Imprinting and the Position of Women in Organizations

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Introduction

It is a well know and well published fact that, compared to men, there are relatively few women in top positions (Fischlmayr, 2002; Goodman, Fields, & Blum, 2003; Holst, 2003; Oakley, 2000). For instance, in the Netherlands the percentage of women on the managing board of directors of the 25 largest companies was 0.9 in 2003 (Portegijs, Boelens, & Olsthoorn, 2004) (for the 100, 500, and 5000 largest companies the percentage women on the managing board of directors was respectively 3.3, 3, and 3.6 (Portegijs, Boelens, & Olsthoorn, 2004)). The supervisory boards of the largest companies in the Netherlands also show a low percentage of women participation (7, 6.1, 5.2, and 4.1 in 2003 for respectively the 25, 100, 500, and 5000 largest companies (Portegijs, Boelens, & Olsthoorn, 2004)).

Many explanations exist on why females do not seem to reach high positions in companies, and these explanations concentrate mostly on the top management position. The reason for this is that there is a significant difference between the participation of women in management positions in general and in top management positions. The overall management participation of women in the United States of America was 36.7 % in 2004 (U.S. Department of Labor & U.S. Bureau of Labor Statistics, 2005), while in the same year women made up only 23.3 % of the chief executives and 26.7 % of the general and operations managers (U.S. Department of Labor & U.S. Bureau of Labor Statistics, 2005). Important to note is that women made up al-most half (46.5 %) of the labor force in 2004 (U.S. Department of Labor & U.S. Bureau of Labor Statistics, 2005). Although overall these figures do not look that dramatic, there is considerable difference between large and small companies, among the 1997 Fortune 500 companies there were only two female CEOs (0.4 %) (Oakley, 2000).

Different authors seek explanations for this lack of female top managers; mostly in what is called *the Glass Ceiling* (Goodman, Fields, & Blum, 2003; Oakley, 2000). The glass ceiling is a “transparent barrier which prevents women from moving up the corporate ladder past a certain point” (Oakley, 2000, p. 321). The barriers that keep the glass ceiling intact are divided in to “two very different categories” (Oakley, 2000, p.

322), barriers created by corporate practices (relatively easy to change) and barriers created by behavioral and cultural causes (relatively hard to change) (Oakley, 2000).

Some authors search for an explanation in women themselves (Anon., 2001; Fischlmayr, 2002; Fletcher, 1999). Women's self-assessments in 360-degree feedback is lower than the assessments their own bosses give them (Fischlmayr, 2002; Fletcher, 1999). For international management carriers not only are there barriers created by the women's environment ("personal managers' are reluctant to decide on a female candidate" (Fischlmayr, 2002, p. 775), "because of cultural factors, women cannot be sent to certain regions, or under difficult circumstances only" (Ibid., p. 775), and "personnel managers have stereotypes in their minds, according to which they often make decisions" (Ibid., p. 775)). There are also self-established barriers ("some women have limited willingness to relocate" (Ibid., p. 776), "partnership is the main reason why many women are reluctant to relocate" (Ibid., p. 776) (this is however not supported by research in Germany that found almost all males in senior positions married against only half of the women (Holst, 2003)), and "women are often a barrier to their own career as they behave according to gender-based role models" (Fischlmayr, 2002, p. 777)).

It is suggested that feminine characteristics are an asset to a leader (Epitropaki & Martin, 2004; Fletcher, 2004; Korabik, 1990; Rickards & Clark, 2006). Both transformational[1] and postheroic[2] leadership are associated with feminine traits (Epitropaki & Martin, 2004; Fletcher, 2004). Although the willingness of women to share power and information, by including others in the decision-making process, might be an asset in middle management, it is not a trait one would expect of the top management (Oakley, 2000).

