Investigating the Influence of Gender on Innovative Work Behaviour in Start-ups

Unveiling the Mediating Role of Transformational Leadership

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Words: 9.040
Date: 15.06.2024

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ABSTRACT

This research examines the relationship between gender, transformational leadership, and innovative work behaviour (IWB) in start-up environments. Using empirical analysis, it investigates whether gender influences leadership behaviours and subsequently impacts employees' IWB. The study adopts regression analysis to explore the relationships among gender, transformational leadership behaviours, and IWB within start-up organizations. The main finding reveals a significant positive correlation between transformational leadership and IWB, highlighting the importance of cultivating transformational leadership qualities among start-up leaders. This suggests that fostering a culture of transformational leadership can effectively promote innovation within start-up ecosystems.

Keywords: Innovative Work Behaviour, Transformational Leadership, Gender, Start-up

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1. Introduction

Nurturing a culture of innovation stands out as a crucial leadership responsibility in today's organizational settings (Pundt, 2015). Leveraging the innovative capacity of employees is a key avenue for organizations to enhance their innovation prowess. Employees' innovative work behaviour (IWB), characterized by their capacity to conceive and execute fresh and valuable ideas within the workplace (Scott & Bruce, 1994), stands as a linchpin for organizational innovation and enduring competitive edge (Montani et al., 2017; Ramamoorthy et al., 2005). Previous research indicates that, for innovation, it is necessary to understand employees' IWB, as their actions have critical importance for incessant improvement and innovation. This formation of innovation is emphasized in the academic literature (e.g., Janssen, 2000) and considered important by studies in the management domain comprising entrepreneurship (Wahyono & Hutahayan, 2021; Sulistyo & Siyamtinah, 2016; Zhao, 2005). Janssen (2000) identified IWB as "the intentional creation, introduction and application of new ideas within a work role, group or organization, in order to benefit role performance, the group, or the organization" (p. 288).

Hernaus et al. (2019) point to gender as a noteworthy predictor of IWB. Studies indicate that organizations with higher proportions of women in leadership positions tend to exhibit more creative and innovative cultures, fostering an environment where employees are more likely to engage in IWB (Eagly et al., 2003). This leads to the proposition by Carless (1998) that organizations need to reassess and broaden their understandings of effective leadership in terms of role expectations, gender, and stereotypes. Over the past three decades of the 20th century, the proportion of women taking over executive, managerial, and administrative positions nearly tripled (Appold et al., 1998). This surge in women's leadership roles has not only led to an increase in social science research but has also prompted a closer examination of gender differences in leadership styles. Leadership traits such as effective communication, problem-solving, and decision- making are recognized as shared attributes between both genders (Foster, 2000; Withers, 2000). Yet, studies on businesses led by women, as highlighted by Harris et al. (2006), suggest a correlation between the lower profitability of female-led companies and the perceived lower risk appetite of women compared to men. Another concern relates to the perception of women as innovators, potentially leading to their ideas being overlooked and impeding progress toward the implementation phase (Poutanen & Kovalainen, 2013). These instances illuminate just a few examples of the potential differences in leadership styles between men and women, prompting contemplation on the distinct impacts these leadership traits may have on the IWB of employees.

Additionally, Leadership plays a pivotal role in fostering and shaping IWB (Ismail & Mydin, 2019; Serrano- Laguna et al., 2017; Torres et al., 2017). Positioned at the core of supporting innovation, leaders have substantial influence over strategic decisions, policies, and procedures within a firm, acting as key catalysts for instigating changes that bolster innovation (Prasad & Junni, 2016). In the realm of start-ups, leadership, especially that of the founder-CEO, holds particular significance, as it intricately intertwines with the foundation and evolution of the organization (Zaech & Baldegger, 2017). Consequently, leadership becomes a critical determinant for the successful development of ventures (Cogliser & Brigham, 2004). Transformational leadership emerges as a noteworthy focus in the study of leadership and innovation (Jung et al., 2003). Leaders achieve transformational leadership by inspiring and enhancing the creative thinking and innovation capabilities of organizational members (Prasad & Junni, 2016). Bass (1987) delineated five integral elements of transformational leadership: idealized influence, attributed charisma, inspirational motivation, intellectual stimulation, and individualized consideration. Especially in the start-up landscape, characterized by efficient processes and streamlined structures, the leadership conduct of founder-CEOs holds significant significance. The leaders or founder-CEOs of start-ups must cultivate a compelling vision to inspire and intellectually stimulate all employees, guiding them toward realizing the company's overarching goals (Zaech & Baldegger, 2017). Numerous empirical studies consistently highlight a favourable correlation between transformational leadership behaviour and various performance indicators, irrespective of whether the studied firms were start-ups or well-established entities. (Gumusluoglu & Ilsev, 2009; Walumbwa et al., 2007).

The research gap identified in existing literature revolves around the lack of exploration into the mediating effect of transformational leadership on the relationship between gender and IWB within start-up environments. Although previous studies have established a positive correlation between transformational leadership and IWB and Reuvers et al. (2008) found out that female leaders tend to exhibit a higher degree of transformational leadership compared to their male counterparts, the specific influence of gender on this relationship remains largely unexplored (Judge & Piccolo, 2004). Therefore, the research question posed is: "How does gender influence IWB in start-ups, and to what extent is this relationship mediated by transformational leadership?"

Understanding how gender interacts with leadership styles to shape innovation behaviour is crucial for several reasons. Firstly, it allows for the identification of potential differences in leadership approaches between men and women, shedding light on how these differences may impact employees' ability to generate and implement innovative ideas (Reuvers et al., 2008). Research

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has consistently shown that female leaders often demonstrate more effective leadership behaviours than their male counterparts across various management levels and age groups (Eagly & Johnson, 1990). Despite this, the representation of women in leadership positions remains disproportionately low. For instance, only 13.2% of all start-up founders are female, and just 10.4% of Fortune 500 companies are women-led (Brush, 2019).

This research aims to address the gender gap in leadership and innovation studies since, there is a notable scarcity of comprehensive research on women's leadership experiences, as the existing literature predominantly relies on studies of men (Elliott & Stead, 2008; Calas & Smircich, 1996; James, 1999; Lämsä & Sintonen, 2006). Historically, leadership literature has largely overlooked gender, primarily focusing on women and their perceived deviation from a male-centric norm.

In a concerted effort to address these research gaps, this study examines the gender of founder-CEOs in the start-up environment and its subsequent influence on employees' IWB. Additionally, it explores the mediating effect of transformational leadership on this relationship. In pursuit of this, the core aims of this research are twofold: to augment the understanding of gender within start-ups and to reveal new perspectives on how gender-influenced leadership behaviour shapes the IWB of employees.

2. Literature Review

The dynamics of leadership styles, IWB, and gender have garnered significant attention in organizational research, particularly within the context of start-up environments. Transformational leadership, characterized by its ability to inspire, motivate, and empower employees, has been identified as a critical factor in fostering innovation and organizational effectiveness (Bass, 1985; Avolio & Bass, 1999). However, the existing literature on the relationship between transformational leadership and IWB remains limited (Kahai et al., 2003; Pieterse et al., 2009), with gaps and inconsistencies necessitating further exploration. Additionally, the influence of gender on leadership behaviours and their impact on innovation within start-ups is an underexplored area (Eagly & Johnson, 1990), despite its potential significance in understanding organizational dynamics. This literature review seeks to synthesize current knowledge on these topics, highlighting key findings, gaps, and areas for future research.

