

Brouwer, Aleid E.

Conference Paper

The inert firm; why old firms show a stickiness to their location

44th Congress of the European Regional Science Association: "Regions and Fiscal Federalism", 25th - 29th August 2004, Porto, Portugal

Provided in Cooperation with:

European Regional Science Association (ERSA)

Suggested Citation: Brouwer, Aleid E. (2004) : The inert firm; why old firms show a stickiness to their location, 44th Congress of the European Regional Science Association: "Regions and Fiscal Federalism", 25th - 29th August 2004, Porto, Portugal, European Regional Science Association (ERSA), Louvain-la-Neuve

This Version is available at:

<https://hdl.handle.net/10419/117028>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.

The inert firm; why old firms show a stickiness to their location

Preliminary version

Aleid E. Brouwer¹

Urban and Regional Studies Institute
Department of Spatial Sciences
University of Groningen, The Netherlands
a.e.brouwer@frw.rug.nl

Paper presented at the 44th European Regional Science Association conference 'Regions and fiscal federalism', 25 to 29 August 2004, in Porto, Portugal.

Abstract: This paper investigates the tendency of older firms to show stickiness to their home-region or fixed location, with the increase of age (in years since founding), as found in earlier research. Empirical evidence supporting this argument is found from a telephone survey under the population of old firms in the Netherlands. In the current paper an analysis is done to determine which other firm characteristics -next to age in years-, influence this stickiness to place; such as innovative behaviour, network relationships, market, size (in number of employees), region and location type. This analysis is done on written questionnaires of 179 firms in the Netherlands, 37 of these firms are specifically labelled as 'old firms' (founded before 1851). Tested is whether inert behaviour, which according to the theory of structural inertia increases with age, also has an influence on the location of firms. Furthermore, the relationship between the spatial environment and other firm characteristics is investigated.

1 INTRODUCTION

Not much is known in literature about the dynamics of commercial and/or industrial organisations in the long run, or what happens to firms over time (Autretch et. al., 1998). Mostly the survival of firms is studied from the viewpoint of growth of the firm or product (Agarwal, 1997). This project however takes a spatial perspective on the firm lifecycle in long-term periods. In most cases the birth of a firm takes place in an urban environment, whereas the growth of firms often takes place in a suburban environment. However the question remains, what happens to the older firm? The research of the spatial context of the later phases of the firm's lifecycle can reveal a better perception of the development of the lifecycle of firms as a whole, considered from a spatial-economic context. None of the existing theories expands upon the fact that very old firms (age in years) outlast the effective industrial period of the (successful) entrepreneur considerably. With this, the characteristics of the firm itself and the characteristics of the firm's business- and spatial environment grow in relevance.

The geographical location of firms has mostly been studied in the light of location of new firms and relocation of firms (Pellenbarg et. al., 2002). This study focuses on the location of 'old' firms; Dutch firms founded before 1851 and still exist today. Collins and Walker (1975) argue that the success of individual firms is a function both of the way they behave and the economic environment in which they exist. Thus, e.g. a firm might choose a location more or less by chance but economic conditions could favour it and the environment would adopt the firm. In this light the question arises if the locational behaviour of old firms is different from younger firms? Is age of the firm an important determinant or is location behaviour more influenced by other factors such as size, market or product?

In previous research (Brouwer, 2003; Brouwer et.al., 2003) it is found that old firms (older than 150 years) have significant lower mobility than the average Dutch firm-mobility, these findings will be elaborated in section 3. This could be explained either by historical factors or by firm specific inertial behaviour. In this paper the stickiness of old firms to their location is investigated. Do old firms show

¹ The author is very grateful for the useful suggestions given on earlier versions of the paper by prof. dr. P.H. Pellenbarg, dr. P.R.A. Terpstra and dr. S. Iammarino. All errors remain the author's.

more locational inertia and why? On basis on locational theory and structural inertia theory, as well as on some previous findings described in section 2 and 3, several assumptions and hypotheses are posed in section 4. The assumptions will be confronted with a survey of locational behaviour of firms of all ages in the Netherlands in section 5 and 6. Some tests are done to find whether firm-age is important for location behaviour in combination with innovative behaviour, network relationships, market, size, region, and location type as a combination of structural inertia. The data comes from 179 written questionnaires, in which 37 cases are labelled specifically as 'old firms'². The problem for this exercise, however, is that the available data only provides insight in the surviving population. Since the time frame of the investigation of old firms is rather long, it is not possible to have entry and exit numbers for the population at stake over the full period. Nevertheless, it is interesting to investigate the survivors and see whether they have the characteristics that are expected from theory. Conclusion and discussion are given in section 7.

2 LOCATION AND STRUCTURAL INERTIA

Location theories focus on the optimal location choice of firms, that is determined by the attractiveness of a site for firm location (*pull* factors). Relocation theory also takes into account the *push out* of the present location³. This section describes the relocation process on the basis of *neo-classical, behavioural, institutional* and *evolutionary* theories (Machlup, 1967; Hayter, 1997; Peneder, 2001). The second part of this section discusses 'structural inertia' with a specific focus on locational adaptation.

2.1 location theories

The *neo-classical location* theory focuses on the maximization of profit by rationale firms in choosing the optimal location⁴. It is based on explanatory models in which 'economic' factors (e.g. transportation cost, labour cost and external economies) are the main forces behind firm relocation. In this view, a firm moves from the current location to a new one when the original location is not functioning within the spatial margins to profitability (*push* factors) and the new location is considered to be a profitable one (*pull factor*). Relocation costs are generally ignored in the neo-classical framework because the emphasis is on full information and rational behaviour. Thus, relocation appears to be a cost-less exercise (McCann, 2001).

The *behavioural location* theory interprets firms (and entrepreneurs) as satisfier persons that have limited information and bounded rationality, which are content with sub-optimal outcomes rather than maximum profits (Cyert and March, 1963; Pred, 1967; Townroe, 1972). The behavioural approach is more appropriate in explaining firm relocation than the neo-classical approach because it explores 'internal' as well as 'external' factors that are important in the decision-making process of the firm, which lead to the choice of a particular location (Hayter, 1997). The behavioural theory seeks understanding of actual behaviour of entrepreneurs and focuses on the decision making process that may lead to relocation and takes also path dependency into account. The basis for this understanding however is much more empirical research than on an explanatory models. Focusing on relocation, firms have to take into account 'relocation costs' that can be very significant; involving the costs of site search and acquisition, dismantling the former location, moving, and reconstruction of existing facilities and the hiring and training of new labour employed (McCann, 2001). These relocation costs, together with imperfect information indicates that firms are unlikely to move. However, when firms have to move (e.g. in case of too little expansion opportunity), the choice will frequently fall on places nearby. Since these are better known by the entrepreneur and easier to imagine than distance places as so-called 'mental maps' (Pellenbarg, 1985).

Considerable criticism is given to neo-classical and behavioural theories, because the basic assumption of the firm as an active decision making agent in a static environment. The *institutional location* theory however starts from the assumption that economic activity is socially and institutionally situated: economic activity is shaped by cultural institutions and value systems in society rather than by firm behaviour (see, among others, Krumme, 1969; Martin, 2000). 'Institutional' factors play key roles at all levels in the economy, from the structure and functions of the firm, through the operation of markets, to the form of state intervention. In institutional theory, economic activity is 'embedded' in ongoing

² A more elaborate discussion on 'old firms' and the selection process can be found in Brouwer, 2003.

³ Relocation approaches are hardly applied and are treated as special cases of location theories or are based on empirical analysis.

⁴ See, among others: Von Thunen (1826), Weber (1929), Losch (1954). Recently economist have discovered the spatial dimension of economic activities as described in 'New Economic Geography' (see e.g. Krugman, 1995; and Fujita et. Al, 1999)

social institutions or networks (Granovetter, 1985) and location behaviour of firms results from the negotiation of firms with suppliers, government, labour unions and other institutions about prices, wages, taxes, subsidies, infrastructure, and other key factors in the production process of the firm (Pellenbarg, et al, 2002).