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[1] "The behaviors most commonly associated with transformational leadership include articulating a compelling vision of the future of an organization; offering a model consistent with that vision; fostering the acceptance of group goals; and providing individualized support, intellectual stimulation, and high performance expectations." (Wang, Law, Hackett, Wang, & Chen, 2005, pp. 420 - 421)

[2] In the literature postheroic leadership is viewed as; "practice: shared and distributed" (Fletcher, 2004, p. 648), "social process: interactions" (Fletcher, 2004, p. 649), and "learning: outcomes" (Fletcher, 2004, p. 649)

Besides organizational size, organizational age is also considered a factor in determining the number of females in top positions (Goodman, Fields, & Blum, 2003). Goodman, Fields, & Blum explain this thought by suggesting that:

1. "Older organizations may be less likely to adopt a culture that values diversity" (Goodman, Fields, & Blum, 2003, p. 482)
2. "Placing women in top management positions reflects organizational change and deinstitutionalization of men in top management, which are inconsistent with the inertia that often characterizes older organizations" (Goodman, Fields, & Blum, 2003, p. 482)

Their hypothesis, "the younger the establishment, the more likely it will have women in top management positions" (Goodman, Fields, & Blum, 2003, p. 482), was however not supported by their data.

I would, however, suggest that we should not expect to see a direct correlation between age of the organization and women in top positions. Rather, I would suggest that we will see a difference between the different time periods organizations were founded. An organization contains an echo from the past, from its environment at the time of its founding, imprinted within its very essence. This *Imprinting at Founding* (Carroll & Hannan, 2005; Romanelli, 1991), or *environmental imprinting* (Romanelli, 1991), has been researched by many authors, for instance (for a short overview of work before 1991 see Romanelli (1991)), the relation between separate periods of development and four strategies (Boeker, 1987).

Technical considerations

Organizations are open systems that engage in "various transactions with their environments" (Kimberly, 1975, p. 1), an organization is thus part of a bigger system (Katz & Kahn, 2005; Senge, 2005). It thus seems then that closely after founding part of the organization, it loses its connection with the environment; otherwise an organization would adapt to the changes of the environment, making the organizational structure of organizations operating in roughly the same environment, but of different vintage, the same. The structure of an organization becomes relatively stable be-

cause the form of an organization at founding becomes institutionalized and makes the organization function effectively (Romanelli, 1991).

Imprinting at founding as the explanation of the organizations structure is not, however, the governing theory of organizational success, there is more than the environment that makes an organization succeed or fail (just as there is more then the environment that makes great men great (James, 1880)). Partly this is captured in the entrepreneur (Boeker, 1987), partly maybe by a more organizational genetics view (Romanelli, 1991), which is more evolutionary, and there are probably more factors that make organizations founded in the same environment differ.

in his research of the semiconductor industry Boeker found that firms founded between 1958 and 1966 were significantly more likely to adopt first-mover strategies. Firms founded between 1974 and 1979 were more likely to adopt low cost strategies, and firms founded between 1980 and 1984 where most likely to adopt a niche strategy (Boeker, 1987). However he expected that firms founded between 1967 and 1973 would be more likely to adopt second-mover strategies, which was not supported by his data (Boeker, 1987).

Using the imprinting at founding theory it can be theorized that the two very different categories of barriers indicated by Oakley (2000) are not so very different after all. The barriers created by corporate practices are imprints from barriers created by the behavioral and cultural causes at the time of the organizations founding. The difference Oakley suggested in the removal of this barriers (barriers created by policy are easier to remove then barriers created by behavioral and cultural causes (Oakley, 2000)) might also not exist, after all “imprinting matters only if a bad imprint is hard to remove” (Jovanovic, 2001, p. 113).

Boeker based his time periods on the difference in the industrial environment (Boeker, 1987). I will base my periods on the feministic emancipation waves in the Netherlands. Two feministic waves are distinguished, the first wave from 1870 to 1920 (some authors put this period from 1880 to 1919 (Hendriks, 2006)), the second wave from 1965 to the mid 1980’s (Waard, 1992).

We can set the highpoint of the first wave on 1919, when the women's suffrage bill was past (Hendriks, 2006; Waard, 1992; Wikipedia Contributors, 2006b)[3]. I will take 1920 as the upper boundary of the organizations with least women in top positions for the Netherlands. It would be almost impossible to use the year of women's suffrage as an upper bound in the whole world since the year varies enormously, for instance New Zeeland was the first country with unrestricted women's suffrage (active and passive voting rights) in 1893 (Wikipedia Contributors, 2006c). In the United States of America 1920 was the year of unrestricted women's suffrage (Wikipedia Contributors, 2006c), in Belgium it was not until 1948 (Wikipedia Contributors, 2006b), and there are still countries without women's suffrage.

Determining the highpoint of the second wave is more difficult. In 1975 a bill was past that ratified a more then 20 year old covenant that men and women should be rewarded equally for work of the same value (Opzij, 2006). An other important year is 1980, a bill for equal treatment of men and women on the work floor, education, social security etc was passed (Opzij, 2006). Because both of these changes are significant I will choose 1980 as the upper boundary for the second period.

