PART IV : SPATIAL FRAMEWORK

The spatial framework of Honda's North American production structure has three important aspects as far as inter-firm relations are concerned (it is also linked to labour markets). It will be recalled that Honda's parts sourcing practices mean that most complex components, largely at first-tier level, are purchased from japanese transplant suppliers, whereas basic materials and simple parts, largely at second-tier level and below, are bought from existing domestic firms.

Three aspects of the spatial framework will be discussed in turn. The first is the **regional location** within North America of the new japanese investments (Honda and its supplier transplants) in the upper tiers of the production structure. This will be analysed in relation to : a) simultaneously developing new patterns due to non-Honda related investments (eg by other Japanese and North American firms) and b) existing patterns of industrial geography; ie the materials infrastructure composed mostly of domestic firms. The second aspect is the **local scale pattern** of site selection for the new Japanese investments, which determines the internal spatial organization of the Japanese upper tiers (distance between plants, overall "shape"). The third aspect is the **concrete linkage** of the new Japanese investments to the existing infrastructure of domestic firms into which they have rooted themselves.

1. Regional location

The geographical pattern of new Japanese investments has resulted in a Honda production structure centred on - and largely located within a one hundred mile radius of - the small town of Marysville in the western part of the state of Ohio. Ohio is one of the United States' major industrial areas and is located at the geographical centre of the traditional "manufacturing belt" of North America that runs east-west from New England to Illinois (figure 3).

This geographical core of Japanese investments related to Honda has important "tails" beyond western Ohio, stretching northeast and south, and also has several outliers in other manufacturing belt states such as Michigan and Illinois. The northeasterly tail includes the Canadian assembly plant at Alliston. The more significant southern tail includes a series of supplier transplants located along the interstate highways (eg I - 75) that run southwards from the central part of the manufacturing belt.

Honda's is indeed one of a series of new automobile production structures built around Japanese automobile assembly firms during the late 1980s (figures 4 and 5). Honda shares a number of supplier transplants with the other Japanese firms, as discussed above. This accounts particularly for the extent of the southern tail, since several of these supplier transplants belong principally to non-Honda production structures or are shared more equally by two or more new structures (ie they belong to the new Japanese automobile production structure taken as a whole).

Moreover, the ABC categorization of Honda suppliers developed above to distinguish firms on grounds of "exclusivity" to Honda clearly manifests itself spatially. Those firms most closely integrated into Honda's production structure tend to be located close to Honda's assembly plants, whereas those that are less dependent upon Honda - are more closely integrated into other structures - tend to have located further away (see table 7).

Table 7 : Extent of integration into Honda's production structure is related to supplier transplant location

Category (B/A)	**A : Number of transplants**	**B : Located in Ohio or Ontario**	**%**
A	32	25	78
B	29	10	34
C	15	3	20

Note : Categories A : 90% or more of output to Honda
B : 11 - 89% of output to Honda
C : 10% or less of, output to Honda

There is in fcat a developing correlation between the geographical boundaries of the different Japanese automobile production structures and the borders of state governments in the United States (in Canada, the large size of Ontario in combination with the smaller production structures militates against this phenomenon). Thus the Honda production structure "occupies" Ohio in rather a "company region" fashion (see figure 5). Unlike the traditional geography of automobile production in the United States, in which the spatial structures of the different firms greatly overlapped at the state level, in this new Japanese geographical model the fortunes of Ohio in automobile production are tied not just to the automobile industry, or even to Japanese firms, but specifically to one firm, Honda. This is reminiscent - admittedly in less acute form - of Toyota's occupation of Toyota City, since it secures **for Honda** a heightened degree of influence over its social environment (eg labour market), political environment (eg support of politicians) and physical infrastructures (eg new roads). It should nevertheless be noted that this pattern of one-transplant-production-structure-per-state cannot be interpreted as a purely political gambit. It also reflects important economic considerations; specifically requirements for spatial proximity in the JIT system (hence concentration within production structures), and the desire of the designers of each production structure - for "greenfield" (labour-market related) sites **with respect to other Japanese manufacturing investment** (hence production structures separated from each other).

2. Upper tiers of the production structure : the local scale

At the regional scale the upper levels of the Honda production structure are concentrated in the heart of the North American manufacturing belt, surrounded, therefore, by an infrastructure of domestic manufacturing firms. However, a closer - local scale - look reveals that the Honda structure is slightly "off centre" within the manufacturing belt, in the sense that it is located at one remove from existing major industrial urban centres, fitting into the belt's **rural and small town interstices**. This is most apparent from a detailed look at western Ohio location patterns (figure 6).