Summarizing, the neoclassical theory focuses on ‘economic’ or ‘external’ factors (transportation cost) and behavioural theory concentrates on the ‘internal dynamics’ of the firm (e.g. spatial adjustment); whereas institutional theory brings in focus the ‘institutional’ and ‘intangible’ factors (e.g. trust, reciprocity, co-operation and convention) (Martin, 2000). Neo-classical location theory defines the ‘optimal’ behaviour of the firm in economic terms, with the notion of rationality and perfect information. It was mostly used to analyse relocation behaviour of small firms. However, in the present day the focus is mostly on firms that are complex organisations, consisting of many decision-making actors; such as managers, shareholders or workers’ representatives basing relocation studies primarily on behavioural principles, such as Townroe (1972), Keeble (1978), and Pellenbarg (1985). Nevertheless, the influence of the ‘institutional’ environment is gaining more and more importance in studies of locational behaviour of firms (Pellenbarg et.al., 2002).

However, in discussing the survival of firms from a population ecology perspective, also the *evolutionary* view on firms and firm location has to be considered. The evolutionary approach is much concerned with the long-term evolution of the economic system in terms of dynamics and stability (Boschma and Lambooy, 1999), grounded on an explicit dynamic account of the interaction between mechanisms of variation and mechanisms of selection (Nelson and Winter, 1982). In an evolutionary perspective a population of firms that all have identical behaviour cannot generate competition and without competition no selection, an evolutionary perspective provides an explanation of the inherent variety of firms and the diversity of their actions (Peneder, 2001). As Penrose already wrote in 1959, *‘exactly the same resource when used for different purposes or in different ways and in combination with different types or amounts of other resources provides a different set of activities ... it is largely in this distinction that we find the source of uniqueness of each individual firm’* (p.25)

Peneder (2001) argues that the models of Nelson and Winter (1982) on evolutionary change also provide a dynamic explanation of variety, arguing the continued reinforcement of diversity by means of path dependent nature of behavioural routines, emphasizing the initial uniqueness of firms. This can also be argued for the location choice the firm made. The initial choice, the firm’s first location can only be left by making enormous relocation costs due to sunk investments made in the past. However, the evolutionary notion in economic geography is mainly used to explain agglomeration economies (Boschma and Lambooy, 1999). For individual firms, the evolutionary notion in their spatial behaviour can be found back in path-dependent embeddedness and ‘lock-in’. Or as Peneder (2001) describes this, “the initial variety of firms is preserved along its particular path of development, which is shaped and constrained by the firms’ specific set of critical and irreversible choices made in the past.”(p.40). The longer a firm exists, the stronger this kind of inertial forces become and can be traced back to earlier events through path dependence. Old firms get locked-in by earlier choices creating their reputation, the legitimization of their product, identity and culture, over generations this becomes a self-reinforcing process within the firm.

2.2 Structural inertia

The interaction between the firm and its regional environment is a crucial determinant of firm behaviour. Firms operate in an environment of customers, suppliers and deliverers, local and regional competition, and more generally a network of relationships with usually a strong spatial dimension. New explanations of these phenomena have focused on the concepts of history and path dependence, chance and learning region, which are familiar terms in the field of evolutionary economics (Van Wissen, 2002; Stam, 2003). In this particular study the location of (old) firms will be investigated with insights from population ecology and industrial organizations. The structural inertia theory will be expanded with an explicit spatial dimension.

Much research has been done on age dependency - especially in a short-run timeframe; many types of organisations have exhibited a liability of newness. Stinchcombe already wrote in 1965 that in any population new organisations are more likely to die than older organisation and, at any age, organisations of a new form are more likely to die than organisations of an old form (Freeman, 1990). Jovanovic's model predicts that firm survival will increase with age and size of the firm, however Agarwal (1997) argues that this model is unrealistic over an extended span of time because it does not allow for a mutation of the environment in which the firm operates and compete. Also Boschma and Lambooy (1999) argue for such a ‘context-dependency’ for firms and other organisations. They say that

regions are regarded as rather stable homogenous entities in terms of their collective knowledge, institutional structures and social conventions. Also Dosi et.al. (1997) describe, that instead of one specific model of 'life-cycle' that can be applied to all firms, survival is as well much dependent on more particular patterns of evolution for specific use of technology in groups of firms or products, also influenced by sectoral differences.

According to Granovetter (1985) even when economists do take social relationships seriously, they invariably abstract away from the history of relations and their position with respect to other relations – what might be called the historical and structural embeddedness of relations. Resistance to change occurs because organizations are embedded in the institutional and technological structures of their environment (Amburgey et.al. 1993). These relationships can ultimately turn into long term dependencies that constrain the migration behaviour of firm to the original region, however, cost structures in other regions of the country or world could perhaps be more beneficial (Romo and Schwartz, 1995). This is an example of path dependency. In path-dependency, the observation is that the sequence of choices determines what is the best fit instead of an objective best choice (Forday, 1997).

Firm population size change as a result of birth, death and migration. The composition of a population may regionally differ due to selectivity in birth and death processes, as well as change in the characteristics of incumbent members of a population. Selectivity in entry and exit from a population, in combination with internal change of surviving members is a relevant field of study for firm population (Van Wissen, 2002). However, the influence of the environment and influence of other members of the populations does not fully explain why some firms become so much older than others. The effect of organisational age on demographic events remains to be fully understood. On the one hand, ageing implies learning, while on the other hand, ageing may mean increasing structural inertia (Van Wissen, 2002). Over time, generations of embedded knowledge and other sunk costs will solidify the once chosen investments and thus limit the choice of options the firm can take in future, as well as explain the choices done in the past (Dosi, 1990).

Inertia or resistance to change is one of the main forces determining firm behaviour. These aging processes of firms are studied in the field of population ecology. This view focuses on population level and entry and exit of organisations in specific industries. This study does not claim to study (old) firms in the Netherlands on such a population level, however, the models and propositions resulting from research in the field of population ecology do provide interesting handles to investigate old firms, also with several industries at the same time. The model of density-dependence⁵ does predict the same patterns of entry and exit for different industries (Geroksi, 2001), from which the prediction can also be put forward and applied to a more heterogeneous group of firms studied together. For as markets also can be defined independently of the particular firms that inhabit them (Geroksi, 2001). Population ecology, describes population dynamics in terms of density, legitimization and competition. In this process of density dependence, the vital rates of the organizations depend on the population's size (Carroll and Hannan, 2000). In population ecology also attention is given to structural inertia of firms. Geroksi (2001) describes structural inertia as a consequence of 'rent displacement'; in other words, firms have already invested in existing activities with a known amount of earnings. These 'older' firms are less willing to invest in new activities that might reduce the earnings, as new firms will do that have nothing to lose. This suggests that structural inertia is a consequence of success. Hannan and Freeman (1990) claim that inertial forces are subject to all organizations and that the selection process favours those organizations whose structures are difficult to change due to this structural inertia. They argue that firms that change less are considered more reliable and have a higher accountability. In other words, inert firms are more 'trustworthy' for their customers and suppliers. Dosi (1982) explains this inertia by the nature of the technological paradigms and trajectories. A technological paradigm is the choice for a specific solution of selected technological problems. Together with this choice there is also the 'evolutionary mechanism', by which the economic and social environment affect the development of technology in two ways. First, selection the choice of solutions and secondly, selecting the best fit of those choices. In a routinised regime, firms rely their production on in-house technology and routines, while in the entrepreneurial regime, firms rely on external sources of knowledge and innovative activities. Older firms can be suggested to be more routinised and trusting on internal knowledge, in the more 'traditional' sectors. Dosi (1990) calls this the long run relationship between patterns of social development and chosen technological paradigm, in a 'path-dependent' way.

⁵ For a more elaborate discussion of the density model in population ecology see among others: Hannan and Freeman, 1989; Hannan and Carroll, 1992; Carroll, 1997 and Carroll and Hannan, 2000.

The structural inertia theory offers a model of the process of organizational change that includes both internal and external constraints on organizational change. The first part of their argument addresses the probability of organizational change. Hannan and Freeman (1984) argue that organizations exit because they are able to perform with reliability and rationally accounting for their actions. Reliability and accountability are high when organizational goals are institutionalised and patterns of organizational activity are routinised, but institutionalisation and routinisation also generate strong pressure against organizational change. Thus, the very characteristics that give organization stability also generate resistance against organizational change. The second part of Hannan and Freeman's argument dealt with the effect of organizational change on survival. They argue that because internal and external stakeholders prefer organizations that exhibit reliable performance and because change disrupts both internal routines and external linkages, organizational change is hazardous. Following Hannan and Freeman, organizations can be defined as structures systems of routines embedded in a network of interactions with the external environment (Amburgey et.al., 1993).

