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段进/主编



空间研究14 URBAN SPACE

空间句法在中国 SPACE SYNTAX IN CHINA

段进 比尔·希列尔 等 著



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内容提要

空间句法是一种关于建筑与城市空间解析的系统理论,它采用的空间分析方法新颖而独特,引起了国际学术界的广泛关注。本书是继《空间句法与城市规划》(东南大学出版社出版)之后国内又一本关于空间句法的著作。本书的视野关注于空间句法在中国的最新进展、潜在问题和未来发展。全书共分为三个部分:第一部分是理论与方法的探索。介绍了空间句法在中国的兴起、演进与应用,以及句法理论在国际上的发展动态和软件技术的创新情况。第二部分是规划与实践的应用。从三大学科城乡规划学、建筑学、风景园林学不同的方向梳理了国内关于空间句法应用的基本研究方法,表达了各个不同方向的研究成果。第三部分是未来的发展与挑战。该部分对空间句法公司进行了简单介绍,分析了空间句法在中国发展的困境和误区,并就未来如何使空间句法在独具中国特色的背景下得到更有效的发展与使用进行了讨论。

本书不仅适合城市规划和空间理论的研究者阅读,而且适于处于城市规划实践第一线的规划师、城市设计师参考,同时,建筑城规院校的师生及广大空间句法爱好者也可以阅读或参考。

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空间研究的内容很广泛,其中人与其生存空间的关系问题是涉及城乡空间的学科和研究的基本问题。在原始社会,这个问题比较简单,人类与其生存空间的主要关系仅发生在相对隔离的族群与自然环境之间,因此古代先民与生存空间的关系直接体现为聚落社会与具有“自然差异”的空间的相互关系,人类根据需求选择适合生存的自然空间。随着技术的进步和社会的发展,这种主要关系不断发生变化。技术的进步使改造自然成为可能,自然界的空间差异不再举足轻重;而劳动分工使社会内部以及社会之间的相互依存性和差异性得以强化。因此,普遍认为,现代人类生存空间最重要的是空间的“社会差异”,而不再是空间的“自然差异”;同时,现代人与生存空间的主要关系也不再是人与自然界的关系,而变成了人与人之间的关系,现代人的生活时时刻刻处于社会的空间之中。这种转变使人与生存空间的关系变得错综复杂,自然的、历史的、文化的、政治的、经济的等等各种力量交织在一起。

现代人与生存空间的这种复杂关系,使我们很容易产生这样的判断,即空间本身不再重要,空间的形态与模式只是社会与经济的各种活动在地域上的投影。这个判断受到了普遍的认同,却带来了不良的后果。在理论研究方面,空间的主体性被忽视,研究的方法是通过经济和社会活动过程的空间落实来解析空间的形式,空间的研究被经济的和社会的研究所取代,客观上阻碍了对空间自身发展规律的深入探讨。由此导致了一系列的假定:空间使用者是“理性的经济人”;空间的联系是经济费用的关系;经济是城市模型的基础;空间的结构与形态就是社会与经济发展的空间化;人类的行为是经济理性和单维的,而不是文化和环境的;物质空间形态,即我们所体验和使用的空间,本身并不重要;等等。不可避免,根据这样的假定所建立的空间是高度抽象的,忽视了空间的主体性,与现实中物质空间的需求也相去甚远。并且由于缺乏对空间发展自身规律的认识,对空间发展与经济建设、社会发展的关系研究等,使城市规划学科的空间主体性与职业领域变得越来越模糊,越来越失去话语权。在城市建设实践中,空间规划的重要性不能受到应有的重视。理论上学术界的简单判断,为社会、经济规划先行的合理性提供了理论依据,形成了空间规划在社会发展、经济建设和空间布置三大规划之中的被动局面,空间规划成为社会发展与经济建设规划后的实施落实。最终,空间规划与设计不能发挥应有的作用,空间发展规律得不到应有的重视,在城乡建设实践中产生许多失误。

因此,人与其生存的空间究竟是什么关系,简单的社会与经济决定论不能令人满意,并有可能产生严重的后果。尽管在现代社会中,社会与经济的力量在塑造生存空间中起着重要作用,但我们绝不能忽视空间本身主体性和规律性的作用,只有当我们“空间”地去思考社会发展和经济发展,达到社会、经济和空间三位一体有机结合时,

人类与其生存的空间才能和谐、良性地发展。这就需要我们进行空间研究,更好地了解空间,掌握规律。需要进行研究的空间问题很多,在空间发展理论方面,诸如:什么是空间的科学发展观;空间与社会、经济的相互关系;空间发展的影响因素和作用方式;空间发展的基本规律;相对应的规划设计方法论;等等。在空间分析方面,诸如:空间的定义与内涵是什么;空间的构成要素是什么;空间的结构如何解析;人们如何通过空间进行联系;如何在空间中构筑社会;建成的物质空间隐含着什么规律;空间的意义、视觉和行为规范的作用;采取什么模型和方法进行空间分析;等等。在空间规划与设计方面,诸如:什么是正确的空间规划理念;空间的规律如何应用于规划设计;规划与设计如何更有效地促进城市发展和环境改善;规划与设计的方法与程序如何改进;等等。

