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Engineer Women Take Top Level Management in Brazil

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Abstract

Scientific and technological advancements have brought deep changes into civilization due to new rules, new values, and a new order in society. As we turn into the 21st century, research has found that organizations often seek engineers for their top management level positions due to their ability to solve problems and their ease with mathematics. Engineer women are found to fulfill 19.9 percent of these executive positions in Brazil, regardless of the hostile male environment. Having held a lower position until the 1800s in the Western world, by the beginning of the 20th century, women obtained the rights to vote, to study, and to work. Brazilian women were no exception. They obtained the right to vote in 1932. In the 1960s and 1970s, industrialization along with the rapid economic development opened the way to more effective female participation in the production process. In the following decades, women aggressively proceeded to take over job openings in professions that had traditionally been seen as male professions in Brazil. They soon started to take more intellectual jobs. Each day, more women entered engineering schools. They aimed at meeting requirements for taking better work positions. This process helped open up the way for some engineer women to take management careers in very high managerial positions in companies. Thus, for the scope of this work, our questions relate to engineer women in leadership positions. The objective of this work is examining engineer women's professional journey in their pursuit for reaching top management positions in a competitive organizational environment. Using a qualitative approach through non-directive open interviews, we examine histories of Brazilian women engineers who have reached top level positions in different organizations and their professional paths to the top along with their attributes and/or determination to grasp powerful managerial positions.
Key-words: Engineer women, organizational top level management, leadership

Introduction

Women's societal position has traditionally been lower than men, especially in most countries of slow development. Brazilian society is no exception. Brazilian women's journey towards citizenship has not been an easy task. The first European colonists in Brazil raised their families under a strict patriarchal system. Following the Moure influence, women were confined to their housekeeping duties, involving the house itself and taking care of children. Women were not even allowed to leave the home by themselves [1].

Along the centuries, struggling against every kind of discrimination, Brazilian women faced their first two big challenges: obtaining the right to education and the right to vote. In the last century, Brazilian women more aggressively took over job openings in professions that had traditionally been seen as male professions. They also took up scientific and technological professions, such as computer science and engineering. Some of these women have even reached the highest managerial positions in companies.

Thus, for the scope of this work, our questions relate to women taking up technological careers, more specifically, engineering careers, and their route towards leadership in Brazilian companies. The objective of this work is examining factors and/or attributes that may have contributed to different women reaching managerial positions. Using a qualitative approach through Moscovici´s non-directive open interviews [2] [3], we examine histories of women engineers in Brazil and their professional trajectories to leadership in a man's world.

Before reporting our findings about Brazilian engineer women who have reached managerial positions in their companies, we will briefly tell the history of Brazilian women within Brazilian society, and quantitatively present the situation of women and men taking up scientific careers during the last decade.

Brazilian Women History

Only in the second half of the 19th century would parents allow their daughters to acquire some cultural abilities such as reading, writing, or performing music. In 1827, Brazil establishes the first law pertaining to women education; girls would be admitted into elementary school with the objective of qualifying women for a better marriage so that those women could better serve their future husbands [4]. In 1879, Brazil opened higher education institutions for women. However, young girls who chose such a path suffered social disapproval and oppression. In 1887, Rita Lopes was the first woman to become a physician in Brazil [5].

The beginning of the 20th century brought some hope. Brazilian women as a group had been fighting hard for women's right to vote. Women obtained that right in 1932 in Brazil. In 1963, under a bad economic situation, for internal reasons (income inequality and high inflation), and for external reasons (ideological conflict caused by the Cold War, as well as under strong American influence over the Brazilian military people), the country, at the eminence of a civilian war, was subjected to an authoritarian military government. As a result, the working class could not vindicate better salaries or benefits.

By the end of the 1960s, with a non-democratic system of government forbidding both people and the media from opposing governmental actions or decision, the country entered a rapid economic development phase, the so-called "Brazilian Miracle." Such economic development opened way to improved and more effective female participation in productive processes. Actually, such growth could not have happened without an enormous increase in the labor force, which could only have come from women's entrance into the labor market.

Women entered the labor market and soon worked their way up to more intellectual jobs (requiring intellectual abilities). Each day, a higher number of women entered the university. They aimed to be capable to meet requirements for taking new work positions. They also entered the teaching and research area within the Brazilian university framework.