The strength of these inertial forces varies with age, size and complexity of firms. Structural inertia is mostly internal to the firm; such as sunk costs in location, plant, equipment, and personnel etcetera. However, structural inertia is also found in the investments made in network relationships. Development of trust and routines takes time, for this structural inertia increases with the age of the firm. Firms of a larger size also have stronger structural inertia; larger firms have a lower speed of response to environmental changes (Hannan and Freeman, 1984). So as firms grows older and larger, the structural inertia increases, making firms slower in its responses and abilities to change. At the same time does the inertia increases the firms' trustworthiness and resources, which implies higher survival chances. Ageing conveys advantages, such as improved capacities and more secure structural positions, which tend to protect older firms from damage caused by changes in the environment. Hence, the life chances of firms improve with ageing (Carroll and Hannan, 2000). Organizational reliability and accountability require organizational structures that are reproducible, or stable over time. Formalizing goals and standardizing patterns of activity; as a fixed location - stabilize organizational structure. This institutionalisation and standardization offer the advantage of reproducibility, but do increase resistance against organizational change (Kelly and Amburgey, 1991). Reliability and accountability of a firm, in turn, is getting larger as the organizations gains experience and becomes better at the tasks the firm performs. According to the findings of Dobrev et.al. (2003), path-dependent learning induces reproducibility of structure, which then makes the set of organizational actions of firms more reliable. In other words, past experiences simultaneously creates survival advantage in selection processes and liability to inertia that endangers survival. Which of the two assets decides the outcome of change depends on how the organization-environment dynamics unfold (Dobrev et.al., 2003). Or as Sorenson (2003) says, firms get better at making things as they gain experience producing them – they learn by doing. This process of experimentation and selection (learning over time of firms), allows the firm to build a 'library of routines and rules', for operating effectively under the environmental conditions the firm experiences. Through iteration, organizations can continually improve their performance, although over time, these routines may become inert behaviour. Or as Ranger-Moore (1997) put it, inertia, while tending to hinder change, is itself the product of past change, commitment to sunk costs, entanglement in external relationships and so on, all represent path dependent organizational change, which increase inertia and ultimately 'lock-in'. Furthermore, change that modifies the visible mission of the organization (e.g. location or premises) undermines its legitimacy, based in part on reliability of performance (Delacroix and Swaminathan, 1991).

The relocation decision is not a common decision in most companies, since there is much uncertainty as to relevant procedures (Townroe, 1979). The first of these is the cost of finding and developing a new site. Frequently, large expenses are required to collect the necessary information for a thorough search, as well as in the purchasing and development of the land, and the building of the factory. Costs are also incurred because of the interruption to production (especially in the case of relocation) and the time spent in bringing a new site into commercial production. These costs tend to discourage firms from considering new locations, especially relocations, unless the firm is facing major problems at its existing site. Thus these problems encourage locational inertia. The second aspect is the fact that locational decisions inevitably involve a large element of risk or uncertainty. Such decisions involve the provision of fixed capital with several years' life-span, but the future conditions facing the firm cannot be known for certain (Pred, 1967; Walker, 1975; Townroe, 1979). The concept of adaptation can be rephrased as locational change as a reflection of both changing environments and the reaction of firms to these changing environments. The term spatial adaptation is used for those types of adjustment in which deliberate effort is being made to cope with the spatial dimension, for example, the price of inputs from various sources, the sizes of demand in different areas, or the cost of transportation

changes. As a result of such environmental change, the firm may adjust its pattern of good linkages to improve its profit record. One set of spatial adaptation can be locational adaptation; in this case, management decisions directly affect the location of the firm's production, for example through the building of new plants or the expansion or closing of existing ones. The focus on individual firms is important in identifying some of the key aspects of locational adaptation. For the purpose of understanding the dynamic development on an industrial space economy, however, it is crucial to transfer these insights to the aggregate situation (Walker, 1975).

From the above, it can be implicated that surviving firms in the long term show higher inertia since they did not suffer from loss of competence on the long run (Delacroix and Swaminathan, 1991). However, taking into consideration the argument of Hannan and Freeman (1984 and 1989) every attempted organizational change may amount to a re-setting of the liability of newness-clock, and with this the changing firm every times increases its risk of failure and disbanding. Following this argument, it can also be reasoned that on the long run more 'inert' firms survived, since without or with less change they decreased the risk of failure. Inert behaviour can be seen as a measure for success. This argument, however, does not fit in the population ecology tradition but more in the organizational learning point of view, as the position of March (1991) takes on this. March argues that organizational change may be beneficial in the short run but harmful in the long run. The ability of organizations to change is limited by structural conditions, both internal and external, in which the firm is embedded. This argument is opposite of the argument that firms are adaptive to environmental shifts and are supposed to be able to adapt the change from within as found in a long-term study on evolution of firms in the US automobile industry (Dobrev et.al., 2003). Kelly and Amburgey (1991) argue that structural inertia varies with organizational age and size. Because old organizations have had time to formalize relationships and standardize routines, structural stability increases with age. This increasing stability in turn is increasing resistance to change, so inertia also increases with age. Consequently, the probability of change in firms declines with age because lock-in and inertia emerge as an outcome of past change and experience (Dobrev et.al., 2003).

3 PREVIOUS FINDINGS

As indicated in the introduction, in earlier research it is found that older firms do relocate less than younger firms (Brouwer, 2003). In this previous research, the findings are presented of a telephone survey among the population of old firms in the Netherlands; 362 firms that are founded before 1851 and still exist today⁶. This telephone survey had results of 257 firms (response rate 71%). In the telephone survey, questions were asked to the managers of old firms concerning the year of founding, legal status, present location, foreign branch plant and product / activity, identity of the firm as well as questions about change of product/ activity, relocation and family involvement during the existence of the firm. The results of the telephone survey can be found in appendix I. The most important outcomes of this research can be summarized as follows.

On average old firms are larger in number of employees and the population of old firm have a different size distribution than the total firm population in the Netherlands. 45,2 % of the old firms has relocated at least once. This is a considerably lower percentage than the Dutch average, 60-65 % of the firms have relocated at least once (Van Steen, 1997). In the Netherlands old firms relocated less. In this survey, when the answer was yes in case of firm-relocation, the succeeding question was whether these relocations did occur inside the own region or over longer distances. 60,6 % of the relocated firms in this sample moved within the own region (short distance relocation). Considering the high number of relocations that was short-distance or in the firm's home region, it can be argued that old firms display a high stickiness to their home region. However, in general in the Netherlands firms do not relocate long-distance (Pellenbang and Kemper, 1999), who found that a vast majority of firm migration movements are local or at most intra-regional.

Concerning sectors, old firms concentrate in the following sectors; manufacturing industry (40%), construction (29%) and wholesale (18%). Firms in the first category originate mostly from craft-business like e.g. the production of beer, liquor, traditional candy, book printing & binding, mills or production of metal objects, formerly blacksmiths. Since the population of old firms originated from before the industrial revolution it is to be expected to find so many of these 'old-fashioned' sectors. In comparison with the sector distribution of the total firm population at present it shows that old firms are

⁶ see for a more elaborate discussion of the definition and the selection process of old firms: Brouwer, 2003. The sample included all old firms in the Netherlands as found by the Chambers of Commerce excluded are the hotel- and catering business, agricultural sector and retail.

over represented in the manufacturing industry and construction. They are underrepresented in the financial services, business services and transportation. An explanation for this, next to the selection employed on the database, can be the different survival rates per sector, however for this long period there is no data about these rates available, as well as the fact that the sector distribution before 1851 was different from nowadays. 7.4 % of the old firms did experience complete product / activity change, which indicates that the firm is now in a different sector than it was at founding.

56,4 % of the old firms expanded on the current site. Expansion on the current site might be considered a spatial adjustment to the firm's own environment. A comparison whether relocated firm had less expansion on site than firms that did not relocate does not give an unambiguous result. 56,1 % of the non-relocated firms has an on site expansion against 53,6 % of relocated firms which did expansion on the current location. Only 12,1% of the old firms has an establishment outside of the Netherlands. Since old firms are in general larger, the small percentage of old firms with a foreign establishment is surprising. An explanation for this can be that many of the old firms do still produce traditional crafts-products, that might not have a (large) foreign demand.

