Offices of Swedish growth firms: facilities management variables

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Abstract

Purpose – To discern patterns of property and facilities management (FM) evolution of the offices of growth firms.

Design/methodology/approach – Statistical analysis with ten variables which are analysed through four perspectives (clusters, industrial sectors, age and size).

Findings – The result consists of characteristic features of three clusters labelled as "low", "high" and "moderate" FM firms with a ubiquity from all major industry sectors. The studied population reveals that various industry sectors expose more significant differences of FM variables than age and size. However, age is a background factor for discerning the three clusters and it reveals to be the youngest cluster that has the most intense FM activities, which argues for linkage between rapid growth and FM.

Research limitations/implications – Relevant study for predefined Swedish growth firms.

Practical implications – Reveals linkage between faster growth and FM.

Originality/value – Survey empery is collected in a primary database of FM variables and analysed.

Keywords Facilities, Sweden, Property management, Life cycle costs

Paper type Research paper

Introduction

How important is facilities management (FM) for growth firms? This underlying research question entails two related questions which are analysed in this paper:

RQ1. How do FM and property management issues develop among various categories of growth firms?

RQ2. Which background factors influence the development of FM in growth firms?

Finding fundamental patterns of these issues necessitates appropriate choice of objects to be observed. The population subject to a study should be firms that fulfil stipulated criteria of growth and be active relevant industry sectors and geographical areas.

The concept of FM and property management has to be theoretically established in order to create a frame of reference. An initial assumption is that FM should be more developed in all aspects in older firms and organizations than in younger firms and start-ups that have no experience in FM. There are many definitions of FM and often the boundaries are unclear to the adjacent discipline property management. (Corporate) property management has an owner perspective that aims to incorporate the real estates of growth firms into the business strategy and the value increment of the firm (Edwards and Ellison, 2004). FM on the other side has a users' perspective where spaces are regarded as service that should be rented and selected by a professional FM entity within or outside the firm, i.e. outsourcing of FM skills (Atkin and Brooks, 2000).

The service industry has grown in significance recent decades since industries have found that gains in several dimensions can be obtained by acquiring services from market instead of maintaining activities as a part of their businesses (Tschetter, 1987; Fitzsimmons, 1998). FM is a specialization of service management that relates to buildings and its users.

O'Mara (1999) describes real estate managers as deal makers and real estate developers whereas facility managers are day-to-day maintenance people. FM literature deals with many activities (both operational and strategically) that are assigned as FM activities. Outside the academia, FM is often related to operational activities such as janitorial services and maintenance and where the strategic skills are often neglected. FM is also strategically related to quality aspects since a continuous matching of FM processes to the changing needs of core business as a means of value management and asset enhancement (Alexander, 1994).

In this paper, both FM and property management issues are dealt with since their interrelated boundaries are unclear. The underlying argument for FM is that optimised spaces and facilities services (e.g. decent climate and acoustic conditions) contribute to the productivity of the working places of organisations and firms and consequently contribute to the competitive advantage of the firm (Becker, 1990).

The purpose of this paper is to discern patterns of property and FM evolution of the offices of growth firms. A particular focus of this paper is the evolution of FM of growth firms. Growth firms are mainly concerned with their turnover growth, survival, prosperity and development of the core business and FM is suspected to have low priority. The curricula of the firms are very different from each other: some firms have very early good initial financial means to find appropriate space and location with good services whereas others find less costly solutions either by low priority of FM importance or simply lack of financial resources. Industry branches use their spaces for their activities differently where the largest differences can be found between service (mostly office space), manufacturing (manufacturing, offices, storage etc), retail (storage, offices etc) and transport industry (infrastructure storage, offices, etc.). By various reasons some industries have to locate on several sites whereas others concentrate on a single site. It is reasonable to assume that the propensity to rent or to acquire office spaces differ between sectors due to dependence on unique equipment as that of manufacturing industry. When comparing spaces from various business sectors, office spaces seem as a common space that is apparent in all businesses. A survey of Dettwiler and Bröchner (2003) indicates that it is no evident distinction of office use between firms that are publicly assigned to service or manufacturing sectors.

Investigation of all major industry sectors in a FM perspective require extensive survey and creation of a database for a analysis where different perspectives can be analysed and compared to each other. Values and variables of a database enable cluster analysis to detect pattern of FM use in various industry sectors. The conducted reasoning above urges for exploring the dynamics of FM and property management growth firms.

Framework, growth firms and FM

Industries are constantly born and disappeared as Schumpeter (1942) described it with his concept of "creative destruction". The industrial development causes emergence and growth of new businesses sectors (e.g. IT, telecom industry in Sweden) and

disappearance of mature industries (e.g. textile industry and wharfs in Sweden). In this paper, it assumes to be a linkage of the life cycles of firms to the industrial development of the society a whole. When the aim is to detect trends in our society, it could therefore have some sense in studying whole groups of industries and relate them to individual firms' pathway. There are several ways to describe evolutions of growing firms. The growth of firms has often been described in phases or stages (Aldrich, 1999). Commonly known is the so-called S-curve that describe slow growth in the first stage due to multiple uncertainties which is followed by a fast growing and then at ended by a stage of slower growth due to obsolete skills. The third phase of this study is regarded to be rather "mature stage" according to the life-cycle model of Williamson (1975). In this study, a life-cycle model with focus on FM development of growth firms (Bröchner and Dettwiler, 2004) has been used and rendered operational as a tool for analysis. The general character of the three-phase model is applicable to the industries of a whole country. The survey of this paper originates from a model created by Bröchner and Dettwiler (2004) that illustrates three successive phases (entrepreneurial, managerial and consolidated) of growth patterns with focus on FM in growth firms. The phases of the model are described through typical features that are characteristic of each phase. As interpretation for this case: all of the features must not necessarily disappear when entering a new phase since an additional concept is also plausible; new factors do not automatically replace older ones, rather additions of FM variables assume likewise to take place as the firm grows. For example, the geographical spread might be mastered in the consolidated phase and the space management is as expected more developed in later phases (Tables I-III).

