Vilniaus universiteto leidykla

Contents lists available at Vilnius University Press

Information & Media
2023, vol. 97, pp. 69–83

eISSN 2783-6207
DOI: https://doi.org/10.15388/Im.2023.97.60

Social Representations on Lithuanian Women Leaders in the STEAM Fields: A Critical Discourse Analysis

Tatiana Buelvas-Baldiris

Rey Juan Carlos University, Spain
t.buelvas.2020@alumnos.urjc.es
https://orcid.org/0000-0002-0156-8883

Rainer Rubira-García

Rey Juan Carlos University, Spain
rainer.rubira@urjc.es
https://orcid.org/0000-0002-5667-6080

Rasa Pocevičienė

Šiauliai State University of Applied Sciences, Lithuania
rasa.poceviciene@svako.lt
https://orcid.org/0000-0003-2576-6443

Abstract. Science, technology, engineering, arts, and mathematics (STEAM) are fields substantially crucial for innovation and development. Nevertheless, the gender gap in these areas is significant also in European countries. Considering the underrepresentation of STEAM women's leadership, we provide insight into the common characteristics that led Lithuanian women to become referents in their fields. We identify elements of leadership in discursive social representations, professional ideologies, gender identity and role congruency in connection to power structures from a gender perspective within organisations, considering the mediations of the social context. We conducted the research in two phases: an online questionnaire and in-depth interviews. We performed a critical discourse analysis of Lithuanian Women's testimonies to understand gender social representations. Parenthood highly influences building leadership and choosing STEAM careers, whereas self-efficacy and creativity are essential elements. High co-responsibility at home confirms that family context is vital. In STEAM careers, a male-centric perspective still constrains female leadership. There is still work to be done regarding active politics, programs, and law enforcement to create equity and social justice relationships between men and females, especially in STEAM areas.

Keywords: Women leadership; Social Representations; STEAM; Gender studies; Lithuania

Savęs atstovavimas moterų lyderystėje STEAM srityse Lietuvoje: diskursas, lyties tapatybė ir vaidmenų suderinamumas

Santrauka. Mokslas, technologijos, inžinerija, menai ir matematika (STEAM) – tai sritys, kurios yra labai svarbios naujovėms ir plėtrai, bet taip pat sritys, kuriose labiausiai pasireiškia lygių galimybių spragos, net ir

Received: 2022-06-10. **Accepted:** 2023-07-03.
Copyright © 2023 Antanas Kairys, Vytautas Jurkuvėnas, Vita Mikuličiūtė, Viktorija Ivleva, Vilmantė Pakalniškienė. Published by Vilnius University Press. This is an Open Access article distributed under the terms of the Creative Commons Attribution Licence, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Europos šalyse. Atsižvelgiant į tai, kad STEAM moterų lyderystė yra nepakankama, straipsnyje pateikiamos įžvalgos, kokios yra tos bendrosios charakteristikos, padedančios kai kurioms Lietuvos moterims tapti savo srities atstovėmis. Lyderystės elementai buvo nustatyti diskursyviame savęs reprezentavime, tapatybės vaidmenyse ir profesinėse nuostatose, susijusiose su valdymo struktūromis organizacijose iš lyčių perspektyvos, atsižvelgiant į socialinį kontekstą. Tyrimas buvo atliktas dviem etapais: iš pradžių internetinė apklausa, po to giluminiai interviu ir gyvenimo istorijos metodas, derinant kiekybinius ir kokybinius metodus. Vėliau atlikta apklausų dalyvių atsakymų diskurso analizė, siekiant suprasti lyčių savęs reprezentaciją. Tyrimu išsiaiškinta, kad tėvas daro didelę įtaką ugdant lyderystę ir pasirenkant STEAM karjerą, o savarankiškumas ir kūrybiškumas yra vieni svarbesnių elementų šioje srityje. Didelė bendra atsakomybė, vyraujanti namuose, patvirtina, kad šeimos kontekstas yra gyvybiškai svarbus. Kita vertus, STEAM karjeroje vis dar išlieka į vyrus orientuota perspektyva, kuri riboja moterų lyderystę. Vis dar reikalinga aktyvi veikla politikos, edukacinių programų ir socialinio teisingumo srityse, kad būtų sukurti lygybės ir socialinio teisingumo santykiai tarp vyrų ir moterų, ypač STEAM srityse.

Pagrindiniai žodžiai: moterų lyderystė; savęs atstovavimas; STEAM; lyčių tyrimai; Lietuva

Introduction

The underrepresentation of women leadership in Science, Technology, Engineering, Arts and Mathematics (STEAM) can be attributed to various aspects, including stereotype threat, lack of role models, access to tertiary education, lack of inclusive policies, upskilling and reskilling (Verdugo-Castro et al., 2022; Cheryan et al., 2020; EIGE, 2022). Concerning the lack of role models, leadership greatly impacts those who embody it and organisations (Love et al., 2017), as this aspect allows them to become influential individuals to pursue common goals. In this regard, the characterisation of women's leadership in Lithuania in these areas can contribute to understanding the role of social representations in shaping perceptions and expectations in connection with professional ideologies, specifically STEAM areas, which in turn can contribute to reducing such gender inequalities.

