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### Innovation, life cycle and the share of independents

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# INNOVATION, LIFE CYCLE AND THE SHARE OF INDEPENDENTS: CASES FROM RETAILING

by Bart Nooteboom

The thesis is often heard that for innovation society depends to a large extent on the initiative of small, independent entrepreneurs. There is some empirical evidence for this. Birch showed for the US that more than half of net new employment was created in independent firms with less than 20 persons employed<sup>1</sup>. This does not yield a direct proof of the thesis. It is possible that the observed development was not the result of more innovation in smaller firms, but of a shift of spending to more labour intensive, small-scale production of goods and services, in which small independents are more predominant.

Partly, the thesis is also based on considerations of plausibility. One suspects that larger firms are generally less flexible and efficient with respect to innovation, and are less motivated to replace existing products and production processes (monopolies). Among other things, this would express itself in a lower yield or throughput of research and development in larger firms. For a large monopolistic firm it can be rational to postpone the introduction of innovations for the benefit of an optimal mix of products in different phases of their life cycles, or for the benefit of a prolongation of the penetration- or saturation-phase of existing products. It can also be rational to leave the initial losses during the early stages to competitors, while one prepares for fast imitation after proven success.

On the other hand, one can also argue that some types of innovation are a matter for teams of highly skilled specialists, and that they require long lead times, heavy investment and large risks, which can only be carried by large firms.

From a historical study of 61 inventions during the first half of this century by Jewkes, Sawyers and Stillerman<sup>2</sup>, it appears that only 16 out of the 61 inventions could be ascribed to organized research by large firms. About half of these 16 were in the area of chemical industry. Studies have also been done of patents. These have the advantage above studies of inventions, that they are more directly related to the flow from inventions to applications. According to Blair<sup>3</sup>, experience on this score leads to the conclusion that the yield of research and development, measured by the number of patents, the number of commercially applied patents and the number of important inventions, is lower for larger firms. Mansfield<sup>4</sup> reported an indication that the productivity of research and development in the largest firms is lower than in medium-sized and large firms. Therefore, next to considerations of plausibility, there are also some empirical indications that new ideas are often found and/or applied by independents in small or medium-sized firms.

It is suspected, however, that the innovators and forerunners form only a small minority of the totality of independents and that the vast majority are more oriented towards the maintenance of traditional ways of performing a trade or craft. From a Dutch study<sup>5</sup> of 758 firms with less than 100 employees, only 18% showed a growing number of employees in a five- to ten-year period (before 1978). Growth of employees was in all cases combined with growth of turnover, and in 70% of these cases with an improvement of profitability. The study concludes that the majority of the firms studied "do not satisfy the image of the entrepreneur, who searches for new opportunities, wants to perform commerce, hunt for his gains and accumulate profits. Those interrogated attach more importance to values such as "quality of the product, craftsmanship, good personal relations in the firm, independence and some freedom on the job"<sup>6</sup>. Of the 381 independents less than 50 years old and in business for more than four years, only 20% was oriented towards expansion and growth<sup>7</sup>.

The results are roughly in accordance with results of studies elsewhere. Thus Williams<sup>8</sup> reports that about 10% of independents in Australia correspond to the type of the "effective entrepreneur and efficient manager". Incidentally, it is not the intention here to suggest that innovation is irreconcilable with the observed striving for quality of the product, craftsmanship, good personal relations, independence and freedom. It is conceivable, and even likely, that these attributes form part of a "psychology of renewal", if combined with the will to assert oneself, a penchant for action and daring, whether or not combined with profiteering. When renewal does not depend on capital-intensive, systematic, large scale, specialised teamwork, precisely such striving for freedom and individualism, and the lack of bureaucratic obstacles, form an important element<sup>9</sup>.

According to the well known scheme, derived from Schumpeter<sup>10</sup>, the process of renewal consists of three stages:

1. invention, often as the result of technical-scientific research;
2. operationalization and introduction in the market (innovation);
3. application on a large-scale after proven success, combined with further streamlining, standardization, increase of scale, differentiation (imitation; diffusion).

We expect that the innovative action of small independents arises especially in the second stage (innovation), and that the next phase of application on a large-scale after proven success (imitation, diffusion) is achieved mostly by large business. Small and Medium-sized Enterprise (S.M.E.) as the trial ground for large business, one might say.

