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How do conventions evolve?

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Abstract. The paper argues that, even in the absence of bureaucratic inertia, the transition from one convention to a superior one can be blocked. Because of the self-reinforcing mechanism generated by coordination effects, the economy can be locked-in to an Pareto-inferior convention. In the framework of evolutionary game theory, convention appears to be an evolutionary stable strategy. We show that the endogenous diffusion of a superior convention is possible but requires the presence of some social or cultural differentiation in order that coordination effects can be localized. The social or cultural links provide no information about the structure of the game, but help people to coordinate themselves by providing external points of reference. We construct a model where matching between agents respects a certain localization of interactions related to social or cultural similarity. These results are used to enlighten the surprising success of japanese labor management in US and UK transplants.

Key words: Institution – Convention – Evolutionary stable strategy – Institutional change – Diffusion process

1. The role of conventions in coordination

Since David Lewis, Thomas Schelling and Andrew Schotter's seminal works, a lot of attention has been devoted to what these authors called *problems of coordination*. This notion can be best understood by using the theory of noncooperative games. In this framework, a "pure coordination game" is defined by the following payoff matrix: (see p. 166)

In a game of pure coordination like the game G0, there is no conflict of interest: both players' preferences are perfectly convergent. They both prefer the outcomes (A, A) or (B, B), in which the utility derived by each is 1, to the situations (A, B) or (B, A). The players are indifferent to the intrinsic content of A or B: all that matters to any player is that he coordinates his behavior with that of

		Player	
		A	B
Player 1	A	1 1	0 0
	B	0 0	1 1

GAME G0

partner. Nevertheless, in spite of this convergence of preferences, the coordination between the participants is not trivial because two solutions are possible: either (A, A) or (B, B). Deductive reasoning is here of no help to these players. It leads to an infinite regress without being able to discriminate between the two Nash equilibria. This point has been thoroughly discussed by Schelling. He shows that the agents must draw on some common experience, historical or cultural, in order to escape the infinite regress of expectations. In the context of such common experiences, certain solutions will stand out in virtue of what Schelling calls "some intrinsic magnetism": "the intrinsic magnetism of particular outcomes, especially those that enjoy prominence, uniqueness, simplicity or precedent, or some rationale that makes them qualitatively differentiable from the continuum of possible alternatives" (Schelling [1960], 70). This use of "focal points" to achieve coordination has led to an understanding of the learning process quite different from what is usually proposed in the framework of orthodox analysis (Crawford and Haller [1990]).

A. Schotter, following D. Lewis, proposes to define a convention as a "regularity in behavior which is agreed to by all members of a society and which specifies behavior in the specific recurrent situation (defined by the game G0)" (Schotter [1981], 9). A convention is a social arrangement which allows people to cooperate with each other. Once the convention is established, no agent has any incentive to deviate from it. The convention is self-sustaining: each agent will choose to follow it provided he expects his opponent to follow it.

One of the essential aspects of conventions is this self-enforcing quality. When one considers the case of a game with n players, rather than only two players, that means that, if there exists a small number of agents who do not conform to the convention, they will obtain a lesser utility than what they would have obtained by following the convention. This situation is a consequence of the fact that, in the coordination games, the utility obtained through the choice of a strategy [A] is an increasing function of the number of individuals having already chosen [A]. This characteristic is essential. It is found in many diverse situations: the choice of techniques (W. Arthur [1988] and P. David [1985]), threshold behavior (M. Granovetter [1978]), the theory of social custom (G. Akerlof [1980) and "the economics of conformism" (S. Jones [1984]). These examples highlight the important role played by the pressure to conform, whether through its direct economic consequences, for instance the "increasing returns of adoption", or through purely social effects such as reputation or the feeling of belonging to a group. Contemporary analyses of the economic impact of interindividual comparisons (D. Kahneman, J. Knetsch and J. Thaler [1986]) and of the notion of equity (B. Reynaud [1991], L. Summers [1988]) point in the same direction. In the same spirit, H. Leibenstein [1982] emphasizes the role played by peer group pressures in the formation of an effort convention within a firm. He adds: "An effort convention need not depend only on the peer group standard. It is also possible that some type of work ethic, or the Japanese consensus system, creates conventions which are superior to some or all possible per group standards. Thus there may exist a wide range of alternative latent solutions" (Leibenstein [1982], 95).