2.1. Gender

Gender dynamics play a significant but underexplored role in shaping leadership behaviours and their impact on innovation. Historically, leadership positions have been predominantly occupied by men, leading to skewed understandings of leadership dynamics (Eagly & Karau, 2002). Despite efforts to address gender disparities in leadership, research on the influence of gender on IWB within start-ups remains limited (Eagly & Carli, 2018). This chapter explores how gender influences leadership styles and organizational outcomes, particularly in start-up environments, and identifies gaps in existing research.

Previous research has examined gender differences in both transformational leadership style and emotional intelligence. While findings have been mixed, a consistent theme is the negative evaluation of women leaders, particularly when they adopt autocratic styles (Eagly et al., 1992). For instance, women tend to be more relationship-oriented, emphasizing support and development (Eagly & Johnson, 1990; Broome, 2013; Eagly & Carli, 2003). This aligns with the transformational leadership style, which incorporates both task-oriented and relationship-oriented behaviours, allowing women to fulfil both leadership and gender role expectations (Hackman et al., 1992). Meta-analyses have shown small but significant gender differences in transformational leadership, with women often rated higher in transformational factors and contingent reward, whereas men excel in transactional styles (Eagly et al., 2003). However, other studies report no significant gender differences in transformational leadership behaviours (Druskat, 1994; Bosch et al., 2004; Kouzes et al., 1997). This inconsistency suggests the need for more nuanced research into how gender influences transformational leadership and its evaluation by subordinates and superiors (Ayman & Korabik, 2010; Carless, 1998).

Masculine images of leadership continue to shape perceptions, often to the disadvantage of women (Olsson, 2000). Despite some behavioural similarities between male and female managers (Manning, 2002), women are typically more relationship oriented (Eagly & Johnson, 1990; Eagly & Carli, 2018). This relationship-oriented approach aligns well with transformational leadership, which can integrate both gender and structural role demands (Eagly & Johannesen-Schmidt, 2001). Research indicates that female managers often excel in transformational leadership dimensions such as individualized consideration and intellectual stimulation (Eagly et al., 2003; van Engen & Willemsen, 2004). However, the effectiveness and perception of transformational leadership can be influenced by gender-stereotypic expectations and organizational context. For example, women leaders in male-dominated environments often face negative evaluations despite

demonstrating effective transformational leadership (Eagly et al., 1995; Tremmel & Wahl, 2023). This underscores the importance of considering organizational culture and gender composition when assessing leadership effectiveness.

Transformational leadership is crucial for fostering IWB, yet gender dynamics can significantly impact its effectiveness. Women are generally more likely to employ transformational leadership styles, emphasizing communal and supportive behaviours (Eagly & Johannesen-Schmidt, 2001; Eagly et al., 2003). However, in male-dominated contexts, female leaders may face challenges in being perceived as effective (Eagly et al., 1995). This suggests that gender congruity between the leader and the organizational context is essential for optimizing transformational leadership's impact on innovation. The effectiveness of transformational leadership in empowering employees can be moderated by gender dynamics. Men are often perceived as more autonomous and risk-taking, traits that align well with the challenging and stimulating aspects of transformational leadership (Schein, 1973; Eagly et al., 2000). Consequently, male subordinates may respond more positively to transformational leadership, experiencing greater psychological empowerment and motivation (Lai et al., 2020; Wofford et al., 1998). In contrast, female subordinates, who may experience less autonomy in their roles, might not respond as strongly to transformational leadership (Bokemeier & Lacy, 1987).

Despite the significant strides in understanding transformational leadership and gender, gaps remain, particularly in different cultural contexts and organizational settings. The existing research highlights the importance of considering gender when evaluating leadership effectiveness and IWB. Future studies should aim to address these gaps by exploring how gender dynamics interact with organizational culture and leadership styles in diverse settings, particularly in start-ups and male-dominated industries.

2.2 Innovative Work Behaviour

Innovative work behaviour (IWB) is crucial for organizations aiming to adapt to rapidly evolving environments and sustain competitiveness. Despite its importance, there is a noticeable lack of formal encouragement for innovation within many organizations, leading to the underappreciation of innovative efforts (Prasad & Junni, 2016). While transformational leadership is posited to foster innovation, the literature reveals inconsistencies and gaps that warrant further exploration, particularly concerning the mechanisms through which IWB is promoted, especially in start-up environments (Prasad & Junni, 2016; Sethibe & Steyn, 2016).

IWB encompasses activities related to the generation, promotion, and implementation of new and useful ideas at any organizational level (Hughes et al., 2018). This behaviour includes developing new ideas, technologies, and techniques, as well as experimenting with new business methods. Organizations need such innovations to tackle emerging challenges due to global competition, shifting customer expectations, and market changes (Savelsbergh et al., 2012; Anderson et al., 2014). Innovation is thus a critical factor for organizational success, ensuring long-term effectiveness and competitiveness (De Jong & Den Hartog, 2010; Janssen et al., 2000). Transformational leadership is often associated with fostering IWB by motivating employees to exceed expectations and engage in creative problem-solving. However, empirical studies show mixed results regarding the direct relationship between transformational leadership and IWB (Saeed et al., 2019; Uhl-Bien & Arena, 2018; Koh et al., 2019). These inconclusive findings highlight the need to examine the underlying mechanisms and conditions under which transformational leadership influences IWB. Research suggests that several mediating and moderating factors might explain the relationship between transformational leadership and IWB. Afsar and Umrani (2019) propose that employees' motivation to learn and the organization's task complexity and innovation climate play crucial roles. Transformational leaders may enhance IWB through intellectual stimulation and individualized consideration, which address individual and organizational levels (Afsar & Masood, 2017).

The complexity of innovative behaviours, which are often risky and uncertain, suggests that additional variables such as relational identification, promotion focus, and knowledge sharing could mediate this relationship (Sudibjo & Prameswari, 2021; Jaiswal & Dhar, 2015; Afsar & Masood, 2017). Further research is needed to explore these multi-level factors comprehensively (Rosing et al., 2011; Tse et al., 2021). Gender differences in the relationship between transformational leadership and IWB have been explored by Reuvers et al. (2008). They found that while transformational leadership positively influences IWB, the impact may vary across genders, suggesting that gender-specific approaches might be necessary to maximize IWB in diverse workforces.

Despite the recognition of various factors influencing IWB, significant gaps remain in understanding the precise mechanisms and conditions under which transformational leadership fosters innovation. IWB is essential for organizational success in a rapidly changing global environment. While transformational leadership has the potential to promote IWB, the relationship is complex and influenced by multiple mediating and moderating factors.

2.3. Transformational Leadership

Transformational leadership has been widely recognized as a crucial determinant of organizational innovation and effectiveness. Research suggests that transformational leaders create conducive work environments, inspire creativity, and motivate employees to exceed their self-interests for the collective good (Jung et al., 2003; Howell & Higgins, 1990; Pawar & Eastman, 1997). Transformational leadership is characterized by five dimensions: Attributed Charisma, Idealized Influence, Inspirational Motivation, Intellectual Stimulation, and Individualized Consideration (Bass & Avolio, 1997).