Of course it is not claimed that all innovation originates in S.M.E. As an exception those forms of renewal that cannot take place without capital-intensive, systematic, large-scale, specialised teamwork have already been mentioned. Examples are: the development and production of a new type of aeroplane, of new pharmaceutical products, of new techniques for exploring and producing oil and other raw materials from deep seas. Examples in retailing are: the introduction of the universal barcode with requisite hard- and software ("scanning"), automated transfer of payments and "televised shopping". Such innovations are spectacular and striking, but are not thereby representative or the most important in respect of size and effects. There are also many smaller product innovations, process innovations, innovations in services, and adjustments and adaptations of existing products, processes and services that do not imply radical renewal and are more in the nature of novel combinations of basic technologies that are already available, but are nevertheless important<sup>11</sup>. Even in this area, do not claim that innovation takes place exclusively, or even mostly, on the part of small- and medium-sized enterprises, but here it is possible that they play a considerable role.

A second type of exception to the image of S.M.E. as the source of innovation is

mentioned by Jewkes c.s.<sup>2</sup>: "Firms which find themselves slipping back and which may introduce some radically new idea in a desperate effort to restore their position". This "innovation as emergency" occurs in already existing and often large firms.

However, "the larger, well established and successful firms might understandably hold back and allow others to take the risks ("pioneering don't pay", as a great industrialist once put it); they are strategically well placed in the sense that their size and strength enables them to acquire inventions and develop them rapidly when their potentialities have been thoroughly established"<sup>12</sup>. This brings us back to the notion of S.M.E. as a trial ground for large business.

From this general discussion, the question emerges how empirical tests can be performed on the basis of specific cases of renewal. In this paper the development of new forms of retail distribution are chosen: the development of self-service, supermarkets and discount-stores in the retail trade of general foods (the "grocery trade"). In the Netherlands, these developments show a striking agreement with the notion of a "life cycle", that has often been applied to the development of products, and is applied here to the development of forms of service. An attempt is made to find answers to the following questions:

- was the renewal initiated by independents?
- does the image apply of S.M.E. as a trial ground for large business, according to which after proven success large business takes over to provide the push for introduction and penetration on a large scale?
- how did the shares of S.M.E. and large business develop during the rest of the life cycle?
- what recommendations and conclusions can be derived for policy or further research?

### **The Development of Self-service Stores and Supermarkets Outside the Netherlands**

In retailing, and perhaps also in a wider perspective, the introduction of self-service is one of the major innovations. This development was especially important in the general food trade ("grocers"), and was gradually accompanied there by a widening of the assortment of products sold, including non-foods (supermarkets, hypermarkets), and a more austere presentation and location combined with lower prices (discount-stores). The first question is, whether these innovations were initiated by independents or large chain-store corporations.

Dreesmann<sup>13</sup> reported how as early as 1912 the principle of self-service was introduced in California, often in combination with service stores. From Dreesmann's account it can be inferred that this was an initiative of a few independents, which was later taken over by a large firm which charged a certain fee for making its trade-name and -system available to independents. In other words: a firm which is comparable to what we now call "franchising". The great breakthrough with respect to lower costs and prices, however, did not occur until the introduction, in 1930, of the formula of a supermarket in the state of New York. This breakthrough was accomplished by M. Cullen, who was employed by the third largest food company in the world. Cullen submitted his ideas to the board of the company, but did not obtain support. He left the company and started for himself. Two years later he had eight supermarkets, and other independents started to follow. Large firms did not join on any scale until 1937 and, as Dreesmann puts it: "The large chain-store companies generally reacted feebly and rather slowly"<sup>14</sup>. After 1937 the large companies more or less took over the initiative from the independents. After a setback during the Second World War, a renewed expansion took place, which in the first instance was again initiated by independents<sup>15</sup>. So far,

the image corresponds to the assumptions discussed earlier: independents begin and large business follows after proven success.

In Europe the development was different in some countries. Incidentally, one may ask whether in Europe one can speak of a "true" innovation (whatever that may mean). It was an imitation in the sense that the new formula had already been successfully applied in the US. It was an innovation in the sense that the formula was applied in a modified form, in different circumstances (industrial, spatial and with respect to the mobility, behaviour and preferences of consumers).

Dreesmann mentions that in Germany self-service was introduced in 1939 by H. Eklöh, who also played an important role, in the late fifties, in the development of supermarkets. The firm was later bought by the four largest department-store companies, who thereby bought themselves a share in the new development.