这些问题的探讨与实践其实一直在进行。早在19世纪末20世纪初,乌托邦主义者和社会改革派为了实现他们所追求的社会理想,就提出通过改造原有的城市空间来达到改造社会的目的。霍华德的“田园城市”、柯布西耶的“光明城市”和赖特的“广亩城市”是这一时期富有社会改革精神的理论与实践的典型。第二次世界大战后,由于建设的需要,物质空间规划盛行,城市规划的空间艺术性在这期间得到了充分的展现。同时,系统论、控制论和信息科学的兴起与发展为空间研究提供了新的分析方法,空间研究的数理系统分析与理性决策模型出现,并运用于实践参与控制和管理城市系统的动态变化。这期间,理性的方法使人们认为空间规律的价值中立。随后,20世纪60年代国际政治环境动荡,民权运动高涨,多元化思潮蓬勃发展,普遍出现了对物质空间决定论的批判。尤其是20世纪70年代,新马克思主义学派等“左派”思潮盛行,它们对理想模式和理性空间模型进行了猛烈的抨击,认为在阶级社会中,空间的研究不可能保持价值中立,空间研究应该介入政治经济过程。对于空间规划实践则成为一种试图通过政策干预方式来改变现有社会结构的政治行动。这促使20世纪70年代末空间规划理论与实践相脱离,一些理论家从空间的研究转向对政治经济和社会结构的研究。空间研究的领域也发生了很大的变化,它逐渐脱离了纯物质性领域,进入了社会经济和政治领域,形成了很多分支与流派,如空间经济学、空间政治经济学、空间社会学、空间行为学、空间环境学等等。进入20世纪80年代,新自由主义兴起,政府调控能力削弱,市场力量的重新崛起,促使空间公众参与等自主意识受到重视。20世纪90年代,全球化、空间管治、生态环境、可持续发展等理论思潮的涌现,使空间研究呈现出更加多元化蓬勃发展的局面。空间研究彻底从单纯物质环境、纯视觉美学、“理性的经济人”等理想主义圈圈里走出来。20世纪空间研究的全面发展确定了现代城市空间研究的内涵是在研究了社会需求、经济发展、文化传统、行为规律、视觉心理和政策法律之后的综合规律研究和规划设计应用。空间研究包含了形态维度、视觉维度、社会维度、功能维度、政策维度、经济维度等多向维度。空间的重要性也重新受到重视,尤其在20世纪末,全球社会与人文学界都不同程度地经历了引人注目的“空间转向”,学者们开始对人文生活中的“空间性”另眼相看,把以往投注于时间和历史、社会关系和社会经济的青睐,纷纷转移到空间上来,这一转向被认为是20世纪后半叶知识和政治发展的最重要事件之一。

尽管空间研究的浪潮此起彼伏,研究重点不断转换,但空间的问题一直是城市规划学科的核心问题。从标志着现代意义城市规划诞生的《明日的田园城市》开始,城市规划从物质空间设计走向社会问题研究,经过一百余年的发展,西方现代城市规划理论在宏观整体上发生过几次重大转折,与城市规划核心思想和理论基础的认知相对应的是从物质规划与设计发展为系统与理性过程再转入政治过程。经历了艺术、科学、人文三个不同发展阶段和规范

理论、理性模式、实效理论和交往理论的转变,城市规划师从技术专家转变为协调者,从技术活动转向带有价值观和评判的政治活动。但从开始到现在,从宏观到微观始终没有能够离开过空间问题。不管城市规划师的角色发生什么变化,无论是作为设计者、管理者、参谋、决策精英还是协调者,城市规划师之所以能以职业身份参与并拥有发言权,是因为规划师具有对空间发展规律、对规划技术方法、对空间美学原理的掌握。只有具有空间规划方面的专门知识,才可以进行城市规划的社会、经济、环境效益的评估,才能够进行规划决策的风险分析和前瞻研究,才能够真正地或更好地发挥规划师的作用。现代城市规划的外延拓展本质上是为了更完整、更科学地掌握空间的本体和规律,通过经济规律、社会活动、法律法规、经营管理、政治权力、公共政策等各种途径,更有效、更公平、更合理地进行空间资源配置和利用,并规范空间行为。城市规划的本体仍是以空间规划为核心,未来城市规划学科的发展方向也应以空间为核心的多学科建设。目前中国城市化快速发展阶段的实践需求更应如此。

在国内,空间研究也一直在不同的学科与领域中进行,许多专家学者在不同的理论与实践取得了重要成果。多年来,在东南大学从建筑研究所到城市规划设计研究院,我们这个小小的学术团队一直坚持在中国城市空间理论与城市规划设计领域开展研究工作。我们将发展理论与空间研究相结合,首先提出了在我国城乡建设中城市空间科学发展观的重要性和七个城市发展新观念[城市发展研究,1996(05)];提出了城市空间发展研究的框架和基本理论,试图以空间为主体建立多学科交叉整合的研究方法[城市规划,1994(03)];出版了《城市空间发展论》、《城镇空间解析》等专著。并先后完成国家自然科学基金重点项目、青年科学基金面上项目、回国人员基金以及部省级科研等十多项有关城市空间的科研课题,同时结合重要城市规划与设计任务进行实践探索。在这些研究、实践与探索过程中,我们取得过一些成绩:曾获得过国家教委科学技术进步一等奖、二等奖;国家级优秀规划设计一等奖、银奖;省部级优秀规划设计一等奖多项;在市场经济竞争环境中,在许多重要国际、国内规划与设计竞赛中获第一名。我们同样也面对着研究的困惑与挫折、实践的失败与教训。我们希望有一个交流平台,使我们的研究与探索引起更多人的关注,得到前辈、同行和关注者的认同、批评和帮助;我们也需要通过这个平台对以往的研究探索进行总结、回顾与反思;我们更希望通过它吸引更多的人加入空间研究这个领域。

