

Organización espacial industrial desde la evolución de los sistemas productivos: fordismo, toyotismo, wintelismo y manufactura distribuida

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Resumen: El estudio compara la lógica espacial de los sistemas fordista, toyotista, wintelista y distribuido.

Muestra un paso desde la centralización hacia organizaciones policéntricas y más descentralizadas, en las que la tecnología digital recompone información, cadenas de suministro y unidades modulares.

Palabras clave: sistema productivo industrial; espacio industrial; fordismo; wintelismo; manufactura distribuida

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1 Sistemas productivos típicos

El fordismo se apoya en la gran fábrica integrada; el toyotismo en producción esbelta y redes locales de proveedores; el wintelismo en modularidad y redes globales; la manufactura distribuida en coordinación digital y unidades próximas a la demanda.

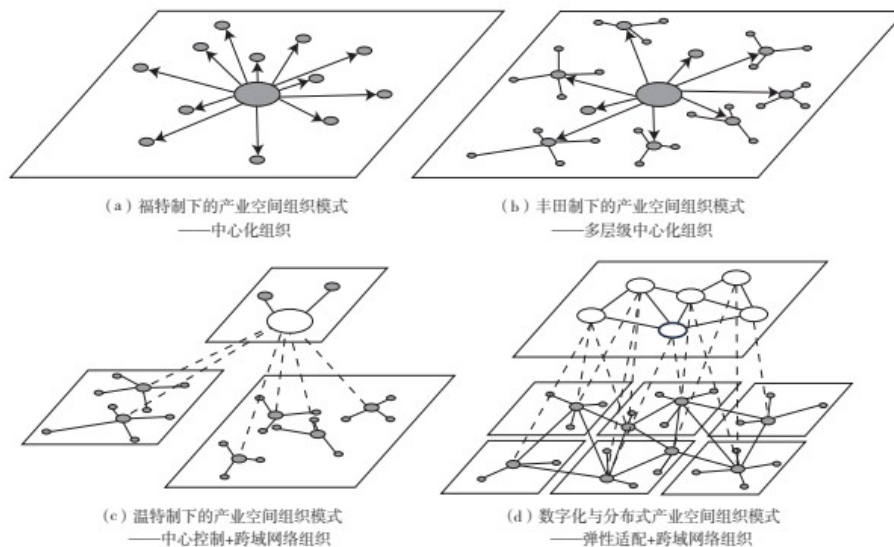


Fig. 1 Spatial organization under different industrial production systems

2 Espacios industriales correspondientes

Los dos primeros sistemas generan parques concentrados y jerárquicos. El wintelismo produce islas productivas conectadas por estándares y logística. El sistema distribuido combina espacio físico y digital.

工厂案例	台积电(南京)	三星(西安)	富士康(郑州)
空间边界	有实体围网 无制度围网	有实体围网 有制度围网(西安高新综合保税区)	有实体围网 有制度围网(郑州新郑综保区)
产业关联	与周边产业弱关联,仅有小部分供应链在本地,产品直接空运发往全球	与周边产业无关联,部分供应链在本地但分布在围网内部,产品直接空运发往全球	与周边产业无关联,供应链不在本地,产品直接空运发往全球
空间区位	城市远郊区的新城	城市远郊区,周边为城乡接合部	远离城市,紧靠机场枢纽
空间形态			

Tabla 1 Examples of island-like layouts among Wintelist firms

3 Cambio bajo sistemas distribuidos

Los sistemas coexisten e hibridan. A escala macro se recombinan clústeres y cadenas en redes regionales amplias. A escala meso y micro se aglomeran servicios manufactureros y se dispersan unidades automatizadas.