The role played by conformity effects and focal point processes in the emergence and stability of conventions does not insure their Pareto-efficiency. It is easy to find situations in which the established convention is inefficient (see, for instance, P. David's analysis of the Qwerty keyboard [1985]). Is it possible to replace an existing convention with a better one? The very nature of self-reinforcing effects makes this a difficult problem. Our thesis is that such transformations require the presence of social differentiation in order that coordination effects can be localized. In other words, in a totally individualistic society lacking any specific links enabling agents to identify one another, such a transformation would be impossible: anonymous contractual relationships are not enough. In order for individuals to coordinate themselves efficiently, they need to have access to some sort of social and historical data making it possible to overcome strategic uncertainty. Here we encounter in a different form the idea behind Schelling's focal points: coordination problems cannot be solved on the basis of individual rationality alone. This idea also recalls Aumann's statement that "true rationality cannot feed on itself only; it is meaningful only in a broader context, one that includes irrationality" (Aumann [1988], 11).

We will address the questions in the framework of evolutionary game theory (Maynard Smith, Sugden) presented in section 2. A very simple model, discussed in section 3, will be applied in section 4 to the analysis of a particularly interesting example, that of Japanese industrial transplants operating in the West. We will show how the Japanese firms construct social filters allowing them to bypass workplace conventions prevailing in the West and to establish new, more efficient ones.

2. Conventions as evolutionarily stable strategies

To understand how conformity effects can lead to the emergence of a group consensus around one convention, it is useful to draw, as R. Sugden does, on the concepts proposed by J. Maynard Smith, especially on the notion of an "evolutionarily stable strategy" (ESS).

Let us consider a large population from which pairs of individuals are repeatedly drawn at random to play a particular two-person game which we will suppose to be symmetrical. We define $E(I, J)$ as the expected utility derived by any player from a game in which he plays strategy I and his opponent plays strategy J. If p is the frequency of I strategists at time t in the population and $(1 - p)$ the frequency of J strategists, then an individual playing I will obtain the utility $U(I, p)$, given by the following formula:

$$U(I, p) = p\,E(I, I) + (1 - p)\,E(I, J) \qquad [1]$$

In the same way, one obtains:

$$U(J,p) = p\,E(J,I) + (1-p)\,E(J,J) \qquad [2]$$

We will posit the existence of a learning process such that p increases if U (I, p) is greater than U (J, p), which can be formulated in the following way:

$$\frac{dp}{dt} - G[U(I,p) \quad U(J,p)] \qquad [3]$$

where G is a non-decreasing, sign-preserving function.

An ESS is a strategy such that, if all members of a population adopt it, then no mutant strategy can invade the population (Maynard Smith [1982], 10). For I to be such a stable strategy, it must have the property that, if almost all members of the population adopt I, then the utility of these members is greater than that of any possible mutant; otherwise the mutant could invade the population and I would not be stable. Therefore I must be such that, for all p very close to 1, $U(I,p) > U(J,p)$. One must therefore have for all J different from I:

either $E(I,I) > E(J,I)$ [4.1]
or $E(I,I) = E(J,I)$ and $E(I,J) > E(J,J)$ [4.2]

These conditions were given by Maynard Smith and Price (1973). Following Sugden, one may extent the definition proposed by Lewis and define a convention as any ESS in a game that has two or more ESS's: "The idea is that a convention is one of two or more rules of behaviors, any one of which, once established, would be self-enforcing" (Sugden [1989], 91).

Consider the symmetrical game defined by the following payoff matrix:

		Player 2	
		A	B
Player 1	A	UA UA	0 0
	B	0 0	UB UB

GAME G1

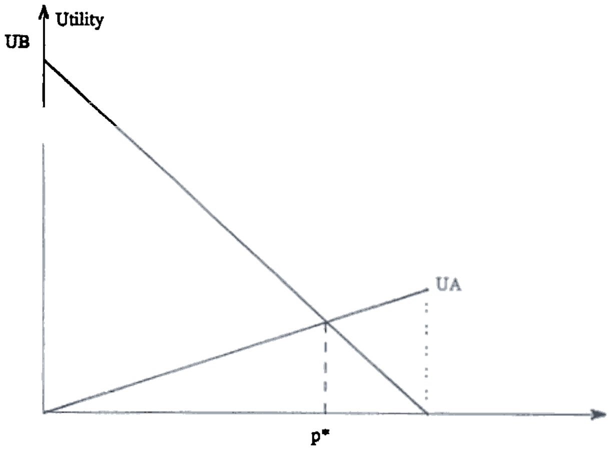
with $0 < UA < UB$.