This all leads to the following hypothesis:

Hypothesis 1

In the Netherlands, organizations founded before 1920 will have fewer females in high positions then organizations founded between 1920 and 1980, and organizations founded after 1980 will have more females in high positions then organizations founded between 1920 and 1980.

As a supplement to this I will look at forty-two United States Chemical companies from data gathered in an informal survey by Chemical & Engineering News (Tullo, 2001). Of the thirty-eight companies from which a founding year could be found, only thirteen were founded after 1920, and only three after 1980, with none in the period

[3] Unlike in most countries, women in the Netherlands first received passive voting right (the right to be elected) in 1917 (Waard, 1992; Wikipedia Contributors, 2006b) and active voting right (the actual right to vote) in 1919 (Hendriks, 2006; Waard, 1992; Wikipedia Contributors, 2006b).

between 1940 and 1981. Therefore I will not take a look at second wave feminism in the United States, and only distinguish between two types of organizations, organizations established till 1920 and after 1920.

Hypothesis 2

In United States of America, organizations founded before 1920 will have fewer females in high positions then organizations founded after 1920.

Result

Although I hoped I could easily obtain data on the number of women in top positions in the Netherlands, this data does not seem to be readily available. Also an attempt to obtain enough information form organizations websites was not successful. Therefore unfortunately hypothesis 1 will not be tested, at least not until more time to collect data is available.

The data to test hypothesis 2 comes from Tullo (2001), Tullos' data was supplemented by the year the company was founded, and the percentage of women on the Board of Directors and on the Top Management level was calculated per company. For the data see the appendix.

In organization founded after 1920 6.35 % (stdev = 7.01) of top management positions were filled by women, in organizations founded till 1920 6.15 % (stdev = 7.45) of the top management positions were filled by women, the Board of Directors consist of 9.62 % (stdev = 7.58) women for organizations founded after 1920, and 11.36 % (stdev = 5.33) women for organizations founded till 1920.

The data does not support hypothesis 2. Not only is the percentage of women in top management positions roughly similar and the percentage of women on the Board of Directors higher firms from the first period, the standard deviation is also to high to make the numbers representative.

There are different reasons why the data found does not correlate with our expectations. First, there is the so called *survivorship bias* (Jovanovic, 2001), meaning that only organizations that are the fittest survive. Since there is survival of the fittest amongst firms, the survivorship bias could be seen as a sort of *natural selection*. The firms that have survived might be more open to structural change.

Secondly, there are a couple of problems with the data:

1. The size of the sample is to small and only focuses of very large organizations, the data is thus not representative.

2. The founding year is subject to *interpretative flexibility*, organizations merge with other organizations, split up, spin-off and what have you. It is suggested that the year an organization becomes incorporated is a good measurement for its founding, since it requires “a strong commitment by the founder(s) to build and maintain an ongoing organization” (Singh, House, & Tucker, 1986, p. 594), but this will not solve all these problems.
3. Although Tullo talks about “major U.S. chemical companies” (Tullo, 2001, p. 19) not all of them find there origins in the United States. For instance, Rohm and Haas is originally a German company (Rohm and Haas, 2006).
4. Tullo categories the organizations as chemical companies (Tullo, 2001), which might be correct for his survey. However, some organizations operate in multiple industries, for instance General Electric is mostly a technology and services company (Wikipedia Contributors, 2006a).

   Female participation in different industries varies enormously, in the Netherlands during the year 2004, for instance, almost 80 % of the workforce in the health industry is female against less then 10 % in construction (Portegijs, Boelens, & Olsthoorn, 2004). In the United States we see similar tendencies with 79.2 % of the workforce in the health care and social assistance industry comprised of women in 2004 and only 9.7 % in the construction industry (U.S. Department of Labor & U.S. Bureau of Labor Statistics, 2005). Comparing organizations of different industries is like comparing apples with oranges.

Another consideration, at least in for data collected in the Netherlands, is that older firms are mostly family businesses, and as such have a higher change of having women, in this case a relative, on a high position in the firm (Hezewijk, 1997; , 1999).