2005年东南大学城市空间研究所的成立为该领域的研究和探索组成了一个新的团队,这个开放性的研究所将围绕空间这个主题形成跨学科的研究,成员不分年龄、不分资历、不分学派、不分国别,吸纳各种学术思想,活跃学术氛围,开拓学术领域,深化研究成果,共同分享空间研究探索的苦乐。这套丛书正是我们进行学术研究与探索的共享平台,也是我们进行交流、宣传、争鸣和学习的重要窗口。

段 进

2006年5月8日于成贤街

空间句法在中国的研究与应用起步较晚。最早文献见于1985年《新建筑》杂志上《空间句法——城市新见》及《关于“空间句法”一文的讨论》两篇文章。尽管当时这一运用计算机研究空间形态的新视角引起了许多学者的关注。但由于对空间句法的理论原理了解甚少,造成的结果是对用计算机来分析空间中人的行为的技术表示出缺乏社会与人文内容的质疑。在短短热潮之后的很长时间里,国内鲜有学者对空间句法进行挖掘和研究,更谈不上在实践中应用。

进入21世纪以来,多项出版物使空间句法的基础理论、应用方法和成功案例在中国有了较全面的展示,尤其是2005年清华大学主办的《世界建筑》出版的空间句法专辑,2007年我与英国伦敦大学学院的比尔·希列尔教授等人共同撰写的《空间句法与城市规划》,以及2008年希列尔教授《空间是机器——建筑组构理论》一书的中文译本。其中,《空间句法与城市规划》一书分为三个部分。首先由希列尔教授权威地对空间句法的理论及国外相关应用进行了简明扼要、清晰地论述,建立了中国学者对空间句法的理论、原理和方法的基本认识;然后我们挑选了四个当时在中国较为典型的应用案例进行解析,其意在引导读者如何将理论应用到城市规划实践中去;第三部分是论战,我们邀请了五位相关领域的研究学者就空间句法这个议题发表了不同的看法。可以说这本书基本上能够客观地反映当时空间句法在中国的研究与应用现状,以及人们对它的认知程度。书籍出版后很快售罄,在国内引起了较好的反响,尤其引起了广大青年学者和研究生的兴趣,更重要的是它促进了城乡规划设计行业的关注并激发了从业人员的应用热情,对推动空间句法在中国的发展起到了重要作用。面对良好的市场反馈,出版社曾多次提出加印或再版事宜。经慎重考虑,我没有采纳再版的建议而是决定写《空间句法在中国》这本新著,主要的原因是基于对空间句法在中国发展现状的几方面思考:

首先,空间句法在中国发展取得的成果需要梳理。随着理论引介的深入、运用实践的探索,并伴随着一批到国际空间句法研究与教学机构的学者学成归来,以及像伦敦空间句法有限公司这样的专业机构通过合作或直接在中国的应用等都推动了国内空间句法的研究与使用进入了一个新阶段。

最显著的成效之一是空间句法改变了人们对空间的一个基本认知。自古以来,人们都自然地认为城市空间的内容在人们的感性认知可思考范畴之内。因此,规划师和设计师都采用简单直接的方式去描述它们。空间被认为是完全被动的人们需求的产物,这种认知已成为一种习惯性思维范式。空间句法作为一种从城市整体到局部都可以运用的理性分析工具,在中国的实证研究和量化分析中证明了空间形式与空间功能之间存在着相关性,空间形式对人的使用功能、活动具有反馈与影响作用,形式与功能之间存在着内在的逻辑性。

我们终于不再只能依靠直觉思维来进行空间研究和规划设计,空间句法已经提供了一种理性科学的系统性辅助手段。

到2014年底,国内公开出版的与空间句法相关的文献总数约为515篇,其中依托国家自然科学基金的有96篇。这说明空间句法作为一种有效的科学研究方法已获得认可并被广泛使用。从这些研究成果来看,应该说涉及了城乡人居环境的分析、研究和设计等不同领域以及空间上、时间上的不同层面。按照实践的应用方向划分:主要有空间形态组构的量化分析、空间与认知的关系以及空间与社会经济的关系三大类别;按照应用的学科领域划分:涵盖了城乡规划学、建筑学、风景园林学、地理学、社会学等多重领域;按照空间尺度划分:既有宏观尺度的城镇群层面、城市整体结构与系统层面,也有中观尺度的城市街区和街道层面,还有微观尺度的建筑群和单体建筑层面;按照关注的时间阶段划分:有研究城镇发展的历史演变,也有探索当代城镇系统与空间的组构方法,更有运用发展规律预测城镇空间未来的发展。这些研究与探索应用深浅不同,相互交织与渗透,形成了空间句法在中国应用与演进的整体图景。

