

Industry 4.0 - A challenge or a risk for the involvement of women in management and business

~ Ph. D. **Cristina Veith** (Academy of Economic Studies, Bucharest, Romania)

E-mail: christineveith@yahoo.de

~ Ph. D. **Daniel Costea** (Academy of Economic Studies, Bucharest, Romania)

E-mail: daniel@thelawchamber.com

Abstract: In the context of "Industry 4.0", applying the principles of diversity management is a very important topic for all developed countries. This paper focuses on the involvement of women in the professional activities of the future. The cultural differences between the developed economies of the world is one of the main causes of the percentage differences related to the involvement and the role of women in ensuring a long term sustainable development. Even if the adoption of regulations intended to increase the number of women in different management positions is discussed at the government level, the culture of each individual organization is a deciding factor for the chances of women's success. Secondary sources consisting of statistical data, scientific articles and relevant sources and materials were used for them. Aspects such as traditions, customs and beliefs influence both the share of women involved in professional life, but also the different level of payment. This leads to another much-debated topic, namely equality in chances and rights. Our country, even though it is not one of the largest economies in the world, has understood the benefits of gender diversity in order to ensure a healthy and sustainable development. This is also the case of the generally man dominated IT sector.

Keywords: Management, IT industry, woman role, Industry 4.0

JEL Classification: M12, M14, M54

Introduction

This subject is widely debated among researchers and specialists, especially the aspect of the difference in chances between women and men in the economic field. Discrimination, equal opportunities for women and men, differences in remuneration and the feminist movement are some of the controversial notions discussed.

In this paper, we make a comparative analysis of the degree of involvement of women in business in different countries compared to Romania. This is done in order to determine the potential development advantages that our country has in the context of the fourth industrial revolution. For this analysis, we considered the involvement of women in management and business in Japan, USA, Germany and Romania. Those countries were chosen based on their major cultural differences, their recent history and their high level of economic development.

In the context of the fourth industrial revolution, or briefly in the context of "Industry 4.0", the challenges facing all economies are particularly important, involving all branches of economic activity. The changes brought about by this new era of digitalization, happen very quickly and demonstrate a wide reach both within companies and in the daily life of every citizen.

During the 2011 fair in Hanover, the term "Industry 4.0" was first presented and opened the way for many debates (Pfeiffer, 2017). "Industry 4.0" aims to initialize the fourth Industrial Revolution. Authors such as Wolfgang Halang, who uses an alternative definition of „the second stage of the third industrial revolution“, because the technological base, the microelectronics, is the same,

have criticized the term. "Industry 4.0" represents an organizational concept, which comprises four principles: interconnection, information transparency, technical assistance and decentralized decisions. Being an organizational and topical concept, it has a direct and inevitable impact on the management of each organization.

The report of the World Economic Forum (WEF) presents that Industry 4.0 presents a higher risk for the jobs occupied by women. The report estimates that by 2026 1,4 million jobs will be affected by digitization in the USA alone. Of these, 57% are jobs occupied by women (WEF, 2018). Generally, in the so-called jobs of the future, the percentage of women is much lower.

The impact of "Industry 4.0" on the jobs occupied by women in Germany

In Germany, during the conference organized in 2018 on the International Women's Day, it was presented that the jobs occupied by women are affected largely than those occupied by men (Waschbusch, 2018). In terms of top management positions, women occupy only 11.7%, and the share in Industry 4.0 is only 7.2%, according to the 2016 Bisnode study (Heinemann, 2016).

A very controversial topic in Germany is if this situation can be improved by the law, which stipulates that women must hold 30% of the mandates of the board of directors of a company listed on the stock exchange. For companies for which this law does not apply and are among the top 200 companies in Germany, we find in top management positions about 8% women. In the case of companies listed on the stock exchange and of companies where the state is a shareholder,

the number of women in top management positions is approx. 13% (Waschbusch, 2018).