	Main features of entrepreneurial phase	Algebraic expression	Corresponding statements/questions in the questionnaire
E1	Dominance of functional features	$E1 = 5 - Q29$	Q29. "The image of our offices was more important than fulfilling practical needs"
E2	Influence or contrast from previous work places	$E2 = (Q20 + Q21)/2$	Q20. "Staff experiences were important when doing office alterations" Q21. "The founder's earlier experiences had an impact on our office design"
E3	Frequent, informal and face-to-face contacts lead to high occupational density	$E3 = (Q26 + (Q4/(\ln"\text{employees } 2002" \times Q8)]/2$	Q4. Average office area of the company Q26. "It was important to be able to have informal meetings inside and outside the offices" Q8. How many percentage of the employed worked in an office setting?
E4	Undeveloped relocation/space management	$E4 = 5 - Q19$	Q19. "We were good at predicting our office space needs"

Table I.
The main features of the entrepreneurial phase transferred to algebraic expressions

The FM life cycle

A young firm that have much more uncertain future than mature firm is expected to put more efforts on satisfying the practical needs instead of having an appropriate image which is expected to be better satisfied in later phases of the FM evolution of the firm. The founders of the growth firms of the first phase, the entrepreneurial phase,

	Main features of managerial phase	Algebraic expression	Corresponding statements/questions in the questionnaire
M1	A professional management is engaged which entirely or partially has replaced the founders	$M1 = Q3$	Q3. Was the company CEO during 1998-2003 also the founder of the company?
M2	Increased hierarchies and specialization	$M2 = Q31$	Q31. "Our organization became more hierarchical with divisions and increased specialization"
M3	Geographical spread that might cause inefficiency in FM provision	$M3 = Q15$	Q15. At how many addresses has the company had offices at the same time?

Table II.
The main features of the managerial phase transferred to algebraic expressions

	Main features of consolidated phase	Algebraic expression	Corresponding statements/questions in the questionnaire
C1	Experiments with work practices expressed by, e.g. new workplace layouts, remote work and cross-functional teams	$C1 = (Q22 + Q23 + Q27 + Q30)/4$	Q22. "Our office (spaces and equipment) supported distance work" Q23. "Our office (spaces and equipment) supported project work in teams" Q27. "We experimented with new approaches to work and workplace design" Q30. "Layouts and technology (e.g. mobile walls, IT) made the offices flexible"
C2	Dominance of symbolic features	$C2 = Q29$	Q29. "The image of our offices was more important than fulfilling practical needs"
C3	Professional capability to minimize the gap between the needs of the core business and supply of facilities	$C3 = (5 - (Q12 + Q13)/2) \times ((5 - Q32) + Q33)/2)$	Q12. Number of persons that were responsible for procuring (e.g. renting) office space Q13. Number of persons that were responsible for purchasing office facility services? Q32. "We had to search for a long time to find the right providers of facility services" Q33. "Our contracts for facility services were flexible"

Table III.
The main features of the consolidated phase transferred to algebraic expressions

might have previous workplaces as an important reference (both negative and positive experiences) when deciding the design of the new workplaces. Strategic gains are expected to occur when the staff can contribute with their experiences when office alterations are effectuated. Swedish cases have shown indication that participation and involvement of staff's ideas and experience when refurbishments and alteration are made is supporting element in the overall strategy of the firm (Granath, 1999). Skills in space management are still low and relocations might be sometimes unnecessary and harmful for the core business of the firm. The mismatch between needed and actually used spaces is expected to decrease with more experiences in space management and awareness what level of mismatch that is acceptable for a particular firm (Blakstad, 2001). The activities of the entrepreneurial phase of growth firms requires often intense interaction of the office working staff that often must endure to work in congested office areas which might cause directly or indirectly efficiency loss (features of entrepreneurial phase are listed in Table I).

Greiner (1998) describes how crises are the threshold to a successive phase. In the managerial phase, the founders are not always the most ideal person to neither manage human resources or how facilities and the properties should best be managed (de Vries and Miller, 1989). When the firm has grown to a certain size it becomes increasingly difficult by the founder to develop simultaneously the core business and FM. The insight that professional skills are needed might be preceded by crises expressed by insufficient management. When a certain size measured in number of employees, increased specialization of work tasks is expected to arise. The managerial phase is characterized by organizational structures and hierarchies that often are mirrored in the layout of the offices. By various reasons locations on multiple sites become necessary: the local market is saturated whereby next step of location is on sufficient distance or presence on multiple sites is important for the survival from the very start-up. Dettwiler and Bröchner (2003) found in a study that maintaining single site tend be related to security factors (features of managerial phase are listed in Table II).

In the third phase, the consolidated phase, the growth firm is more mature and has obtained insights of the importance of FM and appropriate workplaces are produced that fit for the actual situation. The managerial team is expected to encourage experiments with work practices expressed by, e.g. new workplace layouts, remote work and cross-functional teams. Duffy (1997) presented the cell, den, hive, club-model where the future offices work ought to strive against the club-setting or, to offering appropriate proportions of the four settings. Rapid changes, especially project-oriented firms, have also requirements on flexibility of the office spaces and must include space management strategy (McGregor and Then, 1999). The club setting of Duffy argues for simultaneously satisfy space needs of individual work and group work. Finding harmony between general managerial and space needs require often individual solutions for a particular firms and experimentation with the workplace design. The Orbit 2.1 study by DEGW predicted early in the 1980s the significance of IT technology and how it must affects the office layout of the future (by computer cabling, etc.), however, it did not predict the great extent of distant work enabled by information and communication technology (ICT technology) of today (Duffy, 1997). The developed office must support by its equipment, ICT technology, distance work and rapid changes of work patterns like teamwork. Today, both ICT equipment and

building structure of offices of growth firm and their services must thus meet expansion needs due to an increased number of employees.