It follows immediately from the condition [4.1] that [A] and [B] are both EES's. Then [A] is an ESS even if UA is less than UB. That means that it is possible for the system to get stuck in a situation that is Pareto-inefficient. If p is the proportion of A strategists in the population, we can write:

$$U(A,p) = p.\,UA \qquad [5]$$

$$U(B,p) = (1-p).\,UB \qquad [6]$$

The utilities U (A, p) and U (B, p) may be represented by means of the following graph:



There exists one and only one value of p, p*, such that U (A, p*) equals U (B, p*):

$$p^* = \frac{UB}{UA + UB} \qquad [7]$$

For p > p*, U (A, p) is greater than U (B, p) even if UA is less than UB, because of the insufficiency of the number of agents having chosen [B]. If the convention [A] prevails, a proportion d*, equal to (1 – p*), of individuals would have to change their behaviors simultaneously in order for the system to converge on the convention [B]. The greater UB is, the smaller this proportion d* is (equation [8]).

$$d^* = \frac{UA}{UA + UB} = 1 - p^* \qquad [8]$$

This leads us to a rather pessimistic vision of the capacity of societies for self-transformation, even when competitive relations predominate. Why should a society change once it satisfies first-order conditions and thereby finds itself in a local optimum? In such a situation there does not exist a mutant strategy permiting a modification of the convention [A]. The extreme interdependence of the different strategies gives rise to exceedingly powerful pressures to conform, so powerful that they bring about an overall rigidity of the system. If there is no pressure to modify the prevailing convention, that is because the very existence of the externalities makes it impossible for any agents, taken individually or in small groups, to appropriate for themselves the benefits that would be produced by a shift to the superior convention [B]. Everything takes place as if the convention that people created took on a life of its own and opposed the community's desire for change. This pessimism is shared by Arrow, who writes: "It may be really true that social agreements ultimately serve as obstacles to the achievement of desired values, even values desired by all or by many. The problem is that agreements are typically harder to change than individual decisions . . . What may be the hardest of all to change are unconscious agreements, agreements whose very purpose is lost to our minds (Arrow [1974], 28)."

3. A taxonomy for convention change

Nevertheless, such tranformations sometimes occur. If we stay within the framework of the model described by the equations [5] and [6], we can exhibit situations in which radical changes in conventions are plausible.

i) A *general collapse* which indirectly destroys the existing structure of conventions. For example, the two World Wars turned out to be social laboratories for the emergence of new conventions and norms. Two cases must be distinguished. First case: UA stays strictly positive but falls precipitously. In such conditions the value d* comes very close to 0 such that, even if [A] remains an ESS, a very small group of mutants is able, by adopting the strategy [B], to invade the population. Second case: UA becomes negative or null, [A] ceases to be an ESS and the system converges on unanimity around the strategy [B].

ii) *External invasion*: when a new group P′ that has adopted the convention [B] suddenly enters into competition with the existing population P and its convention [A]. If, in the global population, P + P′, the proportion of the newcomers P′ having chosen [B] comes to exceed d*, the individuals who have adopted [A] will convert to [B]. This possibility is all the more plausible in that UB is greater than UA and, consequently, that, following equation [8], d* is close to 0.

iii) *Translation.* This phenomenon is based on the existence of a certain compatibility between [A] and [B], in other words a certain capacity to translate the new convention into the terms of the old. An example of such a situation is what P. David calls "gateway technology." Formally this is expressed by the fact that E (B, A) is no longer null. Let E (A, B) equal 0 and E (B, A) equal UBA. The game thus obtained is then defined by the following payoff matrix:

		Player 2	
		A	B
Player 1	A	UA UA	UBA 0
	B	0 UBA	UB UB

GAME G2

with $0 < UA < UB$ and $UBA < UA$

Following [4.1], [A] remains an ESS. We can write: $U(A, p) = pUA$

$$U(B, p) = pUBA + (1 - p)UB$$

It follows that:

$$p^* = \frac{UB}{UA - UBA + UB} \qquad [9]$$

$$d^* = \frac{(UA - UBA)}{(UA - UBA) + UB} = 1 - p^* \qquad [10]$$

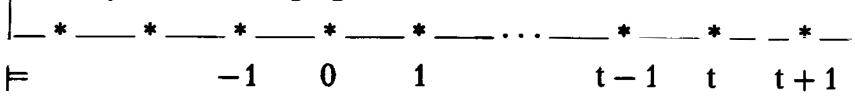
One finds that, as UBA tends to UA, d* tends to 0. The more the convention [B] is compatible with the old one, that is to say the smaller is UA-UBA, the smaller is the minimal proportion of individuals needing to choose [B] for the system to converge on [B]. This kind of dynamics is very general and quite different from the one described earlier. With the notion of translation (game G2), we exhibit *cumulative* transformations, like the ones observed in scientific revolutions: the new convention integrates certain features and properties of the old one. In the other case (game G1) the change is radical. There is no commensurability between the new and the old convention.

iv) *Collective agreement.* As a result of collective deliberation, the community as a whole may recognize the superiority of [B] over [A] and provoke a coordinated change in all behaviors. This kind of process relies on the existence of a central authority.

These results are not completely satisfactory. They don't reveal a general mechanism of diffusion. In cases (i) and (ii), we have only considered situations in which d* is close to 0. We need a better understanding of these dynamics.

4. Internalizing the benefits: an example of successful transition strategies

The negative results yielded from the ESS concept are all the more troubling in that there exist, historically, counter-examples testifying to the possibility of an endogenous diffusion of a superior convention. It appears that the main obstacle to diffusion, in the formalism presented above, lies in the fact that the individuals having chosen the superior convention [B] find temselves indifferently confronting the whole of population [A]. It is this indifferentiation of relations which blocks the diffusion of [B]. In numerous historical examples, however, social mechanisms are observed which tend to restrict the range of interactions. These social links provide no information about the structure of the game, but help the agents to coordinate themselves by providing external points of reference. That is what we are going to study now. In contrast to the foregoing analyses, we shall suppose that matching between agents does not take place uniformly throughout the space but respects a certain localization of interactions. More precisely, we will assume that the agents are distributed over the one-dimensional lattice of integers, Z, as it is shown by the following figure:



In order to describe the pattern of interactions, let us consider the case of the agent i = 0. It will be supposed that the probability of his interacting with another agent, i, for $i \geqslant 1$, is equal to ka^i, with $0 \leqslant a < 1$ and $k = (1 - a)/a$ so that:

$$\sum_{i \geqslant 1} k a^i = 1, \quad \text{with} \quad k a^i = (1-a) a^{i-1} \quad \text{and} \quad i \geqslant 1$$

For a equal to 0, the distribution $\{k a^i\}$ is then identical to the distribution (1, 0, 0, 0, ...). The interactions of i = 0 with the negative i's are formalized by the symmetrial distribution $\{k a^i\}$. One may then calculate T (a), the average distance of interaction:

$$T(a) = k \sum_{i > 1} i a^i = \frac{1}{1-a}$$

T (a) is an increasing function. For a equals 0, T (a) equals 1: the agent i = 0 only interacts with his immediate neighbors to the right and to the left. When a tends to 1, T (a) tends to infinity. The limit case a = 1 can then be considered as a good approximation of the preceding situation (section 2) where the interactions were indifferentiated. So the parameter a measures the intensity of the localization effects. These effects are maximal for a = 0. When a approaches 1, one approaches a quasi-uniform distribution.