An important element is the fact that employers in the IT sector in Germany want to increase the number of women employed in this field. Thus, at present, 17% of all IT employees in Germany are women. For every open position, only every seventh candidate is a woman. This means that only 15% of the candidates are women (BITKOM, 2019). Even though between 2015 and 2017 there was an increase of approx. 4% in the number of female employees in this field and even an increase in management and top management (Waschbusch, 2018), in the last two years the interest of women to enrol, respectively to graduate computer studies has decreased (BITKOM, 2019).

Women in managerial positions in Japan in the context of "Industry 4.0"

Japan is one of the biggest world economies today by nominal GDP, in third place in the world, after China and the United States. Japan's economy is highly developed and market-oriented. It is also the fourth-largest economy by purchasing power parity (PPP) and the world's second largest developed economy. Japan is the world's third largest automobile manufacturer and has the largest electronics industry. Japan is often ranked among the world's most innovative countries (CBRE, 2018). The Bank of Japan (BoJ) expects an economic growth between 1.3% and 1.5% in the 2018 fiscal year (FOCUS, 2018).

In the case of Japan, there is not only the problem of a small number of women in management positions, but of the entire cultural and professional vision of this country. Even though Japan is one of the most

developed economies in the world, the presence of women in professional life and especially in a management position, is perceived as being against tradition.

According to Hofstede's definition for "Masculine", it indicates a society driven by competition, achievement and success. Success is defined here by being the winner / the best in the field. This value system starts with the education at home, then in school and continues throughout organisational life. In opposition to this, a Feminine society has as dominant values: caring for others and the quality of life. By quality of life, in a Feminine society, we understand that success and to be the first is not the goal (Hofstede Insight, 2018).

According to Hofstede's analysis, Japan has the highest score of 95 points in the category "Masculine" in the world. This score, associated with the score of 54 in the category of collectivism, makes us not observe the competitive and individualistic behaviour. Such behaviour was associated with ease of a "Masculine" culture. Japan is, however, a collectivist country, even if does not have a very high score in this direction. Even small children are taught to participate in sports competitions in order to prepare them for later life experiences.

In business life, Japanese employees reach the highest levels of motivation, when they fight as members of the winning team against the competitors. Another aspect of "Masculinity" in Japan is the permanent tendency towards perfection and excellence. This tendency is met both in the case of "material production", called in Japanese "monodukuri", in "material services", hotel and gastronomy, but also in offering gifts and food presentation (Hofstede & Minkov, 2010).

The Japanese are considered by definition workaholics, which is another form of "Masculinity". Thus, they explain that it is difficult for a woman to climb up the hierarchy in a Japanese company, which involves sustained hard work and a large workload.

Even in the year 2000, a woman in a management position in Japan was an absolute exception. Keiko, who held a senior management position in an American health care company in Japan, faced a number of issues surrounding subordinate men being humbled to be coordinated by a woman (Hirsch, 2000).

The statistical data shows that women represent 42.7% of the Japanese workforce. This exceeds the proportion of women working in the USA. Most of the jobs occupied by married women are part-time jobs. On average, a woman in Japan is paid 40% less than a man (Soble, 2015).

Japan ranks 110th in the world in terms of the pay gap between men and women, an important component of gender inequality. The recruitment company HAYS has published on its site an article about employment opportunities offered to women in Japan. The Government of Japan's initiative to increase the share of women in management positions in both the state and private sectors by 30% is underlined (HAYS, 2017). At present, the number of women in IT is very low.

Women in managerial positions in the USA in the context of "Industry 4.0"

In the USA, almost, 47% of workers are women, this means 74,6 million women. 39% of women work in occupations where women make up to 75% of the workforce. Women are well represented also as entrepreneurs

and own close to 10 million businesses, accounting for \$1.4 trillion in turnover.

Women's participation in the U.S. labour force has climbed since 1948 from 32,7% to 56,8% in 2016. More than 40% of women in the labour force had college degrees in 2016, compared with 11% in 1970. The range of occupations women workers hold has also expanded, with women making notable gains in professional and managerial occupations. In 2016, more than one in three lawyers was a woman compared to less than 1 in 10 in 1974.

Nevertheless, women are still underrepresented in STEM occupations, with women's share of computer workers actually declining since 1990. The unemployment rate for women is currently 4,8%, down from a peak of 9,0% in November 2010 (Statistics, 2019).