At the developed phase it is of high importance that FM staff have skills to minimize the gap between the needs of the core business and supply of facilities. If several people in the growth firm are responsible for acquiring various services, there might arise coordination problems of cost effectiveness, wrong contractual decisions. Acquisition of external FM capabilities is a contributing factor to growth according to Tschetter (1987) and Fitzsimmons (1998). By letting one person or unit to be responsible for acquisition of spaces and FM-related services would thus be a contributing factor for growth. Special skills by, e.g. knowing the market of service providers and negotiation capability to gain flexibility in contracts would enhance the conditions for the firm to be successful (features of managerial phase are listed in Table III).

The described features of the three-phase model of Bröchner and Dettwiler (2004) is aimed to describe the evolution of the individual firm. Is it relevant to all kinds of industry, or do FM matter less in some industry sectors? Do some industry sectors have a propensity to have a dominance of some phases or particular features of the phases? Davis *et al.* (1985) find that organizations can be classified into groups with common facility requirements. Is it then possible to find groups or clusters among growth firms with common feature of FM use?

The analysis is made through four perspectives: first, clusters to discern if there are similarities of FM use across business sectors and how there concentration vary in the clusters, second, industry classification to answer the question: how do FM use vary in different business sectors? The question is relevant considering the presumptions that firms in service sector have more developed offices than manufacturing firms. Age and size are both linked measures of life-cycle perspective of growth firms. Thus, follows the question: what significance have age and size (number of employees) to the use of FM?

Survey procedure and statistic methodology

In order make the model of Bröchner and Dettwiler (2004) operational, the features are transferred to formulas according to Tables I-III. A numeric high value of the variables indicates conformity to the semantic expression of the ten statements. Each variable has a correspondence in the database or originate from the enumeration indication of the 35 questions or statements in the questionnaire of the survey. Explanation to the variables appears in Appendix 1 by citation from the questionnaire of the survey. Tables I-III explain the transfer from semantic to algebraic expressions. A high value is sought of every expression that facilitates the analysis. $E1$ is the opposite of $C2$ (Table III) and since firms with low priority of image value should have high values, the statement is put negatively.

The algebraic expressions of the managerial phase are conforming to the three corresponding statements in Table II.

$C1$ expresses the average of reasonable features and tasks that is an everyday activity for FM specialized staff. $C2$ is a direct relation to the questionnaire statement. $C3$ is more complex: since a high value is sought like previous phases the expressions must be turned negatively, thus a low number of FM responsible staff argues for higher FM awareness with high contractual skills (Table III).

The empirical material is assembled from an existing database, the Gaselle list, provided by Soliditet and owned by Bonniers Affärs information. The main criteria for a Swedish firm to be enrolled in the Gaselle list is that the firm has:

- overcome a minimum limit of turnover growth during the preceding four years;
- mainly organic growth (not M&A);
- at least ten employees;
- EBIT more than 10 MSEK; and
- continuous increase and doubling of turnover during the last three years.

Incidentally, the number of firms that fulfil the criteria of the Gaselle list has decreased over the last five years. The present survey is based on the Gaselle list of 2003 containing 967 listed firms. The database also includes turnover, number of employees, EBIT and changes in employee numbers and turnover. The questionnaire was distributed in November and December 2004 by mailing letters to the whole population of 967 firms on the 2002 Gaselle list. The three-phase model was an inspirational source for the questionnaire, although it is a challenge to transfer the complexities of FM and organizational theories to simple questions in a questionnaire that can be understood by a broad group of respondents from very different educational backgrounds. Variables of the period 2001-2003 are used for analysis of the issues of this paper (Appendix 1). The selected period has a low growth of GDP compared to the proceeding three-year period.

After a second reminder the responses were 387 (40 per cent). A total of 58 firms (10 per cent) of the non-respondents (580 firms) were randomly selected for additional telephone interviews. A thorough analysis (non-parametric test, Wilcoxon signed rank test and T-test of secondary data) and additional survey of the non responses argues for generalizing the whole population ($n = 967$).

Appendix 2 explains the details of the ten groups and business categories (letters A-Q). The various business sectors are categorized in ten main groups according to the logic the classification systems: Swedish SNI-2002 and European NACE (Swedish Standard Industrial Classification 2002, equal to NACE). Since, it is probable that there are differences in FM patterns between industries, the mean values of studied variables have been assigned the ten main industry categories as a simplification of the SNI (Appendix 2). Each particularly defined industry of the SNI represents a code that consists of five numbers which are clustered into major categories that are assigned alphabetic letters. For simplification purposes all alphabetic SNI categories are assembled into ten groups (0-9) which correspond to the first numbers of the SNI codes. Comparison between the respondents ($n = 387$) and the non respondent population ($n = 580$), reveals no large differences of the proportions of groups. SNI group nr 5 represents the largest difference (6.5 per cent). This might be explained by the fact that SNI group nr 5 represents letter "G" (Wholesale and retail trade) and "H" (hotel and restaurants) have made minor attention to fill the distributed questionnaire that have its focus on offices and the entrepreneurs in those groups saw little interests to declare their office activities. Appendix 3 illustrates the proportion of the whole population (respondents and non-respondents).

The survey results were coded in SPSS version 12.0.1 with the final check of the accuracy of the variables in April 2005. The 387 respondents have a median age of 15

years and a size of 21 employees (21 employees is also valid for non respondent group), whereby the population should not be regarded as representative for the youngest start-up firms.