Further considerations

It seems there is a problem with data collected about women's participation in organizations' top positions; they are measured in percentages of the total top. This, however, seems strange, we can not expect a close to equal participation of females in top positions of organizations that operate in industries were women are largely underrepresented, for instance, the construction industry (only 9.7 % of the workforce in the construction industry in the United Stated was female in 2004 (U.S. Department of Labor & U.S. Bureau of Labor Statistics, 2005)).

Table 1 shows the participation of women in different industries and on different levels in the Netherlands in 2004 (Bolte, 2005). The odds seem to be against women.

Table 1 Women in different industries and on different levels

Industry	Percentage of women			
	Total	Directors	First level	Second level
Oil and Chemical	17	3	12	17
Transportation and communication	40	7	16	22
Business services	38	8	20	35
Healthcare	79	7	43	52
Media	53	26	33	38
Government	36	16	n/a	14

But we are looking at the figures in the wrong way. The total percentage of women in the industry represents an absolute number of women compared to the absolute number of man and women in the industry, instead of the total percentage of Full Time Equivalent (FTE) worked by women compared to the total FTE worked by men and women in the industry. Table 2 takes a look at the hours per week paid labor per woman and man. And this seems to be the cause in all the research reviewed for this paper.

Table 2 Hours in work week (absolute numbers x 1,000)

Hours per week	Women	Man
< 12	551	270
12 – 19	546	104
20 – 34	1409	480
35 >	997	3578

We should not base the percentage of women and men in top positions within an organization based on the absolute number of top positions and the absolute number of people from the different sex working in one of these top positions, as is done in most research today. Instead we should calculate the total FTE women, the total FTE man, the total FTE women in top positions, and the total FTE man in top positions in an organization and using this to determine the percentage of the total FTE women and the percentage of the total FTE man working in top positions within this organization, comparing these figures will reveal what is really going on.

The percentage of women professors at the University Maastricht in 2003, was 3.5 % (Universiteit Maastricht, 2004), males thus occupied 96.5 % of all professor positions. But we have to note that women occupied only14.5 % of all scientific positions in 2003 (Universiteit Maastricht, 2004). If we thus look at the difference between male and female professors as product of the absolute number of males and females on scientific positions we see that 49.7 % of men and only 10.4 % of women in scientific positions are professors. To fix this problem 'only' 15.2 FTE women in scientific positions should be promoted to a professor position, instead of 109.3 FTE[4] which should be promoted if we would look at the numbers in the old way. What is also clear is that women are underrepresented in the overall scientific field at the University Maastricht, but this is a different problem, and requires a different solution.

The appendix contains a questionnaire that could service as a frame work in collecting the correct data.

[4] The number of male professors would be maintained at the same level (113.3 FTE)

Conclusion

Although hypothesis 1 was not tested and hypothesis 2 was not proven, we cannot conclude that therefore imprinting at founding does not have an effect on the participation of women in top positions. There are other factors at play that color the data collected, survivorship bias, the sample size is too small and only focuses on very large organizations, problems with setting the founding year, the firms were not all originally from the United States, and the data was collected from companies operating in multiple industries.

Of the five problems the last four can be resolved by;

1. Collecting data from a large group of organizations with different sizes
2. Focusing on the year the mean part of the organization was incorporated
3. Collecting data from companies originally from the same country, or collecting data from a large group of companies originating from different countries
4. Collecting data from companies active in only one industry, collecting data from companies with the same mean industry, or collecting data from a large cross industry group of companies

However, there is no successful way to deal with the survivorship bias, it is there and we have to learn to live with it. There are probably statistical ‘tricks’ that we could use to fill in some blanks, but can this really be a substitute for real data and facts? I think not.

Since there is proof for imprinting at founding of different aspects of an organization, for instance, strategy, it is too soon to give up hope. When enough representative data is collected we might still find that the position of women in an organization is an echo from the past. Understanding the problem is the most important step in coming to a solution, if imprinting at founding is indeed one of the causes of the lack of women in top position we know that the company does not hold them back on purpose. Understanding this might foster policies that are more effective to get a representative percentage of women in top positions, a percentage however based on the

absolute Full Time Equivalent of women in the organization, not merely on the absolute number of top positions.