其二,空间句法在中国发展出现的问题需要重视。空间句法在中国的应用与演进图景中,缺乏系统的理论学习和方法培训的困境尤显突出。相对于国际上的理论研究与技术开发,中国基本处于拿来主义阶段。从目前我们分析的与空间句法有关的55项国家自然科学基金、515篇论文以及大量的应用案例研究成果的统计数据可以看出,真正涉及原有理论的创新与发展或是对技术方法进行原创性改进的甚少,只占4%左右,而这些作者绝大多数都有在国外高等院校或空间句法研究机构中攻读学位或进修的经历,这也从侧面反映了中国对于空间句法的教育和培训仍相对落后,尚不能形成一个成熟的教育体系和研究系统。

基于以上原因,造成了空间句法在中国目前的应用与研究中对理论理解和应用范围方面出现了一些问题。在一些研究成果中,错误地将空间句法作为一种预测城市空间发展的方法使用,这样就导致形成城市发展中的空间决定论倾向。很显然,这不是空间句法研究的初衷。通过空间的构型关系或者拓扑关系就能判断未来城市空间发展的想法,或者说空间一定会发展成某种形态的“终极蓝图”说法正是空间句法的基本原理所摒弃的。空间句法所提供的技术支撑主要是对自组织中空间形态与行为功能之间关系的判断,证明了空间是一个整体系统,有好坏优劣,而空间结构中的任何部分发生变化,都会导致系统结构发生改变。严格意义上讲,空间句法是无法承担对城市发展结构变化预测的重任的。因此,国内一些关于空间句法应用于对城市空间结构未来发展预测的研究努力存在原理上的误差。

同样,在应用领域与技术方法上也存在一些误用。如有研究人员将不同城市购物中心的整合度、连接度等进行比较,以数值大小划分等级判断优劣。我们知道,在不同的空间句法分析案例中,各变量的数值大小并不能作为不同案例间相互比较空间优劣性的标准,尤其是不同城市的比较。

更为普遍的问题是大部分的应用人员在模型算法中取什么深度或取多大的度量半径时,都简单地套用其他城市的经验数值,而不是通过实地调研与检验后,通过耦合度分析找到适合本地的数值。这种应用方法的偏差很容易出现误判,甚至对研究和规划设计产生误导。

其三,空间句法在中国发展的未来需要探索。中国目前的规划技术和方法的优化需要空间句法的技术支撑。例如,目前中国城市的功能单元服务配套仍按千人指标,空间区位仍

以地理几何为中心,或以设计人员的经验判断为依据。空间句法把城市作为一个复杂不可分割的整体的自组织系统,通过内在空间网络与人的活动关系的计算所形成的活动单元不再是外表直观显象的划分,而是实际的人的使用行为。空间句法揭示了城市物质空间的内在结构与社会功能的逻辑关系,由此产生出以空间网络特征与城市活动关系为背景的诸多应用领域。

中国的新型城镇化和城市发展的转型为空间句法提供了更为广阔的应用前景。面对越来越多旧城中存量型土地规划与设计中的问题。应用空间句法对旧城区的空间网络和空间视域的分析,在交通网络的织补、土地使用性质与强度的确定、公共空间系统的组织、地区空间活力的提升等多方面进行的前期研究可发挥重要作用,并可对规划与设计方案的实施后成效的预评估,同时它改变了单凭直觉经验进行规划设计与建设的方式,为避免造成不尊重建成环境而大拆大建提供了技术支撑。

中国特色的社会文化和本土空间研究需要空间句法开拓新的领域。我们在对空间句法在中国进行实证研究的案例统计分析后认为:空间句法提供了一种理性的思维方式和有效的空间分析方法,这种方式与方法本身不存在文化与形态的差异性,从实证成果来看能够适应于中国城市与人居环境的分析研究。但是,中国城市与建筑形态及社会经济文化的特殊性,也对空间句法的理论与方法提出了挑战,空间句法需要有理论改进与技术拓展来应对这种挑战。例如,在中国园林空间的分析中由于可视性与可达性、迂回路径与虚拟目标的结构复杂性以及山、石、水、景等空间构成要素的特殊性等,空间句法对此的分析一直存在理论与技术上的困惑。目前研究者们正尝试通过对空间句法分析要素和分析方法的改进来探索这一难题的解决途径。中国的这些人居空间形态原型及特征的空间组构与演化规律需要研究与探索,它是世界城市与建筑文化的重要组成部分,其研究成果必将丰富世界城市空间理论研究类型的发展。

同时,在空间句法的理论深化与技术拓展方面,中国未来也将做出贡献。随着计算机技术、模拟模型、GIS技术等其他空间分析方法的发展,空间句法与之结合可以建立更为完善、便捷而精确的城市与建筑空间描述与分析模型,通过技术的整合和基本资料与数据的积累可以对城市进行多尺度、多领域、多层次的分析,从建筑到城市甚至到区域层次的大数据分析,也可以更精细化地深入到建筑之间、建筑与街道之间进行具体的可视度分析,从而更具体地分析空间形态的构形与行为活动的关系,并结合中国的实践进行技术探索。

