

# 促进社区设计和管理中的参与性行动： 泰国昂西拉地区集体智能数字平台

## ENABLING PARTICIPATORY ACTIONS IN COMMUNITY DESIGN AND MANAGEMENT: A COLLECTIVE INTELLIGENT DIGITAL PLATFORM IN ANG SILA, THAILAND

### 1 项目背景

过去10年间，为了解决各类城市问题，数字技术不断创新，“可持续智慧城市”概念也得到日益推广。国际电信联盟将“可持续智慧城市”（smart sustainable city）定义为“利用信息和通信技术等手段提高生活品质、城市运营和服务效率，以及竞争力，同时确保其满足当代人和子孙后代在经济、社会、环境，以及文化方面的需求的创新城市”<sup>[1]</sup>。然而，在智慧城市的建设过程中，由于公民对决策过程的理解和参与不足，民众与政府之间的信息不对等问题日益加剧。在自然资

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#### 摘要

过去10年间，随着数据收集、计算机技术及可视化方法的发展，“可持续智慧城市”这一旨在运用数字技术解决各类城市问题的新兴概念逐渐得到推广。然而，早期的方法忽略了公众参与决策过程的重要性，导致社会个体与专家权威之间信息不对称，弱势群体的代理权日益萎缩。本文介绍了由研究团队所设计的“共同设计昂西拉”（CoDAS）这一公民参与数字平台和工作流程：这个工具可以促进民众和专家权威在项目的各个阶段中持续沟通。通过让众多利益相关者作为共同创作者参与到设计过程之中，CoDAS可以提高不同群体之间的沟通效率，并实现设计和开发结果的公平及项目建成后使用阶段的公共资源管理。研究团队就泰国一个历史悠久的渔村——昂西拉附近的一处新开发项目展开了场地设计实验，对这一构想进行了验证。

#### 关键词

集体智慧；城市设计；城市治理；社区营造；可持续智慧城市；社区平台；数字应用

#### ABSTRACT

Advancements in data collection, computing, and visualization methods have given rise to a new form of urban concept over the last decade: the smart sustainable city which tackles various urban challenges with digital technologies. However, earlier approaches omit the importance of citizens' involvement in decision-making processes, which leads to an imbalanced information asymmetry between individuals and authorities and an increasingly reduced agency for the vulnerable. In this article, a tool and process was proposed which integrates the voices of evolving self-organizing entities to solve collective action challenges: Named as CoDAS (Co-Design Ang Sila), it is a digital platform which facilitates continuous communication between citizens and authorities during different development phases of a given project. By including a large number of stakeholders to participate in the co-design process as co-creators, CoDAS aims to improve communication efficiency while achieving equitable outcomes in design and development, along with post-occupancy common resource management. To test this hypothesis, a site design experiment was conducted on a site near a historical fishing village of Ang Sila, Thailand.

#### KEYWORDS

Collective Intelligence; Urban Design; Urban Governance; Community Building; Smart Sustainable City; Community Platform; Digital Application

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1. 场地区位图：昂西拉与曼谷相距91km。
1. Location map of the pilot site showing Ang Sila's relation to Bangkok (91 km apart).

源丰富、主要依靠外部投资拉动经济快速发展的地区，开发建设的成本往往很高，且存在当地居民收益不均的问题。此外，公民参与的缺失也使得社区居民与团体利益相关者之间难以建立信任，长远来看，共享资源的最佳管理框架和方法也将无法实现。针对这些问题，英国建筑师杰森·波默罗伊提出了“智慧城市2.0”（一种最新的规划设计策略）的构想，通过借助相关技术，使公民能够有机会参与设计和规划过程<sup>[2]</sup>。这一策略强调跨领域协作以及切实理解公众意见的必要性。

根据教育学家理查德·阿德勒和朱迪·戈金的定义，“公民参与”（citizen engagement）是指“公民为了改善他人的生活条件或帮助营建社区的未参与社区生活的方式”<sup>[3]</sup>。雪莉·阿尔斯坦的“公民参与阶梯”理论为城市规划实践提供了一种启发式框架，该框架包含8个与“公民决定最终产品的权力”<sup>[4]</sup>相对应的梯级。本文着眼于公民参与和共同创造，提出了一种能够汇集多个不断发展的自组织机构的意见的工具和表达途径，以促进开发过程的公平、公正。首先，本文介

绍了由研究团队所设计的“共同设计昂西拉”（CoDAS）这一公民参与数字平台，该平台可以在项目开发的不同阶段中引导并促进民众与政府/专家（如建筑师、开发商、政府和管理公司等）之间的持续沟通。其次，通过让众多利益相关者作为共同创作者参与到共同设计过程之中，CoDAS可以提高不同群体之间的沟通效率，并实现设计和开发结果的公平及项目建成后使用阶段的公共资源管理。

本研究旨在探究以下问题：

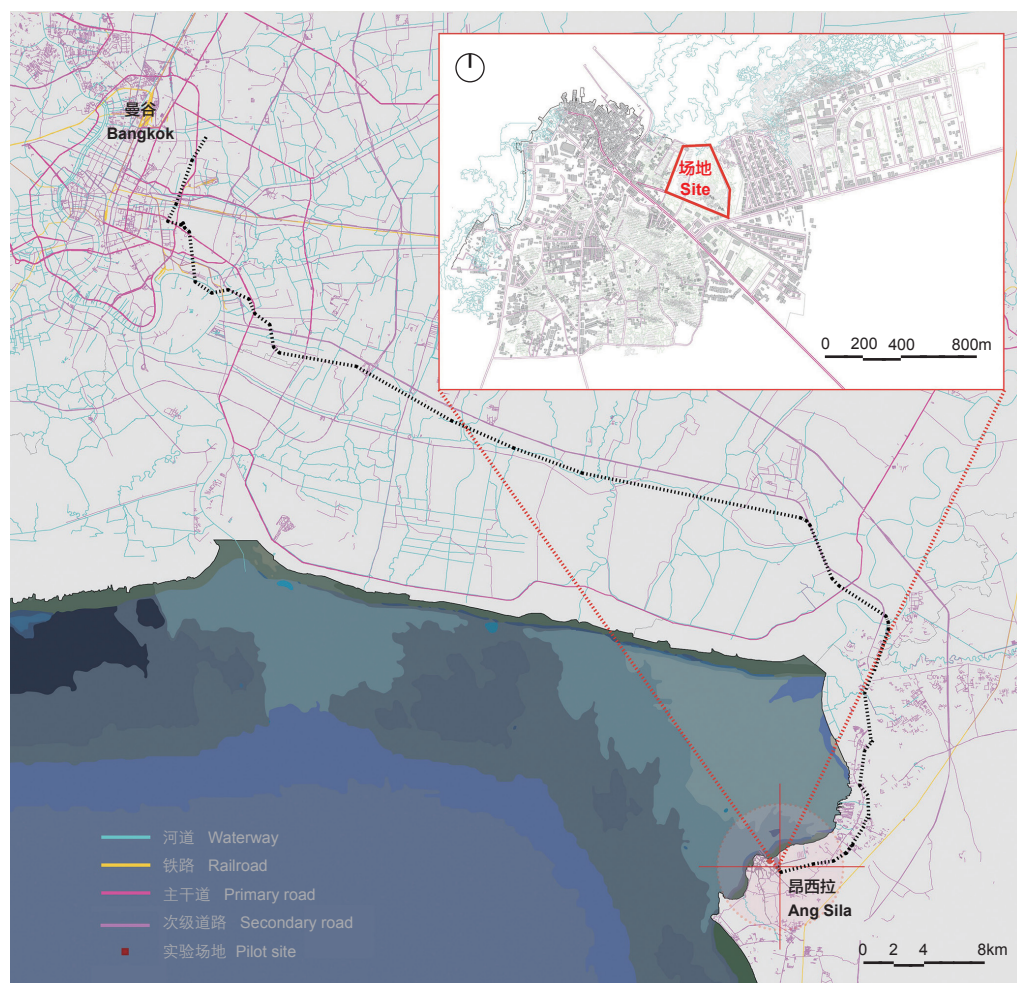
- 1) 数字参与如何改变市民或终端用户在城市规划和设计决策过程中的作用？
- 2) 在开发前设计和使用后管理阶段中，哪些数字工具可以促进不同参与者之间的沟通？
- 3) 如何借助公众意见数据，通过设计邻接空间、共享空间和多功能建筑来协调不同社会群体的利益？