We will assume that the pattern of interactions is translation invariant: a is independent of i so that all agents i react in the same manner to their environment. Let us assume that the game played by these agents is the one described by the payoff matrix G1. In order to calculate the utility of any agent i, we first consider the utility $U_+(i)$ produced by the interactions of i with the i's who are to his right, and $U_-(i)$, the utility produced by the i's who are to his left. If we note j's choice X(j), with a value either A or B, the righthand utility is equal to:

$$U_+(i) = \sum_{j>i} k\,a^{j-i} E(X(i), X(j))$$

where $E(X(i), X(j))$ is given by the matrix G1, namely:

$$E(A, A) = UA; \quad E(B, B) = UB; \quad E(A, B) = E(B, A) = 0$$

We calculate the lefthand utility $U_-(i)$ in the same way:

$$U_-(i) = \sum_{j<i} k\,a^{i-j} E(X(i), X(j))$$

The total utility U(i) is then equal to $\frac{U_+(i) + U_-(i)}{2}$.

Consider now the following spatial distribution where an isolated group of t B-strategists is surroundered by a population exclusively composed of A-strategists:

$$\begin{array}{lccccccccc} & A \text{——} & A & \text{—}A\text{——} & B\text{——} & B\text{——}\cdots\text{——} & & B\text{— —} & A\text{— —} & A\text{—} \\ i = & & \cdot\cdot & -1 & 0 & 1 & \cdots & t-1 & t & t+ \end{array}$$

Let us calculate the utility of the agent i = 0. According to the figure, he has chosen [B]. His lefthand utility $U_-(0)$ is therefore null. His righthand utility $U_+(0)$ depends on the number t of agents having chosen [B]. Let us suppose that $t \geqslant 2$. This gives us:

$$U_+(0) = \sum_{i=1}^{t-1} k\,a^i \cdot UB = UB(1-a^{t-1}) \quad \text{for}$$

Therefore

$$U(0) = \frac{U_+(0)}{2}$$

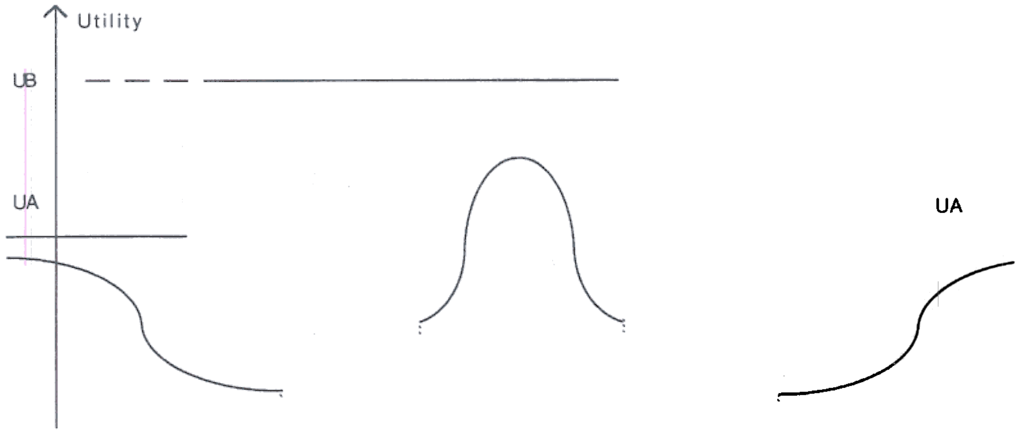
Now let us calculate the utility of the agent i = −1. His lefthand utility has the value UA since there is nothing but [A] to the left of i = −1. His righthand utility is given by the formula:

$$U_+(-1) = \sum_{i \geqslant t+1} k\,a^i \cdot UA = UA \cdot a^t \quad \text{with}$$

This then gives us:

$$U(-1) = \frac{1}{2} UA(1 + a^t)$$

We clearly have $U(-1) = U(t)$ and $U(0) = U(t \quad 1)$. It can also be shown that the utility has the following form:



A —— A —— A —— B —— B —— · · · —— B —— A —— A —

$i =$ · · · -1 0 1 · · · $t-1$ t $t+1$

We will suppose, in accordance with intuition, that there is diffusion of the innovation [B] as soon as $U(0) = U(t-1)$ is greater than $U(-1) = U(t)$. In other words, it is the agents on the border between the space of the [A]'s and the space of the [B]'s who are determinant. For the sake of convenience, let us denote as $\Theta(a, t)$ the double of the difference between $U(0)$ et $U(-1)$, for $t \geqslant 2$:

$$\Theta(t, a) = UB(1 - a^{t-1}) - UA(1 + a^{t})$$
$$= UB - UA - a^{t-1}(UB + aUA)$$