There is an increasing body of scientific literature dedicated to the relationship between gender and leadership (Appelbaum et al., 2003; Eagly & Johnson, 1990; Hoyt, 2010), gender differences in multicultural contexts (Eklund et al., 2017), gender and management (Rhee et al., 2015), among others, although few of them focus on the STEAM sector. Researchers across different disciplines constantly seek to understand the challenges women face in the means of leading or succeeding in life (Winny & Joseph, 2021), paying little attention to the intersection of these topics with professional ideology.

Further evidence suggests that women have a unique leadership perspective, are good at decision-making and innovation skills (Cook et al., 2009; Wu et al., 2022), also tend to be more collaborative and inclusive, producing positive and productive work environment (Cook et al., 2014; Eagly et al., 2001). Despite the optimistic assets that women can bring to organisations, barriers appeared to be greater. Phenomena like the glass ceiling (Purcell et al., 2010) and the glass cliff (Velte, 2018) demonstrate that the roots of these issues are structural gender-based inequalities.

By opening safe spaces for women to be in leadership positions in STEAM-based organisations, thanks to their collaborative approach, it is possible to enable other lower rank women to rise too. It is not the same scenario as when women are promoted only

during conflictive times at companies, as their leadership, power and authority can be compromised, confirming that "the glass cliff is especially evident in male-centred sectors" (Ryan et al., 2007, pp.182–197).

The main goal of this research is to provide a characterisation of Lithuanian women leaders in STEAM according to the social representations of their own. We conducted an online questionnaire and in-depth interviews to identify elements through critical discourse analysis that shed light on patterns that can impact leadership. We use these concepts in connection to professional ideologies, identity and congruency roles, for these notions intersect in how knowledge is hierarchised, creating power dynamics that reinforce gender differences and imbalances in STEAM.

Contextual Background

"Lithuania is often seen as a good example of implementing gender equality measures in Europe" (Zaleniene et al., 2013, p. 284). As a result, in 2007, the European Institute of Gender Equality – EIGE was established there. This country, with approximately 2.8 million inhabitants in 2023, has "adopted legislations and laws since 1999 to promote Equal Opportunities between Women and Men; it was one of the first countries in Central and Eastern Europe to do so" (Zaleniene et al., 2013, p. 284). Among the strategic actions towards promoting women in STEAM, L'Oréal Baltic created cooperation with UNESCO Commission to grant awards of 6,000 euros to support excellent female doctoral and postdoctoral researchers from experimental natural sciences and medicine (UNESCO, 2019). From Women in Science Fellowships, several interviews have been done for the purpose of this study, among other risings talents from STEAM in Lithuania.

The effects of the COVID-19 pandemic and the digital transformation in the labour market created the scenario for European countries to develop the Declaration of Ljubljana on Gender Equality in Research and Innovation, adopted by most, including Lithuania. This is a framework to leverage the Gender Equality Strategy for 2020–2025 (Ljubljana Declaration, 2021). This declaration recognises deficiencies in women's education and access to opportunities in STEAM, which demonstrates the scarcity of qualified profiles to cover STEAM job vacancies in Europe.

The 2022 Gender Equality Index (GEI) results show that "Lithuanians have the highest scores since the 2021 GEI, along with Belgium, Croatia [..]" (EIGE, 2022, p. 19). Compared to other European countries, Lithuania has opened spaces to women in decision-making positions (+6.0 points) and government representatives; in fact, "in early 2022, Lithuania was one of the very few EU Member States with a women prime minister" (EIGE, 2022, p. 47). Nevertheless, 2023 statistics show that 70% of Lithuanian parliament members are male, compared to 28% of women (EIGE website, 2023), which informs about some limitations to overcome, to continue improving gender social policies that impact the STEAM sector.

Despite the lack of research that further informs gender and leadership intersection in STEAM in Lithuania, or if so, written in English. It is thanks to the milestones of this

country in reducing the gender gap that we decided to use it as a study case. Although, this country's size in terms of land and population compared to other Member States, Lithuania's transition to democracy and a market economy was not long ago, and these inequalities were considered non-existent in the Soviet Union (Sipos, 1992; Matkovic et al., 2007), and taboo to researchers (Stubbs et al., 2019), "as it was assumed that communists solved the social problems mentioned before" (Aidukaite et al., 2022, p. 162).

Theoretical Framework

The debate between Science, Technology, Engineering and Mathematics (STEM), and STEAM, including Arts, started from creating a distinction between disciplines conventionally known as "creative", such as music, arts and more, and those disciplines traditionally seen as more rigid and logical-mathematical (Catterall, 2002). We must not forget that most exceptional thinkers ever known in STEAM were creative across disciplines influenced by Art (Root-Bernstein, 2003). The intention to broaden the scope to creative disciplines such as media, making, and digital technology serves the purpose while analysing leadership.

Leadership is the process by which "an individual influences a group of people to achieve a common goal" (Matouq, 2015, p. 3). Although the increasing demand for diversity in career paths, gender discrimination in STEAM leadership remains persistent (Sekiguchi et al., 2022, p. 4). For instance, a survey conducted in 2012 by the Equal Opportunities Ombudsmen Office informs about "gender representation in the Lithuanian academic community recorded results from 22 universities, state and private, informed of men domination among rectors, vice-rectors, senate members and faculty deans. Overall, women had positions at the lowest administrative levels [...]" (Zaleniene et al., 2013, p. 291). Even though the situation has probably changed since 2012, women leaders are necessary to challenge social representations and encourage structural change in these careers.