Hair *et al.* (1998) and Aronsson (1999) describe a method to detect the appropriate number of clusters in a population through Wards method. Hair *et al.* (1998) summarize:

> Hierarchical clustering procedure in which the similarity used to join clusters is calculated as the sum of squares between the two clusters summed over all variables. This method has the tendency to result in clusters of approximately equal size due to its minimization of within-group variation.

Wards method seems applicable for detecting clusters that are independent of industrial sectors. In this case comparison of the agglomeration coefficients between two adjacent stages produce in this survey three relevant clusters (average linkage between groups) (Table IV).

The questionnaire values of the respondent population is arranged according to clusters (Table IV), five largest industry sectors (Table VII) and age and size (Table VIII). The mean values are investigated for the analysis of:

Variables	Cluster 1	Cluster 2	Cluster 3	Significance ANOVA
General variables				
Count	173	97	105	
Age	19.09*	18.37*	25.80*	0.003
Change turnover 1999-2002 (per cent)	206.25	202.91	223.69	0.999
Change employees 1999-2002 (per cent)	165.12	138.52	173.07	0.686
Turnover 2002	89,724.87	88,146.40	89,407.58	0.548
Number employees 2002	40.99	46.28	59.55	0.545
Variables of the FM model				
E1	3.6859*	2.2674*	3.8065*	0.000
E2	3.0458*	3.6419*	3.5200*	0.000
E3	1.9570*	2.3924*	2.2897*	0.000
E4	0.9412*	1.0345*	0.5161*	0.000
M1	1.6131*	1.6042*	1.9423*	0.004
M2	1.5411*	2.1463*	1.7059*	0.000
M3	1.4277*	1.8438*	1.4706*	0.001
C1	2.0259*	3.3500*	2.6140*	0.000
C2	1.3608*	2.8333*	1.1935*	0.000
C3	9.2438*	11.5000*	15.3770*	0.000
Property management and acoustic/climate variables				
Q14. Offices in city core	0.21*	0.47*	0.20*	0.000
Office in suburb	0.55	0.43	0.49	0.160
Office in rural area	0.18	0.15	0.18	0.780
Office in company or business park	0.08*	0.12*	0.19*	0.041
Other location	0.06	0.01	0.03	0.115
Q17. Rented vs owned office space	3.05*	3.83*	3.26*	0.008
Q28. Acoustics and climate	3.22*	3.70*	3.85*	0.000

Note: *ANOVA: *F*-values with $p < 0.05$ in Levenes test

Table IV.
The cluster perspective: mean values of general variables, variables of the FM model and property management and acoustic/climate variables

- the ten FM variables;
- general variables; and
- property management variables.

ANOVA is used in Tables IV and VII, and *T*-test is used in Table VIII to find significant differences on 5 per cent level. As said before, since addition of features are possible from one phase to another, this study pays less heed to the transition between phases than to the features that constitute the phases themselves. The ten variable of the model are treated independently to each other since the interrelated importance is difficult to predict for a whole population of an entire country, therefore the ten variables are not weighted and thus the three growth phases are left to expose of their own their evident characteristic patterns in the created perspectives of analysing the mean values: clusters (Table IV), branches (Table VII), ages and sizes (Table VIII).

The empery incorporated into four perspectives; clusters, industry sectors, age and size

Table IV represents the three clusters created through the ten created FM variables by Wards method. By that reason all ten variables expose significant differences between mean values in ANOVA test. The same variables are further investigated in Table VII with the five largest industry groups of the database and in Table VIII with studies of the upper and lower halves when considering age (median 15 years, 21 employees).

Significant differences of property management variables in the cluster perspective (Table IV) are location in:

- city cores;
- business parks;
- renting or owning propensities; and
- importance of satisfying climate and acoustics.

The latter is, however, more linked to FM but has an investigative relevance because this variable is non apparent in any of the ten FM variables.

Ranking of mean values
By ranking the mean values of the ten variables (*E1*, *E2*, *E3*, *E4*, *M1*, *M2*, *M3* and *C1*, *C2*, *C3*) in Table V, characteristic shapes of the clusters can be found.

Evident biases in the variables of change of turnover and change of employees are mirrored through the criteria of the Gasell firms. Therefore, no significant differences can be observed between the three clusters (significances: 0.999 and 0.686). Cluster 1 exposes a dominance of the lowest values of the ten variables, whereas the highest values are represented in cluster 2. Cluster 3 falls in between with intermediary values.

Count	Cluster 1	Cluster 2	Cluster 3	
Lowest value	6	2	2	**Table V.**
Intermediary value	4	1	5	Ranking of the ten
Highest value	–	7	3	variables in three clusters

The cluster analysis gives a new perspective to the initial three-phase model; the ages of the firms have significant differences in every perspective. With the cluster analysis the significance of phases in the life-cycle perspective seems to be reduced; extreme values throughout the phases appears, either low- or high-mean values seem to dominate in the clusters. It must be mentioned that all Gasell firms are successful and it is difficult to conclude if their focus on FM is appropriate for their business or not. Firms in cluster 1 are not proven to be more unsuccessful firms since there were no significant differences in Table IV of the variables turnover or change of turnover.

Which industrial sectors do the clusters represent?
Comparison of frequencies
Frequency analysis in Appendix 4 reveals clearly over- and under-representations of SNI groups compared to the whole population and in-between the clusters.

All large business sectors are represented in the three clusters. However, there are the over- and under-representations compared to the whole population. SNI groups 0 and 9 are omitted from the analysis because they have very low representation compared to the whole population.

Analyses
Three clusters are discerned and analyses according to interpretation of the mean values of Table IV. As mentioned before, the success factors, growth of turnover and employees are not expected to expose significant differences between clusters or groups since all cases are pre-selected with several growth criteria of the Gazelle list.