The Honda assembly plants, together with the engineering and research and development centres, have been located at the pre-existing Transportation Research Center (TRC) and its test track, built by the state government during the 1970s and sold to honda in 1988. TRC is located in a firmly agricultural area near to the small agricultural town of Marysville, and 50 kms northwest of the state capital, Columbus (metropolitan area population circa 1 million). Nearly all the supplier transplants that have been established in western Ohio to supply Honda are located in rural areas

adjacent to small agriculturally oriented towns. The urban exceptions almost all consist of Japanese purchases of existing domestic manufacturers.

At this local scale we can observe the internal spatial organization of the Japanese upper levels of the Honda production structure. The supplier transplants most cloesly integrated into the Honda production structure have dispersed themselves into rural western Ohio, but still within a radius of 150 kms (under two hours) of Marusville. This pattern od dispersal was influenced largely by labour market considerations, in particular the need to maintain an element of local monopoly over labour supply by reducing competition with other new employers (ie "greenfields" in the sense of away from other new Japanese firms).

The supplier transplant factories that are located closest to Marysville were those constructed first, during the early and mid 1980s. Later arrivals have judiciously selected sites further removed from Honda and therefore further removed from competition with Honda's expanding labour force with its significantly higher wage levels.

At the same time transplant suppliers have selected locations almost entirely to the south and west of Marysville. There are two advantages to this "skewed" pattern of concentration, in which the cluster of suppliers does not surround its functional centre but is "set off" to one side. First, the suppliers are grouped together in a way that allows them to be within a short distance of each other as well as of Honda, facilitating movements of sub-components among plants as described in the case studies of divisions of labour cited above. Such links would require longer distance transportation arrangements if suppliers were spread uniformly around a 150 km radius of Honda (with **diameter** 300 kms). This concentrated network spatial structure for suppliers has several other benefits that will be described below (ie movement of people, meetings, changing inter-firm divisions of labour without adding long distances).

The second advantage of the "off-centre" supplier network is that Honda itself has been left a large swathe of rural and small town Ohio, especially to the north and east of Marysville, from which to recruit its own labour force unencumbered by interference from transplant suppliers.

3. Rooting the new structures into existing structures

The third important aspect of the spatial framework is the way in which these Japanese upper levels of the production structure have rooted themselves into the infrastructure of domestic supplier firms.

First-tier domestic suppliers **that are known** are concentrated within Ohio and immediatedly surrounding areas. Beyond this limited sample, there are doubtless other first-tier domestic suppliers, scattered across the manufacturing belt, supplying materials, manufactured metal and plastic products, and generic parts directly to Honda. The more solid information that is available for domestic firms at **second-tier level** crystalizes the spatial pattern of domestic firm integration into the Honda production structure, at the same time revealing the powerful rationale for the manufacturing belt regional location of the Honda production structure discussed above. For the western Ohio location that Honda selected is quite geographically central to the network of second-tier suppliers into which its production structure is rooted (figure 7).

Precise spatial patterns of rooting in the domestic manufacturing infrastructure reflect the existing industrial geography of North America. Within the manufacturing belt, suppliers of metal and plastic materials and of semi- finished metal and plastic parts predominate. Outside the manufacturing belt, the legacy of previous bouts of industrial geographic restructuring in North America is plainly evident; especially the selective deindustrialization of the manufacturing belt through ths southwards shift of certain industries that occurred in previous decades (eg 1920s, 1970s). Thus second-tier domestic suppliers in Massachusetts - traditional centre of textiles in the United States - provide textiles (two of three; other, product unknown) and in North Carolina - site of many relocations (seven of eight). Similarly, three of the firms located in the deeper southern United States are tyre companies; like the textile sector, the rubber sector has featured prominently in more recent relocation-driven deindustrialization of the manufacturing belt. The result of this previous geographical dispersal of industry is that several of Honda's supply lines stretch over longer distances than would otherwise be the case.

Actual linkages between first-tier supplier transplants and their second-tier suppliers create a back and forth, criss-cross web of materials and parts movements as well as a tendency for neater convergence on Marysville. The criss-crossing is due to the rooting of the upper levels of Honda's production structure into the uneven North American industrial geography described above. Thus several supplier transplants located south of Ohio purchase materials from firms further north, in the manufacturing belt, and then return the finished components northwards again to Honda.