The Theory of social representation (TSR) is defined as an organised and structured set of cognitions produced and shared by members of the same group about the same social object (Abric, 2001; Moliner et al., 2015). TSR and TPI allow us to understand how identity, gender roles and power dynamics shape STEAM as a sector.

The theory of professional ideologies (TPI) refers to how academic disciplines have been theorised in terms of their exercise of power in classifying, hierarchising and preserving certain forms of knowledge while disregarding others (Foucault, 1977). However, it is difficult to recognise the limits within, between and across disciplines as sometimes they are blurry (Osborne, 2015). However, disciplines form curriculums taught in schools and universities, which become instruments that reinforce class, power, and gender division, as the knowledge is hierarchically organised (Connell, 1993). Consequently, some disciplines are more stereotyped as male-centred than others, directly affecting women's representation and leadership.

For example, "biology, chemistry, and mathematics graduate more women than men in the US" (Cheryan et al., 2017, p.8). Hence, in the EU, 73% of students in Engineering, Manufacturing and Construction disciplines were male (EIGE, 2018).

The theory of role congruency (TRC) refers to gender roles that correspond to a social construct and that derive from the division of specific roles and stereotypes, division of labour, access to resources and more between sexes (Eagly et al., 2002). For example, women are nurses, men are doctors, based on the idea that in health careers, one profession is validated collectively as more relevant than the others and is characterised by specific professional behaviours concerning TPI.

TRC is understood through two main aspects, "the descriptive norms (consensual expectations about behaviour in a given group), secondly the legal norms (consensual expectations about ideal behaviour in a given group)" (Cialdini, 1998, pp. 151–1921), the latter is the main error in advancing women's leadership in STEAM. For instance, the descriptive and legal norms manifest in society as follows:

> *Female leadership tend to be "kind", "altruistic and emotionally expressive", – making reference to communitarian behaviour, whereas male leadership is "independent", "dominate", and "assertiveness", – indicating more individual leadership behaviours* (Eagly, 1991, p. 306).

In the intersection with TPI, the gender role perspectives in STEAM are extensive. Some authors argue that women are somehow forced to adapt to limited opportunities by becoming job-oriented and not career-oriented (Mavin, 2001). Others say that women choose non-STEAM careers more than men, based on their abilities with math (Park et al. 2007). Yet, these ideas ignore the layers of women's career path in STEAM: access to quality tertiary education, personal motivations, family influence, and cultural aspects.

There is a tendency to face many social dilemmas concerning women's leadership in STEAM, for all the characteristic roles and expectations assigned by society based on gender. If women are agents of change and perform their leadership role or fail to accomplish what is pre-scripted for most women, they risk being negatively assessed by others (Jun-Yeob, 2020). Similarly, suppose women fail in leading others, even while doing what everyone expects from her. In that case, she will fail either way to meet the ideal expectations of "successful leaders" (Eagly et al., 2002). Thus, the social representation of women leaders in STEAM is important to understand the layers of this career path and allow more women to participate in the sector in the future.

Method

For this study, a critical discourse analysis (CDA) approach was used. "The CDA studies text and talk, emerging from critical linguistics, semiotics [...] is a problem-oriented approach, suitable to study relevant social problems, such as sexism, racism, and other forms of social inequalities" (Van Dijk, 1995, p. 17). This approach focuses analysis of relationships between discourse and society (social cognitions, politics, and culture), which is pertinent considering TSR and TRC are related. By using the CDA, we centre on understanding "group relations of power, dominance and inequalities and the ways these are reproduced or resisted by social group members through text and talk" (Van Dijk, 1995, p. 18). To apply the CDA through text and talk, Van Dijk explains that one

can have key categories that affect the structure and content of the mental model of our object of study. By doing this, patterns of speech fall into general and abstract forms of knowledge, beliefs, opinions, attitudes, and ideologies the group shares.

The following selection criteria determined the sample: women who have studied in STEAM and/or have a leadership position at a STEAM-based company; and/or recognised researcher in such fields; holds a leadership position at a private company or in a political institution regarding STEAM sector. The political level is key, as it can change STEAM laws, legislations, and governmental initiatives.

Accordingly, we surfaced the internet looking for women leaders in Lithuania, results showed international prizes, women who have been featured in the news, or outstanding Lithuanian leaders. Although internet results were general, we stayed with women from STEAM and contacted them via LinkedIn and email to invite them to participate in our study. The sample unit is 18 women from Lithuania, located in the main cities according to results from 2021. From the US 8 informants accepted to participate in the process, first we sent them an email with a Google form with some general questions to know better the informant, from there, we scheduled the in-person or virtual interview, depending on their availability.

The trust and ethical protocol are informed from the beginning to all the informants via email and reinstated in the interviews, we required informed consent, they had the right to withdraw, and we also promised confidentiality, anonymity and strict data management encouraging the use of sensitive and personal information of third parties. We communicated the purpose and goal of the present study, methods, and procedures. Likewise, we remind them throughout the process of our commitment to confidentiality not to disclose any recording or key information that can reveal their identity.