In summary, on average old firms are larger, less mobile, active in manufacturing sector, with no history of changing product or activity and are a public limited - family owned - companies, which have no foreign establishments. Investigating old firms from a spatial perspective especially the results for mobility, foreign establishments and on site expansion are quite interesting. From the inertia perspective, the results could be indicated as follows; it is found that for product / activity changes and locational changes old firms are quite inert. Overall, in this research it is found that by sticking to their own location and producing their own specific products these old firms created their own little survival-niche. As for the low mobility of old firms, it might be that this is caused by structural inertia, on the other hand it can well be that in the era when some of these firms were young - in the 17th and 18th century - migration of firms was just less common (see Brouwer, 2003). True is that these old firms have been young once, and since they distribute less migration activity over the whole period of their active existence, their location behaviour is definitely different that can be seen in contemporary research on relocation behaviour of young and middle-aged firms (compare Pellenbarg and Van Steen, 2003).

However, the results from this telephone survey are not the only results that indicate inert location behaviour of older firms. In a logit analysis conducted on 5568 firms (mostly located in Europe) was found that larger and older firms have significant lower relocation probabilities (Brouwer, et.al., 2004). These results seem plausible since larger firms have to incur higher sunk costs whereas older firms are more embedded in their spatial environment. Other results from this analysis are: firms that serve larger markets are more willing to relocate, as well as firms that were involved in acquisition and take-over had higher relocation probabilities. This analysis was also done just on single-site establishments, the results for this are robust (Brouwer, et.al., 2004).

4 HYPOTHESES

As could be seen in the previous sections, age and size of the firm have an influence on survival chances. From this, it is expected that the surviving firms are generally larger than the 'average' firm. This also raises the expectation that there is a relationship between age and size. Furthermore, since firms with higher structural inertia are expected to have higher chances of survival it can be anticipated that the surviving firms also show signs of this inertia; from a spatial view this means less changes in location than 'average' firms, as found in earlier research. From the previous findings the expectation rises that older firms have different characteristics. Nevertheless, the results from the telephone survey need to be confronted with a sample of firms that include all ages. In section 5 the results from the written survey are described and 'old firms' are confronted with 'younger firms'. Special attention in this section will be given to the expected differences in relocation behaviour and locational adaptation. Furthermore, also the differences in size, network relationships, innovative behaviour, region and location type are investigated by confronting the group of old firms (founded before 1851) with the group of younger firms (founded after 1850). The following assumptions are tested in section 5:

- A. Old firms relocate less than younger firms**
- B. Old firms are more satisfied with their location than younger firms**
- C. Old firms have different location preferences than younger firms**

Furthermore, this investigation focuses on different variables influencing the probability of relocation. Although clear indications were found in previous research, that old firms seem to relocate less or have stronger locational inertia, it is important to test this as well in a population of varying age. The following hypotheses derived from the content of section 2 and 3 are tested with a logit analysis in section 6:

1. Firm's locational inertia increases with the age of the firm
2. Firm's locational inertia increases with the size of the firm

5 (OLD) FIRMS AND STICKINESS

The results for the written survey can be found in appendix II, where percentages are given for the variables investigated over the entire sample, as well as in a division into old firms' percentages (results for those firms founded before 1850) and younger firms' percentages (founded after 1850). The questionnaire was randomly sent to 500 firms, after a pre-selection was made on basis of sectors found in the population of old firms. 142 questionnaires were returned by the contrast group (founded after 1850), a 28,4% response rate. Together with the 37 written questionnaires that were returned by old firms the total survey includes 179 cases

From the results as found from the survey (see appendix II), the following preliminary descriptive conclusions about the old firm in this survey can be drawn. Old firms in this survey are on average larger (measured in number of employees), less mobile, active in manufacturing, single site companies, which are family owned. At the first sight it seems that the results of this questionnaire in comparison with the telephone survey are quite consistent. In this survey the focus is in the comparison of old firms with younger firms as described further in this section, however due to the sample bias (37 'old firms' vs. 142 'younger firms') not all relationships described are tested on significance.

5.1 site and situation

Because old firms have a low mobility, one could expect that old firms are very content with their situation. However, the average appreciation gives a different impression. Overall, the survey indicates an overall appreciation of location of 7,7 on a 1 to 10 scale. The group of old firms has a lower average appreciation of 7,4 of their current – possible new – location in contrast with the average appreciation of 7,8 of the younger firms. However, on the other hand it can be argued that because of the higher mobility of younger firms, these younger firms are more content with their current situation. From this the argument can be maintained that older firms are more attached to their location over time and even contrary to the lower appreciation they will have lower tendencies to relocate. The type of location firms are situated can strengthen this argument. Old firms are considerably more situated in the inner city or at the edge of the inner cities, while younger firms seem to be much more situated at specific office- and industrial-sites on the border of the city or town. In literature it is found that firms are generally born in an urban environment, whereas the growth of firms often takes place in a suburban environment (Pellenbarg, 1985), this would coincide with the relocation of younger firms from the inner cities to the industrial sites. However, this does not explain why old firms did not experience the same kind of movement. Either old firms are more attached to their specific location and are more embedded, or did experience growth in a period in which mobility was much less common and for this reason make do with their location (Brouwer, 2003; Pellenbarg and Van Steen, 2003).

Old firms relocate less. 61,1% of the old firms relocated at least once in contrast with 71,3% of the younger firms. From this it can be expected that older firms have adapted more on the current site, like on-site expansion, instead of relocation. 69,4% of the old firms had on site expansion in contrast with only 48,3% of the young firms. In combination with the higher percentage of relocation for younger firms, this indicates that younger firms have a higher tendency to move instead of adapting the current location in a situation of firm growth. This argument is even more supported by the fact that 72,2% of the old firms has ownership of their premises, while only 45,5% of the younger firms are in the same situation. Ownership of the premises can be seen as sunk costs, that induce path dependency and lock-in, or in other word, work against relocation and in favour of on-site expansion.

From these considerations it can be said, that with the empirical data of this survey, the assumptions A and C are plausible. Old firms have relocated less than younger firms, a difference of more than 10 %. The type of location old firms are situated on also differs from the type of location where younger firms are found. However this last statement is not completely underlined by the data. Though old firms are found at different types of locations than younger firms, this does not mean that these types of

locations are also the most preferred ones. Assumption B does not seem conceivable at all. Old firms are less satisfied with their current location. This result also affects assumption C. Old firms are indeed located at different sites, however, old firms are less content with their current location than younger firms, although just slightly. The stickiness of old firms to their location does not directly seem to stem from the specific 'contentment' with their location, but is perhaps caused by a sort of embeddedness.

The cross tabulations below in table 1 and 2 on relocation yes / no with type of location and the cross tabulation of age and locational adaptation also give proof of the conclusions given above.

Table 1: cross tabulation relocation with type of location (absolute numbers of firms)

	yes	no
inner city	12	8
edge inner city	20	12
residential	7	7
office site	4	3
transportation site	10	2
heavy industry site	8	4
manufacturing site	58	14
rural area	5	5

Table 2: cross tabulation on site expansion with age in groups (absolute numbers of firms)

	yes	no
0 – 5 years old	6	11
6 – 10 years old	7	12
11 - 25 years old	14	23
26 – 50 years old	22	16
51 – 100 years old	22	6
101 – 200 years old	17	8
201 years or older	11	4

Furthermore, when age of the firms is correlated with a Pearson bivariate correlation with the variables premises and on-site expansion the conclusions above are also supported. It is clear from the numbers in table 3, that there is a significant correlation, meaning that with the increase of the age of the firms, there is less chance of finding rented or leased ownership of premises and more chance of adaptation of the current location. Furthermore also with the chance of locational adaptation is negatively correlated with rented or leased premises, as expected.

Table 3: correlations premises and locational adaptation

	correlation	sig.	N
age x premises	-,241**	,001	179
age x locational adaptation	0,230**	,002	179
premises x locational adaptation	-,176*	,019	179

** = significant at the 0,01 level (2-tailed)

* = significant at the 0,05 level (2-tailed)

5.2 size, market and innovation

Of course also other factors influence the chance of inert behaviour of firms, and in this specific paper, locational inertia. For example the size of the firm, the market position of the firm, the size of its network of personal relationships, the number of sites (branch plants) and innovative behaviour. Furthermore, it is interesting to see whether these factors are different with increasing age of the firm and with this perhaps have an influence on relocation behaviour and might hand an explanation for the stickiness of older firms to their location.