Cluster 1 "low FM"
No one of the highest mean values were assigned to cluster 1, which the can be assigned to low interest of FM issues throughout all three phases. Some variables appeared strong, however, managers of this cluster are rather practical minded were functional values ($E1$) having a balance with symbolic values ($C2$). They compared to the other clusters, they have most single site locations ($M3$), that are, however, less often located in city cores ($Q14$) than cluster 2. This is why the firms of cluster 1 are also good at avoiding congestion in their offices compared to the clusters 3 ($E3$). There are significant differences regarding some variables: location in city cores (almost same level as cluster 3) and with the lowest presence business parks. Growth firms in cluster 1 prefer ownership of their office spaces in a higher extent compared to the other clusters. The low FM focus is also mirrored with coordination staff ($C3$) that has responsibility for FM-related contracts and consequently the lowest attention to manage acoustics and climate issues for their offices ($Q28$). Cluster 1 is characterized by over-representation construction firms and less real estate firms compared to the whole population and the other clusters (Table VI). This might be explained by more near co-working with manufacturing staff and their conditions on building sites and manufacturing plants.

Cluster 2 "high FM"
As a contrast to cluster 1 several of the highest ranked values of the ten variables are observed in cluster 2 where FM issues have apparently high importance even though it is the youngest cluster. Despite the age and the high values of the entrepreneurial

phase (highest value of *E2*, *E3* and *E4*) it is tempting to assign this cluster to the consolidated phase (Table III) Image values have high importance (*C2*), which is reinforced by neglecting practical needs in the entrepreneurial phase (*E1*). This can be seen as matching well the consolidated phase (however, too unbalanced gap might be more pathological than sane in FM sense). Influence from previous workplaces dominates (*E2*) in the same time when experimentation with new workplaces takes place (*C1*), which could be related that hierarchies have less significance (*M2*). Cluster 2 has also the highest propensity to rent their office spaces (*Q17*) than the other clusters and in the same time having the highest propensity to locate on several sites (*M3*) and into locate in city cores (*Q14*). Cluster 2 is has high over-representation of service related firms of consultancy and business activities and is remote from the rough environments the less fashionable offices of cluster 2.

Cluster 3 "moderate FM"
The oldest cluster has found some balance in FM since half of the variables have an intermediary ranking position of the ten variables (Table V). FM professionalism tends to be combined with age. The firms of cluster 3 are more practical-oriented and put less attention to image values (*E1*) which is also put to evidence by the high promotion of climate and acoustic (*Q28*) issues for offices of the firms enabled through high kills in space management relocations and contract management (*C3*). According to the frequencies of Appendix 4 and Table VI over-representation can be found in manufacturing industry (wood, machinery chemicals) and transport firms which could be explained by close business relations between the sectors.

Comparative analysis of perspective of industry sectors
The mean values of the ten variables of Table IV expose all naturally significant differences through Wards method. Table VII is arranged according to the classification of the SNI system. The five largest industry groups (Table VII) are compared to Table IV: six of the ten FM variables expose significant differences among the five industry groups. It means that FM behaviour rather strong industry sector dependent. Table VII indicates that fulfilling image and practical needs (*C2*) are sector

	Cluster 1	Cluster 2	Cluster 3
Over-represented industries (per cent) comparison between the clusters, leading value	1 (manufacturing food), 3 (manufacturing), 4 (construction industry), 5 (trade)	7 (real estate and business activities)	2 (manufacturing raw), 6 (transport, storage), 8 (education, health)
Underrepresented industries (per cent) comparison between the clusters, lowest value	2 (manufacturing raw), 7 (real estate and business activities), 8 (education, health)	1 (manufacturing food), 4 (construction industry)	0 (agriculture etc), 3 (manufacturing), 5 (trade)
Over-represented industries (per cent) comparison between the clusters and the whole population	1 (manufacturing food), 4 (construction industry), (6 (transport, storage))	7 (real estate and business activities) (6 (transport, storage)) 8 (education, health)	1 (manufacturing food), 2 (manufacturing raw), 4 (construction industry) 6 (transport, storage), 8 (education, health)

Table VI.
Frequencies of industries in the three clusters, comparison between the clusters and between the clusters and the whole population, numbers of the SNI groups, Appendix 2

Table VII.
The industry sector perspective: mean values of general variables, variables of the FM model and property management and acoustic/climate variables

Variables	15111-15870 28110-28759 DJ, DA Manufacturing of food products; beverages, tobacco basic metals and fabricated metal products	45110-45442 F Construction	50101-52720 G Wholesale and retail trade; repair of motor vehicles. Motorcycles and personal and house-hold goods	60100-64203 I Transport, storage and communication	70201-74879 K Real estate renting and business activities
General variables					
Count	29	79	72	41	101
Q1. Age	27.57*	22.06*	20.16*	28.70*	16.28*
Change employees 1999-2002 (per cent)	187.76	120.51	136.38	175.78	197.05
Change turnover 1999-2002 (per cent)	149.00	216.28	196.21	194.85	249.23
Turnover 2002 (×1000 SEK)	55,276.48	43,633.97	151,249.72	71,236.63	115,905.86
Number of employees 2002	37.34	25.49	37.29	37.73	82.52
Variables of the FM model					
E1	3.5833*	3.6286*	3.4286*	3.7188*	3.0000*
E2	3.4211	3.2589	3.0729	3.2931	3.5181
E3	2.0109*	2.0058*	2.1386*	1.9468*	2.3566*
E4	1.0833	0.7385	0.8571	0.7941	0.9368
M1	1.7931*	1.4605*	1.7424*	1.9750*	1.7320*
M2	2.0000	1.5424	1.8065	1.8667	1.7667
M3	1.3448*	1.2800*	1.3971*	1.3514*	2.0300*
C1	2.4028*	2.0852*	2.4352*	2.3125*	3.0833*
C2	1.5600*	1.3714*	1.5714*	1.3939*	2.0947*
C3	12.8125	10.8631	11.1724	10.9130	11.3418