综上所述,本书的视野关注于空间句法在中国的最新进展、潜在问题和未来发展。

2012年7月,我和博士生陆涵开始着手本书的筹备工作。期间,我们就此事与希列尔教授进行了接洽。在表达了撰写意向之后,希列尔教授一如既往地空间句法在中国的发展及出版工作表示出积极支持。之后,我们荣幸地邀请到在中国不懈努力进行空间句法研究并取得一定成果的专家学者参加了本书的写作。他们代表了这一阶段的研究思路和技术水平。经过多次沟通与讨论,于2012年11月最终敲定本书的写作框架及应用案例。从初稿、二稿到定稿的过程中,我们对作者的写作重点、注意问题、技术方法、格式等方面进行了多次反馈,最终形成了本书的整体性。浙江工业大学的戴晓玲博士为本书的框架和顺利完成做出了重要贡献。她在伦敦大学学院获硕士学位,毕业后一直努力推进空间句法在中国的发展,在中国的空间句法研究与伦敦大学学院的沟通、合作方法方面起到了一定的桥梁作用。

全书共分为三个部分:第一部分是理论与方法的探索,包括第1—3章。第1章“空间句

法在中国的应用与发展”由本人撰写,概述了中国大陆的空间句法兴起与演进,及其在各领域的应用情况;第2章“空间可持续发展:城市街道网络的三种功能”由伦敦大学学院的希列尔教授撰写(杨滔译),对空间句法发展的最新理论动态及应用软件发展等进行了介绍;第3章“引入空间竞争法则的空间句法轴线地图建模方法”由东南大学的邵润青博士撰写,从对句法模型进行现代网格型城市空间的分析技术方法难点进行了探索与改进。

第二部分是规划与实践的应用,包括第4—12章。以国内学者的典型研究为实证,从三大学科(城乡规划学、建筑学、风景园林学)不同的方向梳理了国内关于空间句法应用的基本研究方法,表达了各个不同方向的研究成果。其中,第4章“城镇空间历史演变分析:以丽江为例”由深圳大学的王浩锋、饶小军教授撰写;第5章“组构视野下的城镇空间结构分析:以三个江南市镇为例”由戴晓玲博士以及同济大学的李立与陈泳教授撰写;第6章“街区路网形态与活力:以京津为例”由北京交通大学的盛强博士撰写;第7章“街区路网密度与土地开发强度:以深圳特区为例”由深圳大学的王浩锋、施苏撰写;第8章“街区多尺度空间研究:以福州三坊七巷为例”由南京大学的徐建刚教授、福建省住房和城乡建设厅的陈仲光及南京大学的王培震撰写;第9章“古典园林空间结构与游园行为模式:以苏州怡园为例”由南京林业大学李志明博士撰写;第10章“城市总体规划的街道网络与中心体系:以阜阳为例”由我和陆涵撰写;第11章“基于城市空间逻辑性的活力街区空间塑造:以南京红花机场地区再开发为例”由东南大学的邵润青、我及杨奕人撰写;第12章由“城市滨水空间景观设计:以厦门杏林湾为例”由北京林业大学的王向荣教授,丘华恩及王静文博士撰写。这9个案例分别从城镇、街区、园林景观等不同尺度进行论述,基本可以客观地反映出当前国内研究者对空间句法的理解及应用情况。

第三部分是未来的发展与挑战,包括第13—15章。其中第13章和第15章由我撰写,第14章由英国空间句法咨询公司主管即伦敦大学学院访问教授蒂姆·斯托纳(王夏译)负责完成。多年来,我在参加项目评审、学生论文答辩及阅读期刊论文的过程中经常会遇到各类对空间句法的错用和误读。针对这些情况,在第13章中从支撑平台、理论技术、方法认识等方面对空间句法在中国发展的困境和误区进行了反思和讨论,以纠正目前部分研究与使用者的错误理解;第14章斯托纳先生的文章能够帮助读者更加深入地了解空间句法公司的相关情况,其内容主要涉及公司的背景、组织方式及未来在中国的拓展计划等;最后在第15章中,结合国际上的发展及应用现状,我就未来如何使空间句法在独具中国特色的背景下得到更有效的使用和发展发表了一些自己的看法,希望能够起到抛砖引玉的作用。

在这里要特别感谢希列尔教授对前后两本书出版给予支持与帮助;感谢参与撰写的各位同仁在繁忙的工作之中仍不遗余力地配合出版的各项事宜;感谢戴晓玲及国家住建部(中华人民共和国住房和城乡建设部)的杨滔,在与英国方面的协调与沟通中鼎力协助,杨滔还为本书的英文作了翻译;感谢现旅居美国的建筑师华佳将前言翻译成英文;感谢东南大学出版社的徐步政、孙惠玉编辑对本书提出的宝贵建议;感谢陆涵对前期资料的收集整理及期间与各位作者往来信件的发收。

最后,感谢广大读者对《空间句法与城市规划》和《空间句法在中国》的支持与关注。

段进

2014年12月于东南大学

The research and application of Space Syntax in China started fairly late comparing to its counterparts. The earliest publications are two papers in *New Architecture* journal in 1985, respectively “Space Syntax: A Different Urban Perspective” by Bill Hillier (translated by Bin Zhao) and “A discussion about ‘Space Syntax Paper’” by Dongsheng Jin. This new perspective that studies spatial forms with the assistance of computer did attract attention of many scholars. However, due to an insufficient understanding of its theoretical principles, many criticisms were raised. The attempt to analyze the human behavior in space with computer technologies was questioned for its lack of social and humanistic concerns. As a result, after the short wave of enthusiasm, very few domestic scholars kept working in this field, let alone using the tool in design practice.