First, θ is an increasing function in t. That means that the bigger the group having adopted [B], the greater the relative utility of the agents in that group and the greater the possibilities of diffusion. Second, we obtain the fundamental result according to which θ *is a decreasing function in* a. The smaller a is, the more localized are the interactions and the greater the possibilities for diffusion of the innovating group. The localization makes it possible to internalize in part the beneficial effects of the innovation. For $a = 0$, that is for interactions limited to immediate neighbors, Θ is equal to $UB - UA$. Consequently, for $a = 0$, an innovation [B] will be diffused if UB is greater than UA. As a rule, for $0 < a < 1$, it can be shown that there always exists a value $t^* = t^*(a)$, such that, if the size of the innovating group is greater than t^*, then Θ is positive. So, a superior convention is able to invade a population if this new convention can implement social filters in order to localize the benefits generated by the interactions.

t^* is a strictly increasing function of a which tends to infinity as a tends to 1. Here we come up once more with the previous result, namely that when there is indifferentiation of relations, the innovation [B] cannot be diffused. For $a = 1$, the function Θ is equal to $-2\,UA$, always negative. It will be understood that it is in the interest of an established convention to impose a strong universality constraint on its potential competitors. Conversely, it is in the interest of a new convention to localize its effects and invade progressively the whole space.

Let us confront our theoretical framework with some historical "stylized facts" and consider now a very contemporary issue: what happens when conflicting conventions confront one another in the same territory, when local conventions face invasion by foreign innovations?

5. An example: labor conventions and the japanese transplants in UK and US

No better case can be found in order to scrutinize some of the basic conditions for an endogenous change in work organization, management style and wage system. In the early eighties, many observers were led to believe that the Japanese transplants would not succeed outside their homeland, since the Japanese model seemed too closely tied to a specific and idiosyncratic system of values, customs and tacit norms. They forecast that the Japanese model would lose abroad a lot of its competitive edge. In the United Kingdom, balkanized and adversarial craft unions would impede any improvement in the overall efficiency of the factories taken over by Honda, Toyota or Nissan. In the United States, the UAW strategy as well as the highly individualistic values and the money grubbers and short-run financial views of Wall Street would wipe out most of the potential productivity increases deriving from the implementation of the Japanese management style.

Now, in 1992, many detailed studies and even general surveys (The Institute of Social Science [1990], K. Koike and T. Inoki [1990]) provide a much more balanced view of the exportability and resilience of the set of conventions behind the surprising success of the transplants. Not only have many, if not all the components of the genuine "Toyotist" model been implemented, but globally the market share of Japanese transplants (for example in the US car industry) has significantly increased, so drastically that now some expect that the American branch of Toyota will overtake the Ford Motor Company by the end of the decade. Furthermore, the success of the Japanese firms has put pressure on American institutions, especially in industrial relations and labor regulations: some analysts have noticed a "Nipponization" of the American legislation. Consequently the economic challenge from Japanese transplants has progressively altered some basic features of the American economy, and, in a second stage, has triggered an adjustment, or in some cases, a new direction, institutions, laws and the ideal management style (P. Adler [1989, 1991], J.J. Fucini and S. Fucini [1990]). A slow and still embryonic structural change is underway and has to be explained.

The diffusion model presented in 4 offers some hints which seem to fit rather well the stylized facts about the distinctive features of Japanese transplants with respect to other firms, both homegrown American companies and the branches of European multinationals.

Primarily, the managers multiply signal about their intent to implement a *cooperative strategy* with the white *and* blue collar workers: no absolute barriers between the bosses, the controllers and regular workers; promotion of an apparently egalitarian approach; homogeneous representation of workers; efforts to convince everybody that employers and employees are playing a positive and increasing sum game and not a prisoners' dilemma, as it is usually felt to be by both sides in North America, the UK, Italy or France. Case studies confirm that the workers hired by the Japanese transplants clearly perceive the action of the managers in order to foster more cooperative attitudes (M. White and M. Trevor

[1983]). But the issue is precisely to allow the emergence of cooperation among a society of individualistic and adversarial blue collar workers. The stylized facts seem to confirm the logic of the previous theoretical models.