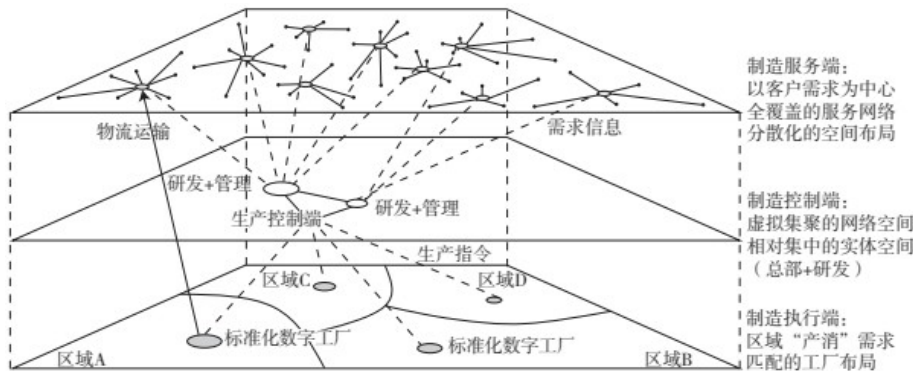


Fig. 2 Physical and digital spaces of distributed production

4 Estrategias de planificación

La planificación debe superar una integración industria-ciudad uniforme y ofrecer espacios modulares, plataformas de servicios, unidades estándar flexibles y ecologías industriales de respuesta rápida.

生产系统	核心逻辑	优势	局限性	典型行业/场景
福特制	标准化流水线、规模经济	低成本、高效率	无法应对需求波动	基础工业品(标准件)
丰田制	精益生产、有限外包	灵活性较高、减少库存浪费	依赖供应链稳定性	汽车、机械装备
温特制	模块化分工、全球价值链整合	快速创新迭代、优化资源配置	产业在地性不足	半导体、电子消费品
分布式	分散化网络、数字技术、人工智能驱动	定制化、服务化、灵活度极高	协同难度大,对研发和服务的要求高	家具建材、服装、医疗器械等

Tabla 2 Comparison of the core characteristics of four production systems

5 Conclusiones

El espacio industrial digital no elimina la aglomeración; redistribuye funciones entre conocimiento, servicios, logística y ejecución automatizada.

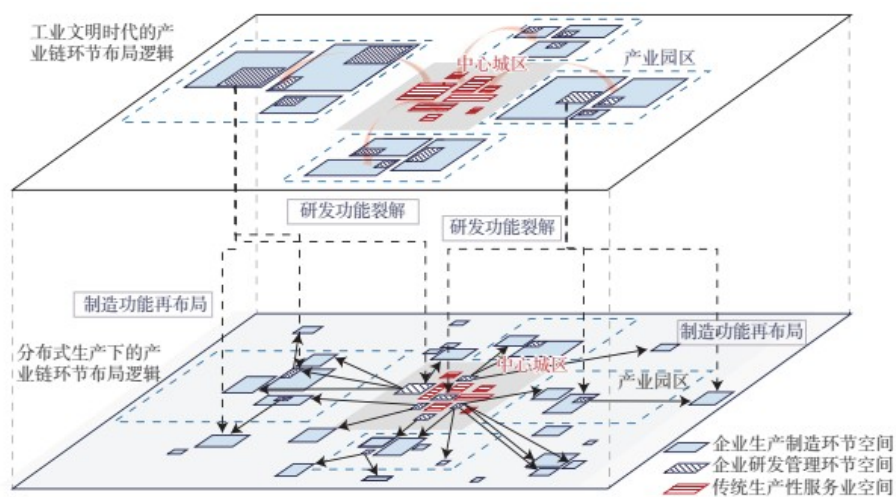


Fig. 3 Industrial-chain and regional-network organization under distributed production