Entering the 21th century, the theory, application methods and case studies of Space Syntax have been introduced to China by many publications in a comprehensive manner, especially by the “Space Syntax” monograph of the *World Architecture* journal, hosted by Tsinghua University, in 2005; *Space Syntax and Urban Planning*, co-authored by Prof. Bill Hillier and I and published by Southeast University Press, in 2007; and the Chinese version of *Space is the Machine* in 2008. The *Space Syntax and Urban Planning* book is divided into three sections. The first section is an authoritative, concise and clear elaboration of the theory and application of Space Syntax by Prof. Hillier, which establishes the basic understanding of the theory, principle and methodology of Space Syntax for Chinese scholars. In the next section we selected four relatively typical cases in China for analysis, intending to guide the readers on how the theory can be applied to the urban planning practice. The third section is a round-table debate, in which we invited five scholars in relevant fields to voice their opinions on the topic of Space Syntax. In a way, this book has objectively reflected the status of the research and application of Space Syntax in China at the time, as well as people’s understandings of it. The book was quickly sold out after publication, was well received in China, and generated a great deal of interest among young scholars and graduate students. Most importantly, it drew attention from the urban and rural planning practices, inspired enthusiasm of the professional planners, and made significant contributions to the development of Space Syntax in China. Encouraged by the excellent feedback, the publisher has repeatedly proposed re-printing or re-publishing the book. After careful consideration, I did not accept the proposal of re-publication, but

instead decided to write a new book *Space Syntax in China*, mainly because of three concerns on the current status of the development of Space Syntax in China:

First, the accomplishments that Space Syntax has achieved as it gains progress in China need to be re-evaluated. The research and application of Space Syntax in China has entered a new phase as the theoretical introduction deepens, the practical exploration furthers, along with the returning of a group of scholars who have graduated from institutions that focus on the research and education of Space Syntax, and the involvement of professional organizations such as Space Syntax Limited in the development of Space Syntax in China through collaboration or direct applications in China.

One of the most evident accomplishments is that Space Syntax has changed people's basic understanding of space. Ever since the ancient time, people have naturally believed that the contents of urban space is within the realm of people's perception and sensibility. Therefore, urban planners and designers have always described them in a simple and direct way. Space was thought to be a completely passive product of people's needs, and this understanding has become a habitual thinking pattern. As a rational analytical tool that can be utilized on parts and wholes of cities, Space Syntax has demonstrated, through the quantitative analysis and practical application in China, that there is correlation between the form and function of space, that the form of space reacts on and influences people's behaviors in the space, and that there is inherent logic between form and function. Finally, we cannot conduct spatial researches and urban planning projects on the sole basis of intuition when Space Syntax has already offered a rational, scientific and systematic tool.

At the end of 2014, the total number of Chinese publications related to Space Syntax was about 515, 96 of which were supported by the National Natural Science Foundation. This indicates that Space Syntax has been recognized and widely used as an effective scientific research approach. These researches have involved various fields, including analysis, research and design of urban and rural living environment, and touched on different locations and time span. Based on the directions of Space Syntax's practical application, they can be grouped into three categories – quantitative analysis of spatial composition, relationship between space and cognition, and relationship between space and social economics. As for the academic fields Space Syntax has been applied to, the researches have covered a multitude of fields, including urban and rural planning, architecture, landscape design, geography, sociology, etc. The spatial scales of the researches vary from the macro scale of city/town clusters and the system and structure of the whole city to the mid-range scale of cityblocks and streets, and to the micro scale of building clusters and individual buildings. Regarding the timeframes the researches have focused on, some have studied evolutions of historical cities and towns, some have explored the organizational structures of contemporary cities and towns' systems and spaces, and others have even forecasted future spatial developments of cities and towns with the aid of the Space Syntax theories. These researches, explorations and application vary in depth and breadth, and they have shaped the whole picture of the application and evolution of Space Syntax in China as they inter-

weave and permeate with each other.

Second, the problems that have emerged as Space Syntax advances in China need to be addressed. In the big picture of the application and evolution of Space Syntax in China, the lacking of systematic theoretical education and methodological training stands out prominently as the greatest hurdle to its development. Compared to the theoretical researches and technical advancements in other countries, China is basically in a “take-it-all-in” phase. Observing from the statistical data on the 55 NNSF grants, 515 papers and numerous practical application cases that are related to Space Syntax, we can see that only 4% of them have really touched on the regeneration and development of the original theory, or innovative improvement of the techniques. Most of these authors have studied in foreign colleges or research institutions that focus on Space Syntax. This indicates the education and training on Space Syntax in China is still relatively underdeveloped. It is not yet able to form a sophisticated system of education and research.