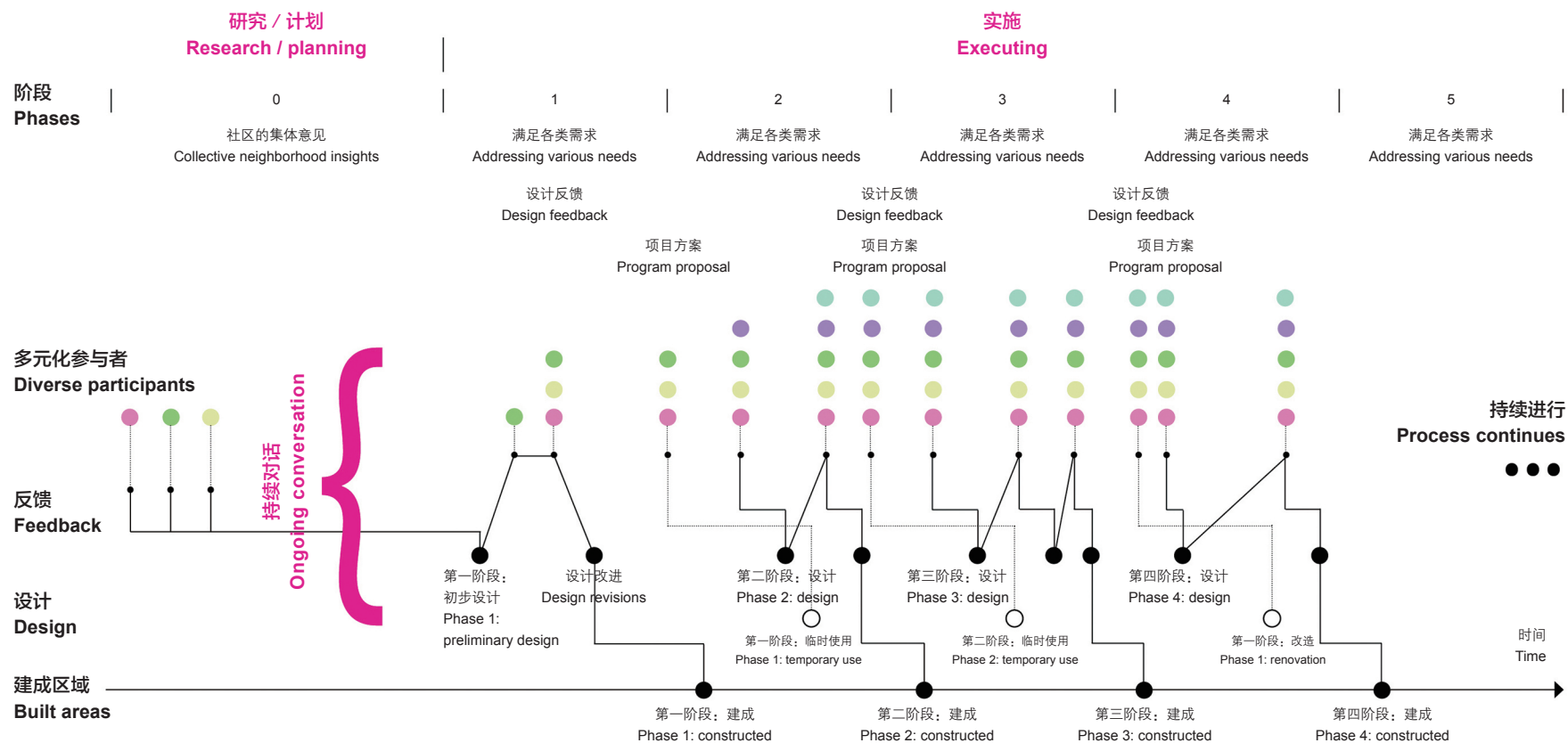
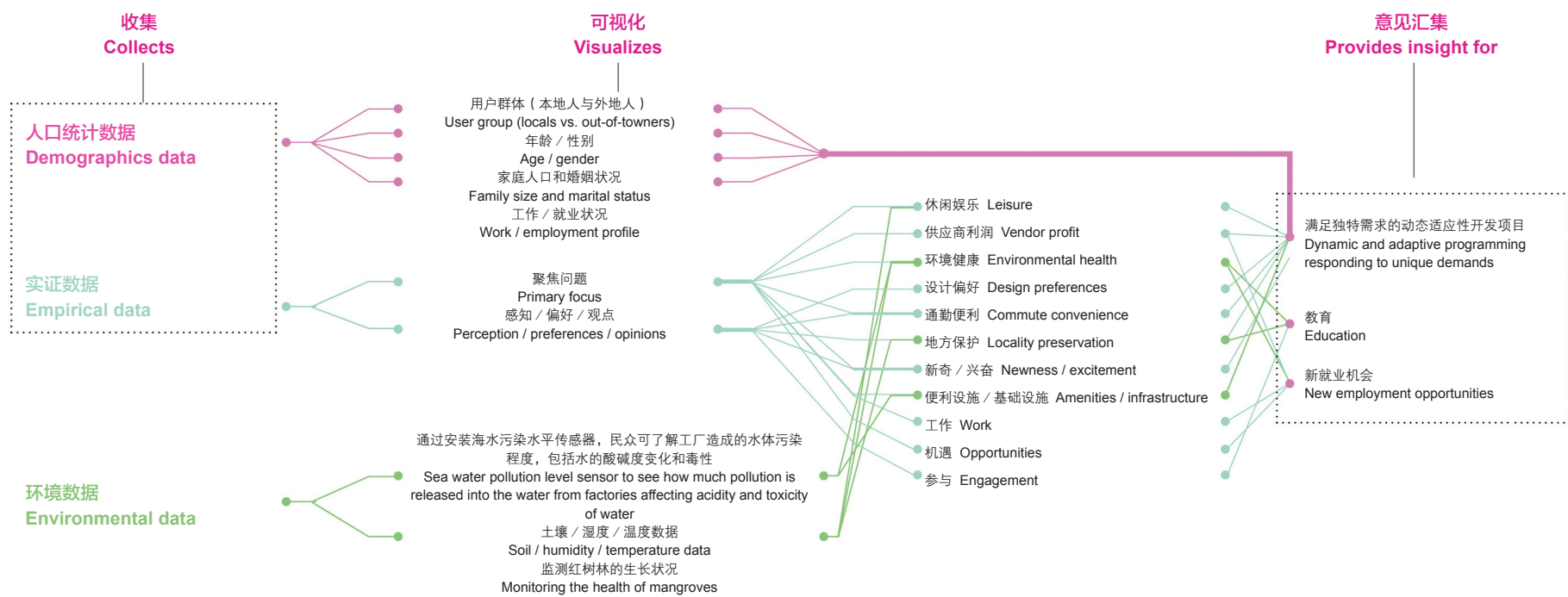
研究团队以泰国昂西拉地区为试点，对这一工具的有效性进行了测试。昂西拉是一个隶属于旅游胜地春武里府的小渔村，位于曼谷东南方向约91km处（图1）。试点地区西侧毗邻泰国历史最悠久的捕鱼区之一，而东侧为茂密的红树林区。春武里府目前有意开展适合当地环境的新型物联网基础设施建设项目。随着旅游业的发展，春武里府所面临的挑战在于：如何在无差别旅游业开发的威胁下保护当地的本土文化和生态特征（如红树林），同时满足不断增长的游客需求，并公平分配新型经济带来的收入。

试点场地是一片面积约14hm<sup>2</sup>的待开发空地，泰国本土开发商计划将这里开发成一个充满活力的、满足多代际需求且具有多元文化特色的混合社区，并修建游客酒店、当地居民住房、海鲜市场、餐馆、共享工作空间和老年社区中心等设施。该地段复杂的人口结构与错综的文化背景使设计问题变得既有趣又富有挑战性：设计需要协调盈利性发展商机与地域特征保护之间的冲突。场地的开发计划最初由香港建筑设计团队主导，但其毫无特色的常规商业化设计方案并未回应当地的文化背景。2019年，开发商委托来自曼谷的CHAT建筑设计事务所对该项目进行重新设计。基于社区参与对保持当地特色原真性的重要性，开发商和CHAT建筑设计事务所意在探索研究本地文化的方法并研发创新性数字化解决方案，以提升当地的可持续性。

在这种情况下，一个能够将公众意见引入决策过程的工具将通过利用公众的集体智慧为专业人员的分析提供意见参考，这将使项目设计大受裨益。此外，在由外部资本推动的如此大规模的开发过程中，公众参与将有助于规避利益分配不均问题。

该项目分阶段进行：第一阶段和第二阶段分别为前期设计和规划阶段，其中包括背景研究和红树林的生态修复；第三阶段引入海鲜市场和购物街的设计；第四阶段引入当地餐馆；第五阶段引入酒店和其他社区功能，并对开发项目进行收尾。本文将展示如何在整个项目中将CoDAS用作参与工具，以及在项目完成后如何将之用作社区数字平台来维护社区中的社会和经济关系——这一工具有助于界定公民和其他利益相关者在复杂社会环境中的角色、职能定位、价值观和行为规范。





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- ① 《参与式唐人街》由艾默生学院参与实验室、大都会区规划委员会、亚洲社区发展公司和莫西兰软件公司于2010年联合开发。
- ② 《我的社区》由Mojang电子游戏公司、微软和联合国人居署于2012年联合开发。

## 2 实例研究

研究团队对过去10年间全球范围内出现的数个关注公众参与的数字平台和应用程序进行了调研。本文将重点介绍一些对推动公众参与做出突出贡献的成功案例。

早期的公众参与数字工具着重理论方法上的创新。2010年推出的《参与式唐人街》实验性多人电子游戏<sup>①</sup>旨在使波士顿唐人街的居民通过社区会议的方式参与当地的总体规划工作。在游戏的虚拟世界中，48位参与者通过扮演各式各样的职能角色，从不同角度思考唐人街的未来发展规划。该项目使社区有机会评估唐人街的当前发展情况并确定其未来发展的优先事项。

另一个游戏化的公众参与工具范例是于2012年推出的《我的社区》<sup>②</sup>，通过将模块植入广受欢迎的视频游戏《我的世界》，可提高社区民众对公共空间规划的参与度。社区居民通过在游戏中建模来表达他们的想法，并将之可视化。这种3D游戏环境可以让人们在快速推演和分享创意的过程中以一种经济、便捷的方法将自己的各种想法可视化。

与强调创新过程的工具不同，创建于2011年的数字平台“街区未来”旨在让政府机构、开发商和公民组织参与到项目的开发过程中来；街区未来为各类用户提供了全面的工具包，为活动和规划类项目的进一步完善提供了长期的技术支持。