One example nicely illustrates a not untypical pattern of spatial movements that eventually converge on Marysville. Five Ohio factories are involved in a multiple tiering arrangement, in a spatial pattern that begins in the traditional steeltown of Warren, Ohio,

passes through a new supplier transplant, returns to a domestic firm in a traditional industrial area before continuing on to Honda's Anna mechanical components plant and finishing at Marysville (see table 8). An additional point to note in this case is the presence of Japanese ownership far upstream in the supplier chain, in steel making but outside sheet steel production.

Table 8 : Making crankshafts involves multiple tiers of firms and several journeys, all located within Ohio

Firm	Ownership (% Japanese)	Process	Location
Copperweld Steel	64	making steel bar	Warren
TFO Tech	100	forging crankshaft	Jefferson
Metallurgical Services Inc.	0	heat treatment	Dayton
TFO tech	100	further treatment	Jefferson
Honda	100	machining, assembly into engine	Anna
Honda	100	assembly of engine into Honda Accord	Marysville (and Alliston)

Sources : Press reports.

Patterns of straight-line distances between firms within Honda's production structure are shown in figure 8. First-tier distances, most of which have been determined by the location of Honda's Japanese suppliers in relation to Honda itself, tend to be shorter than those at second-tier level. But when supplier transplants are involved at second-tier level shorter distances are also apparent, indicating the spatial concentration of Japanese automotive investments in North America relative to the existing pattern of domestic firm locations. Many of the longest distances at second-tier level are links to textile or rubber firms in southern states.

Conclusions :

Several conclusions can be drawn from this analysis of the spatial framework of Honda's production structure.

Regional spatial concentration : Honda's production structure is regionally concentrated in the North American manufacturing belt, and constitutes a further step in regional concentration, based on a particular firm. Like other Japanese transplants in North America Honda has constructed a **JIT region** for itself. This is especially obvious in the patterns of new Japanese investment.

A new Toyota City? This does not, however, constitute a clone of Toyota City in the sense of a local-scale concentrated production complex. The strong tendency is for spatial dispersal at the local scale, primarily because of labour market considerations (which do not concern us here) but **permitted** by very good North American infrastructures of interstate highways, four lane roads and very lightly travelled but well built and maintained rural roads. Dispersal remains within definite limits; supplier transplants that are more exclusively Honda suppliers, and which, with Honda constitute the core of the production structure, locate within a two hour radius of Marysville. Domestic firms tend to be further away, reflecting the historic geography of North America's industrialization. Honda's regional scale location leads to absolute minimization of distances to domestic firms because it is at the centre of the manufacturing belt. In another sense, however, the Honda structure **is** like Toyota's in Japan : ie a new structure of assembly, mechanical components and major suppliers, spatially concentrated, but rooted into a pre-existing infrastructure of manufacturing firms located further afield.

Better than Toyota City? While some commentators have argued that JIT manufacturing is difficult to introduce outside Japan because of dispersed spatial structures of production, it needs to be seriously considered whether Japanese firms are not in fact able to produce **better** versions of their traditional spatial (and organizational) frameworks at their foreign sites. It is quite likely that for medium sized firms like Honda - which in Japan cannot create their own Toyota City complexes, and whose spatial organization is under constant pressure from poor transport infrastructures and high land prices - their foreign production structures are comparatively far more efficient, less disupted, less expensive, easier organized and reorganized, and entail less of the spatial diseconomies that are currently pushing Toyota out of Toyota City.

A new model Honda then, is creating a **new model** of spatial organization, based neither on Japanese frameworks nor on existing western patterns. In terms of spatial scale, Honda's North American structure combines regional scale concentration with local scale dispersal. In terms of urban versus rural locations, it is firmly rurally located in its newer, upper parts. It is of course influenced by previous patterns of industrial geography in its regional - manufacturing belt - location, in its choice of avoiding previously industrialized areas, and in its links with these areas for supply of materials and generic components from existing firms. Its spatial separation from other automobile firms leads to creation of a "company region", a modern version of the pre-Fordism company town. In this, each constituent part mimics the whole, with supplier firms separated from each other and scattered within the **JIT region** of western Ohio.

The new upper tiers of the Honda production structure also result in a very interesting "shape". Rather than the assembly plant surrounded on all sides by rings of supplier factories, Honda has no transplant suppliers to its northeast, all being located south and west. In part this is because some of its suppliers desire to be close to I-75, the main interstate highway connecting Ohio with other transplant location states. But it also allows Honda a swathe of Ohio from which to recruit for tits assembly plants with no competition from its suppliers (and vice versa). Most importantly, it creates a network form for the very important **relationships among the supplier firms** (as opposed to with Honda) which are all closer to each other than if they were dispersed uniformly aroung Honda.