At the university level, an increase in the number of courses would also increase the number of seats available, as well as increase chances for more women to enter the university at both ends—as students and as professors, in every field of knowledge. In a research study of 1,509 executives carried out by Catho Group, expert professionals in human resources, revealed that the percentage of women's participation in higher managerial positions shifted from 3.5 percent in the 1980s to 9.2 percent in the 1990s. Another survey, carried out from April 1994 to April 1995 with those who had registered with the group, showed that about 295, 000 executives, or 19.9 percent, were women. Each day, this process helps open up the way for women to take up technological careers [6].

Brazilian Women's Participation in Scientific Areas in Numbers

Actually, the demand for women's labor fostered women's participation in the labor force in each sector of the Brazilian economy. The need to fulfill that demand with qualified labor fostered both the appearance of new private colleges and an increase in the availability for enrollment within federal government-sponsored universities, which are completely free for students.

Women could then take over positions that required a college degree. Thus, their participation would increase in sectors of highly technical jobs. This improvement would have a strong impact over Brazilian women's condition as a whole. Industrialization, along with the modernization process within the Brazilian economy, caused women's labor to shift from the primary sector to the secondary sector. Naturally, this process also affected the third sector, in areas related to education, health, social services, and public administration.

During the 1980s, Brazilian growth was not so steep, but it grew steadily. Table 1 shows the growth of the economically active population by gender and by residence status, urban or rural. Women's participation in the production sector increased in 48.1 percent. In urban areas, the increase reached 53.9 percent, as shown in Table 1. We observed that while the economically active women's population showed a relative growth of 48.1 percent, the economically active men's population showed a relative growth of approximately half, 24.2 percent. Meanwhile, economically productive women in Brazil increased from 31.3 percent in 1981 to 35.2 percent in 1989. This variation confirms women's ascension within the national labor market [7].

At the university level, women's participation shifted from 9 percent in the 1940s and 1950s to 45 percent in 1973. During this time, women's presence was still confined within the so-called female professions, or better, those culturally defined as adequate for women. In general, approximately 70 percent of women's choices for careers were related to the fine arts or human sciences, such as literature, history, nursing, psychology, etc. [8]

In a 1950 census, women made up 0.6 percent of the total engineering population. In 1970, women made up 1 percent. In 1980 and 1990, they increased to 12.7 percent and 17.2 percent, respectively. We can see an increase of approximately 5 percent in a 10-year period. In 1950, SBPC, a scientific organization with membership open for professors and researchers in every area, had 800 members, and 67 were women. In 1970, among those that graduated, 26 percent were women.

Tables 2 and 4 show for 1995 and 1997, respectively, the numbers of men and women in the human sciences area and the engineering area. As we compare Tables 2 and 4, we can perceive that in the human science area, the figures for women grew from 3,110 to 5,245, while those figures for men grew from 2,403 to 3,807. Looking at the same phenomenon but with percentages (Tables 3 and 5) in 1995, in the human sciences area, 565 of researchers were women, increasing to 58 percent in 1997, while the male representation diminished from 44 percent to 42 percent.

Whereas in the engineering area, according to Tables 2 and 4, we can perceive that the number of women shifted from 841 in 1995 to 1,107 in 1997, while the number of men increased from 3,714 to 5,508. Thus, looking at the same phenomenon but with percentages (Tables 3 and 5, 1995 and 1997, respectively), in the engineering area, 82 percent of researchers were men and decreased to 80 percent in 1997, while the female representation increased from 18 percent to 20 percent.

Tables 2 and 4 show the increase in the total number of women. It shifted from 11,259 in 1995 (Table 2) to 14,711 in 1997. Actually, as we compare the columns with the total number of women, according to these tables, we can perceive that the number of women has increased at every age level. If we look at the columns about the field of knowledge, we can also observe that there has been an increase in the number of women in every field. In the biological area, we can even perceive that there has been a decrease in the number of men.

Tables 3 and 5 present the percentages of absolute numbers shown in Tables 2 and 4, respectively, crossing researchers by gender, age, and field of knowledge. Table 5 shows the percentages of women in the different fields of knowledge, while there has been a correspondent percentage decrease for male representativeness. Thus, we can say that there has been a gradual increase in female participation in careers related to the natural sciences and engineering fields. This is important for mentioning because these careers earn the highest salaries and deliver the highest professional prestige.