Seventy percent of mothers with children under 18 participate in the labour force, with over 75% employed full-time. Mothers are the primary or sole earners for 40% of households with children under 18 today, compared with 11% in 1960 (DeWolf, 2017).

The gender pay gap persists, although there has been some progress: according to a 2017 report from the Bureau of Labour Statistics, women now earn 82 cents for every dollar earned by men -- 20 cents more than in 1979, the first year for which figures were available. However, not all jobs offer the same opportunities for working women. Although the focus around women's pay checks tends to be centred on how they match up to those of men, there are also discrepancies between what women in different careers make compared to one another.

According to that same report, various careers bring in high salaries for women:

healthcare occupations, law, management, and technology jobs are among the top mon-eymaking positions (Doyle, 2019).

Women in managerial positions in Romania in the context of “Industry 4.0”

Romania is a top electronics producer in Central and Eastern Europe. In the past 20 years, Romania has also grown into a major centre for mobile technology, information security, and related hardware research. The country is a regional leader in fields such as IT and motor vehicle production. According to the Labour Ledger as at 1 January 2018, the active civilian population amounted to 8 717 900 persons, representing 44.7% of the resident population. Out of the total active population, 54.7% were men and 45.3% were women (EURES, 2019).

31.4% of the management positions in Romania are held by women. This percentage puts us in the 53rd place out of 126 countries, but far ahead of Germany, Austria, the Netherlands, USA or Japan (Wall-Street, 2019). In terms of top management positions, Romania can be proud of a much better position than most European states, with a share of 31.1% of positions held by women (Wall-Street, 2019).

At the top management level, Romania has the smallest pay gap between women and men among European Union states. The difference in our country is only 5% while the EU average is 23% (Mihai, 2017). Romania exceeds the EU average in terms of the share of employees in the ITC sector. The EU average stands at 16%, and in our country, every fourth ITC employee is a woman (Agerpress, 2018).

All these statistical data underline the advantage and potential of our country to further develop the ITC sector.

Methodology

The present article includes an analysis of the documentation found in various publications and scientific articles in order to illustrate the potential advantages of our country.

Therefore, we used a comprehensive search into numerous sources of secondary data, such as articles, reports and books from the domains of “Industry 4.0”, management, including intercultural management and sociology.

For the research, we used also electronic databases, such as Springer, Academia.edu, BRILL and Wiley Online Library. Other sources were the archives of different journals and conferences, such as the journal “Manager”, the conference “BASIQ”, “ICBE” and “ETIMM”.

The method used is a descriptive and quantitative one, given the fact that the subject is very widely discussed.

Results and discussions

The relationship between sexes, their individual evolution and the interdependence between them had an important influence of the development of society (Săseanu, A., Toma, S.-G., Marinescu, P., 2014). Because corporate cultures define and reinforce typical roles in the working environment and influence social actions of organizational members, they play an essential role in re-thinking gender stereotypes within organizations (Wolf, A., Trenkmann, J., Boos, L., 2017).

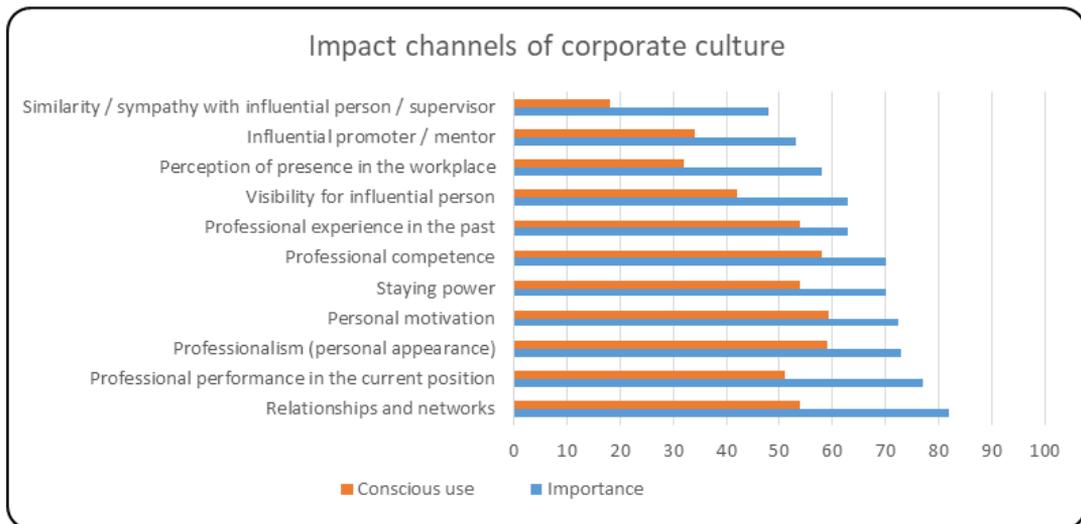
In all four countries presented, it is noted that the number of women employed, especially those in management positions, depends on the culture of each organization and enterprise.