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Appendix

Data of the forty-two chemical companies

Table 3 List of women in top positions in Chemical Companies

Firm Name	Board of Directors			Top management			Founded[5]
	Female	Total	% Women	Female	Total	% Women	
Air Products & Chemicals	1	14	7.14	0	7	0.00	1940
Albemarle	1	9	11.11	0	16	0.00	1887[6]
Alcoa	2	11	18.18	1	14	7.14	1888
Arch Chemicals	0	7	0.00	1	12	8.33	n/a
Ashland	2	12	16.67	0	14	0.00	1924
Cabot	1	13	7.69	0	8	0.00	1890
Cambrex	2	11	18.18	1	15	6.67	1981
Chevron	1	9	11.11	1	9	11.11	1879
Crompton	1	8	12.50	1	18	5.56	1840
Cytec Industries	1	7	14.29	0	8	0.00	1993
Dow Chemical	2	15	13.33	0	10	0.00	1897
DuPont	3	13	23.08	1	5	20.00	1802
Eastman Chemical	1	11	9.09	2	11	18.18	1920s
Engelhard	1	8	12.50	0	7	0.00	n/a
Ethyl	1	7	14.29	2	18	11.11	1923[7]

[5] The founding year and comment added as footnotes was found on the website of the organization, the parent organization, or the organization to which this organization has now merge, they will not appear in the reference list. I have taken the oldest year of the organizations origins, some organization exist out of numerous merged organizations.

[6] Founding of the Albemarle Paper Manufacturing Company, that acquired the Ethyl Corporation, thirteen times its own size, in 1962

Ferro	1	11	9.09	0	8	0.00	1919
FMC	1	13	7.69	1	12	8.33	1904
H.B. Fuller	2	12	16.67	1	17	5.88	1887
General Electric	4	19	21.05	0	21	0.00	1892
Georgia Gulf	0	8	0.00	0	7	0.00	n/a
Goodyear	1	13	7.69	1	23	4.35	1898
W.R. Grace	1	6	16.67	0	5	0.00	1854
Great Lakes Chemical	0	9	0.00	0	8	0.00	1936[8]
Hercules	2	14	14.29	1	11	9.09	1912
Honeywell	1	13	7.69	0	7	0.00	1893[9]
IMC Global	1	8	12.50	3	13	23.08	1909
Intl. Specialty Products	0	6	0.00	1	6	16.67	1840
Kerr-McGee	2	11	18.18	2	11	18.18	1929
Lubrizol	2	11	18.18	1	16	6.25	1928
Lyondell	1	9	11.11	1	10	10.00	1866[10]
Millennium	0	8	0.00	0	8	0.00	1866[11]
Mississippi Chemical	0	13	0.00	1	9	11.11	1940
NL Industries	0	7	0.00	1	6	16.67	n/a
Occidental	1	11	9.09	0	16	0.00	1920s
Phelps Dodge	1	10	10.00	0	8	0.00	1834
PPG Industries	1	10	10.00	0	5	0.00	1883
Praxair	1	10	10.00	0	6	0.00	1907
Rohm and Haas	2	15	13.33	1	8	12.50	1907
Solutia	1	10	10.00	2	10	20.00	1901

[7] Founding of the General Motors Chemical Corporation, a joint venture between General Motors and Standard Oil of New Jersey. This is the same Ethyl Corporation that was acquired in 1962 by Albemarle.

[8] Founding of Great Lakes Chemical Company, later acquired by McClanahan Oil of unknown founding year, they formed Great Lakes Oil and Chemical Company

[9] Honeywell Heating Specialty Co was established in 1906 and merged in 1927 with the Minneapolis Heat Regulator Company founded in 1893

[10] Founded in 1984 as part of ARCO (Atlantic Richfield Company), ARCO was founded in 1866)

[11] Millennium is part of Lyondell and thus shares the founding year

Stepan	0	7	0.00	1	9	11.11	1932
Sterling Chemicals	0	6	0.00	0	4	0.00	1986
Vulcan	1	11	9.09	0	17	0.00	1909

Questionnaire

Company name: ……..

Year that the company became incorporated[12]: …….

Industry of the company at founding: ……..

Current most important industry: ……..

Total Full Time Equivalent (FTE) employers: …….

Total FTE male employers: …….

Total FTE female employers: …….

Total FTE male in management positions: …….

Total FTE female in management positions: …….

Total FTE male in top management positions: …….

Total FTE female in top management positions: …….

Total FTE male in board of directors: …….

Total FTE female in top board of directors: …….

[12] For spin-offs please indicate the incorporation year of the parent company, for merged companies please enter the incorporation year of the company largest at merger