The facts in the survey are quite interesting (see appendix II). The size distribution of the old and younger firms is not similar. Old firms are over represented in either the categories of small firms (2-9

employees) and larger firms (more than 50 employees). Younger firms are mostly present in the intermediate size categories; 10 up to 50 employees. This is the size-distribution as used in the Netherlands, being aware that for example the European Commission would consider all firms up to 250 employees as small and medium sized employees (Brouwer and Henrich, 2001). Currently, no sound explanation is available, besides the fact that older firms had more time to 'grow'. Furthermore, looking at take-overs, which has been much more done by older firms, would explain the overrepresentation of the larger size categories for this group. One could expect that sectoral differences would cause size differences, however no significant correlations were found between size and sector.

For the number of sites, there are not many differences between old firms and younger firms. Both groups in the survey are mostly single-site firms, also the connection with foreign firms, either through joint ventures or foreign branch plants is small for both groups. Interesting, however, is the small percentage of both groups that have foreign branch-plants, delocalisation, or sub-contracting. Old firms operate more world wide (in and outside the EU) and younger firms focus more on the European market. An explanation for this can be that the old firms were established in an era that the Dutch economy was very much based on trade with Suriname and Indonesia and that the foreign connections of old Dutch firms originate from that time (Brouwer, 2003). Also this relationship was tested for sectoral differences. No significant correlation was found between foreign parts and sector.

From this survey it seems that older firms are more innovative than younger firms, 63,9% versus 54,5%. Innovation here is defined either as product- or process innovation, being either primary (first in the world to apply this new product or process), secondary (first in the Netherlands) or tertiary (new to the firm) (Kok et.al., 1984; Damanpour and Gopalakrishnan, 2001). This is remarkable, since from the telephone survey was concluded that old firms in the Netherlands have a strong focus on 'old-fashioned' arts & crafts-business, which would indicate an attachment to tradition which not directly brings up a strong indication towards innovative behaviour of these firms, as in Dosi's (1982) routinised regime as mentioned earlier. Nevertheless, it seems for this particular sample⁷ that old firms are more pioneers and younger firms more followers regarding innovation. Of course the time when the innovations happened are also of importance. For the old firms, the innovation could have been done during the Dutch industrial revolution, unfortunately, not all respondents filled out the year of the indicated innovations. From the available answers, it was found that old firms experienced their main innovations either between 1870-1890 and in the period following the Second World War, while younger firms experienced their innovations mostly in the last decade. The percentage for different kinds of innovations also indicates that older firms have more primary innovations (new in world) and younger firms more tertiary innovations (new in firm). The primary innovation of old firms seem to have been mainly in the period 1870-1914 (industrial revolution). Secondary and tertiary innovations by old firms were predominantly done in the period of 1980 till present, which was often the implication of computer programs. No sectoral differences were found for this variable. In future research the varies implications of the difference between process and product innovation will be investigated more in-depth.

The position of old firms in the market in comparison of younger firms also appears to be different. Older firms indicate a larger percentage that feels that they are doing worse than competitors in the same branch, as younger firms indicate a larger percentage of firms that feel that they are doing better than the average. Additionally it found that old firms have more quality competition and younger firms focus more on price competition, this might be related to the level of innovation, which will be researched in the future.

Interesting are the results for market relationships. In general, as well as with a focus on consumers; suppliers and competition, old firms have a more international focus. This can be an indication of either the past (same line of arguing as for world-wide connections) or because of a long history of doing business. More interesting actually is the strong correlations between these variables, as can be seen in table 4. It is very clear that all three; the spread of competition, suppliers and consumers are very important in determining the firm's network of personal relationships. However remarkable is to see that the strongest relationship for defining the firm's network is the spread of consumers, while mostly the spread of the firm's competitors is supposed to be the defining element. Of more interest for this specific paper is the relationship between network and relocation as well as with age of the firm. In table 5, these correlations as well as correlations with other variables are given.

⁷ The written questionairs originated from the same sample as of the telephone survey, however, just 37 of 257 old firms replied to the written survey. Only on average 'larger' old firms also responded to the written questionnaire. The average number of employees in the telephone survey is 108 employees, for the written survey is 496 employees.

Table 4: correlations market relationship

	correlation	sig.	N
competition x network	0,728**	,000	177
suppliers x network	0,570**	,000	177
consumers x network	0,836**	,000	177
competition x suppliers	0,608**	,000	177
competition x consumers	0,785**	,000	177
suppliers x consumers	0,573**	,000	177

** = significant at the 0,01 level (2-tailed)

The relationships with age, as can be seen in table 5 below, shows some remarkable outcomes. As expected from the percentages, significant positive correlations are found between age and innovation, age and firm size. This means that if the firm get older, the higher the chance is that this firm is larger and has more innovations. Also positive, but less significant are the relationships between age and sort of competition and age and foreign connection. When firms get older, they have a higher probability of having worldwide connections and with aging also the chance of having competition based on quality rather than on price of the product or activity. As said earlier, unexpectedly, none of these variables was found to be sector dependent.

Table 5: correlations age, relocation and other variables

	correlation	sig.	N
age x network	0,059	,435	178
age x innovation	0,208**	,005	179
age x branch situation	0,027	,719	179
age x sort of competition	0,150*	,047	176
age x size	0,229**	,002	179
age x sites	0,021	,781	179
age x foreign conn.	0,163*	,029	179
relocation x network	-,035	,643	178
relocation x innovation	-,120	,109	179
relocation x branch situation	-,023	,759	179
relocation x sort of competition	-,030	,697	176
relocation x size	0,010	,897	179
relocation x sites	0,017	,897	179
relocation x foreign conn.	0,035	,640	179

** = significant at the 0,01 level (2-tailed)

* = significant at the 0,05 level (2-tailed)

Interesting is the fact that no significant relationship between relocation and the other variables is found. The correlations indicated are all very weak and some are negative. These additional firm characteristics have no influence whatsoever at the locational behaviour of firms. Whether these results also indicate that the sense of stickiness is uncalled for, however, is not clear. Nevertheless, it can be concluded from this section that older firms seem to have locational inertia, though not directly caused by the variables as tested in section 5.2, as well as clear indication that old firms and younger firms have different firm characteristics.

7 CONFRONTATION

Locational inertia is in this investigation, among other things, indicated by the relocation-activity of firms. The relocation history (relocated at least once) is modelled by means of a logit model⁸ relating the probability to relocate to a set of explanatory variables x_i . The probability of relocation is $F(x_i' \beta)$ where $F(\cdot) = \exp(\cdot)/[1+\exp(\cdot)]$, and β is the vector of coefficients (Greene, 1997). The explanatory

⁸ Although the number of observation is N=179, which is a rather small sample for a multivariate analysis, applying the rule of thumb that one needs at least 25 cases for each dependent variable, 179 cases would just be enough.

variables are all re-grouped in dummy-categories⁹ and are labelled as follows: AGE (age in years), SIZE (number of employees), NETWORK (network of relationships), INNOVATION (innovative behaviour), REGION (region the firm is located), PREMISES (ownership status of premises), and ADAPTATION LOCATION (on site expansion)¹⁰.

Table 6 below, presents the estimates based on the logit model. From the literature it is expected that with the increase of age, the structural inertia will increase. Thus, the probability of relocation would get smaller with the increase of age. However, very young firms also did not relocate. The first five years can be considered to be the 'incubator' period for new firms, in which young firms need to survive and because of this have very low mobility (Stam, 2003). The results for the estimated parameters for AGE show that older firms have lower probability of relocation, as well as the youngest age-group. For the youngest group the result is a very significant low relocation probability, but this deviance is understandable from literature. The oldest age group seems to have a higher tendency of relocation, which is not in line with the expectations, however this is not significant. Yet, this result can perhaps be explained by the fact that in the sample just a very small number of these very old firms replied, and as such are not representative for this specific age group. In the expectations for the age groups 11 years old up to 200 years old, the evidence, however moderate, is consistent with the expectations in so far that the relationship is not linear, but it indicates that older firms in general are less mobile. Thus, the model tends to accept hypothesis 1.

In literature when the relationship SIZE and relocation is discussed, it is found that smaller firms are more willing to relocate. The estimated results indicate the opposite. Larger firms have a significant higher probability of having relocated. Especially in the category 6-10 employees and 11- 25 employees the chance of relocation history is quite high. This indicates that locational inertia does not increase with the increase of firms' size. Thus, hypothesis 2 is rejected. Nevertheless, it should be taken into consideration that due to this experienced relocation firms might have been able to grow. Relocation might have given these firms sufficient space for expansion. The year of relocation is not known for all respondent and could not be modelled. It might be that the large firms experienced relocation in the early days of their existence and due to this relocation they had the possibility to grow more than firms that did not relocate.