From 1995 to 1997, these were the percentages referring to the existence of male and female researchers: in the earth sciences, shifting from 74 percent and 26 percent to 71 percent and 29 percent; in the biological sciences, from 51 percent and 48 percent to 49 percent and 52 percent; in the health sciences, from 49 percent and 51 percent to 47 percent and 53 percent; in the natural sciences, remaining at 72 percent and 28 percent; in the humanities, shifting from 44 percent and 56 percent to 42 percent and 58 percent; and in the engineering areas, shifting from 82 percent and 18 percent to 80 percent and 20 percent.

Thus, we can perceive that there has been an increase in female participation in different fields of knowledge; in both earth sciences and biological science, the growth has been 3 percent. In the natural

sciences, the percentages have remained the same, while in the health sciences, the humanities, and the engineering sciences, the growth has been 2 percent.

Table 1

Economically Active Population (PEA) Absolute and Relative Growth in the 1980s, Gender and Residence—Brazil

Housing and Gender	PEA 1981	PEA 1989	Total Increase	Relative Increase
Total	47,488,526	62,513,176	15,024,650	31.6
Male	32,639,339	40,523,550	7,884,211	24.2
Female	14,849,187	21,989,626	7,140,439	48.1
Urban	33,552,512	46440,780	12,888,268	38.4
Male	22,279,413	29,093,194	6,813,781	30.6
Female	11,273,099	17,347,586	6,074,487	53.9
Rural	13,936,014	16,072,396	2,136,382	15.3
Male	10,359,926	11,430,356	1,070,430	10.3
Female	3,576,088	4,642,040	1,065,952	29.8

Source: FIBGE. PNAD 81, PNAD 89.

Table 2

Number of Researchers by Area of Knowledge, Gender, and Age—Brazil, 1995

Age	Total		Earth Sciences		Biological Science		Health Sciences		Natural Sciences		Social Sciences		Engineering Sciences	
	Male	Fem.	Male	Fem.	Male	Fem	Male	Fem.	Male.	Fem.	Male	Fem.	Male	Fem.
24 years or less	46	91	2	7	5	21	3	17	8	8	12	33	16	5
25 - 29 years	690	565	121	73	109	134	73	106	105	53	98	132	184	67
30 - 34 years	2,150	1,473	341	183	320	371	196	304	465	194	252	276	576	145
35 - 39 years	2,916	1,995	458	242	400	473	327	448	603	268	335	354	793	210
40 - 44 years	3,454	2,494	690	267	486	557	349	504	737	355	357	605	835	206
45 - 49 years	3,057	1,796	646	141	459	409	381	330	568	196	457	635	546	85
50 - 54 years	1,911	973	412	74	305	178	252	155	379	103	315	429	248	34
55 - 59 years	1,056	424	192	19	179	80	157	72	234	34	175	210	119	9
60 - 64 years	435	166	54	10	72	42	78	24	81	18	96	70	54	2
65 years or more	323	108	36	4	86	25	59	16	60	7	56	53	26	3
Ndo	1,672	1,174	307	126	175	229	290	292	333	139	250	313	317	75
TOTAL	17,710	11,259	3,259	1,146	2,596	2,519	2,165	2,268	3,573	1,375	2,403	3,110	3,714	841

Source: CNPq/SUP

Table 3
Researchers by Area of Knowledge, Gender, and Age in Percentages—Brazil, 1995