We have used both quantitative and qualitative methods for collecting data as this allows us to understand better the research problem (Creswell, 2003). These methods are very common in social sciences, "depending on what we are investigating sometimes is useful to start with a questionnaire and then, follow up with other specific points on a series of interviews, experiment (...)" (Creswell, 2003). We first applied a Google form with simple factual questions, some opinions, and attitudinal questions, "keeping questions as short and simple as possible to increase the accuracy of responses" (Adams et al., 2008, p. 20). Then, semi-structured interviews were conducted, allowing the interview structure to be flexible so that key issues not identified before emerging in the discussion.

For questionnaires and interviews, a list of categories was established and the questions for both tools were created accordingly. The criteria used to code data and display the results are Professional ideologies, leadership, role congruency and social representation in connection with gender perspectives. Both tools were applied to the 8 candidates who accepted to participate from beginning to end in this study, completing a total of 24h of interviews, 1 month extracting data and 1 additional month to code and interpret. Questionnaire results were analysed and shared in this paper separately, from interview results.

The interviews were conducted in isolated spaces to give them the security of being themselves and expressing their experiences in a safe environment. In only two (2) inter-

views a third person (one of the authors in this paper) was necessary who translated, as it was more comfortable for some of them to speak in Lithuanian. We had key points that need to be discussed, and we addressed them with a list of topics, although, we allowed some questions to flow from the discussion rather than being forced (Adams et al, 2008).

Lastly, through the lens of the critical analysis approach we created a matrix in which we located the categories and direct speech from interviews creating correspondence. Therefore, is possible to find common and divergent patterns between them, creating a contrast worth sharing.

Results

The informants are around 30 to 50 years old, born in Lithuania during or after the Soviet Union. Out of 8 women, 6 had a PhD study and 2 had master's degrees. Their field of work and/or study is Digital Innovation, Technology, Construction, Civil engineering, Mathematics, Transport and urban mobility, Neuroscientist, and communications. They are leaders and they manage resources: teams, budgets, projects, and programs for public and private companies, academic boards, corporate boards, human resources departments, legislative and even the Parliament of Lithuania, the Seimas, leading national strategies in the STEAM sector. The industries in which they were working at the time they participated in this study are transport, military, oil and gas sector, mathematics, and molecular biology. Additionally, 4 of the informants are married, 2 in free partnership, and 2 are single; 6 of them mentioned they speak more than 1 language, the most recurrent cases Lithuanian – native for all, Russian, and English.

Discursive Social Representations from Female Leaders

The opportunity to excel in their fields and demonstrate to themselves, rather than others, that they can be as good as the best professionals and defy "how to be" not adapting to what is "commonly accepted" is the main aim of our informants "my personal mission is to say that IT is not just for a man wearing jumpers. When I started it was like if you are in the IT sector, you must be a dirty girl, not nice dressed and I decided to show that it's not true" (Informant 5). Being feminine by polishing nails, or wearing a dress at a congress or conference, should not be related to women's efficacy in STEAM fields or any area of life, and it is also a confirmation of the cultural constraints they experience.

Additionally, informant 3 shared that "I have been working in positions like managing the company that was producing steel construction, where all my employees have been males". But also, from the informant's perspective the STEAM sector appears to have conduct codes in Lithuania that delimitate how individuals considering their gender or sex should address as a team leader or member. For instance, Informant 3 describes how she caused a "surprise" when she appeared in meetings where they expected a man as the CEO, as in the steel construction industry it is less frequent that a woman rises, suggesting significant changes must be done to tackle glass ceiling tendency.

From the gender perspective of their agency and social representations, it is relevant to mention that informants tend to take or crave control over the outcomes and challenges as they have sufficient knowledge and expertise to perform high. Additionally, they have a very critical mindset that promotes planning every step to then, receive the expected outcome out of those efforts. As a result, they have a high sense of achievement and responsibility, self-efficacy and vision that is self-imposed, but that fosters to deliver good results with vision as leaders and therefore, improve the quality of life of others with their creations, "I'm an ambitious person, therefore I have the motivation to aim high" (Informant 1). The common pattern in the figure of speech is present in most of the 8 informants, demonstrating how interiorized is to be competitive, where aiming high, comparing themselves with other colleagues and the technification of knowledge, is part of the role play they have in a male-centred industry that is coded in that way.

On the other hand, the confidence of these Lithuanian women leaders in STEAM is strong. They are aware of what they can do, and they test their own emotions, abilities and competencies which allows them to understand that developing new skills takes additional time, "I'm good at logical things via mathematics, physics, films, etc. So, for me writing is hard" (Informant 6). On the other hand, it is not surprising that those results take them to become entrepreneurs, ratifying they can achieve whatever goal they propose. In several interviews, the informants mentioned they never hide their thoughts or emotions, rather they express them assertively to be coherent in leading their teams and reinforcing their character.

In co-relation with the social representations, we must acknowledge the significance of the family, because their parenting style forms the decisions they have made, not only from joining in STEAM, but also how they are. In their Lithuanian families, the mother was very supportive and cared too much about the emotional side of women, whereas the father was more involved in imposing rules and limits, allowing them to experience their singularity within the values, social behaviour and position taught. The kind of parenthood experienced was highly open, with parents most of the time, encouraging women to pursue big goals.