Actually, the birth and growth of most transplants follow a definite pattern. The first workers hired are carefully selected according to their motivation and aptitude to be incorporated into nascent firms. For example, in the Nissan's Sunderland plants the interview of applicants lasts around six hours (Economic Intelligence Unit [1991]) whereas in the Mazda's plant in Flat Rock no less than six successive screening process are implemented (J. J. Fucini and S. Fucini [1990]). For core managers, controllers and technicians, very intense training is offered, frequently associated with a stay and a working position within one of the parent factories in Japan. Clearly the aim is to engineer the diffusion of the initial cooperative attide.

A careful selection of the incumbent workers – itself made possible by the high unemployment rate, and the choice of greenfield areas in Britain, or by preventing the organization of unions in the United States – makes quite sure that the initial cooperation will not be destroyed by insiders motivated by the opportunistic search for a free lunch. *The Economist* (February 23, 1991) states that "Japanese firms do not blend into their surroundings. . . . Handling and recruiting people is a task at which the Japanese are famously different from their American and British counterparts." For example for the Nissan's plant in UK, 25 000 people applied for the original 470 jobs, and similarly in Mazda's US plant only 3500 workers were chosen out of 96 500 applicants. Such selection ratios, between 1/28 and 1/53, clearly show the importance of the screening process. In some cases the selection is mainly directed toward the psychological profile (J. J. Fucini and S. Fucini [1990]), others toward professional and technical aptitudes. In reference to the model, this means that *social filters* have to make the transplants a semi-closed entity: only the required characteristics may be admitted within in order to promote a high probability a of being surrounded by cooperatively oriented workers. Above the threshold a*, the internal cooperative norm would be destroyed by its contact with abrasive individualistic society-wide values.

But, finally, the transplants' challenge to the American style of manufacturing has to be explained. The second major result from the model can now be brought into play: the internalization of the related competitive edge allows the Japanese firms to enjoy faster growth. Extra workers are hired, or new factories opened, thus extending the size of the population, t. Again, if the initial advantage is large enough and not eroded, but, on the contrary, increased, then the limit size t* is obtained, and the new convention is bound ultimately to replace the old one. It would be a silent but powerful process of "Nipponization" of the British and American economies.

Just for the sake of completeness and in order to prevent any feeling on the part of the reader that the authors are succumbing to a Japanomania, let us mention some limiting or inhibiting factors that militate against such a smooth transition. Two conflicting interpretations can be given about the reasons of such a success and the future of the Japanese transplants. On one side, looking at the impressive selection ratio, one might conclude that these firms are only selecting deviants out of a very large pool of individuals with quite opposite values and attitudes. Consequently, the diffusion process of the Japanese transplants is bound to be very limited as a share of total population. On the contrary, one could imagine that the other firms and workers learn from the Japanese transplant and progressively adopt a similar or equivalent strategy. Thus, the diffusion of the new model is potentially limited only by the total size of the population. From a formal point of view, a quasi Darwinian selection process is equivalent to a Pagetian learning process (B. Walliser [1989]), but the practical and social consequences are quite different indeed. The transitions would be far slower in a Darwinist world than in an adaptative one "à la Piaget".

More practical arguments can be added. First, the complete efficiency of the model supposes that the American subcontractors are willing to accept strong interaction with or even interference from the Japanese transplants. Can they learn and accept the Japanese style sufficiently quickly not to stop the cumulative process? Second, some production processes (for instance that of engines) have large fixed costs, which call for a minimum market size. If that size is not attained, the whole process could possibly collapse, or at least grind to a halt.

Finally, at a more societal level, can American businessmen, workers and politicians accept such an alteration of their styles, values and institutions? Pragmatically, should the US and UK try to copy the Japanese style, with huge adaptation costs or should these countries try to strengthen their own styles in order to be as competitive as the Japanese society. "Japan is strong because each person knows his place. American is strong when people do not know their proper places and are free to invent new roles for themselves" (J. Fallows [1989]). Therefore the choice is between copying a piece of a foreign model or forging a functional equivalent (W. W. Powell and P. J. DiMaggio [1991]). Given the subtle chemistry of the complex set of norms, the answer is not clear . . . and will not be given here.

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