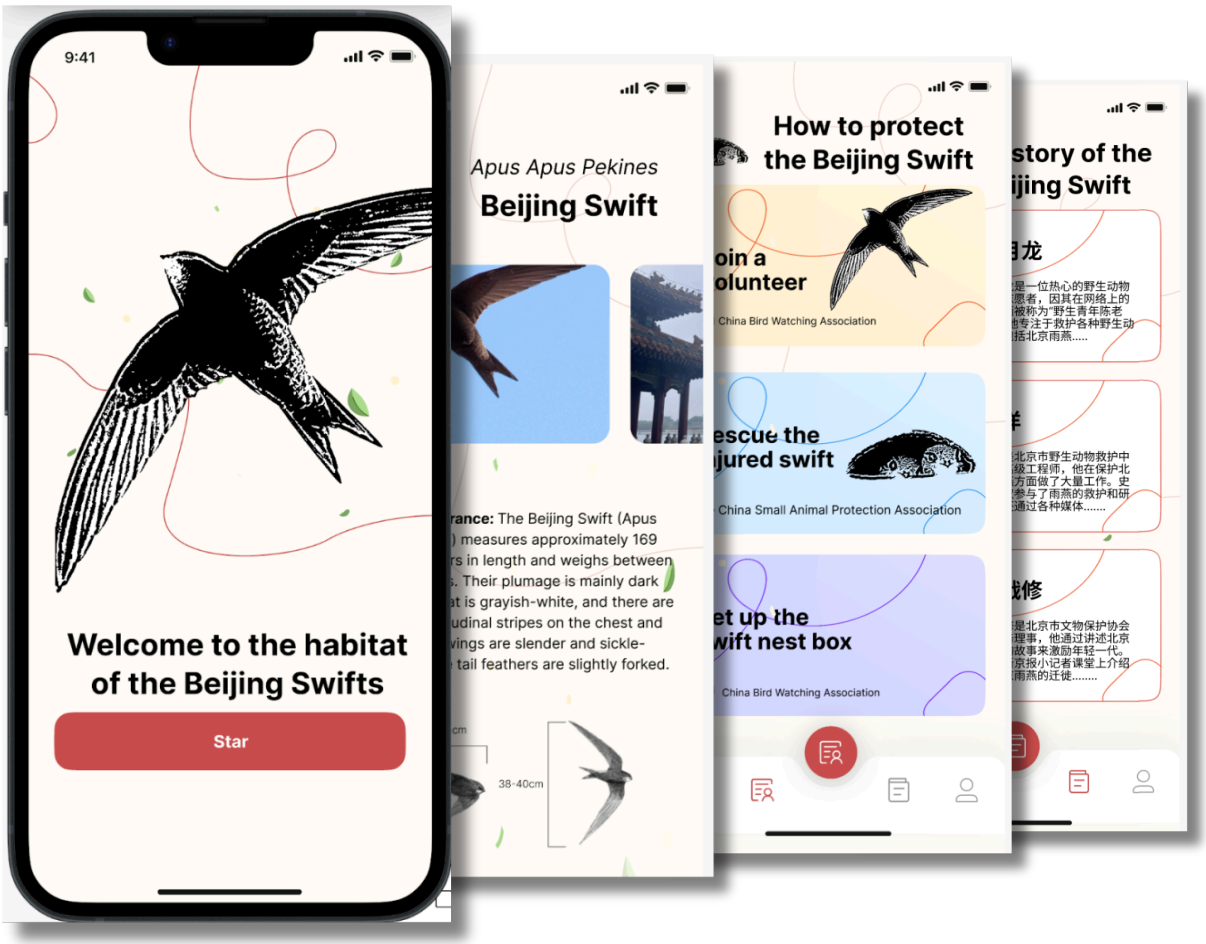


#518C86 #A2A641 #F2E8DC #F2C299 #F26444

Picture Source: TianShuo Zhao Made by AI

Application program





Picture Source: Tianshuo Zhao

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