The role of transformational leadership in fostering organizational innovation is well-documented. Transformational leaders stimulate intellectual curiosity and encourage employees to explore new ideas, fostering an environment that supports innovation (Bass & Avolio, 1997; Bednall et al., 2018; Ghazo et al., 2018). This type of leadership enhances employees' engagement in creative activities and aligns their personal goals with the organization's vision, increasing motivational levels and fostering a sense of belonging (Afsar et al., 2014; Masood & Afsar, 2017).

Studies have shown that transformational leadership positively impacts various organizational outcomes, including job satisfaction, organizational commitment, and performance metrics such as stock performance, sales volume, and profit margin (Rafferty & Griffin, 2004; Geyer & Steyer, 1998; Howell & Avolio, 1993). For instance, Boies et al. (2015) found that transformational leadership significantly enhances employees' innovative performance. Similarly, Sudibjo and Prameswari (2021) demonstrated that transformational leadership facilitates IWB among employees in Korean manufacturing firms. Adams et al. (2015) emphasized the importance of timing and procedural support in enhancing followers' innovative performance, while Ma and Jiang (2018) highlighted that transformational leaders encourage openness, experimentation, and risk-taking behaviour, promoting IWBs in organizational contexts.

Gender differences in transformational leadership have also been explored. A meta-analysis by Eagly et al. (2003) showed that female leaders are more likely to employ transformational leadership and contingent reward strategies compared to their male counterparts. Conversely, male leaders are more frequently associated with management by exception and laissez-faire leadership styles. These findings suggest that transformational leadership may align more closely with traits traditionally associated with female leadership styles, such as nurturing and support (Stempel, Rigotti, & Mohr, 2015).

Despite the extensive research on transformational leadership, there is a noted scarcity of studies specifically examining its relationship with IWB (Mumford et al., 2002; Morales et al., 2008). This gap indicates a need for further investigation across different organizational contexts. Transformational leaders' ability to inspire and intellectually stimulate their followers is believed to be crucial for fostering IWB, yet empirical evidence remains limited. For example, research by Zuraik and Kelly (2019) found that transformational leadership, through intellectual stimulation and emotional appeal, significantly contributes to innovation goals. Johannessen et al. (2015) and Wang et al. (2014) also noted that supportive environments created by transformational leaders are critical for encouraging IWBs.

While transformational leadership is well-established as a key driver of organizational innovation and effectiveness, further research is needed to explore its relationship with IWB in diverse organizational settings. Future studies should focus on identifying the mechanisms through which transformational leadership influences IWB and examine how factors such as gender, and individual differences mediate this relationship. Additionally, the impact of gender on transformational leadership and its effectiveness in different contexts warrants further investigation to develop a more nuanced understanding of this leadership style.

3. Theoretical Framework

The dynamics of leadership styles, IWB, and gender have garnered significant attention in organizational research, particularly within the context of start-up environments. Transformational leadership, characterized by its ability to inspire, motivate, and empower employees, has been identified as a critical factor in fostering innovation and organizational effectiveness (Bass, 1985; Avolio & Bass, 2002). However, the existing literature on the relationship between transformational leadership and IWB remains limited (Kahai et al., 2003; Pieterse et al., 2009), with gaps and inconsistencies necessitating further exploration. Additionally, the influence of gender on leadership behaviors and their impact on innovation within start-ups is an underexplored area (Eagly & Johnson, 1990), despite its potential significance in understanding organizational dynamics.

This chapter aims to synthesize current knowledge on these topics, highlighting key findings, gaps, and areas for future research. The following sections will introduce three hypotheses aimed at further investigating these relationships.

Hypothesis 1 proposes that women-led start-ups demonstrate a greater propensity to foster IWB among employees. Research indicates that female leaders often exhibit transformational leadership qualities more frequently than their male counterparts (Eagly et al., 2003). These qualities, which emphasize inspiration, collaboration, and empowerment, align closely with traits traditionally associated with female leadership styles (Eagly & Johannesen-Schmidt, 2001). Eagly et al. (2003) have shown that female leaders excel in cultivating inclusive and supportive work environments, where employees feel empowered to contribute ideas and engage in innovation initiatives. This suggests that the influence of transformational leadership on IWB within start-ups may be more significant among female leaders, reflecting unique leadership dynamics shaped by gender-related expectations and societal norms.

Building on this understanding, Hypothesis 2 posits that women-led start-ups exhibit a higher prevalence of transformational leadership behaviours compared to their male-led counterparts. Given that transformational leadership plays a pivotal role in driving organizational innovation (Bass, 1985; Avolio et al., 1999; Zhang & Bartol, 2010; Jung et al., 2003), and that female leaders demonstrate these qualities more frequently, women-led start-ups are expected to create environments conducive to innovation through their inclusive and supportive leadership approach. In start-up contexts, where agility and creativity are crucial for success, the impact of transformational leadership on IWB is expected to be particularly pronounced in women-led organizations.

Hypothesis 3 asserts that there is a positive correlation between transformational leadership and employees' IWB in start-up environments. This hypothesis aligns with existing research indicating that transformational leadership fosters creativity, problem-solving, and risk-taking among employees (Bass, 1985; Avolio et al., 1999; Zhang & Bartol, 2010; Jung et al., 2003). Transformational leaders, by providing intellectual stimulation and individualized consideration, enable employees to unleash their creative potential and actively contribute to innovation initiatives.

The anticipated outcomes for these hypotheses and the mediating effect of transformational leadership are grounded in an understanding of leadership dynamics in start-ups. I expect support for Hypothesis 1, correlating transformational leadership with IWB. Additionally, I foresee a higher prevalence of transformational leadership behaviours in women-led start-ups, aligning with research on female leadership traits fostering innovation (Hypothesis 2). Consequently, I expect women-led start-ups to excel in cultivating IWB among employees (Hypothesis 1). However, the

mediating effect of transformational leadership may introduce complexities, potentially shaping the relationship between the gender of the founder-CEO and innovation differently based on societal expectations and stereotypes.

Hypothesis 1: Women-led start-ups demonstrate a greater propensity to foster innovative work behaviour among employees.

Hypothesis 2: Women-led start-ups exhibit a higher prevalence of transformational leadership behaviours compared to their male-led counterparts.

