

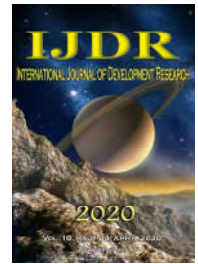


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RESEARCH ARTICLE

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## AN EXPLORATORY CASE STUDY: MENTORING STRATEGIES EXPERIENCED BY MINING FEMALE MANAGERS

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### ABSTRACT

The mining industry has experienced significant labor and expertise shortages due to demographic changes like the rapidly aging workforce, a negative perception of mining as a promising career path, and low rates of female participation. Within this skills shortages scenario, the apparent obstacles that women experience for advancing into executive positions in the mining industry worsen the forecasts. An exploratory case study incorporating semi-structured interviews with 10 senior female managers was conducted to gain insights on the challenges surrounding upward mobility and the effects of mentorship for women in the Latin American mining industry. This study's findings have the potential to increase insights into the underrepresentation of women in leadership positions in the Latin American mining sector and the influence that the lack of effective mentoring has. Female obstacles-to-progress, active mentoring attempts, and women progress opportunities emerged as core themes related to the progress possibilities of women in the Latin American mining industry. Participants indicated the privileged position of men, the role of women at home, male chauvinism, the industry's traditional practices, and the lack of systematic mentoring programs influenced how few women were functioning in leadership positions in the mining organizations. Recommendations apply to the implementation of new artificial intelligence and teleworking as part of the mentoring strategies to be developed for female managers.

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### INTRODUCTION

The mining industry has experienced significant labor and expertise shortages due to demographic changes (Salinas & Romani, 2014). According to Mills (2012), the skills shortages are a global concern and have occurred in South Africa, Australia, Canada, and South America, affecting the global consumption. The forecasts for the future seem to be worse, with a critical skills shortage starting in 2020 (Silva-Segovia & Salinas-Meruane, 2016). The potential causes for this shortage have been identified as the rapidly aging workforce, a negative perception of mining as a promising career path, and low rates of female participation (Burns, 2013). The latter also contributed to the existence of vacancies in executive management positions and will become more significant starting in the next decade based upon projected industry growth and the high rate of skilled workforce retirements occurring in the present (Wylie, 2013). Furthermore, the literature supports that technical and professional female participation in the mining sector is discouraged (Clark, 2015).

The present study pursued to gain insights about the effectiveness of the mentorship as a propelling factor for female managers seeking executive roles in the Latin American mining industry. In Canada, women were not allowed underground until 1974, and in some resource-rich countries, like Mongolia, the practice of banning women from mining operations has continued (Sitchinava, 2014). In Chile, women were not allowed to visit mines until 2003 (ISSUU, 2013). In 2014, the percentage of women working in the mining industry ranged from 13 – 20% with South Africa and Australia leading the way (Sitchinava, 2014). Jenkins (2014) stated that the World Bank reported that across the world, women's employment in extractive industry companies was low. In Latin America, women represented 13.6% in Mexico, 5% in Colombia, 4.2% in Chile, and 2% in Peru (ISSUU, 2013). Within the current scenario, the apparent obstacles that women experience for advancing into executive positions in the mining industry worsen the forecasts (Jensen, 2014; PwC, 2015). In the present study, there was an effort to investigate

the overall barriers that female managers experienced and how the effective mentorship to potential and current senior management women in the mining industry may help in the advancement of those women into the executive level management.

## MATERIALS AND METHODS

A qualitative method with a case study design was employed to investigate the experiences of female managers in the mining industry of the mentoring processes and how these mentoring strategies have affected their careers. The focus was on identifying the potential mentoring processes that facilitated the career advancement of women. The phenomenon investigated was a contemporary phenomenon, and there was an effort to study it in depth and within its real-world context (Yin, 2014). Yin also stated that the borders between the case and context might not be evident.

### Research Design

According to Yin (2014), an exploratory case study might be suitable when researchers focus on identifying the research questions or procedures to be applied in a subsequent study. Yin (2014) observed that a case study was preferred when the case was contemporary, and the behaviors could not be manipulated. This case study focused on mentoring strategies that took place in the mining industry, which propelled or restrained female senior managers in the mining industry in Latin America to advance into the higher management positions. The phenomenon investigated was a contemporary phenomenon and the purpose was to study it in depth and within its real-world context. The research question asked how female senior managers in the mining industry perceived the mentoring strategies available to them and how these contributed to the advancement into executive management positions.