In contrast with the United States and West Germany, Dreesmann tells us, "the supermarket in the UK and Switzerland started its development primarily within existing chain-store companies"<sup>16</sup>. In Switzerland in the Migros co-operatives of G. Duttweiler. In the UK in five chain-store companies and co-operatives. Fulop<sup>17</sup> reported that in the UK self-service was first applied by co-operatives, followed by large chain-store companies, and finally, as the last group, by the independents. Thus the picture in Europe is differentiated. It is not true that in all countries the developments were initiated by independents. That would be too simple a picture. In a large firm also a true entrepreneur with vision and daring may emerge to initiate the new development. Perhaps there have been cases of what we called "Innovation as emergency" in large firms. Furthermore, as already mentioned, the innovations discussed here partly have the character of an imitation of developments that had already proved to be successful in the US.

### **The Development of Self-service Stores, Supermarkets and Discount Stores in the Netherlands**

Now we will consider in more detail how the developments occurred in the Netherlands. For the study the development of the number of shops was considered, split up between independents, chain-store companies and co-operatives, for the following three types of store in the general food trade:

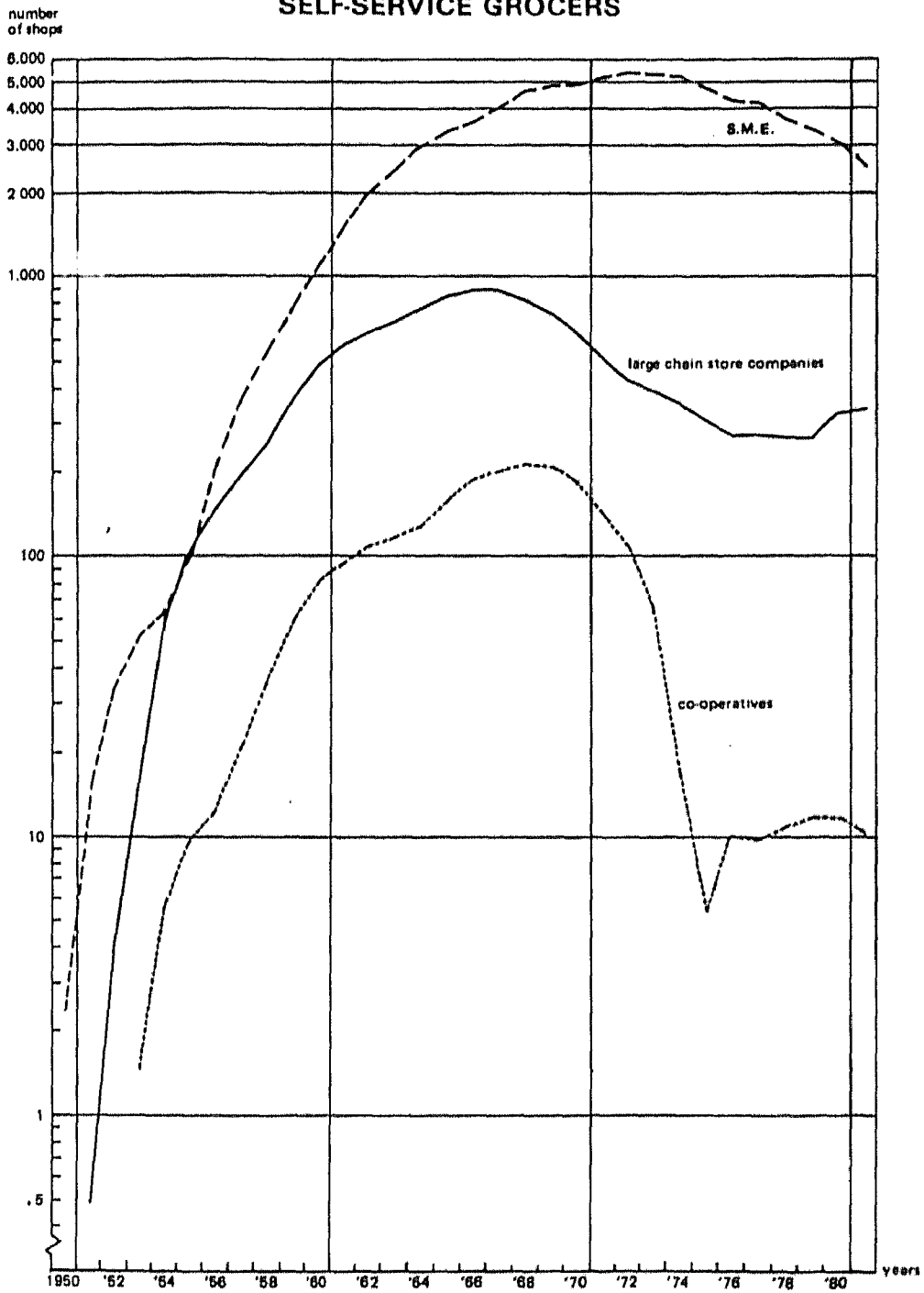
- self-service stores, defined as grocery stores with the majority of sales in self-service, with a limited assortment in the so-called "freshgroups" (fresh meats, vegetables and fruit) and a limited non-food assortment. These stores seldom have a sales area of more than 400m<sup>2</sup>;
- supermarkets, defined as self-service grocers with a complete assortment in the "freshgroups" and more non-foods. These shops generally have a sales area over 400m<sup>2</sup>;
- discount-stores, described as large self-service stores with often a limited range of choice per type of product, an often unbalanced, incomplete and shifting assortment, little service and austere presentation, on cheap locations.