The following graph shows the channels of action of the company culture that influence the chances of promoting women.

In the research conducted by Kohaut and Möller, the answers to the following two questions were evaluated:

- Which of the following factors are important for your professional advancement in your company?
- Which factors have you ever consciously used to advance professionally?

Figure 1: Impact channels of corporate culture (Wolf, A., Trenkmann, J., Boos, L., 2017)



According to the report of the Institute for the Labour Market and Professional Research (IAB), in the East German part, even almost 30 years after the fall of the Berlin wall and the Reunification of Germany, there are still differences in the organizational culture (Kohaut, S., Möller, I., 2016). The explanation appears to be related to the role of women in the communist period, when everyone, regardless of gender, level of preparation, etc., had a job.

Women rarely occupy management positions simply because their male colleagues, bosses or subordinates do not accept them

and because women, instead of perfecting their leadership and implicit managerial skills, are comfortable in this situation. However, the literature offers enough material to reduce this negative impact of stereotypes (Coman, 2016).

The results clearly show that companies do have an impact on the proportion of women in leadership positions in designing their corporate cultures and adapting their gender equality measures accordingly (Wolf, A., Trenkmann, J., Boos, L., 2017).

Conclusion

In Romania this difference does not exist in this form, which is demonstrated by the much larger number of women in management and top management positions, as well as in the industries of the future, compared to the rest of the highly developed industries.

In this context, the differences in leadership styles can be said to be an advantage, both for men and women, as they develop the leadership skills needed today for a good manager.

In the current economic context, in which the changes occur much faster, certain

features of the female leadership style, such as flexibility, intuition, ability to communicate, care for detail and last but not least the ability to motivate and promote staff, are mandatory for a successful management. But no less important are the masculine traits, such as risk taking, the general vision, the establishment of general strategies, the understanding of the technological processes.

Thus, as stated in the Huber study, diversity, including gender, is one of the recommended solutions to face the challenges of the future (Huber, 2018).

REFERENCES:

1. Agerpress, 2018. *România, peste media UE în ceea ce privește ponderea femeilor în sectorul ITC*. [Online] Available at: https://www.economica.net/romania-peste-media-ue-in-ceea-ce-priveste-ponderea-femeilor-in-sectorul-itc_160744.html [Accessed on 30 September 2019].
2. BITKOM, 2019. *IT-Fachkräfte: Nur jeder siebte Bewerber ist weiblich*. [Online] Available at: <https://www.bitkom.org/Presse/Presseinformation/IT-Fachkraefte-Nur-jeder-siebte-Bewerber-ist-weiblich> [Accessed on 30 September 2019].
3. CBRE, 2018. *CBRE Releases Q2 2018 Japan Investment MarketView*. [Online] Available at: <https://www.cbre.co.jp/en/about/media-centre/cbre-japan-investment-marketview-q2-2018>
4. Coman, A., 2016. *Stereotyping Woman in Leadership Postions: What We Know And What We Can Do About It*. *Manager*, 24(1), pp. 151 - 161.
5. DeWolf, M., 2017. *12 Stats About Working Women*. [Online] Available at: <https://blog.dol.gov/2017/03/01/12-stats-about-working-women> [Accessed on 30 September 2019].
6. Doyle, A., 2019. *High Paying Careers for Women*. *The Balance Careers*, 20 May.
7. EURES, 2019. *The European Job Mobility Portal*. [Online] Available at: <https://ec.europa.eu/eures/main.jsp?catId=9545&acro=Imi&lang=en&countryId=RO®ionId=RO0&nuts2Code=null&nuts3Code=null®ionName=National%20Level> [Accessed on 30 September 2019].
8. FOCUS, 2018. *Japan - Investment*. [Online] Available at: <https://www.focus-economics.com/country-indicator/japan/investment>
9. HAYS, 2017. *'Womonomics' boosts job opportunities for women in Japan*. [Online] Available at: https://www.hays.co.jp/en/press-releases/HAYS_226667[Accessed on 30 September 2019].
10. Heinemann, S., 2016. *Frauen im Management weiterhin deutlich unterrepräsentiert*. [Online] Available at: <https://www.bisnode.de/ueber-bisnode/ueber-uns/presse/studie-frauen-im-managment-weiterhin-deutlich-unterrepraesentiert/> [Accessed on 30 September 2019].