Idade	Total		Earth Sciences		Biological Sciences		Health Sciences		Natural Sciences		Social Sciences		*Engineering Sciences*	
	Masc.	Fem.	Masc.	Fem.	Masc.	Fem.	Masc.	Fem.	Masc.	Fem.	Masc.	Fem.	Masc.	Fem.
24 years or less	34	66	22	78	19	81	15	85	50	50	27	73	76	24
25– 29 years	55	45	62	38	45	55	41	59	66	34	43	57	73	27
30–34 years	59	41	65	35	46	54	39	61	71	29	48	52	80	20
35–39 years	59	41	65	35	46	54	42	58	69	31	49	51	79	21
40–44 years	58	42	72	28	47	53	41	59	67	33	37	63	80	20
45–49 years	63	37	82	18	53	47	54	46	74	26	42	58	87	13
50–54 years	66	34	85	15	63	37	62	38	79	21	42	58	88	12
55–59 years	71	29	91	9	69	31	69	31	87	13	45	55	93	7
60–64 years	72	28	84	16	63	37	76	24	82	18	58	42	96	4
65 years or more	75	25	90	10	77	23	79	21	90	10	51	49	90	10
Not known	59	41	71	29	43	57	50	50	71	29	44	56	81	19
TOTAL	61	39	74	26	51	49	49	51	72	28	44	56	82	18

Source: CNPq/SUP

Table 4
Number of Researchers by Area of Knowledge, Gender, and Age—Brazil, 1997

Age	Total		Earth Sciences		Biological Sciences		Health Sciences		Natural Sciences		Social Sciences		Engineering Sciences	
	Male	Fem.	Male	Fem.	Male.	Fem.	Male	Fem.	Male	Fem.	Male	Fem.	Male	Fem.
24 years or less	237	368	19	24	33	67	39	66	23	16	79	178	44	17
25–29 years	1,004	1,040	111	85	150	202	110	183	152	72	231	396	250	102
30–34 years	2,674	2,163	328	192	366	399	292	436	495	238	508	686	685	212
35–39 years	3,421	2,648	416	262	369	480	439	649	699	283	578	716	920	258
40–44 years	3,842	3,051	579	320	388	543	512	696	766	382	575	826	1,022	284
45–49 years	3,711	2,548	701	200	375	401	523	533	660	258	667	1,018	785	138
50–54 years	2,469	1,482	469	115	268	225	348	251	434	126	528	716	422	49
55–59 years	1,394	688	234	26	175	90	222	122	289	57	283	378	191	15
60–64 years	626	245	65	8	91	47	129	44	108	15	164	129	69	2
65 years or more	427	170	43	4	79	30	83	19	76	19	105	94	41	4
Not known	555	308	61	18	40	36	42	45	244	75	89	108	79	26
TOTAL	20,360	14,711	3,026	1,254	2,334	2,520	2,739	3,044	3,946	1,541	3,807	5,245	4,508	1,107

Source: CNPq/SUP

Table 5
Researchers by Area of Knowledge, Gender, and Age in Percentages—Brazil, 1997

Age	Total		Earth Sciences		Biological Sciences		Health Sciences		Natural Sciences		Social Sciences		Engineering Sciences	
	Male.	Fem.	Male	Fem.	Male	Fem.	Male	Fem.	Male	Fem.	Male	Fem.	Male	Fem.
24 years or less	39	61	44	56	33	67	37	63	59	41	31	69	72	28
25–29 years	49	51	57	43	43	57	38	62	68	32	37	63	71	29
30–34 years	55	45	63	37	48	52	40	60	68	32	43	57	76	24
35–39 years	56	44	61	39	43	57	40	60	71	29	45	55	78	22
40–44 years	56	44	64	36	42	58	42	58	67	33	41	59	78	22
45–49 years	59	41	78	22	48	52	50	50	72	28	40	60	85	15
50–54 years	32	38	88	20	34	40	38	42	78	23	42	38	90	10
54–59 years	67	33	90	10	66	34	65	35	84	16	43	57	93	07
60–64 years	72	28	89	11	66	34	75	25	88	12	56	44	97	03
65 years or more	72	28	91	9	72	28	81	19	80	20	53	47	91	10
Not known	64	36	77	23	53	47	48	52	76	24	45	55	75	25
TOTAL	58	42	71	29	48	52	47	53	72	28	42	58	80	20

Source: CNPq/SUP

Engineer Women in Top Managerial Positions in Brazil

For the present study, the focus has been on factors and/or attributes that have contributed to women engineers reaching leadership positions in their companies. In another paper, we have searched for factors that might have contributed to different women taking up the engineering career. The result of that study showed five important factors: intelligence and an interest in mathematics; exposure to the profession (equipment, processes, gadgets, work place, etc.); the constant encouragement of a loving parent or relative on behalf of the child's growth and development; the presence of a loved one as model in the engineering career; and holding attributes such as perseverance and determination [9].