The numbers of shops are plotted against time, on a logarithmic scale, in Figures 1 to 3. The number of shops are averages of beginning — and end year data (which occasionally results in proximal numbers). A logarithmic scale was chosen because on an ordinary linear scale the resulting exponential growth curves would not facilitate insight in the differences in starting points between independents and large firms in which we are interested. In a plot on a logarithmic scale a straight line represents exponential growth. The growth rate is proportional to the slope of the curve. A declining slope thus represents a declining growth rate.

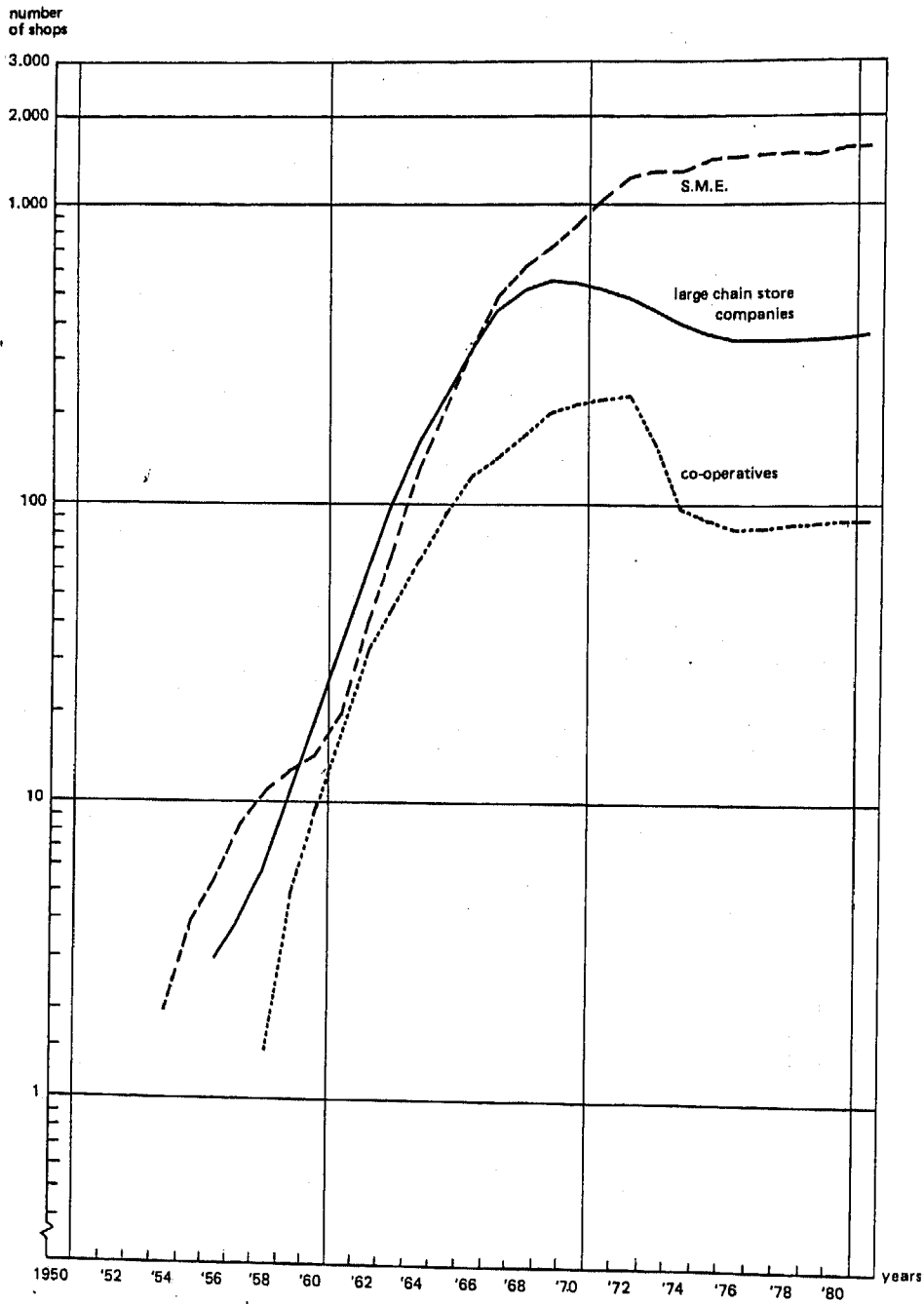
The Figures 1 to 3 show that for all three types of trade considered:

- the development was initiated by independents, followed by the large chain-store companies and finally, as the last group, by the co-operatives. This is the reverse

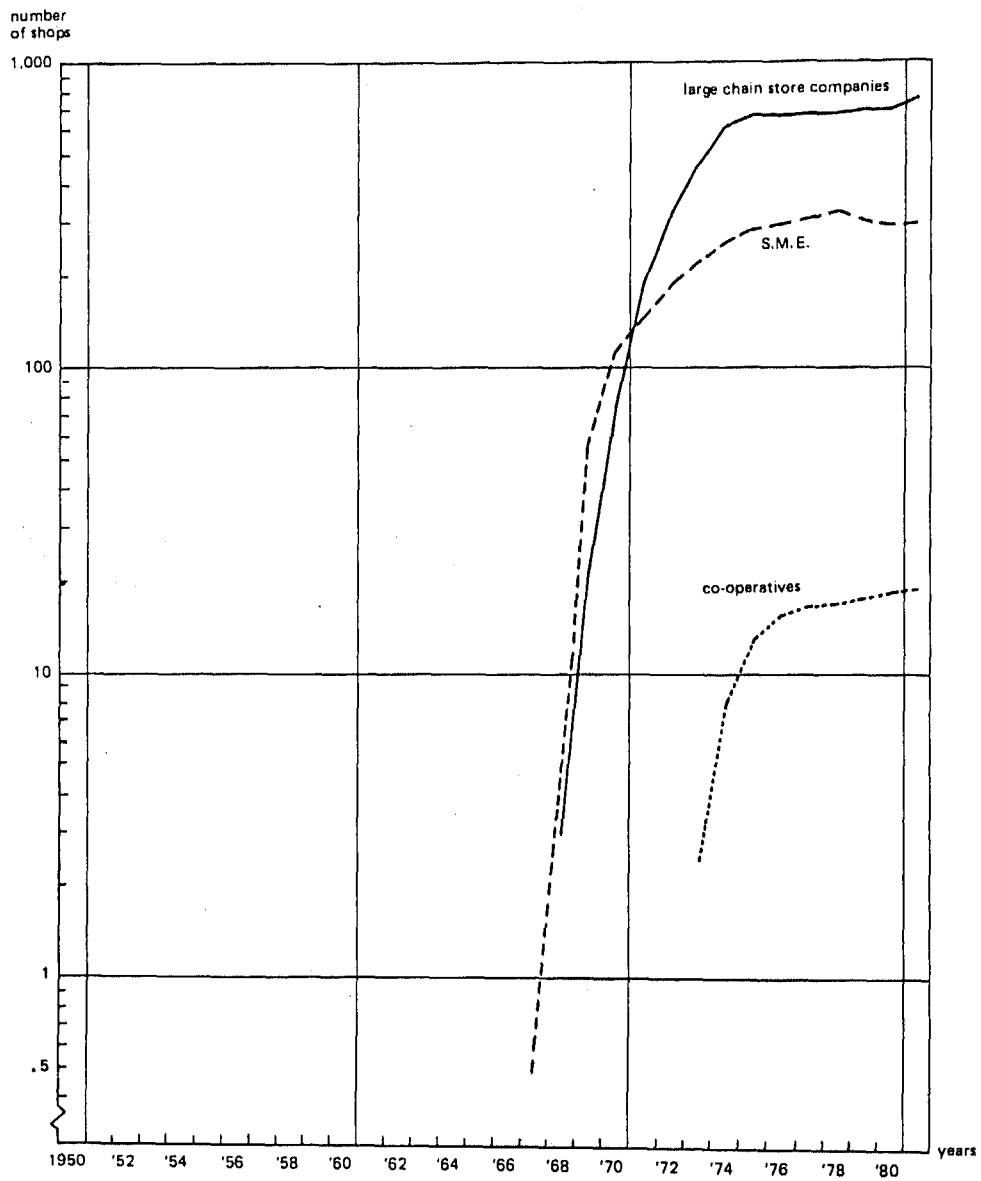
**FIGURE 1**  
**SELF-SERVICE GROCERS**



### FIGURE 2 SUPERMARKETS



**FIGURE 3**  
**DISCOUNT STORES**





- of the order reported by Fulop<sup>17</sup>;
- after a period of four to six years the growth of independents declined, and they were overtaken by large business.