Hypothesis 3: There is a positive correlation between transformational leadership and employees' innovative work behaviour in start-up environments.
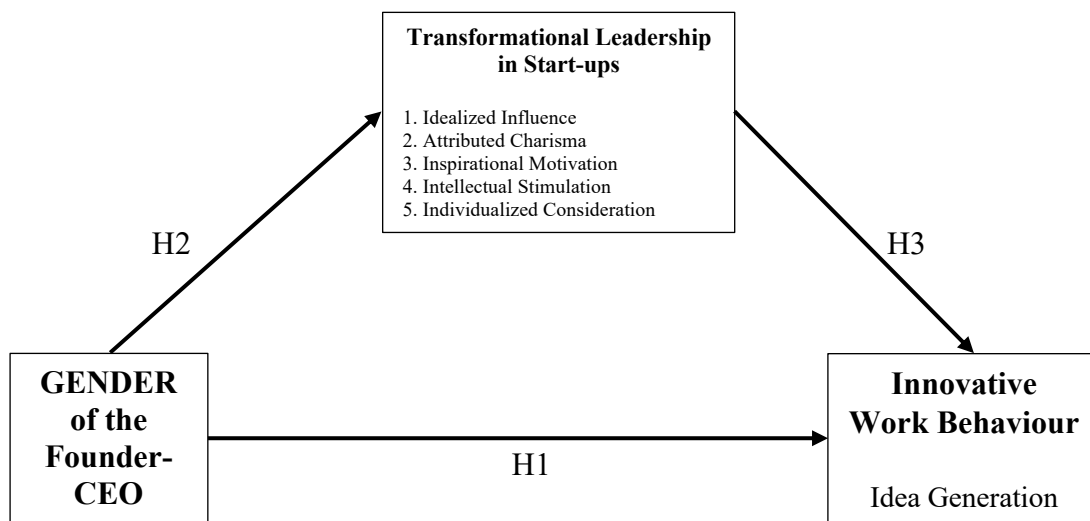
Figure 1: Conceptual Model of this Research

4. Empirical Strategy

4.1. Data Collection and Description

The forefront concept in leadership studies revolves around the paradigm of transformational and transactional leadership initially proposed by Burns (1978) and later expanded upon by Bass and Avolio (1999). Advancing this framework, the Multifactor Leadership Questionnaire (MLQ) has emerged over the past two decades, undergoing rigorous validation processes (Avolio & Bass, 1999). Widely accepted, the MLQ serves as the primary tool for evaluating various dimensions of

leadership, including transformational, transactional, and non-leadership attributes. Extensive research, as indicated by Judge and Piccolo (2004), has illustrated the efficacy of transformational leadership across diverse contexts worldwide. The MLQ feedback comprises a personalized, computer-generated assessment, furnishing a comprehensive overview of the frequency with which leaders are perceived to demonstrate specific behaviours across the spectrum of leadership performance. This MLQ encompass the five dimensions of transformational leadership , the independent variable, developed by Bass and Avolio (1997): idealized influence (1), which emphasizes the leader's ability to influence followers' ideals, ideas, and even aspects of their personal lives; attributed charisma (2), focused on followers' perceptions of the leader's behaviour and direct relation to their ability; inspirational motivation (3), involving the provision of inspiration and contextual motivation to foster optimistic behaviours, positive attitudes, and sustained enthusiasm among followers; intellectual stimulation (4), where transformational leaders encourage creativity by prompting followers to question assumptions and beliefs; and individualized consideration (5), concentrating on enabling followers to reach their highest potential and providing opportunities for learning and development.

In evaluating IWB, I employ Janssen's (2000) scale in my survey, comprising nine items that span three dimensions: (1) idea generation (e.g., "I generate original solutions to labour problems"), (2) idea promotion (e.g., "I make important organizational members enthusiastic about innovative ideas"), and (3) idea realization (e.g., "I introduce innovative ideas into the work environment in a systematic way"). Participants express their responses using a Likert frequency scale ranging from 1 ("totally disagree") to 5 ("totally agree"). However, in this study and the forthcoming survey, I will focus exclusively on the idea generation aspect of innovative work behaviour. This decision is based on the need to keep the survey concise, as the number of questions significantly impacts the response rate. By concentrating solely on idea generation, I believe I can effectively evaluate employees' IWB without overburdening respondents.

To assess the proposed hypotheses comprehensively, I conduct a robust survey aimed at gathering data on employee evaluations of their founder-CEOs' leadership style and their own assessment of their IWB. Employing a survey methodology allows us to reach a large population, enhancing statistical power through the accumulation of substantial information and the utilization of validated models.

The survey evaluates two key variables at the individual employee level, encompassing employee assessments of founder-CEOs' transformational leadership and the individual's IWB, as delineated

by Reuvers et al. (2008). Transformational leadership is measured through five questions capturing the five components of transformational leadership, adapted from Bass and Avolio (1997). Respondents rate these items on a five-point scale ranging from 1 ("not at all") to 5 ("frequently, if not always"), following the methodology established by Pieterse et al. (2009). Illustrative statements by Mokhber et al. (2017) capture key aspects of transformational leadership: "the leader emphasizes the importance of having a strong sense of purpose" (idealized influence), "the leader displays a sense of power and confidence" (attributed charisma), "the leader talks enthusiastically about what needs to be accomplished" (inspirational motivation), "the leader seeks differing perspectives when solving problems" (intellectual stimulation), and "the leader helps me to develop my strengths" (individualized consideration).

To measure IWB, I employ Janssen's (2000) scale in the survey, focusing solely on the idea generation component for the aforementioned reason (e.g., "I generate original solutions to labour problems").

The third key variable is the gender of the founder-CEO of the start-up.

Adding to the independent and dependent variables, I add the following control variables to be taken into consideration. In prior research, the correlation between the level of education, age and organizational tenure with innovative behaviours has been consistently established (Baer et al., 2003; West & Anderson, 1996; Wiersema & Bantel, 1992; Jung et al., 2003). Additionally, because this survey will be distributed in both the Netherlands and Germany, I will include the respondent's country as a control variable. This is necessary because most previous research on this topic has been conducted in a single country, making it impossible to rule out the potential influence of different national contexts on the proposed hypotheses. To ensure the robustness of the findings independent of these individual attributes, these variables are incorporated as control variables.

Survey distribution utilizes various channels, primarily leveraging an integrated survey platform to disseminate links efficiently. This approach streamlines data collection and analysis within the same platform used for survey deployment. For this research, I have selected Qualtrics as the survey platform. To boost response rates, outreach extends to start-ups in the Netherlands and Germany. To identify potential participants for the survey, I begin by extracting data from a Crunchbase, filtering based on specific criteria. The filters include selecting start-ups founded within the last five years and located in Germany and the Netherlands. Next, I conduct thorough

research on each start-up's website to gather information such as the founder-CEO's name, ensuring the founder-CEO is not inadvertently included as a survey participant and employing filters based on founding year and country code. Furthermore, I extract details about the sector in which each start-up operates, ensuring a broad representation across various industries. This data is organized in an Excel table containing information about the start-up name, employee name, LinkedIn contact of the employee, employee's organizational tenure, email and website link of the start-up, founder-CEO's name and gender, and the start-up's sector. This meticulous approach guarantees a diverse and comprehensive pool of potential survey respondents.

I gather the remaining information through the survey, which consists of the following ten questions seen in Figure 2.