We interviewed eight women engineers who have reached top managerial positions within their companies, five of whom are actively working in private companies, one who reached managerial positions within the academic world, and two who are retired professionals. In so doing, we could perceive some interesting common points in their professional journeys.

Initially, we found several items that permeated the interviews, such as handling conflict, decision-making, motivation, importance of the group, engineering as a dream, enthusiasm for the job, knowing your job, doing your job, seriousness, friendship, double journey, working overtime, etc. As we proceeded to reduce them, we finally divided our results into five categories: a) important personal characteristics for a woman engineer in leadership positions; b) importance of the leader; c)

importance of group relationships; d) importance of the family for a woman engineer in a top position; and e) female perspectives on their work and position within the company.

a) Important personal characteristics for a woman engineer in a leadership position

Most of these research participants seemed to have put all their efforts into becoming effective professionals. Having an interesting personality, either a powerful or a very calming and concealing one in their day-to-day rapport, or even through their explanations of procedures for solving daily problems, we could perceive attributes such as equilibrium, justice, and ethics. All the interviewees were proud of their jobs and career trajectories. As they spoke about projects and about those under their leadership, they showed enthusiasm, determination, commitment, motivation, competence, trust, friendship, loyalty, and joy.

> *I know they use me for their model… we are a group, but I am their chief, and we can't change that, so, they look up to me, so I need to do and say the right thing because even when I am not there, I know they will remember me…. The other day, a new young female engineer working with me said to me, when telling me about her contact with one of our civil construction suppliers, "I used that same strategy you told us you had used when you started working"… I would never remember I had informally talked to them about that during lunch… but that gave me a good sense you know, that I am doing something right.*
>
> *I try never to be unfair; I may love you, but in my group, I'll never favor you over the others because I think the management is not allowed to act this way, they may go out together for a beer, invite you to their home, but you have to be fair with everyone. I can be very hard with someone if I know they're doing the wrong thing…I will go to hell for fairness and justice.*
>
> *I like challenges, so I took it... I was a little ashamed to face the meeting as a company representative for a subject I did not understand but I took it, I wrote down everything… After the meeting, I was promoted to the position of national representative of the company.*
>
> *Sometimes, if I am lucky, I can leave soon after the regular hours… and I never take the usual 90 minutes for lunch… in fact, I take less than 30 minutes for lunch time.*
>
> *…of course I want them to do everything right… I want their success from the bottom of my heart… therefore I'm very strict on them… and they know I expect them to do the right thing always, because company overview is my job… you know, just checking details on everyone's work… they know I'm concerned with details… so they become concerned too, and this makes it easy for me… because I know they are all concerned about doing the right thing, too.*
>
> *I know they'll only follow my leadership if I act accordingly, I mean… I must provide them with my example of hard work, determination, and love for a well done work…*

b) Importance of the leader

A leader can or cannot be sensible to workers' needs; can work with goals or with people; can be friendly or not; and can or cannot ask for participation for his or her decision making [10] [11]. In this

study, we observed high incidences of strong group feeling pertaining to a democratic way of managing.