In the cases of self-service stores and supermarkets the growth of independents subsequently increased to such an extent, that they again overtook large business in number of establishments. It was noted that the fast imitation and penetration by large business, at the expense of a brief setback in the growth of independents (self-service 1952-1954, supermarkets 1958-1960) is accompanied by the buy-out or take-over by large business of successful establishments of independents. One should also take into account the transition of successful independents to the category of large business, as a result of chain-formation<sup>18</sup>. The temporary setback in the growth of the number of independents, in the penetration stage of the life cycle, is probably largely due to these effects rather than a setback in the entry of independents. The renewed increase among independents, after this temporary setback, may be due to pressure from voluntary chain organisations on their membership, to adopt novel types of operation after they have proved to be successful.

In the case of the discount-stores, the independents kept lagging behind large business; after their initial lead. In all three cases the growth of the number of independents continued after stabilization had set in of the number of large firm-establishments and co-operatives. In the cases of self-service and supermarkets the growth of independents continued even after elsewhere (first large chain-stores and next co-operatives) the decline had begun (self-service 1966-1973, supermarkets 1970-1976).

In all three cases the co-operatives stayed below both independents and large chain-stores, throughout the life cycles.

The figures further show that the penetration of the supermarket occurred faster than that of the self-service stores. The penetration of discounters was yet faster: for all three types of enterprise (independents, chain-stores, co-operatives) the fast growth occurred in only four years, before the decline of growth set in.

### **Life Cycle and the Share of Independents**

Figures 1, 2 and 3 show the development of the *number* of shops, per type of shop, for independents, chain-stores and co-operatives. One can also plot the development of the *shares* in the total number of shops per type of trade. This is done in Figure 4. The figures are again based on averages of beginning — and year data.

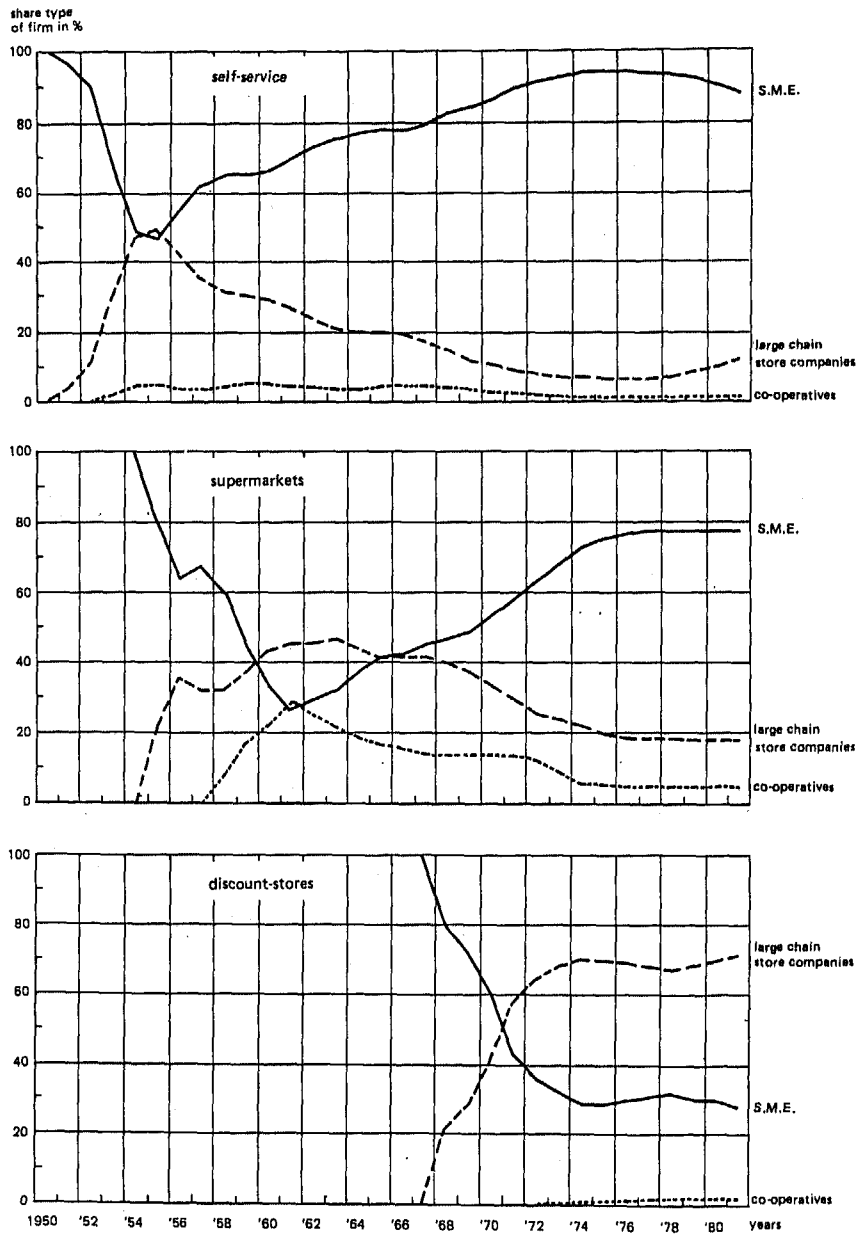
Figure 4 shows that for all three types of shop:

1. as found earlier, the start of the life cycle was in the hands of independents;
2. the share of independents in the number of establishments declined sharply in a period of five to seven years: from 100% to a minimum of about 50% (self-service), 25% (supermarkets) and 30% (discounters);
3. the minimum occurs at a point in time near the point where the next innovation begins;
4. subsequently the share of independents increases again, after other independents have taken the initiative for the next innovation, and after large business has followed in the adoption of the new innovation.

Here again it can be seen that independents are not only the first, but also the last to enter. The number of the last is far greater than of the first. The mirror image is that of large business which first waits for a short time until success is manifest, then joins on a large scale, and next takes care to move out in time to join the next innovation.

The phenomenon of ongoing growth of the number of independents after for

**FIGURE 4**  
SHARES PER TYPE OF FIRM



others the decline has already set in, requires closer attention. It suggests that a large group of independents lags far behind new developments, and enters a shop type whose formula is obsolete, and which is already in the declining phase of the life cycle. If that interpretation is correct, it indicates a potentially serious condition, which evokes the question whether something should be done about it, for example in the context of information, guidance and advice to S.M.E. An entry which is too late is the more remarkable if one takes into account that especially in the phase of decline there is a narrowing of profit margins and, as a result, an increase of average scale (shop size) due to an increase of minimal profitable shop size. For a discussion of this reference is made to other publications<sup>19</sup>.

The correctness of this interpretation of the figures shown is not beyond doubt, however. In response to the emergence of discount-stores in the years 1968-1972, there has been an adaptation of the formulas of self-service stores and supermarkets in the nineteen seventies. There is on the one hand of a "trading down" of some of these firms to the so-called "soft-discount" formula, in which discounters are fought with their own weapons, and on the other hand a "trading up" of especially supermarkets towards deeper assortments, more speciality products, better presentation and service, in which a better contrast was sought with respect to the discounter. These developments cannot be expressed explicitly in figures, because in the basic statistical material there are no opportunities to separate these adapted formulas ("soft-discount", "speciality- or service-supermarket"). However, more implicitly, and more speculatively, these developments can partly be distinguished in the figures. In Figure 1 (self-service) as well as in Figure 2 (supermarkets) we see that the establishments of large firms, after a brief period of decline, show a stabilization on a high level, and for supermarkets we even see a renewed increase. It seems very likely that this is a manifestation of the adaptation of existing formulas, which can also be seen as a (modest) form of innovation.

The question now is whether the lack of a decline of the number of independent self-service stores and supermarkets, simultaneously with the decline in large business, may be a sign of the pioneering role of independents in the adaptation of formulas. In other words: is there perhaps not a sign of weakness (entry to an obsolete formula), but of strength (early adaptation of formulas)?