Now, the control variables will be discussed. The estimated parameters for NETWORK were hypothesized to give an indication that firms with a 'larger' network of market-relationships would have higher chance of relocation. The results are twofold. Very clearly, it can be seen that firms with a local network have significant lower probability of relocating than firms that have an international network. However, for regional networks, the probability to relocate is a little bit higher than for international networks. The results indicate that firms with a local network have the smallest probability of relocation, in other words show the most locational inertia. The divergent results for firms with a regional network can perhaps be explained by the large percentage of firms in this sample that relocated within the home-region for all age groups.

For the variable INNOVATION the results give the opposite direction as was hypothesized. Firms that did experience innovation have lower relocation probabilities than firms that did not innovate. Therefore, innovative firms show more locational inertia. However, literature is ambiguous about the relationship between innovation and location, some argue that innovation is the result of localized learning capability, indicating that firms located in a tight localized cluster have higher innovation rates and will not relocate, and others seem to argue the opposite (Malmberg, 1997). The estimated results for this survey tend to follow the first line of arguments.

The results for the variable REGION show that all other regions show a lower probability for relocating than the region 'West of the Netherlands'. Since West Netherlands is the area where the Randstad is located, which is the most urbanized and most economic dynamic area (Pellenbarg and Van Steen, 2003) the highest probability of relocating for firms in this region is in line with literature.

The variable PREMISES also has results that are in line with literature. Firms that have ownership of their premises have very significant lower relocation probability than firms that either rent or lease their

⁹ Most of the variables have few observations that are missing. These observations are included in the reference group. In earlier versions of the model, missing observations were explicitly modeled as dummy variables. The results are almost identical.

¹⁰ As for sectoral differences, the descriptives already indicated that there were no significant relationships between sector and other characteristics. Nevertheless, in other versions of the model, the variable sector was explicitly incorporated. The results however did not indicate any relationship and when modelled without sector, the results for the other variables proved robust.

premises. Since premises can be seen as sunk costs, it is to be expected that firms that own their premises have more locational inertia.

As for on-site expansion, modelled here as the variable ADAPTION LOCATION, the result are not convincing. It seems that firms that did on site expansion have a bit more locational inertia, nevertheless, the result is not significant. However, one would expect that firms that have spent money on their current site would be less willing to relocate, or vice versa, firms with more locational inertia are more willing to adapt their current site instead of relocating to a new site, considering this to be a less disruptive change compared to complete relocation.

Table 6: empirical results logit analysis

all observations	B	t-value ⁰
Constant	2,564	
AGE (in years)		
6-10 years		
0-5 years	-2,846	2,70 ***
11-25 years	-1,427	1,47 *
26-50 years	-0,910	0,92
51-100 years	-0,942	0,93
101-200 years	-1,435	1,98 *
201 + years	0,304	0,26
SIZE (in number of employees)		
1-5 employees		
6-9 employees	1,708	2,70 ***
10-25 employees	1,000	1,40*
26-50 employees	-0,016	0,02
51 or more	0,933	1,19
NETWORK (of relationships)		
International		
National	0,452	0,89
Regional	0,916	1,73 *
Local	-1,333	1,50 *
INNOVATION		
No		
Yes	-0,567	1,34 *
REGION		
West Netherlands		
South Netherlands	-0,407	0,72
East Netherlands	-0,877	1,62 *
North Netherlands	-0,846	1,20
PREMISES		
Rental / lease premises		
Ownership premises	-1,558	3,45 ***
ADAPTION LOCATION		
No		
Yes	-0,449	0,99

⁰ : * = significant at 10 % level, ** = significant at the 5% level, *** = significant at the 1% level.

N : 179

Overall percentage: 74,6%

7 CONCLUSION AND DISCUSSION

This paper investigated whether firm's age is an important determinant in location behaviour or is this more influenced by other factors such as size, market and networks? From section 5 it can be concluded that indeed older firms relocated less than younger firms. The reasons for this lower

mobility however are not completely unambiguous. There is a difference in location type for the both groups as well as a slight difference in appreciation of the location type. The stickiness of old firms to their location does not directly seem to come forward from the specific 'contentment' with their location, but perhaps is caused by a sort of embeddedness over time. Furthermore can be concluded from section 5, that there are differences in characteristics between old and younger firms. Significant correlations are found for age with the different firm characteristics. However, these characteristics do not seem to have a direct influence on location behaviour for either age group. The overall conclusion from this section can nevertheless be that old firms seem to have locational inertia, though not directly caused by the differences in other firm-characteristics, but perhaps more due to path dependence lock-in.

As for the conclusions from section 6, these seem to underline the conclusions as found in section 5. Indeed the age of the firms has an influence on the probability of having a relocation history; this means with aging, firms will have less chance of deciding for relocation. Also evidence is found for immobility of very young as well as for firms in the older age-categories. It can be concluded that locational inertia increases with the age of the firm. Interesting is that in this model relocation probability is not getting smaller with the increase of firm's size. However, it can be argued, since this model is testing the past behaviour of firms, it does make sense that firms that experienced growth (assuming that all firms started small, with low numbers of employees), have experienced relocation in their past, especially if one sees that for 73% of the firms that relocated the reason for relocation was 'lack of space' (see appendix II). This explains the fact that size in this model has no effect on relocation. Nevertheless, this is contradictory with earlier findings and literature. However, from the results in section 6 it can only be concluded for this sample that locational inertia does not increase with the increase of firms' size.

The results for other characteristics indicate that firms with a local network have the smallest probability of relocation, in other words show the most locational inertia. Firms that did experience innovation have lower relocation probabilities than firms that did not innovate. Therefore, innovative firms show more locational inertia. Literature is ambiguous about the relationship between innovation and location; some argue that innovation is the result of localized learning capability, indicating that firms located in a tight localized cluster have higher innovation rates. The estimated results for this survey tend to follow the first line of arguments. As for the region firms are located, the numbers indicate that all other regions show a lower probability for relocating than the West of the Netherlands. Since West Netherlands is the area where the Randstad is located, the higher probability of relocating for firms in this region is as expected. Firms that have ownership of their premises have very significant lower relocation probability than firms that either rent or lease their premises. Since premises can be seen as sunk costs, it is to be expected that firms that own their premises have more locational inertia. It seems that firms that did on site expansion have a bit more locational inertia, nevertheless, the result is not significant. However, one would expect that firms that have spent money on their current site are less willing to relocate, or vice versa, firms with more locational inertia are more willing to adapt their current site instead of relocating to a new site, considering this to be a less disruptive change compared to complete relocation.

Age-dependency is proven, though modest sometimes, for several characteristics and also evidence is found strengthening the conclusion that old firms have more locational inertia. Nevertheless, the results do not indicate directly this locational inertia to be caused by other characteristics than firm's age. The large percentage of firms that relocate in the home-regions is an acknowledgement of behavioural location theory; firms prefer new sites to be nearby. Locational inertia exists for old firms. Also the higher tendency to prefer on-site expansion instead of relocating appears to indicate the same conclusion. Structural inertia from a spatial view for old firms acts as a consequence of rent displacement, and by this it can be said that locational inertia of old firms is a path-dependent mechanism. Old firms have already invested in existing activities with known amounts of earnings, in this view spatial inertia can be seen as a result of firm-success. The sunk cost in location, plant, equipment, personnel, but also in network relationships all tend to direct towards the conclusion that old firms have a stickiness to place.

Unfortunately, with the focus on structural inertia in location behaviour, no insight in other forms of structural inertia in more firm 'internal' factors is gained. The findings, however, indicate that age is important 'explanation' of this spatial inert behaviour. Meaning that other firms' characteristics such as size and market are not delineating firm's locational behaviour as such, but that the 'embeddedness' or 'sense-of-place' for firms originates mostly from history. With the passing of time, firms get entangled with their local environment. A known and unchanging location can increase the firm's reliability and

accountability over time. Together with a sense of tradition and ‘belonging’ for the firm, as well as ‘recognisability of the firm’ for the customers-sides, can stimulate firms towards locational inertia. This would agree with the findings of Peneder (2001), “the initial variety of firms is preserved along its particular path of development, which is shaped and constrained by the firms’ specific set of critical and irreversible choices made in the past.”(p.40). The longer a firm exist, the stronger this kind of inertial forces become and can be traced back to earlier events through path dependence. Old firms get locked-in by their reputation, the legitimization of their product, identity and culture, over generations this becomes a self-reinforcing process within the firm. However, these last statements need to be further investigated, since the written questionairs do contain information about firms’ identities and cultures, which have to be incorporated. Furthermore, in future research it should be conderidered to incorporate as well export shares and sales, FDI, specialization effects and other firm internal data, as an additional explanation of old firms’ stickiness to place.