> *I like challenges, so I took it... I was a little ashamed to face the meeting as a company representative for a subject I did not understand, but I took it. I wrote down everything… after the meeting I was promoted to the position of national representative of the company… Sometimes, if I am lucky, I can leave soon after the regular hours… and I never take the usual 90 minutes for lunch… in fact, I take less than 30 minutes for lunch time.*
>
> *I value the relationship at the office… I stand for my workers.*
>
> *I had two secretaries when we had that project with the United Nations, and I had to travel a lot… My secretaries said I was always up in the air… so we ended up making a slogan out of that… I mean, whenever I said I am there up in the air, they understood it was urgent… and that spread out to engineers and technicians meaning urgency, you know… They understood something had to be done immediately… and they accepted we had to go for deadlines.*
>
> *I don't know how to say this, but many times, I feel that I act with them the same way I act with my family… I always try to show my children that when I am hard on them, it is for their own sake and for the harmony within the family… So, when something goes wrong with my folks… I mean at the office, you know… as I speak harder, I feel that I am talking to my family… and I always make them understand that when I push them to do things the right way or if I just want them to do a better job… it is because I believe they can do much better… Then I show I trust them, you see.*
>
> *In engineering, we cannot afford bad surprises, you know…so, I always say to my engineers that they may not come to my office and show me a problem…they must always say there will be a problem and show me a set of possible solutions 'cause that is why we want him or her to work in our team…We need their heads and their thinking…that also shows them we are open to their ideas and solutions.*
>
> *When you want people to do a good job, you need to value them and their work… People need to know that they are doing something important… They need to know why it needs to be done, too, and, on top of it, they need to feel that you like what they are doing…So, of course, if they are doing the right thing, you need to tell them that, and you can repeat it, I mean, each time, they do something right, I do not act proud, I congratulate them…"Yes, that is a good job you are doing,"… and they love it… even if it is not perfect, but it is done, you know…Then, next time I explain better, trying to guide better…I know they are gonna try harder and, in general, the result ends up being better… because they want to hear me say it was a good job, you see.*
>
> *…I have no problems in saying I need the person…or I need you to help me on this project… In engineering, we have deadlines, and I always tell them that deadlines can kill you… so we need to work as a team to beat that deadline.*

c) Importance of the group relationship

This study has also shown that the interviewees think it is important to be humble, be equal, create space, make space for every one, care for the group, disseminate trust, and create harmony and feelings of belonging.

> *…of course, I want them to do everything right… I want their success from the bottom of my heart… therefore, I'm very strict on them… and they know I expect them to do the right thing always… because company overview is my job, you know… Just checking details on everyone's work… They know I am concerned with details, so they become concerned, too… and this makes it easy for me… because I know they are all concerned about doing the right thing, too.*
>
> *When you want people to do a good job, you must value them and their work…They must feel what they are doing is valuable for you as their boss…and, on top of it, they need to know that their work is good for the company.*
>
> *My department is very close...everybody is very close...They say it is because we are all alike…I think they say that 'cause I give them enough space for them to present their views, whatever they are. I hear before I say what I think, so, if I like their ideas better, I immediately agree… If I don't, I let one say to the other what they think, instead of myself going against their ideas.*
>
> *I never had any problems with my people…I make them feel we are in a group…I always use an expression I learned from my mother, she liked to repeat this to us, especially in rough times, "we are all in the same boat." This expression has done wonders for me, they already know…On some occasions, I have even heard some of them repeating this to each other…almost meaning "we are together"… or "let's work that, we will make it."*
>
> *… and they know they can lean on me…The truth is that I always try to value my people…for the outside, I mean out of the office, but within the company, my group means myself 'cause I am their director, you see…So, when I talk to them, or even when I talk to my Director, I am always for them… You always know what your people want…and, of course, if they want something I know the company will not do for them, I say it right there so that they will not be embarrassed for any reason…You want your people to feel good… so, they know they can lean on me.*
>
> *… we are nothing by ourselves… The other day, someone suggested that we split the group and divide the projects for better results, I would never agree to that…It would mean disaster for the group…We work with people, not figures, or results… and people are very complex… and if they are functioning well as a group, leave them together and they will go on functioning…If you split them, you never know…*

d) Importance of the family for a woman engineer in a top management position

Interviews also showed the importance of the family for women engineers in top positions. Four of our eight interviewees were married; three of them were divorced; and, one of them was not married. All of them somehow mentioned the importance of their families in their daily life, as if the family was the starting point. Most of those who were married pointed to their husband's part in helping them cope with professional and personal responsibilities.

Yes… Who doesn't want a top position? But for me, I opened my own way…I am right where I would like to be…I love what I do…but it just came naturally as this was a new sector in the company… and I grew with it… I can say that probably nobody knows as much as I do about it in the company…so, I do a good job, but I work very hard, you know, sometimes I ask myself whether I have given more attention to my work than to my family…but thanks to God, and also to my husband's part in this… we have raised our two children and they have turned into two good citizens. I am very proud of them; they have gone through college and are very responsible and very ethical adults.

…my husband has helped me a lot with his incentive all along…about my children…I think we showed them a way of life…Their mother, as everybody else, also got up in the morning, had breakfast, and got ready to go to work…That is life for everyone… without distinctions.

…There is no doubt it is much harder for women…She has the second shift… double journey.