It is possible, and even likely, that independents were the pioneers in the adaptation of existing formulas. But it is unlikely that the sustained increase of the number of independents, after the decline in large business, can be explained fully by adaptation of formulas. The size of the sustained (net) increase seems too large for that. From the moment that the number of supermarkets in large business started to decline (1969), the number of independent supermarkets increased with 150 (21%) in 1970, 165 (19%) in 1971, 185 (18%) in 1972 and 71 (6%) in 1973. These numbers seem too large for the inception of a(n) (adapted) formula. For the time being the interpretation that large numbers of independents have joined obsolete types of shop is maintained. This interpretation does not deny that independents are pioneers in new developments. On the contrary, it states that independents are often the first, but also the last.

It seems worthwhile to investigate whether the pattern of the development of the share of independents during the life cycle, as expressed in Figure 4, applies more generally to life cycles of products, processes, services, sectors or industries. In this context an important methodological point is noted: in such studies, one should keep in mind the question whether during the observed development the product, process or service was sufficiently homogeneous, and whether important subsidiary innovations have not been hidden behind aggregates. This complication of inhomogeneity in the course of the life cycle, due to many smaller and larger adjustments and changes, was pointed out before by Rosenberg<sup>20</sup> and Gold<sup>21</sup>, among others. Generally, the implication is that the data should be sufficiently

differentiated and not too highly aggregated. To give an example: if in the present study we had taken the total grocery trade, as a whole, without a differentiation into service stores, self-service stores, supermarkets and discounters, we would have seen no life cycle at all, but only a steadily rising curve for the aggregate. It appears from the study that we should ideally have had a finer differentiation of formulas (including soft-discount- and service-supermarkets).

### **Conclusions**

At the end of the introduction to this paper the question was asked whether the development of self-service, supermarkets and discounters confirms the hypothesis that new developments are initiated by independents and are subsequently, after proven success, adapted on a large scale by large business, in short: whether S.M.E. is a trial ground for large business. For the cases studied, in the Netherlands, the hypothesis is clearly and consistently confirmed. It also seems to apply to West Germany and to the US, where the innovation was more radical, without the element of imitation that applies in Europe. But it clearly does not apply to Switzerland and the UK.

It is striking that, concerning the development of self-service, the picture for the Netherlands is the reverse of that reported for the UK by Fulop<sup>17</sup>. The innovating role that in England was played by co-operatives was in the Netherlands played by independents. Apparently there have been important differences between the UK and the Netherlands in the relation between independents and co-operatives. In neither country, however, was it large business that took the first step on the path of renewal. This was the case, however, in Switzerland. The question whether this can be ascribed to an unique situation with an unique individual (Duttweiler). This recalls Dreesmann's account of the start of the supermarket in the US by M. Cullen, who started for himself when he obtained no support from the management of the large company where he worked. Does this confirm the hypothesis? But what if at that moment a Duttweiler had stood at the top of that company. Would things have gone differently? And would we then have rejected the hypothesis? Clearly, the hypothesis concerning the innovative role of independents cannot claim the universal validity of natural law. It is concerned with tendencies that can be disturbed or reinforced by conditions and circumstances. The tendency certainly does not apply for certain types of innovation (which demand much capital, specialization, large scale operation and teamwork). Thus it is already clear that large business is the pioneer in the development and introduction of scanning in the retail trade.

However, the hypothesis is confirmed in a number of cases. The development of self-service, supermarket and discount in the Netherlands presents such cases. The pattern that appears in this study suggests a process that proceeds as follows:

**—innovation:**

the first steps are made by a small number of independents with vision and daring. The majority of independents wait;

**—first stage of diffusion:**

large business follows with some delay; probably at the first signs of success. This following soon occurs on a large scale, partly by means of takeovers of successful independents;

**—second stage of diffusion:**

as the success of the innovation becomes clearer and more certain, many independents join, after they had first taken a more cautious attitude;

**—third stage of diffusion:**

the entry of independents continues after the entry of large business has come to an end. This may concern a group of independents who, almost forced by circumstance, reluctantly join a formula which has meanwhile become obsolete.

The results suggest that in the process of innovation and diffusion SME and large business play different, and partly complementary, roles. The image of the independent as the first and the last is in agreement with sociological studies of independents<sup>5</sup>.

It looks as if innovation can indeed arise to a large extent in SME, but from a small segment of 10 to 20%. In policy formation one should take into account that innovative potential is present, but only in part of SME. The function and role of the majority lies more in craftsmanship, continuity, spatial spread, differentiation and small scale operation. Policy should try to provide opportunities from different types of independents. One point of attention is the phenomenon of the independent who joins too late. The question is whether it is a general phenomenon that independents join, in large numbers, types of enterprise that are obsolete and find themselves in the declining phase of the life cycle. The next question is whether and how this should be prevented.

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