在学术研究领域，由约翰内斯·穆勒率领的新加坡—苏黎世联邦理工学院中心未来城市实验室发起了一个公民参与领域的新研究分支——公民设计科学。公民设计科学将借助信息和通信技术收集而来的众包意见和观点与快速城市分析工具包相结合。该工具包是一个适用于项目初期的网页界面应用程序，用户可以在3D环境中改变一小部分可移动对象的几何布局<sup>⑤</sup>。然而，如何使程序中高度简化的3D设计工具更具指导性，以及如何使程序覆盖各个年龄层用户等问题仍有待进一步研究和改进。

## 3 设计方法论与策略

### 3.1 CoDAS：实时地理空间信息平台

CoDAS是一个社区层面的开放平台，它将现实生活中面对面的亲密人际关系与具有规模化和即时性特点的在线网络结合起来。作为一个实时地理空间信息平台，CoDAS将开发规划方案可能带来的变化在平台上予以即时展示，并吸引那些自愿参与社区建设和集体决策的昂西拉当地居民加入开发和设计的过程中，使他们可以保障自身在当地社区发展中的权利，而不再被动地接受外部资本的决策。在使用后阶段，该平台除了跟踪并记录现有共享资源的使用情况外，还可以通过培育各种生活类或商业类志愿团体来加强居民间的联系，这也将有助于居民获得餐饮业、海产品加工、市场推广、电商、环境保护等方面的额外收入。这些团体与社区个体居民间可以通过竞争或合作的方

式共同享用本地资源。目前，这些活动的组织形式仍较为随意，主要依靠居民口口相传或在一些社交媒体平台上发布信息。CoDAS通过提供一个从整体层面审视社区的视角，来促进社区内不同事务的互联与协调，从这个意义上讲，该平台可以使包括团体和个人的不同利益相关者之间就各种问题进行持续对话，从而实现集体决策、协作和监督（图2）。

作为一个实验性项目，CoDAS可向当地政府、社区组织或物业管理公司提供“平台型服务”（PaaS）。CoDAS当前阶段的主要任务包括：1）鼓励公众参与开发和设计过程；2）在社区层面实现信息的开放获取；3）促进转型中的偏远社区的商业发展。

### 3.2 设计实验

通过实地调研，研究团队依照使用者特点归纳出了5类用户（图3）：

- 1）昂西拉当地商人（如渔民和售卖当地特色手工艺品的摊贩），他们主要关心商机拓展与当地环境保护；
- 2）本地回头客：居住在周边封闭式社区中，却只有很少休闲选择的中产阶级；
- 3）关注生态保护和公众教育的环保主义者；
- 4）来自曼谷的外乡游客，他们通常希望有良好的自然环境中享受悠闲的周末时光；
- 5）热爱冒险或想要获得原汁原味旅行体验的外国游客，包括穷游的学生旅行者、寻求度假胜地的退休外国游客，以及打算长期旅居的远程办公族。

根据2019年3月进行的场地走访调研结果及CHAT建筑设计事务所对当地人口进行的统计研究，研究团队按年龄、婚姻状况、收入等级，以及兴趣和目标的不同，对潜在用户群体进行了预测。该实验性设计项目有助于评估如何通过协调不同使用群体的意见来推动当地的设计与开发过程，其目标是创建可满足并协调不同使用需求的功能空间，以便将当地的特色、生活习惯和文化与新兴旅游业相融合。

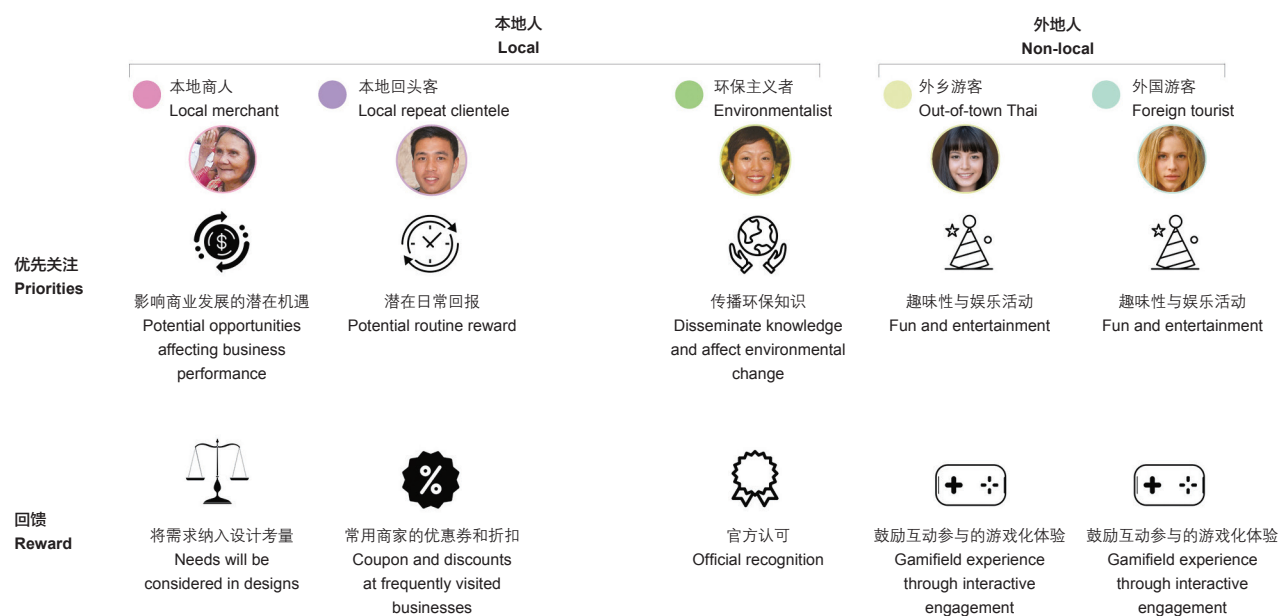
整套系统分为数字平台和实体空间两个部分，可在开发人员、设计师和当地居民之间建立一个交流界面，邀请民众参与设计和开发过程。这种类似“情绪普查”的方法可以叠加每一个个体对于社区的理解和感知，汇集并展现不同的意见，从而服务于昂西拉地区的开发与设计决策。

最近的一项研究发现，泰国的社交媒体渗透率非常高——Youtube、Facebook、LINE、Instagram和Twitter的使用率分别达到了97.1%、96.6%、95.8%、56.0%和27.6%<sup>⑥</sup>——泰国民众已在这些社交平台上形成了活跃的在线社群。昂西拉当地人非常关心也愿意投身于社区事务（如愿意接受面对面采访），因此像CoDAS这样的数字平台将有助于促进当前公众参与的积极态势，尤其是那些小型社区的事务讨论活动。

在项目的初始阶段，研究团队需要在场地的主要公共场所内安置

2. 作为一种数字工具，CoDAS为开发商、设计师和民众个人提供了一个建言献策的对话平台；在从预设计到规划再到使用后的不同阶段，CoDAS可以维持各个利益相关方之间的持续对话。这一平台可以将收集到的民意进行数字可视化，从而实现对昂西拉社区的“情绪普查”。

2. CoDAS, as a tool, is an interface between developers, designers, and individuals, inviting contributions from large amounts of audience; as a process, CoDAS supports a continuous conversation between different stakeholders, from pre-design / planning to post-occupancy. The platform collects digital overlay of personal narratives and perceptions, creating an emotional census of Ang Sila neighborhoods.



- 研究团队依照人口统计特征将使用者分为了5类：昂西拉当地商人、本地回头客、环保主义者、外乡游客和外国游客。
- Generalization of on-site demographics into 5 user groups: local Ang Sila merchants, local repeat clientele, environmentalists, out-of-town Thai travelers, and foreign tourists.

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若干个信息亭，以向公众展示CoDAS项目计划，为游客或不习惯使用电子设备的人们介绍相关信息（图4）。而下载了CoDAS移动应用程序的社区居民则通过CoDAS的聊天机器人接收调查问卷或社区公告等通知，了解关于开发项目各个阶段的最新资讯。用户可以通过文本、媒体或投票的方式提交回复。这一开源的网络平台可以定位众包信息，并将关键信息以可视化的形式推送给建筑师和开发商，同时支持项目的动态跟踪。当用户首次连接CoDAS聊天机器人时，CoDAS将以匿名的方式采集用户基本信息，包括地点、访问频率、年龄段和家庭人数等。此类数据将用于生成某项议题的用户群体地理空间分布。网络信息中心会记录总参与人次，支持特定用户群体和年龄段用户的信息筛选，同时支持用户查看项目所处阶段与实时进展，浏览过往的调查问题及公告，并了解新闻动态、民众的热点议题、情绪分析和投票结果（图5）。

该项目的设计过程会不断地进行迭代，在这一过程中，从潜在用户群体收集来的公共反馈意见可以帮助建筑师在不同的开发阶段完善设计想法。在研究阶段，CoDAS设置了若干问题来收集现有“热点地区”的信息，以获知当地居民的偏好和习惯，这些众包信息可以帮助专家了解当地居民对现有公共场所的感知情况（图6）。例如，在第一阶段红树林修复期间，CoDAS不仅对现有的社区活动进行宣传，还招募社区成员加入到造林工作中。在第二阶段，在设立功能空间之前，社区可以根据市民的投票和反馈意见在闲置地块上组织临时性活动（图7）。第三阶段引入了第一批建筑项目，包括海鲜市场和特色购物街。CoDAS聊天机器人会询问社区居民是否有意愿进行商业经营，以及他们喜欢的商业类型（图8）。根据收到的积极反馈意见，建筑设计方案增加了更多类型的功能空间，如共享办公空间、教育中心和有机

超市（图9）。社区居民的进一步反馈使设计师能够了解潜在用户的特定习惯和需求，从而对设计进行调整。在第四阶段，场地引入了新的餐饮业商户。基于CoDAS对社区居民饮食偏好的调查，场地选择性地引入了一些品牌商户，以保护本地商铺免受外来大型连锁店的冲击（图10）。设计的最后阶段通过采纳多元化的公众意见，在场地内增设了新的功能空间，包括观景台、雕塑公园、码头餐厅和托儿所（图11）。