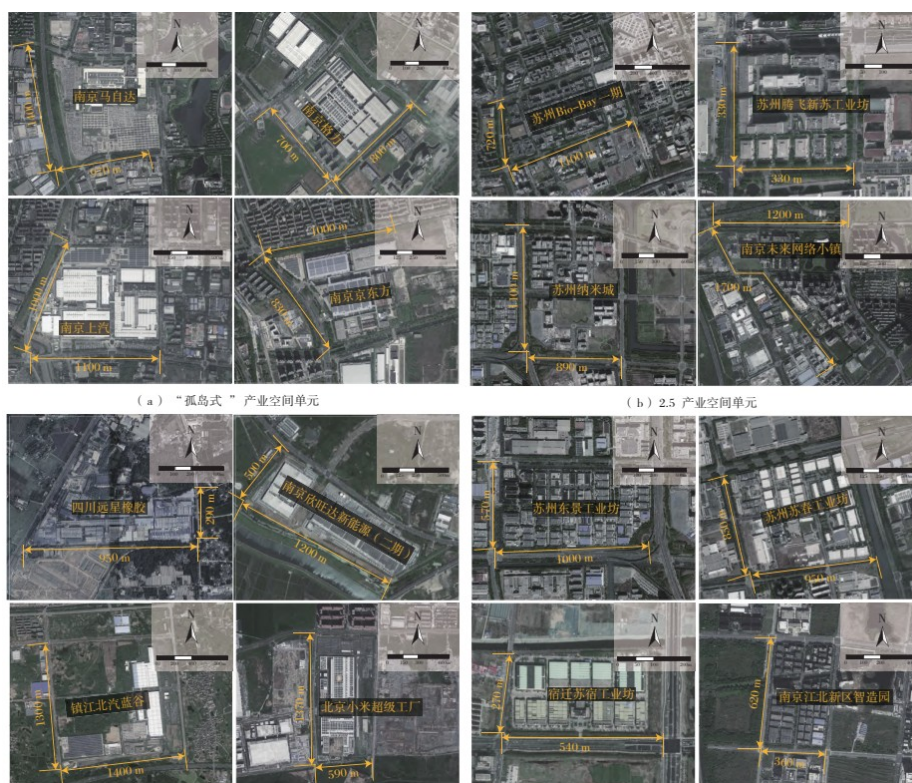


Fig. 4 Scale and morphological characteristics of industrial-space units

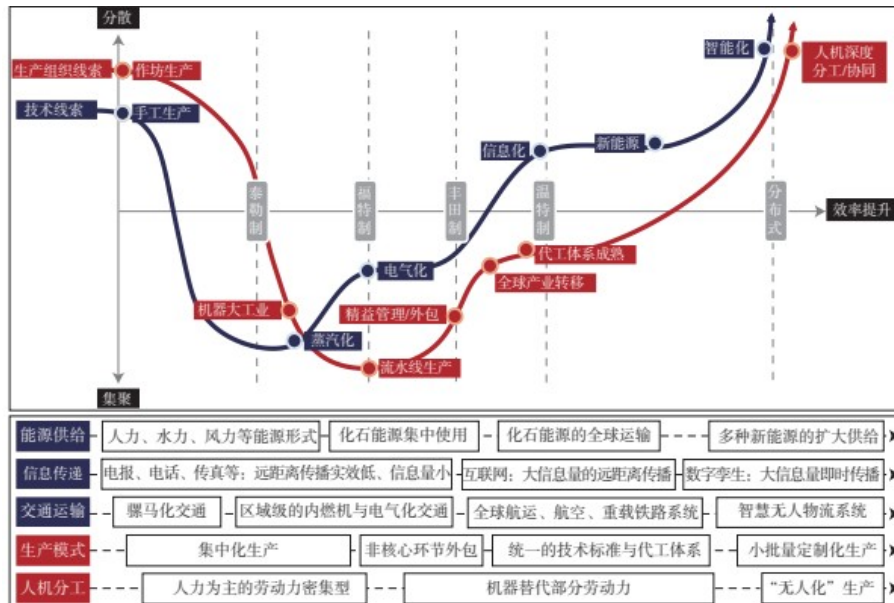


Fig. 5 Evolution of industrial space from a technical-social systems perspective

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