### Population and Sample

The target population of this study was the female senior managers in the mining industry with operations in Latin America. The list of participants was drawn from the organization International Women in Mining, and its subsidiaries in Latin America. Yin (2014) recommended a sample of 6 to 10 participants for interviews if they are combined with other data collection sources to advance credibility through the triangulation concept for data gathering. The sample used in this study included 10 women in leadership positions in the Latin American mining industry. Recruitment occurred through purposive sampling to acquire a sample of senior women managers. Purposive sampling was appropriate in this study because it contributed to achieving a sample with the required proficiency and experience in mining management issues relevant to the topic under study. Qualitative researchers are nonrandom in the selection of data sources (Denzin & Lincoln, 2008). One potential disadvantage of using non-random techniques is the limitation of transferability of the study results in other cases (Guba & Lincoln, 1981). The sampling procedure aligned with this research study to generate more profound information for understanding the different mentoring strategies in which participants were involved. The female participants had a minimum continuous experience of 10 years in senior management and decision-making positions within mining

companies with operations in Latin America. The study sample was a diverse group of senior female managers drawn from the IWIM network. Diverse characteristics within the sample resulted because the leaders were women from different countries, reported different mining organizational backgrounds, held different roles at senior levels in their organizations, and were in a different age range from one another. Of the 10 participants, 60% were from Chile, 20% were from Peru, 10% from Ecuador, and 10% from Mexico (see Figure 1). Among participants, 40% were civil engineers leading projects, 30% were geologists analyzing potential projects, 10% were in business development management, 10% were in the financial management, and 10% were responsible for environmental and social development (see Figure 2).

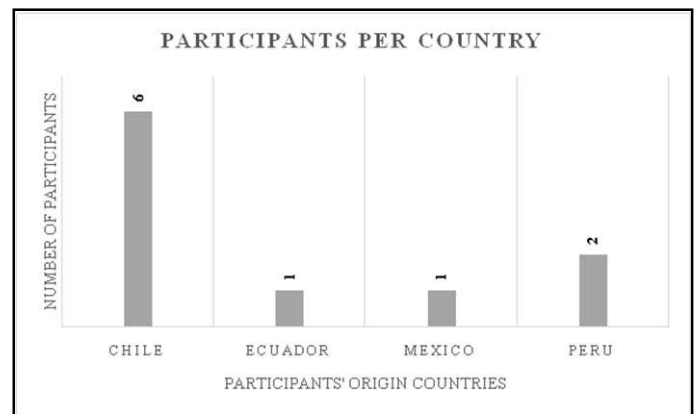


Figure 1. Number of participants from each country

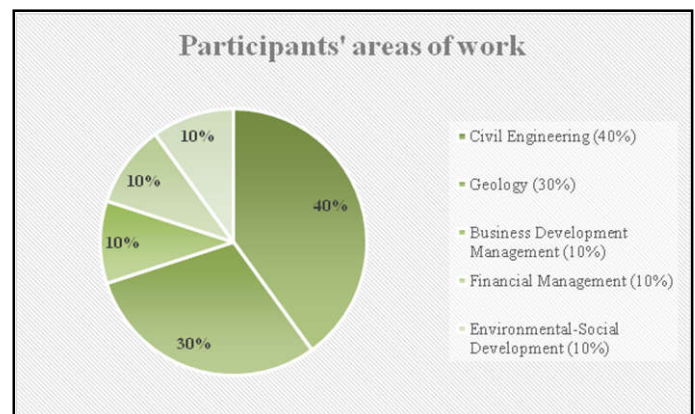


Figure 2. Study sample broken down by area of work

## Research instruments and gathering procedures

### Data collection instrument

Yin (2014) suggested employing more than one tool for data collection in case study designs. In qualitative studies, the investigator plays a critical role as the primary data collector (Patton, 1990). This study followed the tradition with the investigator acting as the primary data collector. The instrument for this research study was 13 open-ended interview questions. The interview questions were based on the central research question proposed for the study. The interview questions contributed to providing a thorough understanding of the individual viewpoints of participants in the study. For recording the information from the interviews, the investigator used handwritten notes and audiorecording.

The audio recording contributed for double checking and supported the notes taken while interviewing. The use of an online platform allowed the investigator to reach different places within Latin America with no need to travel. The use of multiple sources of information enabled the investigator to address a broader range of behavioral issues. The use of multiple data sources allowed for data triangulation (Yin, 2014), which is an instrument suitable to exhibit completeness and confirmability of the data. Data sources included semi-structured, online interviews with each participant, field notes, and member checking. By developing convergent evidence, data triangulation contributed to strengthening the construct validity of this study (Yin, 2014).