尽管目前本实验采用的数据和信息都是假设的，但研究团队仍可以通过与在Instagram和Twitter等社交媒体平台上发布的内容（如有关本地居民偏好和习惯的内容）相互参照，来确保假设的合理性。

## 4 使用后案例研究

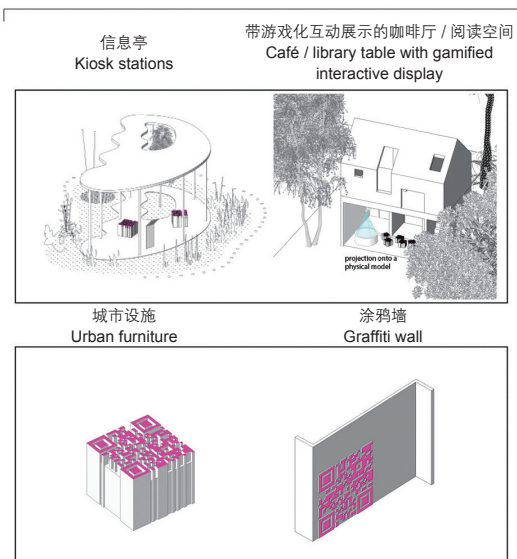
城市发展和设计不会随着项目的落成而告终。对于昂西拉等新兴城乡地区而言，公共资源（公共空间、设施和自然资源）的管理与使用将一直是一个关键问题。本项目思考的另一个问题是：能否将开发与设计阶段中公众参与的热情延续到使用后管理过程中？随着当地居民、开发商、市政机构、社会团体等利益相关方被串联在一起，CoDAS有助于在开发项目投入使用后继续维持这些或合作或竞争或错综的互动关系。

在使用后阶段，CoDAS将作为社区的信息基础设施，服务于社区未来的长期规划和管理。当地利益相关方可以利用这一数字平台，随着规划和设计工作的推进，建立起彼此间的相互关系。例如，致力于红树林保护的当地居民可以成立生态保护团体；海鲜市场的租户和业主可以成立海鲜产业委员会，以组织开展季节限定促销活动；酒店和



实体装置  
Physical

数字化工具  
Digital



4. 初始阶段：在主要的公共场所放置信息亭，以便公众了解开发项目和CoDAS计划的相关内容。

4. Initial intervention: placing information kiosk stations in key public spaces to begin informing the public about the development project and the CoDAS initiative.

短期出租屋业主也可以建立行业协会，以协调旅游业相关问题。除了个体间的互动外，这些自组织群体之间也会出于利益而形成合作或竞争关系。

为了应对这种动态且复杂的环境，CoDAS需要设计完整的数字化工具包，并规范用户的交互流程。但这项工作难度巨大，因此研究团队利用假想用户群体来推演符合当地实际情况的场景，从而制定假设条件、预测问题，并探寻可能的解决方案。昂西拉独特的场地条件为本次实验项目提供了一个复杂但相对封闭的测试环境（图14~16）。

## 5 讨论与回顾

CoDAS是一个拥有宏大目标的实验性项目，试图将短期的参与式规划设计与长期的使用后社区管理这两个城市发展过程的重要环节结合起来。其基本逻辑相对简单，即从鼓励当地利益相关者的公众参与，到提供定制的应用工具包来实现长远的社区共治。在前期，该工具包通过为设计师提供有价值的公众意见来优化设计方案；通过全程参与设计过程，研究团队在这一框架下积累了大量设计经验，使他们能够提出更为精准的调查问题，以便收集对于具体设计决策具有实际指导意义的反馈意见。值得一提的是，CoDAS提出的解决方案摒弃了满足所有需求的幻想，而是提供了一种能够促进多方对话的透明合作机制，有助于发现那些未知的或被忽略的关键问题。该研究提出的方法和工具在城市数据收集、公众参与、微型场地研究，以及利用众包数据了解不同用户需求并优化设计方法等方面进行了创新。就诸多层面而言，该工具重新定义了专业人士与普通民众之间的“代理权”概念，以一种务实的态度，将设计视为一种动态的（而非非依靠单方面决策的）、有据可循的（而非全然主观的）实践过程。

同时，在使用后管理过程中，CoDAS作为一种信息基础设施，可以长期促进并维持物理空间与社会网络之间的信息交换。不同实体之间的正式合作伙伴机制和非正式联系网络将会对商业生态及社区未来发展产生重大影响。两者分别代表了两种社交结构，即“社会”（基于正式组织架构之间的合作关系）与“社群”（基于参与者之间的非正式联结）。在动态的经济发展过程中，这两种结构既互相平衡也互相促进，为地区发展创造适宜的制度性环境<sup>[7]</sup>。

CoDAS强化了当地利益相关者之间的社交网络，以应对在现代城市中实现公共资源公平管理的挑战。当社区的开发建设依赖严格的专业权威（无论是具有一定专业知识的开发商或建筑师、地方政府机构，还是社区委员会）时，信息不对称可能会导致代理权问题，即执行代理人在代表社区时会带有自己的主观偏见。此外，如果社区中的多元化利益相关者彼此信任度低且信息获取不平等，那么社区会经常在共享资源（包括公共空间、共享设施、共享第三方服务等）管理中遇到落实不力的问题。针对信息不对称和社会信任危机的问题，CoDAS鼓励个人积极了解社区计划，并就设计和规划进展等议题提供反馈意见。

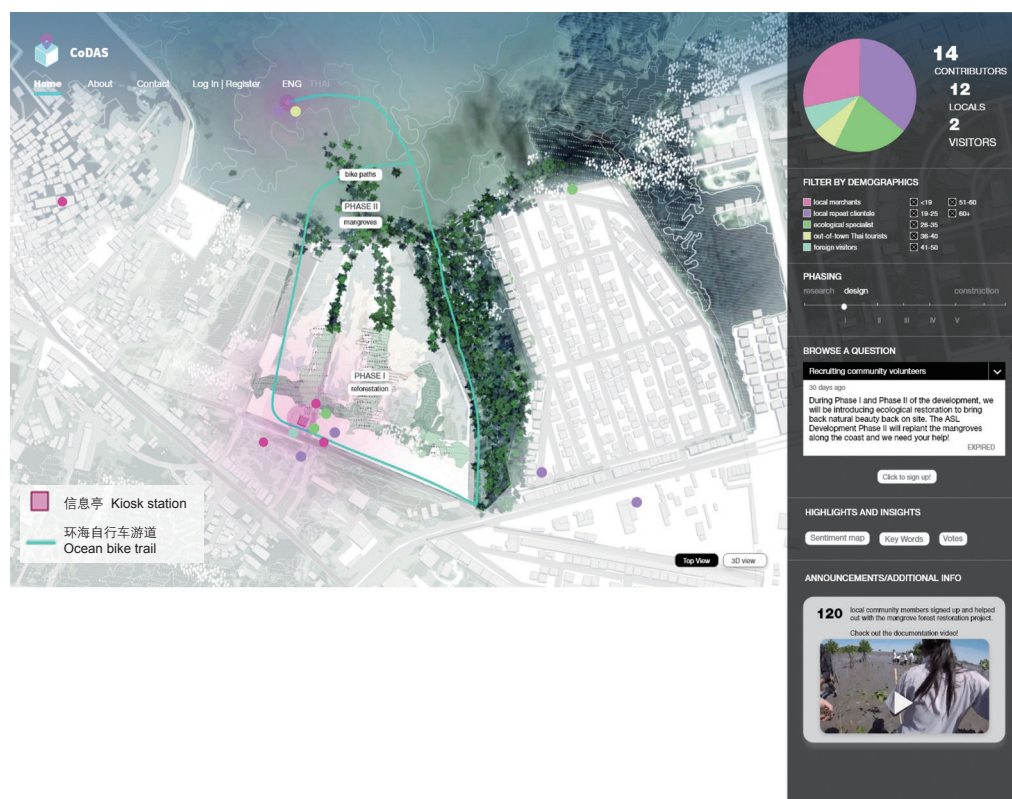
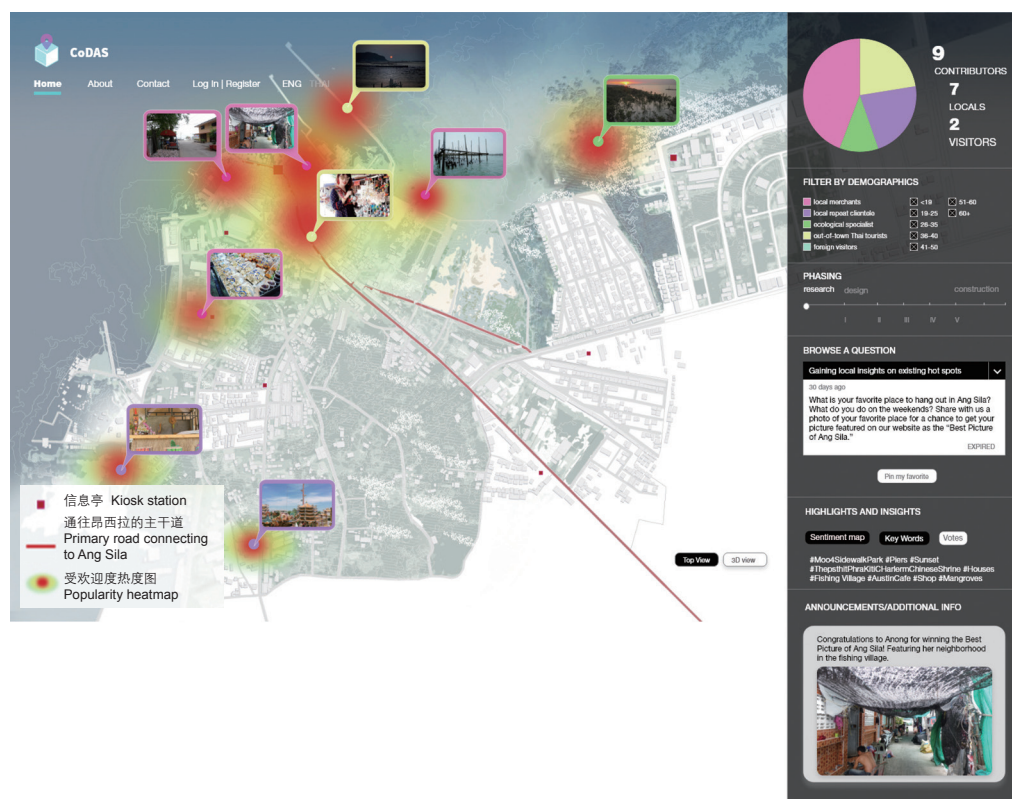
CoDAS并不认为当地利益相关者经过长期的互动后会为了实现利