Nevertheless, in 2 informants traditional families' women were expected to be at home and men at work, living under the Soviet Union that suppressed women despite official postures. In this dichotomy where the "breadwinner" is the father, mothers and daughters tend to value and create their self-image at work in terms of what the father would approve or be proud of, meaning in most cases our informants were not seeking external validation, but instead their father's approval. Contrasting this idea with TSR, informants have coded themselves not only by what they learnt at home, but also, culture, education, and other external influence, which allow them to find a place where to develop accordingly and succeed, most of the time challenging impostor syndrome and other inadequacy feelings.

In most cases, informants choose to be in such leadership positions, although they had no interest in using public relations tools to enhance their leadership in public spaces. As the nature of the positions they hold, social exposure came as a secondary challenge mainly because they love what they do, but not with the purpose of being validated by others.

Despite this, in the Lithuanian context the dissemination of knowledge in STEAM careers, in public spaces is sometimes considered as bragging, and "they think you are not serious scientists if you have time for this" (Informant 2), this is an interiorized bias taken from the social representation's constraints imposed to women. To make visible relevant scientific achievements, women and men need to participate in media interventions, therefore it should not be considered a negative practice if the colleague is female.

Professional Ideologies and Leadership in STEAM

By the time we conducted this study, informants had leadership positions in industries that are considered male-centred, as a study described that "males prefer to work with objects, whereas females prefer working with other people" (Su et al. 2009, p. 860), explaining why there are more men than women in these areas. In fact, some of the informants mentioned they did not study STEAM as a first career, but rather later in life, because of the personal opportunities they found to grow in these sectors.

Considering the intersection with professional ideologies, the mixed academic background allowed them to have competencies required to direct and manage teams within STEAM as certain learned behaviours and skills, "I came to the STEAM field randomly, but those experiences and those skills that I have from journalism, they are very important here as well" (Informant 7); which informs about how these fields can intersect in a multidisciplinary approach.

There is a common pattern about how 5 of our informants made the decision to join the STEAM career path, and this is thanks to a positive influence from someone close as the father, mother, siblings or a teacher they admire that encouraged them such as "an amazing and rigorous math teacher. She was a solid, fair and very elegant woman" (Informant 2). Regarding the role models, as women are a minority in some of the STEAM fields, "encouraging and giving broader exposure to successful women STEAM scientists and professionals to visit schools and career days" (Ming-Te et al, 2016, p. 132) serves to reject the stereotypes that these fields are not only for men. Additionally, by the figure of speech used by our informants in this question, the leadership relationship was described as amazing, rigorous, solid, and fair, adjectives that allow them to feel admiration and reflected on what they wanted to become.

The STEAM careers have increased in popularity due to the digital transformation that Covid-19 brought to global economies. Nevertheless, these fields are often seen as complex because of the mathematical background and other technical knowledge, evidence suggests that when comparing mathematically gifted individuals, those with higher math skills relative to verbal skills are more likely to pursue STEAM careers (Wang et at., 2013). Contrasting this affirmation with our results, we found that almost all 8 informants consider that to work and succeed in STEAM, one must have certain skills and technical knowledge that allow you to perform high, as only being relatively good at it, is not enough.

A pattern of validation of attitudes and performance at a very early stage creates stimulation to choose STEAM as a career path in the later years, "back in the school, I was

very good at mathematics, but my love for chemistry started back then. For me chemistry was more intuitive. I'm currently a Neuroscientist" (Informant 1), and "Computer engineering was the only profession I could imagine" (Informant 5). Therefore, validations and cumulative specialization of knowledge sustained over time allow them to develop a natural leadership in STEAM, as every process was intuitive and results-oriented.

In the same order of ideas, specific behaviours that guide professionals from the STEAM-specific fields, the informants had a common interiorized pattern for considering career development as a tournament, with a tendency for perfectionism which allow them to produce high quality as mentioned "I can work fast, and I don't like excuses, I know right away who can work with me or not" (Informant 4), or "unfortunately, women in mathematics are not popular even in the 21st century. Men feel superior in this science. I didn't use any tools to combat them, I worked hard until I achieved recognized results" (Informant 2), demonstrating they felt they needed to prove themselves even more than other colleagues.

The 8 informants demonstrated a desire to succeed driven by the purpose of helping other people to grow next to them, therefore, in the leadership development they mentioned not experiencing any preference for male or female pupils, as they tried to keep the processes objective. Although, they did mention encouraging young girls from universities to apply for their research teams and other initiatives.

One of the questions asked was if they consider themselves innovators in their field and how they nurture creativity to see if they happen to have a connection with any form of arts. Informants mention that they see challenges as opportunities, as they use their own fear as fuel, to pursue the execution of projects that are often risky and highly defiant "I'm not afraid to start unique and original projects and processes again and again" (Informant 4). The informant's activities outside the work-life produced a benefit in terms of creativity stimulation such as gardening, painting, playing music, going to the woods, and practising hunting, even riding a motorbike. To solve work-life problems solutions are often found in spaces where they can disconnect and re-think their approach.