(*continued*)

Variables	15111-15870 28110-28759 DJ, DA Manufacturing of food products; beverages, tobacco basic metals and fabricated metal products	45110-45442 F Construction	50101-52720 G Wholesale and retail trade; repair of motor vehicles. Motorcycles and personal and house-hold goods	60100-64203 I Transport, storage and communication	70201-74879 K Real estate renting and business activities
Property management and acoustic/climate variables					
Q14. Offices in city core	0.14*	0.21*	0.19*	0.11*	0.47*
Office in suburb	0.55	0.57	0.56	0.51	0.46
Office in rural area	0.28*	0.15*	0.21*	0.30*	0.05*
Office in company or business park	0.17	0.07	0.16	0.14	0.15
Other location	0.03	0.05	0.07	0.00	0.01
Q17. Rented vs own office space	2.62*	2.86*	3.40*	3.09*	4.23*
Q28. Acoustics and climate	3.31	3.55	3.46	3.39	3.60

Note: *ANOVA: F-values with $p < 0.05$ in Levenes test

Table VII.

dependent; real estate industry concentrate more on image values whereas construction industry is most practical-oriented (*E1*). The real estate industry has also the highest degree of multisite location (*M3*) and propensity to experiment with new workplaces (*C1*). The transport, storage and communication sector offers the largest office spaces (*E3*) to their employees and have in the highest extent replaced the founder with a new CEO (*M1*).

Table VII indicates that location in city cores and rural areas have significant differences but not the location in suburbs which might be due to that suburbs house all kinds of businesses. Expectedly, real estate, renting and business activity-sector (K) prefer location of their in city cores whereas both sectors of transport (I) and manufacturing (DA, DJ) tend to locate their offices in rural areas. The propensities of renting or acquire offices spaces is apparently also industry sector dependent The industry sector of real estate, renting and business activities (K) has lowest propensity to own their office spaces in contrast to the manufacturing sector (DA, DJ). In contrast to the cluster perspective (Table IV) Climate and acoustic issues are not industry sector dependent (*Q28*). That confirms that climate and acoustic concerns is related to FM activities.

Comparative analysis of perspective of age and size

As a comparison of the cluster analysis (Table IV) the same variables are incorporated in a life-cycle perspective (measured as age and number of employees) in Table VIII. The median values of ages is 15 years and sizes counted as 21 employees and function as limits for the analysis. Table VIII illustrates the mean values of the variable of the lower and upper halves of the ages and numbers of employees. Regarding young vs older firms, significant difference is only found in variable *M1* (CEO's that have replaced the founders). No other significant differences can be observed of the FM variables. As in the industry groups of Table VIII the choice between owning and renting the office spaces have also significant differences between older and younger firms (regarding *T*-test). The renting propensity has, however, no significant differences considering small and large firms whereas influence or contrast from previous workplaces (*E2*) is more apparent in the size perspective. Climate and acoustic issues have significant differences concerning size but not age of the firms. It is worth commenting that the lack of significant differences is compensated by unexpected similarities of the values; despite size and age the mean values seem very even, compared to the other perspectives, in the size perspective: especially *E2* (difference: 0.0038) (influence from previous work places) and *E4*: 0.0162 (space and relocation management skills) (dominance of symbolic values).

Comparing Tables IV, VII and VIII give the conclusion that in the industrial sector perspective significant differences between groups can be found in six of the ten variables, whereas the size perspective gave three variables and the age only one variable with significant difference between groups. Industry sectors are thus more FM-related than size (measured in number of employees) and age perspectives. The propensity to rent or to own office space has significant differences in all perspectives apart from the size perspective. Climate and acoustic issues have significant differences in the size and cluster perspectives.

Question variables from the Gaselle list	< 15 years (younger firms)	≥ 15 years (older firms)	< 21 employees (smaller firms)	> = 21 employees (larger firms)
General variables				
Count	170	186	185	202
Q1. Age	10.01*	30.64*	18.08*	23.20*
Change employees 1999-2002 (per cent)	185.10	141.30	115.49*	203.84*
Change turnover 1999-2002 (per cent)	244.94*	181.55*	186.68*	234.70*
Turnover 2002 (× 1000 SEK)	55460.59*	100452.52*	42632.61*	130051.34*
Number of employees 2002	33.95*	48.92*	13.83*	76.97*
Variables of the FM model				
E1	3.3203	3.3697	3.4136	3.3006
E2	3.3976	3.3050	3.3284*	3.3322*
E3	2.2197	2.1193	2.0866	2.2233
E4	0.8481	0.8188	0.8553	0.8391
M1	1.5030*	1.8950*	1.4971*	1.8872*
M2	1.7292	1.7338	1.6690	1.8095
M3	1.5799	1.5163	1.3829*	1.6939*
C1	2.4918	2.6340	2.3586	2.7464
C2	1.7643	1.6707	1.6485	1.7557
C3	11.0225	11.7437	11.2870	11.4111
Property management and acoustic/climate variables				
Q14. Offices in city core	0.33	0.21	0.28	0.27
Office in suburb	0.46	0.53	0.46	0.54
Office in rural area	0.17	0.18	0.20*	0.14*
Office in company or business park	0.11	0.12	0.08	0.14
Other location	0.05*	0.03*	0.05	0.03
Q17. Rented vs own office space	3.64*	3.03*	3.24	3.37
Q28. Acoustics and climate	3.41	3.55	3.41*	3.60*

Notes: *T*-test, Levene's test for equality of variances; *significance < 5 per cent

Table VIII.
The age and size perspective: mean values of general variables, variables of the FM model and property management and acoustic/climate variables

Conclusive discussion

This paper has analysed FM use and its development in a population consisting of all major industry sectors of entire Sweden. The underlying assumption that FM is more developed in older firms seems here not to be supported. On the contrary, the younger and dynamic growth firms are more FM-oriented than older firms. The studied firms are predefined as "Gazelle firms" through stipulated growth criteria and in this study regarded as "growth firms". It must be clearly notified that the median age is 15 years and median size is 21 employees, thus very few of the firms that could be regarded as "start-ups" and consequently firms that should ideally represent the "entrepreneurial phase" are scarce. The life-cycle model and its operationalised version should be considered as a tool for extracting firms with characteristic FM behaviours. Cluster 1 (intermediary age) exposed low values throughout the phases and was more or less an opposite of cluster 2 (the youngest cluster) that was considerably more FM focused.