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益最大化而达成合作。毫无疑问，不同的个人和群体都会面临利益冲突问题。然而，当人们在公共空间使用问题上存在个体利益冲突时，这种利益冲突也会体现在物理空间上。从长远来看，人们将不得不通过协商的方式，共同决定如何使用共享空间，而这需要制定对于各方而言都可接受的方案——从这个意义上讲，CoDAS需要在处理不同类型的社会关系时保持中立。

但是，这件看似简单的事情却需要大量的工作，其中，CoDAS的设计和试点项目的启动尤为困难。首先，尽管现场走访调研表明诸如Facebook之类的社交软件在昂西拉的老年人口中非常流行，但研究团队仍担心对他们来说，CoDAS的移动端和网页端界面可能会存在操作困难。因此，团队需要与当地社区合作，开展在线或现场操作教学。其次，尽管信息亭的设计目标是社区居民提供一个离线界面，从而减少潜在的数字鸿沟，但信息亭位置的选择仍有可能造成某些特定人群的使用不便。在开发过程中，尤其是开发初期，仍需同时展开工作坊等其他线下的社区参与活动。第三，研究团队还担心，在当地居民组建志愿团体后，用户体验可能不符合他们过去习惯的互动方式，这将需要对CoDAS的功能进行现场测试和迭代更新。最后，作为PaaS项目，CoDAS必须获得地方当局的批准并与现有的公共及私人组织合作。除了拥有可靠的本地合作伙伴外，项目的启动还需要付出巨大的努力，并能够预见所在地区的政治和社会阻碍。在当前阶段，CoDAS仍是基于诸多假设的实验性项目，研究团队将在条件允许时对其进行验证和调整。未来，研究团队将尝试与开发商和建筑师联合研发在线平台，以在适当时机将CoDAS引入昂西拉地区的各个社区并收集两大类信息：1) 现场使用数据，如众包热点、实时活动、个人评论，以及志愿团体的注册信息；2) 对当前产品原型的评价反馈。考虑到未来将CoDAS应用于其他环境下的可能性，这两类数据对于CoDAS短期的迭代更新和长期的改进完善而言都非常关键。

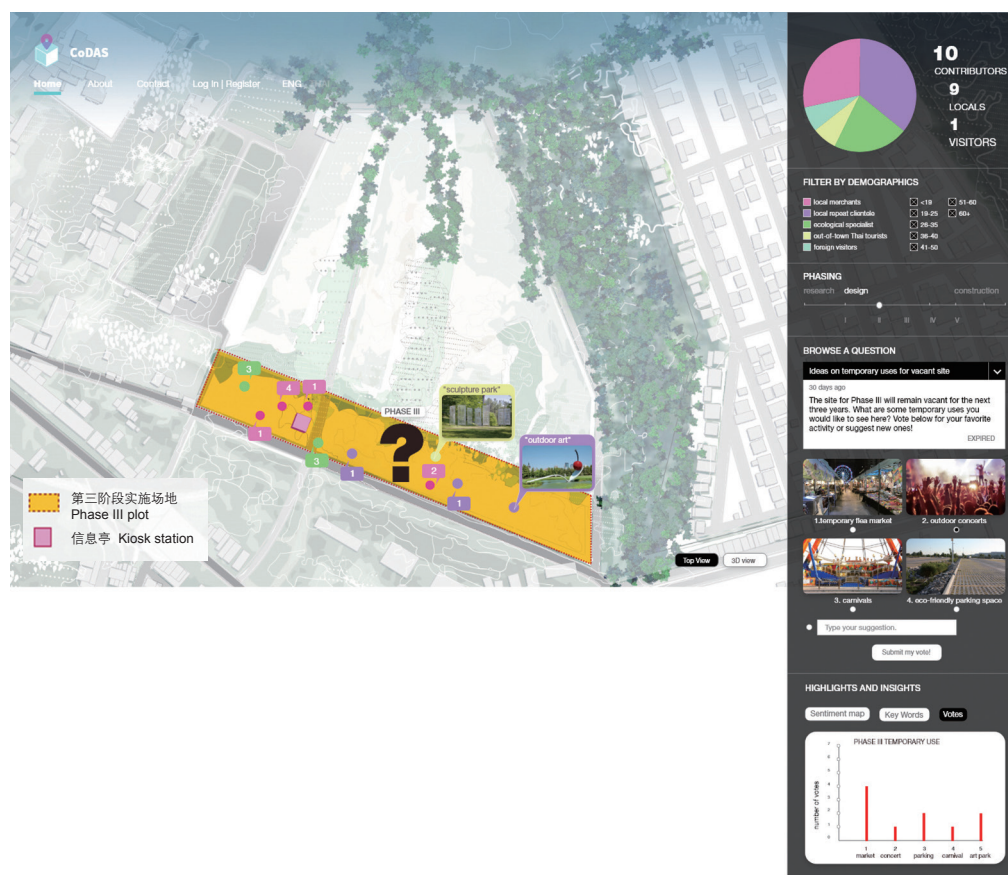
互联网并非单纯通过数据收集和统计均值来汇集人类的智慧，而是通过“一种聚合版本控制的新的开源模式来邀请所有代理进行相互编辑，从而获得社区的集体知识——在某种形式的指导下，可以自由无限制地进行实践”<sup>[8]</sup>。这种集体知识的聚合概念概括了马里奥·卡波尔所引用的亚当·斯密的“看不见的手”或“众人之手”，从而将个人利己主义转化为集体智慧<sup>[8]</sup>。本项目并非旨在研究互联网城市，而是研究一种可以由个体使用者塑造的城市。LAF



#### 项目信息

项目地址：泰国昂西拉地区  
项目面积：14hm<sup>2</sup>  
首席设计师：戎航  
设计团队：杨骏程、钱经纬  
研究时间：2019-2020年

5. 调研阶段：通过收集现有“热点”相关信息来获知当地居民的偏好和习惯，使得专家权威可以透过这些众包数据来了解当地人对现有公共场所的感知情况。
  6. 第一开发阶段：在红树林修复期间，CoDAS不仅可对现有的社区活动进行宣传，还可招募社区成员加入到造林工作中。
  7. 第二开发阶段：在设立功能空间之前，社区可以根据市民的投票和反馈意见在闲置地块上组织临时性活动。
5. Research Phase: a questionnaire is deployed to gather information about the existing "hot spots" to gain local insights on preferences and habits, demonstrating how crowd-sourced data can help authorities understand local perception of existing public spaces.
  6. Development Phases I: CoDAS helps with broadcasting a community activity opportunity and recruits members of the community to participate into the process of mangrove reforestation.
  7. Development Phase II: prior to the introduction of architectural programs, vacant plots host temporary events based on votes and suggestions of the citizens.



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## 1 Introduction

The last decade witnessed a tremendous trend in harnessing innovative digital technologies to respond to myriad urban challenges, with an effort to optimize the city under the smart sustainable city concept. Defined by the International Telecommunication Union, a smart sustainable city is an “innovative city that uses information and communication technologies and other means to improve quality of life, efficiency of urban operation and services, and competitiveness, while ensuring that it meets the needs of present and future generations with respect to economic, social, and environmental as well as cultural aspects”<sup>[1]</sup>. However, what is missing from these discussions is citizens’ perception and involvement in the decision-making processes, which leads to an increasing information asymmetry between individuals and authorities. At locations with abundant natural resources and rapid economic development driven by external investment, the development process is often highly costly, and people are unevenly benefited. Further, the lack of civic engagement prevents the communities from fostering trust between individuals and group stakeholders, hindering optimal management framework and methodology for

shared resources in the long run. Countering to this, Smart Cities 2.0, a very recent strategy presented by British architect Jason Pomeroy, suggests an alternative approach which emphasizes human-centered technologies and possibilities of engaging citizens in the design and planning process<sup>[2]</sup>. Such an approach outlines a people-oriented vision driven by a cross-sectoral coalition which recognizes the need for understanding public opinions in an enabling environment.