Gender Identity and Role Congruency in STEAM

Informants mentioned they have not felt direct discrimination for being women in STEAM, but rather for being too young in positions of leadership. On special occasions such as meetings with decision-makers, suppliers' negotiation, and factory tours with clients, when the male counterparts asked for the Chief Operating Officer or the CEO, and noticed that was a young woman, our informants mentioned, it was shocking and sometimes, even uncomfortable for some, for instance, "people would come to the company and ask for the manager, see me with the jeans in my 20s. They go back to ask again where the manager is and then realize it was me, I could see the shock there" (Informant 3). The role played would have been performed by a man, suggesting that age and gender intersectionality can be noteworthy as a future variant to combine with leadership and female studies in STEAM.

From the cultural contexts characterised by informants, it is possible to see external judgments that do not necessarily reflect their efficacy as leaders in the field. Understanding the regular processes that a career path has, once a person has demonstrated such abilities and capabilities over performance and consistency in time, it should not be labelled as young in any field, nor even considering the clothing she is wearing.

The culture and social representation patterns are performed by informants showing us some of the gender-role stereotypes transferred from the family and society. For instance, "I receive some advice from my mother saying I can't show up my cleverness, because then I would not find a husband" (Informant 1), although, at the same time, she concluded, "I don't think my mum would hold this view today. But 30 years ago, she was just being a good mother", confirming the impact and influence of culture and gender role critique.

"The stereotype that a man has to earn more because he maintains a family and that good leaders are only men" (Informant 7), such biases and stereotypes are present in all social relationships indistinctly of the sex expression or gender identity of individuals. In Lithuania the historical context influenced the educational system, the labour market and the way society are organized creating a generational gap in equal rights education and normalising what should be rightfully for men and women, making these fields as one managed by men stereotypes.

One key aspect questioned in the interviews was the work-life balance, and how this affected the career path for women in science. In the Lithuanian context, informants who choose to be a mother decided to pause their careers as soon as they got their babies, but this did not stop their careers.

Some of these women give us different perspectives on the same situation, whereas some of the informants claimed to have a supportive partnership that executes the co-responsibility at home. "High achievers mums feel guilty because you are spending too much time at work" (Informant 1), nevertheless the pursuit of balance is always a concern. Women express the need to always seek constantly for balance between work, parenting, and all, as they tend to put everything and everyone else above their own needs.

Regarding co-responsibility, informants tend to have clear limits over each activity they have from home to work issues, and those limits allow them to make decisions every day. It is because of those boundaries that they can support children at home as mothers, and this does not stop them to take on projects, change jobs or to be in leadership positions. This confirms considering the role congruency theory, that what is expected from a woman and what women do, is changing in the way that the new masculinities are now at play, taking upon their roles as co-parents raising their children.

Discussion and Conclusions

The discursive social representations expressed by women leaders in STEAM fields, in Lithuania reveal their determination to excel and challenge stereotypes. They aim to demonstrate that femininity should not be linked to their efficacy in these fields and strive to break cultural constraints. These women display a strong sense of agency, critical

thinking, and a commitment to achieving high standards, as well as, they excel in a male-centred industry through expertise and knowledge. Considering family influence, parents' support and encouragement play a significant role in shaping decisions and self-image while contributing to building a strong character to face traditional gender expectations, in which they have successfully overcome frequent feelings of inadequacy. These leaders value their own achievements over public recognition for their work, although, they also acknowledge the role of media interventions to defy existing biases and promote women's visibility in STEAM careers.

Regarding professional ideologies and leadership in STEAM, informants have found opportunities to grow in mixing academic backgrounds, which gave them diverse skill sets to effectively manage and lead teams. Also, the positive influences from role models, such as teachers or family members played a crucial role in inspiring them to pursue a career path in STEAM. Meanwhile, they exhibit a natural inclination toward leadership and view challenges as opportunities for growth. However, they also experience a heightened sense of competition and perfectionism, feeling the need to prove themselves more than their male counterparts. Nevertheless, their leadership style is focused on achieving results and helping others to grow, they also make room to actively encourage young girls to pursue STEAM fields.

About gender identity and role congruency informants have faced both, direct and indirect discrimination due to their young age in leadership positions. The intersectionality of age and gender can be noteworthy in understanding obstacles women face in leadership roles. Cultural and societal influences sometimes reinforce gender-role stereotypes, but these Lithuanian women challenge and defy these biases. While the work-life balance remains a concern, they have found ways to manage their careers and motherhood, often with the support of their partners. Co-responsibility at home and clear boundaries between work and personal life enable them to pursue their goals without compromising their roles as mothers.

In conclusion, findings suggest that women leaders in STEAM fields in Lithuania are driven by their personal mission to challenge stereotypes, achieve high standards, and make a positive impact. They navigate male-dominated industries with determination and resilience, drawing on their knowledge, expertise, and support systems. Although we do not seek or expect all STEAM sectors to be only women at the top, continued efforts must be done to break down gender barriers, promote diversity and inclusion, as well as opportunities for real growth for women in STEAM.

References

Adams, A., & Cox, A. L. (2008). Questionnaires, in-depth interviews, and focus groups. In P. Cairns & and A. L. Cox (Eds.), *Research Methods for Human-Computer Interaction* (pp. 17–34). Cambridge University Press.