Nr.	Question
1	Idealized Influence "The leader emphasizes the importance of having a strong sense of purpose."
2	Attributed Charisma "The leader displays a sense of power and confidence."
3	Inspirational motivation "The leader talks enthusiastically about what needs to be accomplished."
4	Intellectual Stimulation "The leader seeks differing perspectives when solving problems."
5	Individualized Consideration "The leader helps me to develop my strengths."
6	Idea Generation "I generate original solutions to labour problems."
7	Education of Employee
8	Age of Employee
9	Organizational Tenure of the Employee

10	Gender of the Founder-CEO

Figure 2: Survey Questions

The survey is distributed to the approximately 1,000 employees of start-ups in the Netherlands and Germany I listed in the mentioned Excel Table via LinkedIn direct messages. The distribution period spanned from April 24, 2024, to May 20, 2024, providing a time frame of three and a half weeks. During this period, I received 138 anonymous responses, resulting in a response rate of 14%. I received data on the founder-CEO's Transformational Leadership, the employee's IWB, the founder-CEO's gender, and the control variables: organizational tenure, age, and education. Additionally, after concluding the survey, I extracted the longitude and latitude of each respondent's location from Qualtrics and determined their respective country of residence. I then proceed to clean and export the data into a CSV format, which was then imported into STATA. There, I continued the data cleaning process and assigned names to the various variables, which are listed in Figure 3.

Variable Name	Label	Values
TL	Transformational Leadership of the Founder-CEO	Likert Scale (1-5) 1= no transformational Leadership 5= a lot of transformational leadership
IWB	Innovative Work Behaviour of the Employee (Idea Generation)	Likert Scale (1-5) 1= no innovative work behaviour 5= a lot of innovative work behaviour
gender	Gender of the Founder-CEO	1= Male 2= Female
OT	Organizational Tenure of the Employee	1= <1 year 2= 1-2 years 3= 2-3 years 4= 3-4 years 5= 4-5 years 6= +5 years

age	Age group of the Employee	1= 18-24
		2= 25-34
		3= 35-44
		4= 45-54
		5=55-64
		6= 65+
educ	Education level of the Employee	1= No education or primary education
		2= Secondary school or equivalent
		3= Bachelor's degree
		4= Master's degree
		5= Doctoral degree or higher
respondentid	Country of Respondent	1 = The Netherlands
		2 = Germany
		3 = Other

Figure 3: Collected Variables

4.2. Data Analysis

The data received from the two measures IWB and transformational leadership, obtained through the survey, and the data of the control variables, will undergo analysis using the statistical software STATA. Finally, introducing a mediation analysis to investigate whether the influence of the gender of the start-up's founder-CEO on IWB varies depending on the mediating effect of transformational leadership.

Mediation analysis is an essential methodology in understanding the mechanisms through which an independent variable (X = Gender of the Founder-CEO) affects a dependent variable (Y = Innovative Work Behaviour of the Employee) by incorporating a third variable known as a mediator (M = Transformational Leadership). The concept of mediation involves a causal sequence where an antecedent variable influences a mediating variable, which subsequently affects an outcome variable. This mediating variable can be behavioural, biological, psychological, or social in nature, transmitting the effect from one variable to another (MacKinnon et al., 2007). Essentially, mediation provides a framework to elucidate the process or mechanism by which one variable exerts an influence on another.

Mediation analysis typically adds a third variable to the $X \rightarrow Y$ relationship, transforming it into $X \rightarrow M \rightarrow Y$. This approach highlights how the inclusion of a mediating variable can complicate the straightforward relationship between two variables, introducing multiple potential explanations for observed correlations (Fritz & MacKinnon, 2007). The complexity of these three-variable systems necessitates robust methodological and statistical techniques to accurately assess mediation effects.

There are three main methods for conducting statistical mediation analysis: the causal steps approach, the difference in coefficients method, and the product of coefficients technique. Each of these methods relies on data derived from specific regression equations (MacKinnon, 2000).

1. $Y = i_1 + cX + e_1$
2. $Y = i_2 + c'X + bM + e_2$
3. $M = i_3 + aX + e_3$

In this context, i_1, i_2, and i_3 represent the intercepts; Y denotes the dependent variable; X stands for the independent variable; M signifies the mediator; c is the coefficient that links the independent variable to the dependent variable; c' is the coefficient that connects the independent variable to the dependent variable while accounting for the mediator; b is the coefficient that relates the mediator to the dependent variable, adjusted for the independent variable; a is the coefficient that associates the independent variable with the mediator; and e_1, e_2, and e_3 are the residuals.

The causal steps approach, detailed by Baron and Kenny (1986) and further refined by Kenny et al. (1998) and Judd and Kenny (1981), is the most widely used method. It involves four steps: demonstrating a significant relation between the independent and dependent variables, between the independent and mediating variables, and between the mediating variable and the dependent variable when both the independent and mediating variables are predictors. Finally, it requires that the effect of the independent variable on the dependent variable is reduced when the mediator is included in the model. This causal-steps-approach will be used in this research.

More recent advancements in mediation analysis address issues of endogeneity and confounding, which were often neglected in earlier linear model-based approaches (Cai et al., 2020). The potential outcome framework, commonly used in treatment evaluation, has introduced more general identification approaches. These newer methods aim to control for confounding by

assuming conditional exogeneity of the treatment and mediator given observed characteristics (Robins & Greenland, 1992). Empirical economic research has applied these approaches to various contexts. For instance, Simonsen and Skipper (2006) evaluated the direct wage effect of motherhood, while Heckman et al. (2013) investigated the cognitive and noncognitive mechanisms of the Perry Preschool Program. Studies using instrumental variables for identification, such as Boyce et al. (2012) on the indirect effect of education on life satisfaction, further illustrate the application of advanced mediation techniques.

The mediation analysis explores the mechanisms through which the gender of the founder-CEO (X) affects the IWB of employees (Y) by incorporating Transformational Leadership (M) as a mediator. The model is represented as follows:

1. Direct Effects:
    o   Regression of IWB (Y) on Gender (X): $Y=\beta 0+\beta 1X+\epsilon 1Y=\beta 0+\beta 1X+\epsilon 1$
    o   Regression of Transformational Leadership (M) on Gender
        (X): $M=\alpha 0+\alpha 1X+\epsilon 2M=\alpha 0+\alpha 1X+\epsilon 2$
    o   Regression of IWB (Y) on Transformational Leadership (M) and Gender
        (X): $Y=\gamma 0+\gamma 1X+\gamma 2M+\epsilon 3Y=\gamma 0+\gamma 1X+\gamma 2M+\epsilon 3$
2. Mediation Testing:
    o   Include Transformational Leadership (M) in the regression model of IWB (Y) on
        Gender (X): $Y=\beta 0'+\beta 1'X+\beta 2'M+\epsilon 4Y=\beta 0'+\beta 1'X+\beta 2'M+\epsilon 4$
3. Bootstrap Method:
    o   Apply bootstrapping to estimate the indirect effect and test its significance,
        providing robust mediation analysis results.

With the following variables:

1. X (Gender of the Founder-CEO): Categorical variable indicating gender (1 = Male, 2 = Female).
2. Y (IWB) Likert scale measuring innovative work behaviour (1 = no IWB, 5 = a lot of IWB).
3. M (Transformational Leadership): Likert scale measuring transformational leadership (1 = no transformational leadership, 5 = a lot of transformational leadership).
4. Control Variables:

    o   OT (Organizational Tenure of the Employee): Categorical variable representing organizational tenure.

- o Age (Age group of the Employee): Categorical variable representing age groups.
- o Educ (Education level of the Employee): Categorical variable representing education levels.
- o Respondentid (Country of Respondent): Categorical variable representing respondent countries.