Civic engagement refers to scholars in Education Richard Adler and Judy Goggin’s definition of “the ways in which citizens participate in the life of a community in order to improve conditions for others or to help shape the community’s future”<sup>[3]</sup>. In the field of urban planning, Sherry Arnstein’s “ladder of citizen participation” provides a heuristic device for structuring her argument as 8 rungs corresponding “citizens’ power in determining the end product”<sup>[4]</sup>. This article, by focusing on citizen engagement and co-creation, proposes a tool and formulation which integrates the voices of evolving self-organizing entities to advance an equitable development process. First, this article introduces CoDAS (Co-Design Ang Sila) as a citizen engagement digital platform which mediates and facilitates continuous communication between citizens

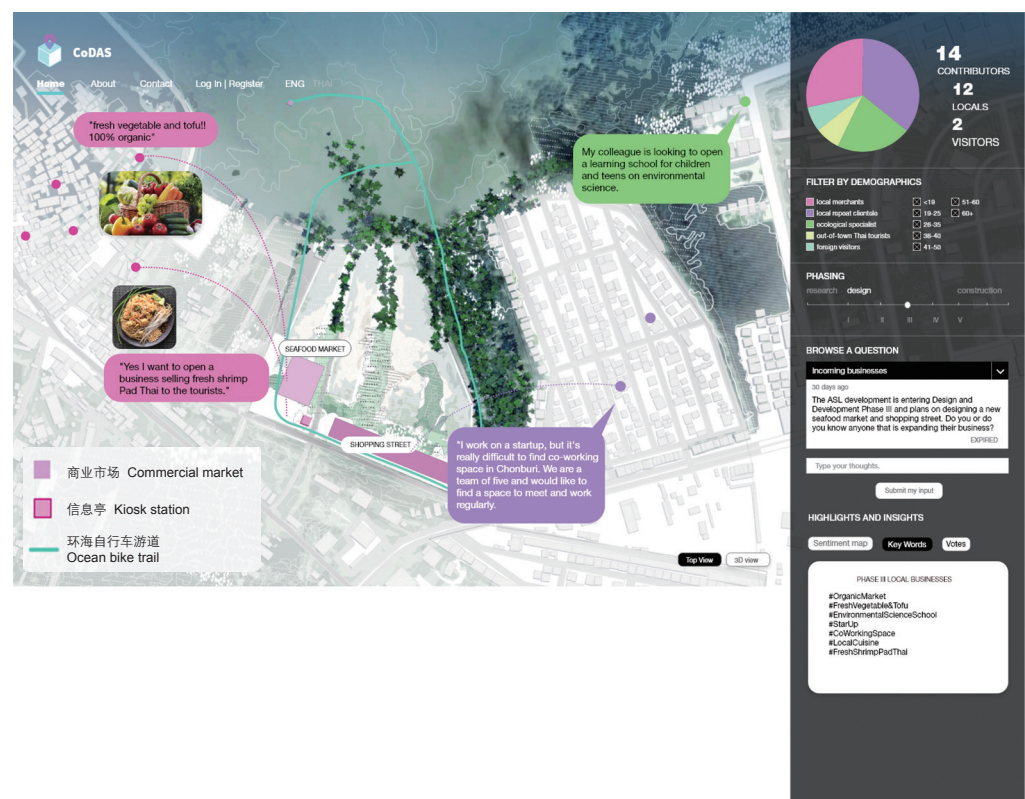
and authorities such as architects, developers, government, and management companies during different phases of a given project. Second, by including a large number of stakeholders to participate in the co-design process as co-creators, CoDAS aims to improve communication efficiency between different groups while achieving equitable outcomes in design and development, along with post-occupancy common resource management.

This research investigates the following questions:

- 1) How is digital participation changing the role citizens or end-users play in the decision-making processes of urban planning and design?
- 2) What digital tools can facilitate the interaction between different actors in pre-development design and post-occupancy management?
- 3) How to use public opinion data to negotiate various interests of different social groups by designing spatial adjacencies, shared spaces, and hybrid programming?

To validate the effectiveness of the proposed methodology, the hypothesis was tested in Ang Sila, Thailand. Ang Sila is a small fishing village located in the touristic province of Chonburi that is 91 km southeast of Bangkok (Fig. 1). The pilot plot is adjacent to one of the oldest fishing neighborhoods in Thailand to the west and rich mangrove forests to the east, currently welcoming novel IoT infrastructure initiatives to engage with its local context. As Chonburi develops in tourism, the challenge lies in preserving vernacular cultural and ecological features (mangrove forests) of the site under the threat of generic tourism development, accommodating new needs of serving increasing visitors and distributing equitably the wealth generated from new economy.

This site is a 35-acre vacant land to be developed by a Thailand-based developer into a vibrant and hybrid, multi-generational and multicultural community featuring programs such as hotels for tourists, housing for locals, a seafood market, restaurants, co-working spaces, and a senior center. The site's intricate demographic structure and complex cultural heritage renders the design problem both interesting and difficult: the tension between lucrative development opportunities and preservation of regional locality challenges the design to negotiate and cater to the needs of opposite interests. The site was initially designed by a Hong Kong architectural team with a conventional plan for commercial projects, which led to a generic proposal insensitive to local cultural context. In 2019, the developer appointed CHAT Architects. Understanding the importance of engaging the community in order to preserve authenticity of local characteristics, the developer and CHAT Architects seek ways to research local cultures and experiment with innovative digital



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① Participatory Chinatown was launched in 2010 by Emerson College Engagement Lab in collaboration with the Metropolitan Area Planning Council, the Asia Community Development Corporation, and Muzzy Lane Software.

② Block by Block was launched in 2012 by Mojang, Microsoft, and UN-Habitat.

solutions for a greater sustainability.

In this context, a tool which helps channel public input into decision-making process could tremendously benefit the project by engaging the collective wisdom of the public to provide analytical insights for the professionals. In addition, public participation may help avoid unequal distribution of the benefits brought by the development and secure indigenous residents' rights in Ang Sila during such a massive process initiated by external capitals.

The project occurs in phased development: the first and second phases are pre-design and planning, which involve contextual research and ecological restoration of the mangrove forests; the third phase introduces design of a seafood market and shopping street; the fourth phase welcomes local restaurants; the fifth phase brings in hotels and additional community programs and concludes the development project. This article will demonstrate how CoDAS can be used as an engagement tool throughout the project and how it can remain useful as a community digital platform after project completion to maintain social and economic relations in the community, creating complex social structures that help define roles, positions, values, and norms for citizens and other stakeholders.

## 2 Case Studies

The research team surveyed a number of digital platforms and applications that focus on public engagement in the past decade and highlighted several projects that are making successful impact on public engagement across the globe.

Early attempts in public engagement through digital tools emphasized on methodological innovations. Participatory Chinatown, launched as an experiment in 2010, is a multiplayer video game<sup>①</sup> which engages residents of the Boston Chinatown in the master planning process through community meetings. In the virtual world, 48 participants assumed the role of fictional characters in Chinatown to consider future planning from different viewpoints. The project gives the community a chance to assess recent growth about Chinatown and determine priorities for its future.

Another example of gamified participatory tool is Block by Block<sup>②</sup>, launched in 2012, which attempts to enhance community engagement in public space planning through the popular video game Minecraft. Neighborhood residents were asked to express and visualize their ideas through modeling in the gaming environment. The 3D game environment provides a cost-effective way for people to visualize their ideas in a format designed for rapid iteration and idea sharing.

Different from tools which emphasize innovative processes, Neighborland, founded in 2011, is a digital platform that aims to engage government agencies, developers, and civic organizations on a project basis. With a comprehensive toolkit for typical engagement tasks in planning, Neighborland provides technical support for recurring events and planning projects in the long run.

In academic literature, a new branch of research conducted at Singapore-ETH Centre Future Cities Laboratory led by Johannes Müller expands from the field of citizen engagement to a novel approach termed "Citizen Design Science." The Citizen Design Science approach combines crowd-sourced opinions and thoughts by citizens through information and communication technology with active design tools the team has developed called the Quick Urban Analysis Kit (qua-kit). This is an early-stage web-based application where users can directly manipulate 3D moveable objects and modify geometric layouts, although only minimally<sup>[5]</sup>. However, unresolved challenges, such as the instructiveness of the highly reductive 3D designs and technological accessibility for different age groups, require further research and improvements.

## 3 Design Methodology and Strategies

### 3.1 CoDAS: A Real-Time Geospatial Information Platform

CoDAS is a community-level open platform that combines the scale and instantaneous connectivity of an online network with the kinship created through face-to-face interactions. As a real-time geospatial information platform, CoDAS visualizes proposed changes during development, and engages community residents who are willing to voluntarily contribute to community building and collective decision-making. The tool incentivizes Ang Sila residents to participate into the development and design processes to ensure their own rights to Ang Sila, instead of accepting passively the outcomes determined by external capitals. In the post-occupancy stage, besides keeping track of current usage of existing shared resources, the platform may connect residents by fostering voluntary groups on various life- or business-related subjects also which could help residents generate supplemental income: food tasting, seafood production, marketing, online business, and environmental preservation. These groups along with individuals may compete over or collaborate in the use of local resources. These activities are currently organized haphazardly among residents via either word of mouth or across several social media platforms. CoDAS will allow for interconnections and unification of different matters within the community by providing a holistic view of the community. In that sense, the platform facilitates a

8. 第三开发阶段：通过CoDAS聊天机器人询问社区居民商业经营及业务类型的意愿，从而了解餐馆和海鲜市场的潜在租户的需求。

9. 第三开发阶段：来自社区的反馈使设计师能够了解潜在用户的习惯和需求，并相应地调整设计，在市场中加入居住单元，并建立与有机蔬果园直接连接的超市。

8. Development Phase III: CoDAS ChatBot asks the community whether they seek to open a business and the type of business they prefer, researching the needs of potential tenants of restaurants and seafood market.

9. Development Phase III: feedback from the community allows the designer to understand latent habits and needs, and adjust the design accordingly to include living units in the market and relocate the supermarket to connect with the organic gardens.

continuous conversation between different stakeholder groups and individuals on various issues, enabling collective decision-making, collaboration, and supervision (Fig. 2).