… you know, before your work comes your family…but I have a special husband…He always gives me all the support I need…When we got married, I was still in graduate school, and he was wonderful…then I got pregnant…and he helped me finish school.

e) Female perspective on her work and position within the company

All participants in this research somehow mentioned the existence of a heavier burden on women because of women's double roles as professional and mother. They also showed a clear view of higher responsibility on women's shoulders because women have to show that they can do a better job to survive in a man's world. Moreover, all of these research participants pointed to being satisfied with their profession choice, regardless of their motives for deciding to take up the engineering career. When asked whether they would like to have an engineer daughter, all but one answered that they would.

Yes, I see myself as a leader, and I'm proud of that, but the road has not been easy. I even lost my husband for competence jealousy…I've heard male engineers in the company saying in a low voice when I passed… "She'll be out of here in one month"…and I've been there for more than five years, and everybody likes me; I have good contact with everybody, below or above me…I don't mind others' opinions, I do my job…I know I do it right… and that is what matters.

My male counterparts? Oh, I have made very good friends throughout Brazil, but initially they may look and ask why a woman…People still have their prejudices that women should be home taking care of the children, you know…But as I start working with them, they immediately realize I am talking business…You know, I work very hard…I have worked hard all my life…I started working when I was 14, and my family is German origin with a very traditional work and duty view…so, I learned that and people realize you are very serious about your job by the way you talk to them… So, everywhere I went in Brazil, I never had any problems about being the woman in charge.

… women fill in better for this job…very detailed work….Women are more careful…can deal better with small details.

Of course, I will be hard if it is necessary…A woman needs to show a hard word sometimes, so they know they cannot go out doing whatever they please…But I have never had big problems with that…I have a tradition of always talking… talking openly… so things never get out of hand…Because we are always talking… I am here all the time… sometimes, way over my regular time… and they know that…In fact, if necessary, they will also stay overtime for the sake of a project deadline.

We women are born to get things done…We are able to face challenges to the end.

My husband holds a master's degree…I want to study more…I think we should never stop learning…but now it is more difficult.

I never had any problems with being a man or a woman…I don't care about that…I care about results.

…as women, we have a second journey, caring for the family at home…As women engineers, we have another mission: concealing the professional journey with our individual journey.

Men? Ha! Initially, when they see a woman in a top position, they have doubts…They always do, but they cannot say anything; they are not insane, this would be a crime 'cause discriminating is a crime… and at the job, it is even worse…so they do not say anything, but we women, we are warriors…so, we have to work double to show them we are fit for their job…We cannot fail on anything…'cause if you do, they will quickly criticize you…So, women actually fight harder to get what they want and to reach their goals.

Final Remarks

As we could see, there has been an increase in the percentage of seats being taken by female students in scientific areas, more specifically, in engineering schools in Brazil. Actually, we can perceive a larger percentage of young women deciding to take up engineering careers at every age and school level in Brazil.

This study has shown that participants believe that women need to work harder than their counterparts. However, all of them have also stated that they found no obstacles to managing men and women in a "man's world." Moreover, they have stated that should their daughter want to take up engineering as a profession, all of them, but one, would be very happy about it.

During the interviews, participants were mostly concerned with: 1) stating, through talks and cases, about the way they act with the groups—always with fairness, ethics, justice, enthusiasm, etc. (they know they end up being the model for their teams); 2) showing they care for their team by listening, being there for them, motivating them, etc; 3) showing how important their own family is in the process; and 4) remarking their awareness about their need to work hard and prove that they can do the job, regardless of being women.

Thus, considering the Brazilian professional engineer women who have been interviewed, we could depict their concern with four wide categories. These categories seem to embrace all the concepts that

were present during the interviews: important personal characteristics for a woman engineer in leadership positions; importance of the leader and the group relationship; importance of the family for a woman engineer in a top position; and female perspective on her work and position within the company.

The increase in female participation in scientific areas, especially in engineering, is beneficial for any society because it contributes to a more equitable society. Today, women engineers in Brazilian companies' top management positions signals to a modern society, which can help us visualize a much more democratic society for the future, as we all hope. It is the author's expectation that this qualitative research has shed some light on questions about women engineers taking top management positions in Brazil.

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Biography

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