Aidukaite, J., & Navicke, J. (2022). The evolution of social policy research in Central and Eastern Europe. In K. Nelson, R. Nieuwenhuis, & M. A. Yerkes (Eds.), *Social Policy in Changing European Societies* (pp. 154–170). Edward Elgar Publishing. https://doi.org/10.4337/9781802201710.00018

Abric, J.-C. (2001). A structural approach to social representations. In K. Deaux & G. Philogène (Eds.), *Representations of the social: Bridging theoretical traditions* (pp. 42–47). Blackwell Publishing.

Appelbaum, S. H., Audet, L., & Miller, J. C. (2003). Gender and leadership? Leadership and gender? A journey through the landscape of theories. *Leadership & Organization Development Journal*, *24*(1), 43–51. https://doi.org/10.1108/01437730310457320

Catterall, J. S. (2002). The arts and the transfer of learning. In R. J. Deasy (Ed.), *Critical Links: Learning in the arts and student academic and social development* (pp. 151–157). Arts Education Partnership.

Cialdini, R., & Trost, M. R. (1998). Social influence: social norms, conformity, and compliance. In D. T. Gilbert, S. T. Fiske, & G. Lindzey (Eds.), *The handbook of social psychology* (pp. 151–192). McGraw-Hill.

Cook, A., & Glass, C. (2009). Between a rock and a hard place: Managing diversity in a shareholder society. *Human Resource Management Journal*, *19*(4), 393–412. https://doi.org/10.1111/j.1748-8583.2009.00100.x

Cook, A., & Glass, C. (2014). Women, and top leadership positions: Towards an institutional analysis. *Gender, Work & Organization*, *21*(1), 91–103. https://doi.org/10.1111/gwao.12018

Connell, R. W. (1993). *Schools & Social Justice*. Temple University Press.

Cheryan, S., Ziegler, S. A., Montoya, A. K., & Jiang, L. (2017). Why are some STEM fields more gender-balanced than others? *Psychological Bulletin*, *143*(1), 1–35. https://doi.org/10.1037/bul0000052

Cheryan, S., Lombard, E., Hudson, L., Kengthsagn, L., Plaut, V., & Murphy, M. (2020). Double Isolation: Identity expression threat predicts greater gender disparities in computer science. *Self and Identity*, *19*(4), 412–434. https://doi.org/10.1080/15298868.2019.1609576

Creswell, J. W. (2003). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches* (2nd ed.). SAGE.

Eklund, K. E., Barry, E. S., & Grunberg, N. E. (2017). Gender and leadership. In A. Alvinius (Ed.), *Gender differences in different contexts* (pp. 129–150). InTech. http://dx.doi.org/10.5772/65457

Eagly, A. H., & Johnson, B. T. (1990). Gender and leadership style: A meta-analysis. *Psychological bulletin*, *108*(2), 233–256. https://doi.org/10.1037/0033-2909.108.2.233

Eagly, A. H., & Wood, W. (1991). Explaining sex differences in social behavior: A meta-analytic perspective. *Personality and Social Psychology Bulletin*, *17*(3), 306–315. https://doi.org/10.1177/0146167291173011

Eagly, A. H., & Johannesen-Schmidt, M. C. (2001). The leadership styles of women and men. *Journal of Social Issues*, *57*(4), 781–797. https://doi.org/10.1111/0022-4537.00241

Eagly, A. H., & Karau, S. J. (2002). Role congruity theory of prejudice toward female leaders. *Psychological Review*, *109*(3), 573–598. https://doi.org/10.1037/0033-295X.109.3.573

European Institute of Gender Equality. (2018). *Overview | Gender Statistics Database*. EIGE. https://eige.europa.eu/gender-statistics/dgs

EIGE, European Institute for Gender Equality. (2022). *Gender Equality Index*. Retrieved May 25, 2023, from https://eige.europa.eu/gender-equality-index/2022/domain/power/LT

EIGE, European Institute for Gender Equality. (2022). *Gender Equality Index 2022: The COVID-19 pandemic and care*. Publications Office of the European Union.

Foucault, M. (1977). *Discipline and punish: the birth of the prison*. Pantheon Books.

Hoyt, C. L. (2010). Women, men, and leadership: Exploring the gender gap at the top. *Social and personality psychology compass*, *4*(7), 484–498. https://doi.org/10.1111/j.1751-9004.2010.00274.x

Kattan, M. M. (2015). *Factors of successful women leadership in Saudi Arabia*. [Doctoral dissertation, Rey Juan Carlos University].

Kim, J.-Y., Hsu, N., Newman, D. A., Harms, P. D., & Wood, D. (2020). Leadership Perceptions, gender, and dominant personality: the role of normality evaluations. *Journal of Research in Personality*, *87*, Article 103984. https://doi.org/10.1016/j.jrp.2020.103984

Ljubljana Declaration. (2021). *Gender Equality in Research and Innovation*. Endorsed final document. Slovenian Presidency of the Council of the European Union official publication.

Love, E. G., Lim, J., & Bednar, M. K. (2017). The face of the firm: The influence of CEOs on corporate reputation. *Academy of Management Journal*, *60*(4), 1462–1481. https://doi.org/10.5465/amj.2014.0862

Matkovic, T., Sucur, Z., & Zrinscak, S. (2007). Inequality, poverty, and material depprivation in new and old members of the European Union. *Croatian Medical Journal*, *48*(5), 636–652.