REFERENCES

Agarwal, R. (1997) Survival of firms over the product lifecycle. *Southern Economic Journal* 63, p.571-584.

Amburgey, T.L., D. Kelly, and W.P. Barnett (1993) Resetting the clock: the dynamics of organizational change and failure. *Administrative science quarterly* 38, p. 51-73.

Audretsch, D.B., P. Howeling and A.R. Thurik (1998) *Firm failure and Industrial dynamics in the Netherlands*. EIM research report 9802/A, Zoetemeer: EIM

Baum, J.A.C. and R.C. House (1990) *Commentary on the maturation and aging of organizational populations*. In: Singh, J.H. (ed) (1990) *Organizational evolution: new directions*, London: Sage publications, p. 129-142.

Bhidé, A.V. (2000) *The origin and evolution of new businesses*. Oxford: Oxford university press.

Boschma, R.A. and J.G. Lambooy (1999) Evolutionary economics and economic geography. *Journal of Evolutionary economics* 9, p.411-429.

Brouwer, A.E. and P. Henrich (2001) *Size distribution of small and medium sized enterprises in the Netherlands*. SOM-essay booklet 2001. Groningen: University of Groningen.

Brouwer, A.E. (2003) An empirical study on the relationship between the spatial environment and the survival of old firms in the Netherlands. *Paper presented at the 43th ERSA conference at Jyväskylä, Finland, August 2003*.

Brouwer, A.E., I. Mariotti, and J.N. van Ommeren (2004) The firm relocation decision: an empirical investigation. *The annals of Regional Science* 38 (2), p.335-347.

Carroll, G.R. and M.T. Hannan (2000) *The demography of corporations and industries*. Princeton, New Jersey: Princeton University Press.

Collins, L. and D.F. Walker (1975) *Locational dynamics of manufacturing activity*. London: John Wiley & Sons.

Cyert, R.M. and J.G. March (1963) *A behavioural theory of the firm*. Engelwood Cliffs, NY: Prentice Hall.

Damanpour, F. and S. Gopalakrishnan (2001) The Dynamics of the adoption of product and process innovations in organizations. *Journal of management studies* 38 (1), p. 45-66.

Delacroix, J. and A. Swaminathan (1991) Cosmetic, speculative and adaptive organizational change in the wine industry: a longitudinal study. *Administrative science quarterly* 36, p. 631-661.

Dobrev, S.D., T.Y. Kim and G.R. Carroll (2003) Shifting gears, shifting niches: organizational inertia and change in evolution in the US automobile industry 1885-1981. *Organizational Science* 14 (3), p. 264-282.

Dosi, G. (1982) Technological paradigms and technologiocal trajectories. A suggested interpretation of the determinants and directions of technical change. *Research policy* 11, p. 147-162.

Dosi, G. (1990) Finance, innovation and industrial change. *Journal of economic behavior and organization*. 13 (3), p. 299-319.

Dosi, G., F. Malerba, O. Marsili and L. Orsenigo (1997) Industrial Structures and Dynamics: Evidence, Interpretations and Puzzles. *Industrial and Corporate Change*, 6, 1, p. 3-24.

Foray, D. (1997) The dynamic implications of increasing returns: technological change and path dependent inefficiency. *International journal of Industrial Organizations*. 15, (1997), p. 733-752.

Freeman, J. (1990) *Ecological analysis of semiconductor firm mortality*. In: Singh, J.H. (ed) (1990) Organizational evolution: new directions, London: Sage publications, p. 53-77.

Geroski, P.A. (2001) Exploring the niche overlaps between organizational ecology and industrial economics. *Industrial and corporate change* 10 (2), p. 507-548.

Granovetter, M. (1985) Economic action and social structure: the problem of embeddedness. *The American journal of sociology* 91 (3), p. 481-510.

Green, W.H. (1997) *Econometric analysis*. London: Prentice Hall

Hannan, M.T. and J. Freeman (1984) Structural inertia and organizational change. *American Sociology Review* 49 (2), p. 149-164.

Hannan, M.T. and J. Freeman (1989) *Organizational Ecology*. Cambridge, Massachusetts: Harvard university press.

Hayter, R. (1997) *The dynamics of industrial location. The factory, the firm and the production system*. New York: Wiley.

Keeble, D. (1978) *Industrial location and planning in the United Kingdom*. London: Methuen & co.

Kelly, D. and T.L. Amburgey (1991) Organizational inertia and momentum: a dynamic model and strategic change. *Academy of management journal* 34 (3), p. 591-612.

Kok, J.A.A.M., g.J.D. Offerman and P.H. Pellenbarg (1984) *Innovatieve bedrijven in Nederland. Aard, niveau en regionale spreiding van innovaties in het Nederlandse midden- en kleinbedrijf*. Sociaal-Geografische reeks 32. Groningen: GIRUG.

Krumme, G. (1969) Towards a geography of enterprise. *Economic Geography* 45, p. 30-40.

Malmborg, A. (1997) Industrial geography: location and learning. *Progress in Human Geography* 21 (4), p.573-582.

March J.G. (1991) Exploration and exploitation in organizational learning. *Organizational Science*, 2, p. 71-87.

Machlup, F. (1976) Theories of the firm: marginalist, behavioural, managerial. *American economic review*, 57, p. 1-33.

Martin, R. (2000) Institutional approaches in economic geography. In Sheppard, E. and T.J. Barnes (Eds) *A companion to economic geography*. Oxford: Blackwell Publishers.

McCann, P. (2001) *Urban and regional economies*. Oxford University Press.

Nelson, R.R and S.G. Winter (1982) *An evolutionary theory of economic change*. Cambridge, Massachusetts: Harvard University Press.

Pellenbarg, P.H. and N.J.Kemper (1999), *Industrial mobility in the Netherlands: patterns, causes and impacts for spatial policy* SOM research report 99D34, University of Groningen.

Pellenbarg, P.H. en P.J.M. van Steen (2003) Netherlands in maps. Spatial perspectives on firm dynamics in the Netherlands. *Tijdschrift voor economische en sociale geografie* 94 (5) p. 620-630.

Pellenbarg, P.H., L.J.G. van Wissen, and J. van Dijk, J. (2002) *Firm migration*. In: McCann, P. (Ed.) (2002) *Industrial location economics*, Cheltenham: Edward Elgar Publishing.

Pellenbarg, P.H. (1985) *Bedrijfsrelokatie en ruimtelijke kognitie*. Sociaal-geografische reeks 33, FRW/RUG, Groningen.

Peneder, M. (2001) *Entrepreneurial competition and industrial location. Investigating structural patterns and intangible sources of competitive performance*. Cheltenham: Edward Elgar.

Penrose, E.T. (1959) *The theory of the growth of the firm*. Oxford: Basil Blackwell.

Pred, A.R. (1967) *Behavior and location; foundations for a geographic and dynamic location theory*. Lund: department of Geography.

Ranger-Moorse, J. (1997) Bigger may be better, but is older wiser? Organizational age and size in the New York life insurance industry. *American Sociological Review*. 62, p. 903-920.

Romo, F.P.M. and M. Schwartz (1995) The structural embeddedness of business decisions: the migration of manufacturing plants in New York State, 1960 to 1985. *American sociological review* 60, p. 874-907.

Sorenson, O. (2003) Interdependence and adaptability: organizational learning and the long-term effect of integration. *Management Science* 49 (4), p. 446-463.

Stam, E. (2003) *Why butterflies don't leave. Locational evolution of evolving enterprises*. URU, Utrecht.

Steen, P.J.M. van (1997) *Bedrijfsgrootte en ruimtegebruik van ondernemingen in leeftijdspectief, bijdrage aan de bedrijvendemografie*. Onderzoek en advies, nr.83. Groningen: Faculteit der Ruimtelijke Wetenschappen, Rijksuniversiteit Groningen.