The mediation analysis will likely support H0, showing a significant positive relationship between transformational leadership and IWB. H1 is expected to be validated, indicating that female founder-CEOs display higher levels of transformational leadership. Consequently, H2 should reveal that transformational leadership mediates the relationship between the gender of the founder-CEO and employees' IWB, highlighting the unique impact of female leadership in start-up environments.

While the empirical strategy employs robust statistical techniques and includes several control variables to enhance internal validity, it is essential to acknowledge and address several methodological considerations and potential biases that may affect the research findings. Despite efforts to control for confounding variables such as education, age, and organizational tenure, the possibility of no causal effect remains. Unobserved factors, such as organizational culture or individual personality traits, could influence both leadership styles and IWB (Boyce et al., 2012). To mitigate this concern, regression analysis and robust statistical techniques will be employed to assess the strength and significance of the relationships while controlling for potential confounders. As an observational study, there are inherent threats to validity, including the influence of unobservable factors that could confound the relationship between transformational leadership and IWB (Antonakis et al., 2010). For example, organizational culture or individual personality traits might impact the results. Despite using control variables and rigorous statistical analysis, biases such as response bias may still be present. Respondents may provide socially desirable answers, leading to skewed results (Podsakoff et al., 2003). To mitigate this, anonymity and confidentiality will be ensured to encourage honest and accurate reporting. Additionally, validated measurement scales, such as the Multifactor Leadership Questionnaire (MLQ) and Janssen's scale for IWB, will be used to enhance the reliability and validity of the data (Bass & Avolio, 1995; Janssen, 2000). The cross-sectional nature of the survey limits the ability to establish causality definitively. While associations between variables can be identified, causality cannot be inferred without longitudinal or experimental research designs (Shadish et al., 2001). Longitudinal studies would provide more robust evidence of causal relationships by tracking changes over time. The subjective nature of self-reported data may introduce response bias, affecting the reliability of

the findings. Participants might overestimate or underestimate their behaviour or experiences due to social desirability or recall bias (Podsakoff et al., 2003). Ensuring anonymity and employing validated scales will help mitigate this issue, but the inherent limitations of self-reported data remain.

Missing data can significantly impact the results and interpretations of the study. To address this issue, multiple imputation techniques will be employed to handle missing data. This approach allows for the estimation of missing values based on the observed data, thereby improving the robustness and reliability of the analysis (Rubin, 1987). Sensitivity analyses will also be conducted to verify the impact of missing data on the results, ensuring that the findings are not unduly influenced by incomplete data (Schafer & Graham, 2002). To account for potential confounders, control variables such as education, age, the country of the respondent and organizational tenure will be included in the regression models. These variables have been consistently shown to correlate with innovative behaviours in prior research and are essential to isolate the effect of transformational leadership and gender on IWB (Anderson et al., 2014). Including these control variables helps to reduce the risk of omitted variable bias and provides a clearer understanding of the relationships being studied. Despite efforts to control for various confounding factors, there may still be unaddressed biases that could affect the study's findings. For instance, the specific industry or size of the start-ups might play a role in shaping leadership styles and IWB, which are not accounted for in this study (Dong et al., 2008). The findings of this study may not be generalizable beyond the specific context of start-ups in the Netherlands and Germany. Different cultural, economic, and organizational contexts might yield different results. Future research could extend the study to different regions or industries to enhance the generalizability of the findings. To establish causality more definitively, future research should consider employing longitudinal or experimental research designs. Longitudinal studies, in particular, would allow for tracking changes over time and provide more robust evidence of causal relationships (Shadish et al., 2001). While this study focuses on transformational leadership, gender, and IWB, future research could explore other potential mediating or moderating variables. Factors such as team dynamics, organizational support, and external environmental influences could also play significant roles in shaping IWB (Simonton et al., 1992).

In conclusion, while the empirical strategy of this study employs robust statistical techniques and controls for potential confounders, there are inherent limitations and potential biases that must be considered. Acknowledging and addressing these concerns is crucial to enhancing the internal validity of the research findings.

5. Results and Interpretation

5.1. Summary Statistics

Variable		Obs	Mean	Standard Deviation	Variance	Minimum	Maximum
TL_composite		115	3.855652	0.760216	0.5779283	1.8	5
Idealized Influence		126	3.793651	1.140649	1.301079	1	5
	1	5	1	0	0	1	1
	2	14	2	0	0	2	2
	3	25	3	0	0	3	3
	4	40	4	0	0	4	4
	5	42	5	0	0	5	5
Attributed Charisma		125	4.016	0.91567	0.8384516	1	5
	1	2	1	0	0	1	1
	2	6	2	0	0	2	2
	3	21	3	0	0	3	3
	4	55	4	0	0	4	4
	5	41	5	0	0	5	5
Inspirational Motivation		121	4.289256	0.9698627	0.9406336	1	5
	1	3	1	0	0	1	1
	2	4	2	0	0	2	2
	3	14	3	0	0	3	3
	4	34	4	0	0	4	4

Variable	Obs	Mean	Standard Deviation	Variance	Minimum	Maximum
5	66	5	0	0	5	5
Intellectual Stimulation	119	3.823529	1.038636	1.078764	1	5
1	1	1	0	0	1	1
2	13	2	0	0	2	2
3	31	3	0	0	3	3
4	35	4	0	0	4	4
5	39	5	0	0	5	5
Individualized Consideration	116	3.301724	1.210245	1.464693	1	5
1	11	1	0	0	1	1
2	18	2	0	0	2	2
3	33	3	0	0	3	3
4	33	4	0	0	4	4
5	21	5	0	0	5	5
IWB	112	3.883929	0.8462481	.7161358	2	5
1	0	-	-	-	-	-
2	7	2	0	0	2	2
3	26	3	0	0	3	3
4	52	4	0	0	4	4
5	27	5	0	0	5	5
Gender	109	1.183486	0.3888525	.1512063	1	2
Male	89	1	0	0	1	1

Variable	Obs	Mean	Standard Deviation	Variance	Minimum	Maximum
Female	20	2	0	0	2	2
OT	104	2.230769	1.839326	3.383122	1	6
<1 year	48	1	0	0	1	1
1-2 years	25	2	0	0	2	2
2-3 years	21	3	0	0	3	3
3-4 years	2	4	0	0	4	4
4-5 years	1	5	0	0	5	5
>5 years	7	6	0	0	6	6
Age	111	2.216216	1.056628	1.116462	1	5
18-24	30	1	0	0	1	1
25-34	44	2	0	0	2	2
35-44	25	3	0	0	3	3
45-54	7	4	0	0	4	4
55-64	5	5	0	0	5	5
Education	111	3.576577	0.732983	0.5372645	2	5
No education or primary education	0	-	-	-	-	-
Secondary school or equivalent	9	1	0	0	1	1
Bachelor's degree	36	2	0	0	2	2
Master's degree	59	3	0	0	3	3
Doctoral degree or higher	7	4	0	0	4	4
RespondentID	116	2.206897	0.7747902	0.6002999	1	3

Variable	Obs	Mean	Standard Deviation	Variance	Minimum	Maximum
The Netherlands	25	1	0	0	1	1
Germany	42	2	0	0	2	2
Other	49	3	0	0	3	3

Figure 4: Summary Statisitcs Table

5.2. Diagnostic Tests: Breusch-Pagan and VIF Assessments

The following Figure 5 presents the results of the Breusch-Pagan test, which evaluates the presence of heteroskedasticity in the regression model's residuals.