For the aforementioned reasons, problems on the theoretical understanding and scopes of application have aroused in the application and research of Space Syntax in China. In some researches, Space Syntax is incorrectly employed as a method of forecasting the direction of urban space development, resulting in a tendency of space determinism in urban development. Apparently, this is not the original intention of Space Syntax. The assumption that future development of urban spaces can be deduced from their spatial configuration or topological relationship, or that the space will inevitably develop into an “ultimate blueprint” of certain form, is what the basic principles of Space Syntax disapprove. The technical support that Space Syntax offers is mainly to determine the relationship between spatial forms and functions of behavior in a self-organization, and therefore prove that space is an integrated system that could be sound or faulty, and that changes of any parts in a spatial structure will lead to changes of the structure of the system. Strictly speaking, Space Syntax cannot take the substantial responsibility of predicting the transformation of the developmental structure of cities. Therefore, some of the Chinese researches that employ Space Syntax to predict the future development of urban spatial structure are fundamentally flawed.

Similarly, there are quite a few faulty applications of the techniques in the practical field. Some researchers have compared the integration and choice values of shopping centers in different cities, and evaluate their spatial qualities based on the numerical values. As we know, the numerical values of variables in different Space Syntax cases cannot serve as basis for spatial quality comparisons between different cases, especially between different cities.

The most wide-spread problem is that most professionals would simply apply other cities' values to their own models when choosing the specific values of depth or radii, instead of finding values that suit their own cities through compatibility analysis after conducting field researches and tests. The flaws in this application method would easily result in wrong conclusions or even mislead researches or designs.

Third, the future of Space Syntax's development in China needs to be explored. The optimization of current planning techniques and approaches in China requires the technical support of Space Syntax. For example, presently the arrangement of service facilities for urban neighborhoods is still based on population, and spatial locations are still based on their geometrical or geographical centers, or on design professionals' experience. Space Syntax treats the city as a complex, undividable and comprehensive self-organization; and by computing on the relationship between its internal spatial network and human behaviors, it forms subdivisions that are no longer based on superficial perceptions but on actual behaviors of users. Space Syntax reveals the logic relationship between the internal structure of urban material spaces and social functions, and therefore generates many fields of application that explore the relationship between spatial network configuration and urban activities.

The new urbanization and urban transformation in China offers a more expansive prospect for the application of Space Syntax, especially when confronted with the growing number of issues on the planning and design of existing land in old cities. Applying Space Syntax to the analysis of the old cities' spatial network and view corridors can contribute significantly to the initial research on mending transportation networks, determining the nature and intensity of land use, organizing public spatial systems and elevating spatial dynamism in these regions. It can also pre-evaluate the outcome of urban planning and design efforts. This could change the conventional planning and construction approaches that rely on intuition, and offer technical support that help avoiding destructive constructions that do not respect the existing built environment.

Space Syntax is essential for the Chinese socio-cultural researches and domestic spatial studies to venture into new realms. After analyzing the statistical data on the application of Space Syntax in China, we believe that Space Syntax offers a rational mode of thinking and an effective method of spatial analysis, and this mode and method itself is indifferent to the heterogeneity of culture and form. Judged from the results of its application, it is compatible to the analysis and research of the living environment in China. However, the uniqueness of Chinese urban and architectural configurations and Chinese socioeconomic culture brings new challenges to the theory and methodology of Space Syntax. To answer these challenges, Space Syntax has to further advance its theories and develop its techniques. For instance, in the spatial analysis of the Chinese gardens, because of the compositional complexity of their visibility, accessibility, meandering paths and virtual targets, as well as the particularity of their spatial components such as hills, rocks, water and scenery, there have always been technical and theoretical confusions in Space Syntax's analysis. Presently, researchers are attempting to explore the solutions to this problem by improving the components and methodology of Space Syntax. The spatial configuration and evolutionary rules of the archetypes and features of the Chinese living spaces needs to be studied and explored. They are essential components of the global urban and architectural culture, and the researches on them will undoubtedly enrich the archetypal development of the theo-

retical researches on urban spaces worldwide.

Meanwhile, with regard to the theoretical intensification and technical development of Space Syntax, China will also contribute considerably in the future. With the advancement of spatial analysis technologies such as computer technologies, simulation models and GIS technologies, the combination of Space Syntax and these technologies can establish more sophisticated, accessible and accurate models that depict and analyze urban and architectural spaces. Through the integration of technology and accumulation of basic data and information, we can conduct multi-scale, multi-field and multi-level analysis on cities, and architectural-level, urban-level or even regional-level data analysis. We can also carry out detailed visibility analysis by zooming in between buildings or between buildings and streets, and therefore analyze the relationship between spatial configurations and human behaviors, and explore the techniques in combination with practical application in China.

In summary, the vision of this book focuses on the latest development, its potential problems and future development of Space Syntax in China.

In July 2012, doctorate student HanLu and I started the preparation work on this book. During this period, we contacted Prof. Hillier for this matter. Expressing his intent to participate, Prof. Hillier actively supported the development of Space Syntax in China and the publication work, as he has always done. Then we were honored to recruit many Chinese experts and scholars, who have endeavored to further the research of Space Syntax and achieved great outcome, to work on this book. They represent the typical research methodology and technological altitude of the current stage. After many rounds of communication and discussion, we finally decided on the outline and practical cases of the book in November 2012. During the whole process from the preliminary draft, the second draft to the final draft, we had gone back and forth with the authors for many times on the emphasis, key issues, technical approaches and layout of the articles, and eventually achieved the integrity of the book. Dr. Xiaoling Dai from Zhejiang University of Technology has made tremendous contributions to the initial outline and final completion of the book. She received her Master's degree from University College London, and since her graduation, she has been striving to promote the advancement of Space Syntax in China. She has served as a link between the Chinese researchers on Space Syntax and UCL, especially on the ways of their communication and collaboration.