Cluster 3 (the oldest cluster) had a more moderate relation to the ten FM variables. It is difficult to assign any of the clusters to be dominated by a certain growth phase. Instead of viewing the matter on life cycles, the concept "FM intensity" is a contribution to this study. The clusters are labelled as:

(1) *Low FM firms*. They have low-FM intensity concerning the ten created variables in all phases. It is worth mentioning some characteristic features:

- Single site location.
- Not located in city cores.
- Office ownership.
- Low FM coordination.
- Low attention to climate and acoustic issues. They are over-represented by construction industry.

(2) *High FM firms*. They have high intensity concerning the ten created variables in all phases. It is worth mentioning some characteristic features:

- High influence previous workplaces and experimentation with the new ones.
- Mediocre relocation and space management skills.
- Image dominating role over the practical needs.
- Offices are rented and located on multiple sites and city cores. They are over-represented by the industry sector real estate and business activities.

(3) *Moderate FM firms*. They have intermediary intensity concerning the ten created variables in all phases where the characteristic features are:

- Preference of fulfilling the practical needs instead on focus on the image.
- Managerial professionalism that also has given a place to FM professionals which is also mirrored in the high attention to low attention to climate and acoustic issues. They are over-represented by manufacturing and transport industry.

It is tempting to assign cluster 1 as "manufacturing firms", cluster 2 as "service firms" and cluster 3 as something "in-between as transport firms". However, another contribution of this study is to point out that there is a ubiquity of all industry sectors in the three clusters despite frequency differences. The under-representation of industries deserves attention; for example, manufacturing firms are after all classified into cluster 2 and vice versa. This study has shown that industry sectors use FM differently to a considerable extent but age and size are less related to FM activity of growth firms.

The outcome of the three clusters indicates that growth firms more or less enters a pathway of developing FM; some firms will never apply FM in a particular extent whereas other use it and develop it in harmony with the growth of the firm. It can be argued that firms that have applied the pathway of FM have also more rapidly been classified into the growth criteria of the Gazelle list; however, this study does not reveal a direct causal relationship between FM and rapid growth.

The propensity to rent or to own office space has significant difference in the cluster, industry sector and age perspectives but not the size perspective. Climate and

acoustic issues have significant differences in the size and cluster perspectives but not industry sector and age perspectives.

The survey has revealed following location conditions of the growth firms:

- office location in city cores are clusters and sectors dependent; and
- offices in rural area are sector dependent and size dependent (number of employees) and offices in business parks are cluster dependent.

It can be further discussed how another choice of empirical material would give other clusters like a comparative study of "non growth firms".

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Appendix 1. Explanation to the variables and the assigned values for the database (SPSS)

Q1. Age: The ages of the firms counted from 2005.

Q3. Was the company CEO during 1998-2003 also the founder of the company? (SPSS values: 1 – yes, 2 – partly, 3 – no).

Q4. Average office area of the company during the 1998-2000 and 2001-2003 periods (m^2) (SPSS values: $1 = $ " < 250", $2 = $ "250-499", $3 = $ "500-749", $4 = $ "750-999", $5 = $ "1,000-1,499", $6 = $ "1,500-1,999", $7 = $ " $\geq 2,000$").

Q8. How many per cent of the employed worked in an office setting? (SPSS values: $1 = $ "0-20", $2 = $ "21-40", $3 = $ "41-60", $4 = $ "61-80", $5 = $ "81-100").

Q12 and *Q13* are recoded in the database afterwards from larger questions (SPSS values: 1 – "one person in the company", 2 – "two or more").

Q12. Number of persons that were responsible for procuring (e.g. renting) office space.

Q13. Number of persons that were responsible for purchasing office facility services? (e.g. cleaning, space planning, catering, building maintenance) (one or more alternatives).

Q14. Where has the office(s) been situated? (one or more alternatives) (SPSS values: 1, 0: city core, 1, 0: suburb, 1, 0: rural area, 1, 0: company park, 1, 0: other localization).

Q15. At how many addresses has the company had offices at the same time? 1 – "one address", 2 – "two addresses", 3 – "three addresses", 4 – "four or more addresses".

Q17. How much percenttage of the office space was rented? (SPSS values: 1: 0-20, 2: 21-40, 3: 41-60, 4: 61-80, 5:81-100).

Q19, *Q20*, *Q21*, *Q22*, *Q23*, *Q27*, *Q29*, *Q30*, *Q32* and *Q33* represent corresponding statements valid for the time period 2001-2003 in the questionnaire with qualitative scale 1-5, where "1" – "I disagree entirely", and "5" – "I agree entirely" and is conformingly coded to the same values in SPSS (0 – "unknown").