As a pilot project, CoDAS is a subscription-based Platform as a Service (PaaS) employed by local government, community organizations, or property management companies. The key missions of CoDAS at the current stage are 1) to encourage public participation during development and design; 2) to realize the open access to information at the community-level; and 3) to facilitate business creations for remote yet transforming communities.

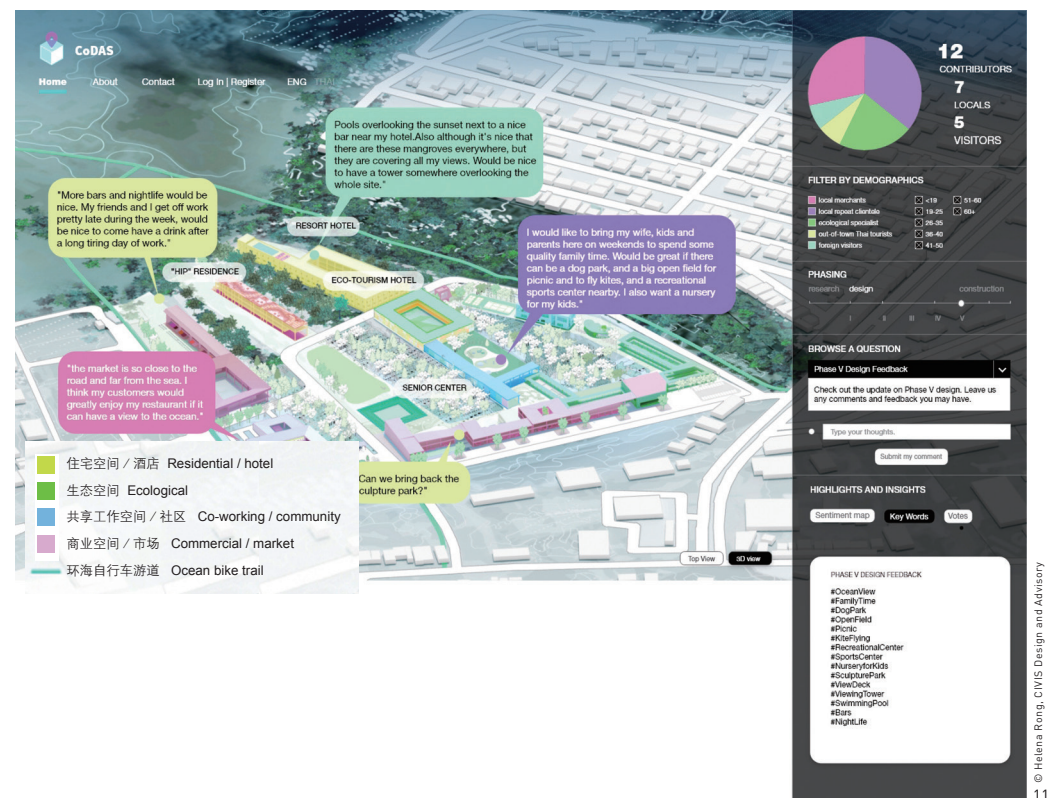
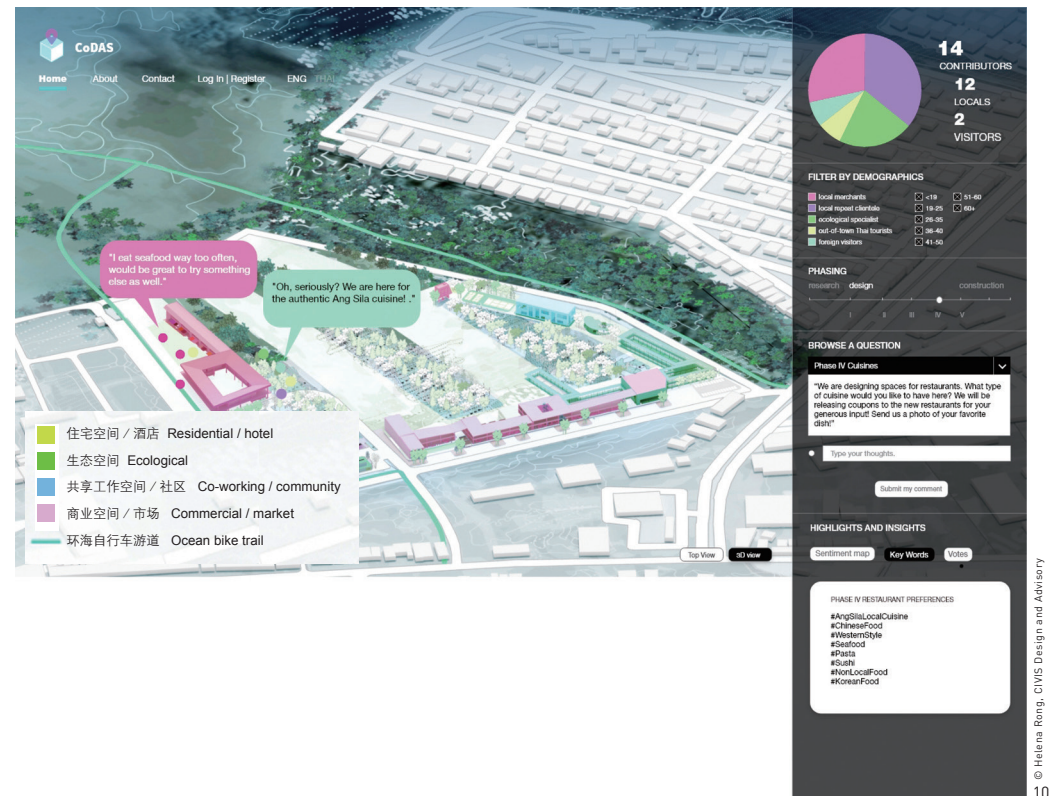
### 3.2 Design Experiment

From the field survey, the research team learned that demographics on the site can be generalized into five types of users (Fig. 3):

- 1) Local Ang Sila merchants, such as fishermen and vendors who sell local crafts primarily concerned with business opportunities and locality preservation;
- 2) Local repeat clientele: middle-class living in gated communities in surrounding neighborhoods with few options for leisure;
- 3) Environmentalists who concern with ecological preservation and public education;
- 4) Out-of-town Thai traveling from Bangkok who seek a relaxing weekend stay;
- 5) Foreign tourists who prioritize adventure and an authentic travel experience, ranging from budget college student travelers to retired foreign tourists seeking a resort vacation, to digital nomads intending to stay for longer periods of time.

Based on these insights from the on-site surveys and interviews conducted in March, 2019, as well as thorough demographic research conducted by CHAT Architects, the research team speculates potential user groups by age, marital status, income bracket with a diverse mix of interests and goals. The hypothetical design project can evaluate how design and development benefit from negotiating the voices of different perspectives. The project's goal is to create programs and spaces that accommodate and negotiate different needs and integrate local narratives, habits, and cultures into the newly developed tourism.

Consisting of both digital and physical components, the tool creates an interface between developers, designers, and residents, and invites contributions from a broad audience on the site to participate in the design and development process. It is a means to create an emotional census of Ang Sila neighborhoods and a digital overlay of people's individual narratives and perceptions,



10. 第四开发阶段：项目基于CoDAS对社区居民饮食偏好的调查，引入了一批品牌租户入驻场地。
11. 第五开发阶段：通过采纳社区居民对于设计的反馈意见，在场地内增设了新的功能空间，包括观景台、雕塑公园、码头餐厅和托儿所。
10. Development Phase IV: CoDAS solicits cuisine preferences from the local community to provide an alternative way of recruiting anchor tenants.
11. Development Phase V: community input further diversifies the mixed use and programming to include a viewing deck, a sculpture park, a pier restaurant, and a nursery.

providing granular neighborhood insights which assist with design decision-making.

A recent study finds that social media penetration in Thailand is extremely high, where Internet users actively form online communities on platforms such as Youtube (97.1%), Facebook (96.6%), LINE (95.8%), Instagram (56.0%), and Twitter (27.6%)<sup>[6]</sup>. Ang Sila locals' willingness to participate in traditional community engagement processes (e.g. in-person interview) is high and a digital platform like CoDAS will help facilitate existing activities such as discussing local matters within smaller communities.

Initially, several information kiosk stations are introduced to key public spaces on site to begin informing the public about the project and the CoDAS initiative, providing information for visitors or people who are not digitally connected (Fig. 4). Community members connect with the CoDAS mobile app, and receive a notification from the CoDAS ChatBot whenever a survey question is deployed or an announcement is made, to stay virtually connected with the project at each stage. Users respond to these questions in the form of text, media, or votes. The open-source web platform geospatially locates the crowd-sourced information and visualizes key information for the architects and developer, and tracks changes of the project overtime. When the users initially connect with the CoDAS ChatBot, the platform collects users' basic information through an anonymized survey, including locality, frequency of visit, age bracket, and family size. Such data are mapped onto the web interface, displaying geospatial distribution of interest of different user groups. The web dashboard keeps a tally of total number of participants, allows filtering of information based on different group and age bracket, displays the phasing of the project, allows for the browsing of other survey questions, and shows highlights, key concerns, sentiment analyses, and voting results (Fig. 5).