VARIABLES	(1) Breusch-Pagan
2.gender	0.327
	(0.201)
OT	0.0735
	(0.0502)
educ	0.175
	(0.114)
age	0.0909
	(0.0864)
2.respondentid	0.534**
	(0.237)
3.respondentid	0.317
	(0.227)
Constant	2.509***
	(0.496)
Observations	103
R-squared	0.132

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p

Figure 5: Results Breusch-Pagan Test

The results of the heteroskedasticity test provide insights into the reliability of the assumption of constant variance in the regression model. The chi-square test statistic is a measure of the discrepancy between the observed variance and the expected variance under the assumption of constant variance (Ho: Constant variance). In this case, the chi-square test statistic is calculated to be 0.07. The p-value associated with the chi-square test statistic is 0.7846. This p-value represents the probability of observing a chi-square test statistic as extreme as the one calculated, under the assumption that the null hypothesis of constant variance is true. A high p-value suggests that the observed discrepancy between the observed and expected variances is not statistically significant. Given the p-value of 0.7846, we do not have sufficient evidence to reject the null hypothesis of constant variance at the conventional significance level of 0.05. This indicates that the assumption of constant variance of the error term in the regression model is likely valid.

Therefore, based on the results of the heteroskedasticity test, we can have confidence in the reliability of the standard errors estimated in the regression model. This implies that the coefficients' significance levels are unlikely to be affected by heteroskedasticity in this particular analysis.

The following Figure 6 presents the results of the Variance Inflation Factor (VIF) test, providing insights into the degree of multicollinearity among the independent variables included in the regression model.

VARIABLES	(1) VIF
2.gender	0.274
	(0.204)
OT	0.0861
	(0.0519)
3.educ	0.0974
	(0.305)
4.educ	0.418
	(0.294)
5.educ	0.159
	(0.437)
age	0.0767
	(0.0871)
2.respondentid	0.498**
	(0.239)
3.respondentid	0.295
	(0.228)
Constant	2.910***
	(0.403)
Observations	103
R-squared	0.149

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Figure 6: Results VIF test

In this regression model, the VIF values for each independent variable are calculated. A VIF close to 1 indicates that there is no multicollinearity, while higher values suggest increasing levels of multicollinearity.

For the variable gender, the VIF is 1.04, indicating low multicollinearity. Similarly, for OT, the VIF is 1.45, suggesting no significant multicollinearity issue. The variable educ has three categories: Bachelor's degree, Master's degree, and Doctoral degree. The VIF values for these categories are 3.24, 3.46, and 1.94, respectively. While these values are above 1, they are not excessively high, indicating some but not severe multicollinearity. For the age variable, the VIF is 1.29, indicating low multicollinearity. Regarding the respondentid variable, representing different countries, the VIF values for Germany and Other are 2.14 and 2.06, respectively. These values suggest relatively low levels of multicollinearity.

Overall, the mean VIF for this model is 2.08, which is generally considered acceptable. It suggests that multicollinearity is not a major concern in this regression model. However, it's important to note that while the VIF values are relatively low, interpretation should still consider the possibility of multicollinearity influencing the estimates of the regression coefficients.

5.3. Direct Effects

In the following section, we investigate the direct effects of gender and TL_composite on IWB while controlling for instrumental variables OT, education, country of the respondent and age as seen in Figure 7.

VARIABLES	1 Gender - IWB	2 Gender - TL	3 TL - IWB
TL_composite			0.267**
			(0.122)
2.gender	0.274	0.113	0.238
	(0.180)	(0.215)	(0.173)
OT	0.0861	-0.00940	0.0868*
	(0.0527)	(0.0406)	(0.0488)
3.educ	0.0974	0.103	0.124
	(0.369)	(0.352)	(0.359)
4.educ	0.418	0.319	0.323
	(0.362)	(0.342)	(0.349)
5.educ	0.159	0.653	-0.0130
	(0.471)	(0.430)	(0.438)
age	0.0767	-0.00751	0.102
	(0.0827)	(0.0780)	(0.0811)
2.respondentid	0.498**	0.432**	0.415*
	(0.201)	(0.190)	(0.214)
3.respondentid	0.295	0.0718	0.345*
	(0.191)	(0.218)	(0.195)
Constant	2.910***	3.489***	1.888***
	(0.406)	(0.391)	(0.636)
Observations	103	101	101
R-squared	0.149	0.102	0.200

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Figure 7: Regression Results of Direct Effects

1. Model: Gender - IWB

In the first model, we regress the IWB on gender, organizational tenure (OT), education level, age, and respondent's country. The overall regression model is statistically significant, as indicated by the F-statistic ($F_{(8, 94)} = 2.59$, $p = 0.0132$). The R-squared value suggests that approximately 14.92% of the variance in IWB is explained by the independent variables in the model. Among the predictors, only gender of the respondent and respondent's country (specifically, being from Germany) appear to be significant predictors of IWB, with females showing a coefficient of 0.274 ($p = 0.131$) and individuals from Germany showing a coefficient of 0.498 ($p = 0.015$). This suggests that female respondents tend to exhibit slightly higher levels of IWB compared to males, and individuals from Germany tend to exhibit higher levels compared to those from other countries.

2. Model: Gender - TL

In the second model, we regress the Transformational Leadership (TL) composite score on gender, organizational tenure (OT), education level, age, and respondent's country. The overall regression model is not statistically significant ($F_{(8, 92)} = 1.52$, $p = 0.1599$), and the R-squared value indicates that approximately 10.23% of the variance in TL is explained by the independent variables. None of the predictors, including gender, appear to be significant predictors of TL. This suggests that gender does not have a significant influence on Transformational Leadership behaviour in this analysis.

3. Model: TL - IWB

In the third model, we regress IWB on TL composite score, gender, organizational tenure (OT), education level, age, and respondent's country. The overall regression model is statistically significant ($F_{(9, 91)} = 3.20$, $p = 0.0021$), and the R-squared value indicates that approximately 19.96% of the variance in IWB is explained by the independent variables. The TL composite score is a significant predictor of IWB, with a coefficient of 0.267 ($p = 0.031$), suggesting that higher levels of Transformational Leadership are associated with higher levels of IWB. However, gender and the other predictors do not appear to be significant predictors of IWB in this model. This indicates that while TL has a significant impact on IWB, gender does not have a significant independent influence on IWB when controlling for TL and other factors.

By adding the robust option, Stata will compute robust standard errors that are robust to heteroskedasticity, improving the reliability of the standard error estimates and the subsequent statistical inference. This helps address any potential issues arising from heteroskedasticity in the regression model.

In summary, three models were examined to understand the dynamics between gender, IWB and transformational leadership. The analysis revealed that while gender and respondent's country (specifically, being from Germany) were significant predictors of IWB, gender did not play a significant role in determining TL behaviour. Moreover, while transformational leadership had a notable positive influence on IWB, gender did not independently affect IWB when controlling for other factors. This suggests a complex relationship where gender's impact varies across different aspects of organizational behaviour, highlighting the importance of considering multiple factors in understanding workplace dynamics.