The book consists of three parts. Part 1: "Theory & Method Exploration", include Chapter 1 to 3. Chapter 1 "The application and development of Space Syntax in China" is written by me, which summarizes the beginning and development of Space Syntax researches in mainland China and its application in many fields. Chapter 2 "Spatial Sustainability: The Triple Function of Street Networks in Cities" is written by Prof. Hillier from University College London (translated by Tao Yang) which introduces the latest theoretical trend and the development of application software of Space Syntax. Chapter 3 "A New Modeling Method of Axial Map Drawing by Introducing the Rule of Spatial Competition" is written by Dr. Runqing Shao from Southeast University, which addresses technical diffi-

culties in analyzing modern grid-type urban space by syntactic model and proposed modification methods.

Part2: "Application in Researches and Practices", includes Chapter 4 to 12. With empirical evidences from domestic scholars' typical researches, this book sorts out basic research methods in China in relation to the application of Space Syntax in three different directions: Urban and rural planning, Architecture and Landscape Architecture, and presents research findings of different directions. Chapter 4 "Analysis of Historical Evolution of Urban Space: A Case Study of Lijiang" is written by Dr. Haofeng Wang and Prof. Xiaojun Rao from Shenzhen University; Chapter 5 "Analysis of Urban Spatial Structure from Perspective of Configuration: Taking three Settlements in the Jiangnan Region as Examples" is co-authored by Dr. Xiaoling Dai, Prof. Li Li and Prof. Yong Chen from Tongji University; Chapter 6 "Morphology and vitality of Neighborhood Road Network as Exemplified by Beijing and Tianjin" is written by Dr. Qiang Sheng from Beijing Jiaotong University; Chapter 7 "Street Network Density and Land Development Intensity: A Case Study of Shenzhen Special Economic Zone" is co-authored by Haofeng Wang and Su Shi from Shenzhen University; Chapter 8 "Multi-scale Spatial Research of Neighborhoods as Exemplified by Sanfang-Qixiang of Fuzhou City" is co-authored by Prof. Jiangang Xu from Nanjing University, Zhongguang Chen from Fujian Provincial Department of Housing and Urban-Rural Development and Peizhen Wang also from Nanjing University; Chapter 9 "Spatial Structure of Classical Chinese Gardens and Recreation Behavior: A Case of Yiyuan (The Garden of Pleasance) in Suzhou" is written by Dr. Zhiming Li from Nanjing Forestry University. Chapter 10 "Street Network and Center System of Comprehensive Urban Planning as exemplified by Fuyang" is written by me and Han Lu; Chapter 11 "Space Shaping of Dynamic Neighborhoods Based on Logicity of Urban Space as Exemplified by Redevelopment of the Nanjing Honghua Airport Area" is co-authored by Runqing Shao, me and Yiren Yang from Southeast University; Chapter 12 "Landscape Design for Urban Waterfronts as Exemplified by Xinglin Bay in Xiamen" is co-authored by Prof. Xiangrong Wang, Huaen Qiu and Dr. Jingwen Wang from Beijing Forestry University. These nine cases elaborate from the diverse scales of towns, streets and landscaping and can demonstrate objectively domestic scholars' understandings of Space Syntax and its applications at present.

Part 3: "Development and Challenges in the Future" includes Chapter 13 to 15. Among these, both Chapter 13 and Chapter 15 are written by me. Chapter 14 is written by Tim Stonor (translated by Xia Wang), both the managing director of Space Syntax Limited and Visiting professor of University College London. I have often encountered various misapplications and misinterpretations of Space Syntax theory and method over the years in the process of project review, thesis oral defense and reading of periodical thesis. Taking this situation into account, Chapter 13 reflects and discusses difficulties and misunderstandings of Space Syntax in its development in China from the aspects of support platform, theoretical technology and method recognition in order to correct present wrong understandings from some researchers and users. In Chapter 14, Stonor's writings help readers to gain

more in-depth knowledge about the Space Syntax consulting company, which involves mainly the background and organization of the company as well as its future development plan in China. Finally in Chapter 15, on the basis of present situation of international development and application, I express my own opinions about more effective application and development of Space Syntax in China in the hope that more valuable opinions can be drawn.

Hereby I shall express great gratitude to Professor Hillier for his support and help given in publishing this book and its precedent; also thanks shall be extended to my every colleague who spares all efforts from his or her busy work to assist in everything of publishing; I shall thank Xiaoling Dai and Tao Yang from Ministry of Housing and Urban-Rural Development of PRC for their timely coordination and communication with our British colleagues. Tao Yang also helps in translating articles from English to Chinese. Besides, I would like to thank Jia Hua, who is a registered architect in the United States, for translating the preface of this book into English. Furthermore, my sincere thanks shall also be extended to Mr. Buzheng Xu and Editor Huiyu Sun from Southeast University Press for their valuable suggestions; I shall also appreciate Han Lu for her help on collecting information in the preliminary stage and correspond with every co-author for exchange ideas during the editing phase of the book.

Lastly, sincere thanks shall be extended to our general readers for your care and support on the two books: *Space Syntax and Urban Planning* and *Space Syntax in China*.

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