### Administration of data collection instruments

The initial recruitment approach consisted of an invitation through e-mail, and although the interview did not take place in the same room, it was still necessary to seek participant's informed consent and to protect participant's privacy. The study participants needed to sign an Informed Consent Form before they were interviewed for the study. The informed consent form provided a means for participants to acknowledge and to confirm comprehension of the nature of the study and the way in which personal information would be kept confidential.

### Data analysis

Data analysis required the identification of essential parts of the experience participants underwent concerning their observations of the mentoring strategies and their outcomes. Analyzing data involved content analysis of data collected from the three sources considered, but separate analysis occurred for each data source. The data came from the interview responses using audio recording. Once recorded, the data were transcribed. Computer Assisted Qualitative Data Analysis Software (CAQDAS) was considered in this research. In this study, the researcher employed NVivo12, a computer-based program, to collect high-frequency word use and classify the terms by assigning them to appropriate nodes. At the end of this process, which was repeated for every interview, a list describing the more salient thematic meanings during the interviews was created.

## RESULTS

Analysis of responses to the interview questions entailed matching participants' views to the research question of how female senior managers in the mining industry perceive the mentoring strategies available to them and how these contribute to the advancement into executive management positions. After uploading the data into NVivo12 software, coding and grouping into nodes the aspects of the information relevant to the research question proceeded. Using the coding stripes feature in NVivo12, nodes became color shaded and showed the frequency of the coded information.

### Emerging themes

The coding process resulted in 14 of the most frequently appearing relevant categories in the interview data. Reviewing and grouping the 14 nodes occurred by calculating totals of the various sums of the frequencies of nodes per participant. The process resulted in three color codes, red representing *effective*

*mentoring attempts* with 125 references, blue representing *women's obstacles to progress* with 108 references, and green representing *potential women's progress opportunities* with 159 references from participants

Table 3. Themes

| Themes   | Percentage | Count |
|--|------------|-------|
| Women's obstacles to progress: social-cultural obstacles, situational obstacles.                                     | 28%        | 108   |
| Effective mentoring attempts: mentoring programs, mentoring advantages, mentoring opportunities, mentoring outcomes. | 32%        | 125   |
| Potential Women's progress opportunities: gender-equity, males-female's differences, females as complement.          | 41%        | 159   |

## DISCUSSION

Three main themes emerged from the data analysis that represented the descriptions of the mentoring experiences shared by participants: *women's obstacles-to-progress*, *effective mentoring attempts*, and *potential women's progress opportunities* (shown in Table 3). The themes applied in different ways in addressing the research question, which inquired how female senior managers in the mining industry perceive the mentoring strategies available to them and how these contribute to the advancement into executive management positions.

**Content Implications:** There was no evidence of serious gender equality efforts being considered in any of the experiences described by participants. As all participants indicated, the mentoring programs experienced seemed more improvised than thoughtfully planned. All participants considered that strategies to increase the number of women at the top echelon of the industry were not included in the organizational business strategies. All participants were concerned about how few women were in senior mining positions and the effect that mentoring programs had on the progress of women in the mining industry. Regarding the research question, nine out of 10 participants in the study agreed about the importance that mentoring strategies may have in increasing the number of women in the field and the improvement of the existing female professionals working in the industry. The most effective mentoring tactics experienced were those related to trusting in mentees and challenging their capabilities. All participants manifested that one of the most relevant mentoring outcomes was to realize how women see themselves within the industry. Several topics analyzed within the themes described in the analysis of data were not previously found in the literature reviewed. Those topics were the decision of women to postponing their professional development and prioritizing their family and the support (or lack of it) of husbands to their wives in the mining field. In the existing literature, the previous topics were lightly analyzed and in geographic areas distant from the Latin American region. The concerns manifested by all participants about postponing their professional development and the support of female managers' husbands are topics that might deserve further understanding.

**Recommendations:** Recommendations of the study include the development of mentoring programs for professional women in their early stages to contribute to change some

existing paradigms in the industry. Other recommendations relate to the implementation of new artificial intelligence as a component of mentoring strategies to be developed for female managers. All participants agreed on the fact that the employment of the new technologies would contribute to balance the progress possibilities for women and men within the industry. When linked to the specific problem of this study, participants suggested that the application of new technologies for the mentoring strategies might represent new opportunities for female managers. The potential improvement of female opportunities in the mining sector would also contribute to reduce the skills shortage in the industry and propel better companies' performance.

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