The design process is an iterative process in which public feedback collected from potential user groups helps the architects refine design proposals at each development phase. During the research phase, questions are deployed to gather information about existing "hot spots" to gain local insights on preferences and habits (Fig. 6), demonstrating how crowd-sourced information can help authorities understand local perception of existing public spaces. During the mangrove restoration in Phases I, CoDAS helps with broadcasting a community activity opportunity and recruits community members to participate in the reforestation process. During Phase II, prior to the introduction of architectural programs, vacant plots host temporary events based on votes and feedback of the citizens (Fig. 7). Phase III introduces the first architectural

programs: a fish market and a featured shopping street. CoDAS ChatBot asks the community members whether they seek to open a business and the type of business they prefer (Fig. 8). As a result of the active input, the programming has covered more typologies of spaces, such as co-working spaces, an education center, and an organic supermarket (Fig. 9). Further feedback from the community allows the designers to understand latent habits and needs, adjusting the design accordingly to specific needs. During Phase IV, the site welcomes new restaurant tenants. CoDAS solicits local community's cuisine preferences to provide an alternative in recruiting anchor tenants and protecting local businesses from intrusions of larger chains (Fig. 10). During the final stage of design, community input further diversifies the mixed use and programming and includes a viewing deck, a sculpture park, a pier restaurant, and a nursery (Fig. 11).

Although data and information used in this experiment are currently based on speculation, the research team is able to cross-reference their assumptions (e.g. local insights on preferences and habits) with contents found on social media platforms such as Instagram and Twitter.

#### 4 Post-Occupancy Case Study

Projects of urban development and design do not permanently end with the completion of construction. Post-occupancy management of shared resources—public spaces, facilities, and natural resources—remains critical for emerging urban-rural areas like Ang Sila. Is it possible to extend the enthusiasm of participation into the process of post-occupancy management? By bringing together local stakeholders into the participatory design process, be it residents, developers, municipal institutions, or social groups, CoDAS helps foster sophisticated interactions—collaboration, competition, and conflict, all of which will continue when the project is physically completed.

In the post-occupancy stage, the use of CoDAS is extended into long-term community planning and management. The platform will serve as an informational infrastructure and a digital tool for local stakeholders to build upon their relationships developed during the planning and design phases. For instance, local residents who are passionate about preserving mangroves may form a local alliance that takes charge of management; vendors and business owners at the seafood market may organize a seafood business committee that hosts seasonal events to improve sales; hotel and short-term rental housing owners might have their own association that addresses issues pertinent to tourism. Besides interactions among individuals, it is also possible to speculate these self-organized groups may

collaborate or compete with each other for different interests.

Responding to such a dynamic, complex social context requires CoDAS to invent carefully designed digital toolkits and user-interaction processes. However, understanding the difficulty of designing tools and processes for speculated post-occupancy tasks, speculative potential user groups are introduced to construct context-specific scenarios to help develop the hypotheses, questions, and solutions. The variety of characters and unique site conditions of Ang Sila provide a complex but contained testing environment (Fig. 14 ~ 16).

## 5 Discussion and Review

CoDAS is an ambitious experimental project that attempts to join two distinctive components of urban development: participatory design (short-term) and post-occupancy community management (long-term). The underlying logic is simplistic—from encouraging participation of local stakeholders to providing tailored toolkits and procedures that foster long-term collaboration and supervision. On the one hand, the tool benefits the design process by providing designers with valuable public insights to improve proposed solutions. Positioned as a designer and running through the design process using this framework, the research team is able to ask better design questions for each decision-making. The system by no means guarantees a utopic outcome which satisfies all observed needs, but rather provides a device to facilitate conversations in a transparent and collaborative way, leading to better design questions which have been previously unknown or overlooked. The proposed methodology and tool innovates in data collection, community engagement, micro-scale site research, and utilizing crowd-sourced data to optimize a design by negotiating user needs. In many ways, this approach equalizes and redistributes the notion of agency of the agents and patients from prior professional beliefs and broadens a pragmatic understanding of design as a dynamic and conscious practice.

On the other hand, within post-occupancy management procedures, CoDAS functions as a digital infrastructure that facilitates the information exchange between the existing physical and social networks to build and sustain long-term relationships. The quality of formal partnerships and informal networks among these entities may place significant impacts upon the existing business ecology as well as its future development of communities. The two represent two forms of social integration—society (based on the “bridging” between formal partnerships) and community (based on the informal “bonding” among participants). The two balance, check, and improve each other in

the dynamic process of economic development, constructing the institutional environment for development<sup>[7]</sup>.

Empowering the social networks among local stakeholders, CoDAS responds to the challenges in achieving equitable management of public resources in the contemporary urban realm. When a community relies on a heavy-handed professional authority, be it trained developers or architects, a local government institution or a community committee, informational asymmetry may easily lead to the agency problem where the executive agents prioritize their own biased opinions while representing the community. Meanwhile, communities that engage with diverse stakeholders yet with weak trust and unequal access to information are frequently faced with collective action problems in the management of shared resources—including public space, shared facilities, and third-party shared services. Seeking remedies for informational asymmetry and weak social trust, CoDAS incentivizes individuals to actively learn about community initiatives and provide feedback on matters such as design and planning updates.

CoDAS does not take for granted that local stakeholders, after a long-period of interaction, would collaborate to maximize their interests. There is no doubt that individuals and groups with different interests are faced with conflicts of interests. However, when individuals have mutually exclusive plans for the use of these types of spaces, spaces become a physical representation of conflict of interest. In the long run, people will have to confront and negotiate with each other to collectively decide the use of the shared spaces. There needs to be an acceptable plan for all the stakeholders involved. In that sense, CoDAS remains neutral when it needs to deal with different types of social connections.

However, building upon the simplistic logic requires a significant amount of work, particularly the difficulties of

12. 使用后阶段：公共活动的计划与组织。CoDAS 包含“活动管理”和“即时通讯”功能模块。通过活动管理功能模块，使用者能够自主发起不同类型的公共或个人活动。此外，CoDAS 的“智能助手”功能模块可以帮助用户迅速完成活动注册及相关手续的办理，尤其是那些在特定公共空间举行的活动。
12. Post-occupancy: public event planning and organizing. CoDAS integrates “event manager” and “message” to work hand in hand. Through the event manager, the users will be able to initiate events in different categories. In addition, intelligent bot modules are also designed to expedite the event registration process, especially with those that require designated public spaces.



13. 使用后阶段：公众投票。推动以数据认知为基础的、经由指导的公民参与是CoDAS的核心目标。CoDAS平台上的各个部分皆引入了“投票”功能模块，每个用户都可以便捷、平等地发起公众投票——小到跑步路线，大到公共基础设施的建设。此外，每个用户都能够浏览当前或过去的公开投票结果。

14. 使用后阶段：物联网（IoT）。CoDAS为城市传感器提供了网络基础设施，可供市民查看实时数据及变化趋势。用户可以通过CoDAS的IoT平台订阅特定活动的传感器，并进行个性化的设备配置。采集到的数据将经过充分处理并用于优化迭代。

13. Post-occupancy: public voting. Informed, data-empowered civic participation is the core value of CoDAS. Voting module is integrated into every part of CoDAS platform structure. Everyone will be able to initiate a public voting ranging from running routes and public infrastructure development in an easy and equal way. Also, everyone will be able to browse active / archived public voting sessions.

14. Post-Occupancy: Internet of Things (IoT). CoDAS provides network infrastructures for urban sensors that provide community members with real time data and record based trend analysis. CoDAS's IoT platform enables the users to subscribe to specific active public sensors and they will be able to set up their own devices as well. The data will be processed adequately for optimization iterations.



designing CoDAS and launching a pilot. First, although on-site interviews suggest that digital software, such as Facebook, is popular among aged populations in Ang Sila, the research team worry that the interface of CoDAS (both mobile and web page) might not be technologically friendly for every individual. Such a challenge requires the team to collaborate with local communities to launch online or on-site learning sessions. Second, although kiosk stations are designed to provide an offline interface with the community which helps reduce potential digital divide, the location selection may still have bias towards certain demographics. Additional in-person community engagement activities such as workshops will be carried out during the development process, especially at the very beginning. Third, the team are also concerned that, when local residents are forming voluntary groups, the user experience might not correspond intuitively to the way people interact in the past. This would require on-site testing and upgrades of CoDAS' functions. Last, as a PaaS project, it is imperative for CoDAS to acquire approvals from local authorities and collaborate with existing public and private organizations. Besides having reliable local partners, launching the project still requires a tremendous

amount of effort and should anticipate political and social challenges in the region. For the current stage, CoDAS remains as an experimental project based on a number of assumptions made during the design process, which will be verified and adjusted when it comes with the opportunity for on-site testing. For the next step, the team intends to work with the developer and architects to launch the online platform, looking for a chance to introduce the project to the local communities of Ang Sila. In that way, two groups of information will be collected: 1) on-site usage data, such as crowd-sourced interest spots, real-time activities, individual reviews, and registration of voluntary groups; and 2) reviews of the current prototype. Both sets of data will provide critical inputs for short-term upgrades and long-term modifications, especially considering the possibility to implement CoDAS in different contexts.

The Internet empowers wisdom of crowds not through mere data collection and statistical mean-finding, but through “a new, open-ended mode of ‘aggregatory’ versioning, where the collective knowledge of a community is garnered by inviting all agents to edit one another—in theory, *ad libitum* atque *ad infinitum* [and] in practice, under the stewardship of some form of curation”<sup>[8]</sup>. This aggregation of collective knowledge summates to what Mario Carpo refers to as Adam Smith’s “invisible hand” or “style of many hands,” which transfers individual egoism into a collective wisdom<sup>[8]</sup>. This project studies not what an Internet city looks like, but a user-generated city. **LAF**

#### PROJECT INFORMATION

**LOCATION:** Ang Sila, Thailand  
**AREA (SIZE):** 35 acres  
**CHIEF DESIGNER:** Helena H. Rong  
**PROJECT TEAM:** Yang Juncheng, William Jingwei Qian  
**RESEARCH PERIOD:** 2019 – 2020

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