Mavin, S. (2001). Women's career in theory and practice: time for change? *Women in Management Review*, *16*(4), 183–192. https://doi.org/10.1108/09649420110392163

Moliner, P., & Abric, J.-C. (2015). Central core theory. In G. Sammut, E. Andreouli, G. Gaskell, & J. Valsiner (Eds.), *The Cambridge handbook of social representations* (pp. 83–95). Cambridge University Press. https://doi.org/10.1017/CBO9781107323650.009

Osborne, P. (2015). Problematizing disciplinarity, transdisciplinary problematics. *Theory, Culture & Society*, *32*(5-6), 3–35. https://doi.org/10.1177/0263276415592245

Park, G., Lubienski, D., & Benbow, C. P. (2007). Contrasting intellectual patterns predict creativity in the arts and sciences: tracking intellectually precocious youth over 25 years. *Psychological science*, *18*(11), 948–952. https://doi.org/10.1111/j.1467-9280.2007.02007.x

Purcell, D., MacArthur, K. R., & Samblanet, S. (2010). Gender and the glass ceiling at work. *Sociology Compass*, *4*(9), 705–717. https://doi.org/10.1111/j.1751-9020.2010.00304.x

Rhee, K. S., & Sigler, T. H. (2015). Untangling the relationship between gender and leadership. *Gender in Management*, *30*(2), 109–134. https://doi.org/10.1108/GM-09-2013-0114

Ryan, M. K., & Haslam, S. A. (2007). The glass cliff: Exploring the dynamics surrounding the appointment of women to precarious leadership positions. *The Academy of Management Review*, *32*(2), 549–572. https://doi.org/10.2307/20159315

Root-Bernstein, R. (2003). The art of innovation: Polymaths and the universality of the creative process. In L. Shavanina (Ed.), *International handbook of innovation* (pp. 267–278). Elsevier.

UNESCO. (2019). *Women in Science: The gender gap in science*. UNESCO Institute for Statistics.

Sekiguchi, T., & De Cuyper, N. (2022). Addressing new leadership challenges in a rapidly changing world. *Applied Psychology*, 1–10. https://doi.org/10.1111/apps.12401

Sipos, S. (1992). *Poverty Measures in Central and Eastern Europe Before the Transition to the Market Economy* (Special Subseries *Child Poverty in Industrialised Countries*). UNICEF. www.unicef-irc.org/publications/pdf/eps29.pdf

Su, R., Rounds, J., & Armstrong, P. I. (2009). Men and things, women and people: a meta-analysis of sex differences in interests. *Psychological Bulletin*, *135*(6), 859–884. https://doi.org/10.1037/a0017364

Stubbs, P., An, S., & Chubarova, T. (2019). Poverty, inequality and well-being in the global East: Bringing the 'social' back in. In S. An, T. Chubarova, B. Deacon, & P. Stubbs (Eds.), *Social Policy, Poverty, and Inequality in Central and Eastern Europe and the Former Soviet Union: Agency and Institutions in Flux* (pp. 11–43). Columbia University Press.

Van Dijk, T. (1995). Aims of Critical Discourse Analysis. *Japanese Discourse*, *1*, 17–27.

Velte, P. (2018). Appointing Female CEOs in Risky and Precarious Firm Circumstances. A Review of the Glass Cliff Phenomenon. *Corporate Ownership & Control*, *15*(2), 33–43. https://doi.org/10.22495/cocv15i2art3

Verdugo-Castro, S., García-Holgado, A., & Sánchez-Gómez, C. (2022). The gender gap in higher STEM studies: A systematic literature review. *Heliyon*, *8*(8), Article e10300. https://doi.org/10.1016/j.heliyon.2022.e10300

Wang, M.-T., & Degol, J. L. (2016). Gender Gap in Science, Technology, Engineering and Mathematics (STEM): Current knowledge, Implications for Practice, Policy and Future Directions. *Educational Psychology Review*, *29*(1), 119–140. https://doi.org/10.1007/s10648-015-9355-x

Wang, M. T., Eccles, J. S., & Kenny, S. (2013). Not lack of ability but more choice: individual and gender differences in choice of careers in science, technology, engineering, and mathematics. *Psychological science*, *24*(5), 770–775. https://doi.org/10.1177/0956797612458937

Winny, S., & Joseph, D. (2021). Gender and leadership: A criterion-focused review and research agenda. *Human Resource Management Review*, *31*(2), Article 100765. https://doi.org/10.1016/j.hrmr.2020.100765

Wu, J., Richard, O. C., Triana, M. C., & Zhang, X. (2022). The performance impact of gender diversity in the top management team and board of directors: A multiteam systems approach. *Human Resource Management*, *61*(2), 157–180. https://doi.org/10.1002/hrm.22086

Zaleniene, I., Rakauskiene, O. G., & Grigoloviciene, D. (2013). Gender Equality in the Lithuanian System of Education and Science. *European Scientific Journal*, *9*(17), 282–302. https://doi.org/10.19044/esj.2013.v9n17p%25p