Statements

Q19. "We were good at predicting our office space needs"

Q20. "Staff experiences were important when doing office alterations"

Q21. "The founder's earlier experiences had an impact on our office design"

Q22. "Our office (spaces and equipment) supported distance work"

Q23. "Our office (spaces and equipment) supported project work in teams"

Q26. "It was important to be able to have informal meetings inside and outside the offices"
Q27. "We experimented with new approaches to work and workplace design"
Q28. "The indoor climate and acoustics were satisfactory in our offices"
Q29. "The image of our offices was more important than fulfilling practical needs"
Q30. "Layouts and technology (e.g. mobile walls, IT) made the offices flexible"
Q31. "Our organization became more hierarchical with divisions and increased specialization"
Q32. "We had to search for a long time to find the right providers of facility services"
Q33. "Our contracts for facility services were flexible"

Secondary data
Number employees 2002: The fiscal year of 2002
Turnover 2002 × 1000 SEK: The fiscal year of 2002
Change of turnover (four years) 1999-2002 (per cent)
Change of employees (four years) 1999-2002 (per cent)

Appendix 2

Group	Code (count respondents)	Major categories (count respondents)	Examples of respondent firms
0	01111-05025 (2 firms)	(A) Agriculture, hunting and forestry (2) (B) Fishing (0)	
1	10100-19300 (11 firms)	C Mining and quarrying (0) D(A-C) Manufacturing of: (A) food products; beverages and tobacco(11), (B) textiles and textile products (0), (C) leather and leather products(0)	15810 Manufacture of bread; manufacture of fresh pastry goods and cakes (3 firms)
2	20101-29720 (40 firms)	D(D-K) (D) Manufacture of wood and wood products (3), (E) pulp, paper and paper products; publishing and printing (5), (F) coke, refined petroleum products and nuclear fuel (0), (G) chemicals, chemical products and man-made fibres (1), (H) rubber and plastic products (3), (I) non-metallic mineral products (1), (J) basic metals and fabricated metal products (18), (K) Manufacture of machinery and equipment (9) n.e.c.	28510 Treatment and coating of metals (5 firms) 28520 General mechanical engineering (7 firms)
3	30010-37200 (13 firms)	DL Manufacture of electrical and optical equipment (7) DM Manufacture of transport equipment (6) DN Manufacturing n.e.c.	

(*continued*)

Table AI.

Group	Code (count respondents)	Major categories (count respondents)	Examples of respondent firms
4	40110-45500 (80 firms)	E Electricity, gas and water supply (1) F Construction (79)	45110 Demolition and wrecking of buildings; earth moving (10 firms) 45211 General construction of buildings (20 firms) 45250 Other construction work involving special trades (7 firms) 45310 Installation of electrical wiring and fittings (12 firms) 45331 Installation of heating and sanitary equipment (8 firms) 45332 Installation of ventilation equipment (4 firms) 45441 painting (6 firms)
5	50101-55529 (80 firms)	G Wholesale and retail trade; repair of motor vehicles, motorcycles and personal and household Goods (72) H Hotels and restaurants (8)	51840 Wholesale of computers, computer peripheral equipment and software (6 firms) 51879 Wholesale of machinery for industry, trade and navigation n.e.c. (4 firms) 52112 Retail sale in other non-specialized stores with food, beverages and tobacco (4 firms) predominating 55300 Restaurants (4 firms)
6	60100-67202 (44 firms)	I Transport, storage and communication (41) J Financial intermediation (3)	60240 Freight transport by road (23 firms)
7	70110-75300 (101 firms)	K Real estate, renting and business activities (101) L Public administration and defense; compulsory social security (0)	72220 Other software consultancy and supply (10 firms) 74202 Construction and other engineering activities (25 firms) 74701 Cleaning of premises (8 firms)
8	80101-85329 (13 firms)	M Education (3) N Health and social work (10)	85122 Medical practice activities, not at hospitals (4 firms)
9	90010-99000 (3 firms)	O Other community, social and personal service activities (3) P Activities of households (0) Q Extra-territorial organizations and bodies (0)	90030 Sanitation, remediation and similar Activities (3 firms)

Table AI.

Appendix 3

SNI group	Respondents		Non-respondents		Whole population	
	Freq.	Per cent	Freq.	Per cent	Freq.	Per cent
0	2	0.5	8	1.4	10	1.0
1	11	2.8	9	1.6	20	2.1
2	40	10.3	62	10.7	102	10.5
3	13	3.4	23	4.0	36	3.7
4	80	20.7	104	17.9	184	19.0
5	80	20.7	158	27.2	238	24.6
6	44	11.4	56	9.7	100	10.3
7	101	26.1	135	23.3	236	24.4
8	13	3.4	15	2.6	28	2.9
9	3	0.8	10	1.7	13	1.3
Sum	387	100	580	100	967	100

Table AII.
Proportions of the ten
SNI/NACE groups

Appendix 4. Frequencies of the ten SNI groups

SNI group	Cluster 1		Cluster 2		Cluster 3		Total respondents		Whole population	
	Count	Per cent	Count	Per cent	Count	Per cent	Count	Per cent	Count	Per cent
0	1	0.6	1	1.0	0	0.0	2	0.5	10	1.0
1	7	4.0	1	1.0	3	2.9	11	2.9	20	2.1
2	14	8.1	9	9.3	17	16.2	40	10.7	102	10.5
3	6	3.5	3	3.1	3	2.9	12	3.2	36	3.7
4	43	24.9	11	11.3	23	21.9	77	20.5	184	19.0
5	42	24.3	17	17.5	16	15.2	75	20.0	238	24.6
6	19	11.0	11	11.3	13	12.4	43	11.5	100	10.3
7	37	21.4	39	40.2	24	22.9	100	26.7	236	24.4
8	4	2.3	4	4.1	5	4.8	13	3.5	28	2.9
9	0	0.0	1	1.0	1	1.0	2	0.5	13	1.3
Total	173	100.0	97	100.0	105	100.0	375	100.0	967	100

Table AIII.
The frequencies of the ten
SNI groups within each of
the extracted clusters of
firms

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