11. **Hirsch, J. L.**, 2000. *Culture, Gender, and Work in Japan: A Case Study of a Woman in Management*. Ethos, 28(2), pp. 248 - 269.
12. **Hofstede Insight**, 2018. *Country Comparison*. [Online] Available at: <https://www.hofstede-insights.com/country-comparison/japan,romania/>
13. **Hofstede, G. & Minkov, M.**, 2010. *Cultures and organizations: software of the mind: intercultural cooperation and its importance for survival*. New York: McGraw-Hill, 3rd edition.
14. **Huber, V.**, 2018. *Lohnt sich Gender-Diversity?*. Springer Gabler Hrsg. St. Gallen: Christian Keuschnigg.
15. **Kohaut, S., Möller, I.**, 2016. *Im Osten sind Frauen öfter an der Spitze*. [Online] Available at: <http://doku.iab.de/kurzber/2016/kb0216.pdf> [Accessed on 30 September 2019].
16. **Mihai, A.**, 2017. *O femeie manager din Romania castigă cu 5% mai puțin decât un manager bărbat*. [Online] Available at: <https://www.zf.ro/profesii/o-femeie-manager-din-romania-castiga-cu-5-mai-putin-decat-un-manager-barbat-16185022> [Accessed on 30 September 2019].
17. **PFEIFFER, S.**, 2017. *The Vision of "Industrie 4.0" in the Making a Case of Future Told, Tamed and Traded*. Nanoethics, Springer Open Choice(PMC5383681), pp. 107 - 121.
18. **Săseanu, A., Toma, S.-G., Marinescu, P.**, 2014. *Feminine leadership and organisational culture*. Manager, Band 19, pp. 144 - 150.
19. **Soble, J.**, 2015. *To Rescue Economy. Japan Turns to Supermom*. The New York Times, 1 January, pp. 7 - 8.
20. **Statistics, B. o. L.**, 2019. *Employment status of the civilian population by sex and age*. [Online] Available at: <https://www.bls.gov/news.release/empsit.t01.htm>[Accessed on 06 October 2019].
21. Wall-Street, 2019. *Romania, pe locul 53 dupa numarul femeilor manager, dar depaseste tari din Occident*. [Online] Available at: <https://www.wall-street.ro/articol/Careers/178162/romania-pe-locul-53-dupa-numarul-femeilor-manager-dar-depaseste-tari-din-occident.html#gref>[Accessed on 30 September 2019].
22. **Waschbusch, L. M.**, 2018. *Industrie 4.0 braucht mehr Expertinnen*. [Online] Available at: <https://www.industry-of-things.de/industrie-40-braucht-mehr-expertinnen-a-693190/> [Accessed on 30 September 2019].
23. WEF, (. E. F., 2018. *Towards a Reskilling Revolution - A Future of Jobs for All*, Geneva: Inside report.
24. **Wolf, A., Trenkmann, J., Boos, L.**, 2017. *Corporate cultures and their impact on women in top management positions – Theoretical review and empirical findings*, Berlin: HTW.