Swaninathan, A. (1996) Environmental conditions at founding and organizational mortality: a trial-by-fire model. *Academy of management journal* 39, p. 1350-1377.

Townroe, P.M. (1972) Some behavioural considerations in the industrial location decision. *Regional Studies* 6, p. 261-272.

Townroe, P.M. (1979) *Industrial movement*. Westmead: Saxon House.

Collins, L. and D.F. Walker (1975) *Locational dynamics of manufacturing activity*. London: John Wiley & Sons.

Wissen, L.J.G. van (2002) Demography of the firm, a useful metaphor? *European journal of population*, 18, p. 263-279.

Wood, P.A. (1978) Industrial organisation, location and planning. *Regional Studies*, 12, p. 143-152.

APPENDIX I

Results of telephone survey ‘Old firms in the Netherlands’ (Brouwer, 2003) (N =257)

Founding year	% of old firms	
before 1801	22,2	
1801-1820	11,3	
1821-1840	30,7	
1841-1850	35,8	
Number of employees	% of old firms	% of all firms¹¹
1 to 9	45,9	91,2
10 to 99	43,6	8,2
100 or more	10,5	0,6
Relocation	% of old firms	
don't know	1,9	
not relocated	52,9	
Relocated	45,2	
Sectors	% of old firms	% of all firms¹²
manufacturing industry	40,1	29,2
Construction	29,2	7,1
Wholesale	17,9	16,8
financial institutions	4,7	27,2
Transportation	3,9	7,1
other services	3,5	4,1
business services	0,8	8,5
Product / activity	% of old firms	
no change / continuity	60,3	
Differentiation	32,3	
total change	7,4	
Legal forms	% of old firms	
public limited company	65,0	
general partnership	13,6	
one man business, personnel	9,3	
limited liability company	5,1	
one man business, no personnel	4,3	
other	2,7	
Family involvement	% of old firms	
family owned	90,7	
other	9,3	
Foreign establishments	% of old firms	
Yes	12,1	
No	87,9	
Expansion on current site	% of old firms	
yes	56,4	
No	43,7	

¹¹ Source: Brouwer and Henrich, 2001. Note: these percentage for the total population is based on all firms in the Netherlands with one to 250 employees, larger firms were not taken into consideration. Nevertheless, these numbers give a rather good indication of the size distribution of the entire firm population.

¹² Source: Van Steen, (1997) FRW-firmpanel, representation of total firm population.

APPENDIX II

Results of written survey 'old firms in the Netherlands and contrast group' (N = 179; 37 cases are 'old firms'; 142 cases are 'contrast group')

Age distribution:

0 - 5 years old	9,5%
6 - 10 years old	10,6%
11 - 25 years old	20,7%
26 - 50 years old	21,2%
51 - 100 years old	15,6%
101-200 years old	14,0%
201 years or older	8,4%

Average appreciation current site and situation (scale 1 to 10):

	all	old	rest
Location	7,7	7,4	7,8
Accessibility	7,4	7,0	7,5

Legal Status:

	all	old	rest
single proprietor	54,2%	55,6%	53,8%
single proprietor with employees	14,5%	11,1%	15,4%
private partnership	18,4%	11,%	20,3%
General partnership	12,3%	22,2%	9,8%
other	0,6%	0	0,7%

Sites:

	all	old	rest
Single site	88,3%	88,9%	88,1%
Branche plants	11,7%	11,1%	11,9%

Foreign branches:

	all	old	rest
None	83,2%	80,6%	83,9%
Within EU	10,6%	8,3%	11,2%
Outside EU	1,7%	2,8%	1,4%
World wide	4,5%	8,3%	3,5%

Premises:

	all	old	rest
Owners	50,8%	72,2%	45,5%
Rent	45,3%	25%	1,4%
lease	1,1%	2,8%	50,3%

Family firms:

	all	old	rest
Yes	55,3%	86,6%	52,4
no	44,7%	13,9%	47,6%

Locational adaptation:

	all	old	rest
Loc adaptation	55,3%	69,4%	48,3%
not	44,7%	30,6%	51,7%

Type of location:

	all	old	rest
Inner city	11,2%	16,7%	4,2%
Edge inner city	17,9%	41,7%	11,9%
Residential	7,8%	8,3%	7,7%
Office site	3,9%	2,8%	4,2%
Transportation site	6,7%	2,8%	7,7%
Heavy industry site	6,7%	2,8%	7,7%
Manufacturing site	40,2%	25%	44,1%
Rural area	5,6%	0	7,0%

Accessibility of location:

	all	old	rest
intercity trainstation	3,9%	2,8%	4,2%
regular trainstation	5,0%	5,6%	4,9%
Public Transportation point	1,1%	2,8%	0,7%
regional busstation	2,2%	2,8%	2,1%
public transportation stop	5,6%	13,9%	3,5%
entrance road to the innercity,	14,0%	25%	11,2%
highway to another city	32,4%	22,2%	35%
general acces in the build environment	16,8%	16,7%	16,8%
commodity exchange point	3,4%	2,8%	3,5%
other	15,6%	5,6%	18,2%

Concerning the **network** relations the following results are found:

Spread of consumers:

	all	old	rest
Local	5,6%	8,3%	4,9%
Regional	27,4%	5,6%	29,4%
National	33,0%	38,9%	35,7%
International	34,1%	52,8%	30,1%

Spread of suppliers:

	all	old	rest
Local	2,2%	2,8%	2,1%
Regional	19,0%	5,6%	22,4%
National	44,1%	38,9%	45,5%
International	34,1%	52,8%	29,3%

Spread of competition:

	all	old	rest
Local	6,1%	5,6%	6,3%
Regional	22,9%	19,4%	23,8%
National	43,0%	36,1%	44,8%
International	27,4%	36,1%	25,2%

Network of marketrelations:

	all	old	rest
Local	6,1%	8,3%	5,6%
Regional	34,1%	25%	36,6%
National	26,8%	25%	27,5%
International	32,4%	41,7%	30,3%

Competition:

	all	old	rest
Price	65,4%	52,8%	68,5%
Quality	17,3%	22,2%	16,1%
both	15,6%	19,4%	14,7%

Sectors:

	all	old	rest
Transport/communication	7,8%	2,8%	9,1%
financial services	2,8%	2,8%	2,8%
business services	9,5%	0	11,9%
Other services	20,1%	5,6%	23,8%
engineering	4,5%	5,6%	4,2%
Food and drinks	5,0%	11,1%	3,5%
Publishing / printing	6,7%	19,4%	3,5%
Other manufacturing	16,2%	30,6%	12,6%
Construction	16,8%	11,1%	18,2%
wholesale	10,6%	11,1%	10,5%

The size distribution of the firms is

	all	old	rest
2-9 employees	15,6%	33,3%	11,2%
10-25 employees	44,7%	25%	49,7%
26-50 employees	18,4%	8,3%	21,0%
51-100 employees	9,5%	11,1%	9,1%
101 + employees	11,7%	22,2%	9,1%

Take-over

	all	old	rest
Take over	19,0%	44,4%	12,6%
none	81,0%	55,6%	87,4%

Relocation

	all	old	rest
Relocation	69,3%	61,1%	71,3%
none	30,7%	38,9%	28,7%

Relocation reasons: (percentage of relocated firms)

	all	old	rest
Distribution goods	11,3%	9,1%	11,8%
Labor market	4,0%	4,5%	3,9%
Lack of space	73%	68,2%	73,5%
Market situation	10,5%	4,5%	11,8%

Of these relocated firms xx% of the relocations was in the home region.

	all	old	rest
Home region	76%	77%	75,4%
further	24%	23%	24,5%

Innovative behaviour:

	all	old	rest
Innovation	49,2%	63,9%	54,5%
not	50,8%	36,1%	45,5%

kinds of innovation¹³:

	all	old	rest
Primairy (new in world) product-innovation	14,8%	21,7%	12,3%
Primairy (new in world) process-innovation	8,0%	17,4%	4,6%
Secundairy (new in NL) product-innovation	29,5%	34,8%	27,7%
Secundairy (new in NL) process-innovation	12,5%	13,0%	12,3%
Tertiairy (new in firm) product-innovation	40,9%	30,4%	44,6%
Tertiairy (new in firm) process-innovation	40,9%	26,1%	46,2%

¹³ Percentage of kind of innovation can add up till over 100%, since some firms had plural kinds of innovation.