5.4. Mediation Regression

Based on the findings from the regression models, it seems prudent to delve into a mediation regression analysis. Here's why: While the direct effect of gender on IWB is not statistically significant across all models, the TL composite score emerges as a significant predictor of IWB, suggesting a positive influence of transformational leadership. Even though gender does not directly impact Transformational Leadership behaviour in this analysis, the significant impact of TL on IWB implies a potential mediating role for TL in the relationship between gender and IWB. Conducting a mediation analysis offers a structured approach to explore whether the influence of gender on IWB operates indirectly through TL. Despite gender's direct impact on both TL and IWB being non-significant, mediation analysis can unveil hidden pathways and provide a more nuanced understanding of the relationship dynamics. Therefore, proceeding with a mediation regression holds promise for uncovering valuable insights into the intricate interplay between gender, transformational leadership, and IWB.

To explore whether TL mediates the relationship between gender and IWB, we include TL in the regression model of IWB on gender.

| | (1) |
VARIABLES	Mediation
2.gender	0.238
	(0.173)
TL_composite	0.267**
	(0.122)
OT	0.0868*
	(0.0488)
3.educ	0.124
	(0.359)
4.educ	0.323
	(0.349)
5.educ	-0.0130
	(0.438)
age	0.102
	(0.0811)
2.respondentid	0.415*
	(0.214)
3.respondentid	0.345*
	(0.195)
Constant	1.888***
	(0.636)
Observations	101
R-squared	0.200

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Figure 8: Mediation Regression Results

This mediation analysis aimed to understand the relationship between TL, gender, and IWB. The results show that TL, representing transformational leadership, has a significant positive effect on IWB (coef = 0.267, p = 0.031). This suggests that higher levels of transformational leadership are associated with increased levels of IWB. However, the coefficient for gender, particularly for females, is positive but not statistically significant (coef = 0.238, p = 0.173), indicating that being female may be associated with slightly higher levels of IWB, but this relationship is not conclusive in this analysis. Other predictors such as organizational tenure (OT), education level, age, and respondent's country do not have statistically significant effects on IWB in this model.

Overall, the results suggest that transformational leadership plays a significant role in influencing IWB, while the influence of gender on IWB is not statistically significant in this analysis.

5.5. Bootstrapping

Bootstrapping is a vital statistical technique used to estimate the uncertainty associated with parameter estimates in mediation analysis. By resampling the observed data with replacement, bootstrapping generates multiple samples to calculate standard errors, confidence intervals, and hypothesis tests. This method is particularly useful in mediation analysis due to its non-parametric nature, making it robust against violations of distributional assumptions. Additionally, bootstrapping offers flexibility in handling complex mediation models and diverse data characteristics, allowing for accurate estimation of indirect effects. Its ability to provide bias-corrected estimates and more reliable inference enhances the validity and credibility of mediation results. Overall, bootstrapping plays a crucial role in mediation analysis by ensuring robustness, accuracy, and flexibility in estimating mediation effects and assessing their significance.

VARIABLES	(1) y1
ab	0
	(0)
Observations	101

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Figure 9: Bootstrapping Results for Indirect Effects

The bootstrap mediation analysis aimed to assess the indirect effect of gender on IWB through the mediator TL. As seen in Figure 9, the observed coefficient for the indirect effect (ab) was estimated to be 0, but it was omitted from the results due to inability to estimate parameters in 5 bootstrap replicates. Out of 4995 bootstrap replications, the indirect effect was estimated in 4990 cases. However, due to the observed coefficient being 0, the standard error and confidence interval were not computed. While the observed coefficient was not statistically significant, it's essential to interpret the confidence interval generated through bootstrapping. However, in this case, the confidence interval was not provided due to the omitted parameter. This suggests that the indirect effect of gender on IWB through TL could not be reliably estimated in the bootstrap analysis.

6. Discussion and Conclusion

To start with Hypotheses H1, which stated, that women-led start-ups demonstrate a greater propensity to foster IWB among employees. Given that transformational leadership plays a pivotal role in driving organizational innovation (Bass, 1985; Avolio et al., 1999; Zhang & Bartol, 2010; Jung et al., 2003), and that female leaders demonstrate these qualities more frequently, women-led start-ups are expected to create environments conducive to innovation through their inclusive and supportive leadership approach. In start-up contexts, where agility and creativity are crucial for success, the impact of transformational leadership on IWB is expected to be particularly pronounced in women-led organizations. The findings of Model 1 suggest partial support. While gender alone did not significantly predict innovative work behaviour, female respondents showed slightly higher levels of IWB compared to males. However, this difference was not statistically significant. Additionally, being from Germany was associated with higher levels of IWB. This implies that there might be contextual factors beyond gender influencing innovative work behaviour within start-up environments. Further investigation is needed to fully understand the role of gender in fostering innovative work behaviour in start-ups.

Hypotheses 2 posited that women-led start-ups exhibit a higher prevalence of transformational leadership behaviours compared to their male-led counterparts. Research has consistently shown that female leaders often demonstrate more effective leadership behaviours than their male counterparts across various management levels and age groups. For instance, Eagly and Johnson (1990) found that female leaders generally exhibit more effective interpersonal leadership behaviours. Additionally, a meta-analysis by Eagly, Johannesen- Schmidt, and Van Engen (2003) indicated that female leaders are more likely to employ transformational leadership and contingent reward strategies compared to their male counterparts. The findings in Model 2 however, suggest no significant evidence to support this hypothesis. Gender did not emerge as a significant predictor of transformational leadership behaviours in the regression model. This implies that within the sample studied, gender does not significantly influence the prevalence of transformational leadership exhibited by leaders in start-up environments. Therefore, the results do not align with the hypothesis, indicating that gender may not be a determining factor in the prevalence of transformational leadership behaviours within start-ups.

Hypothesis H3, stated that there is a positive correlation between transformational leadership and employees' IWB in start-up environments. The results in Model 3 provide support for this hypothesis. The regression analysis revealed a statistically significant overall model, explaining

approximately 19.96% of the variance in IWB. The TL composite score emerged as a significant predictor of IWB, indicating that higher levels of transformational leadership are associated with higher levels of innovative work behaviour. However, gender and other predictors did not independently predict IWB in this model, suggesting that transformational leadership has a significant impact on IWB, while gender does not have a significant independent influence on IWB when controlling for TL and other factors. The control variable education levels of the employees showed no significant impact, and age had a positive but insignificant coefficient (0.058). Therefore, I cannot confirm the findings of prior research, which established a consistent correlation between the level of education and age with innovative behaviours (Baer et al., 2003; West & Anderson, 1996; Wiersema & Bantel, 1992; Jung et al., 2003). However, I was able to confirm the existing theory in the literature about the positive effect of transformational leadership IWB and extend that literature to the start- up climate. This addresses the research gap identified in existing literature, which revolves around the lack of exploration into the mediating effect of transformational leadership on the relationship between gender and IWB within start-up environments (Judge & Piccolo, 2004), a gap which my research aimed to fill and successfully did.

In interpreting the results, it's crucial to consider the potential for causal relationships between gender, leadership behaviours, and IWB within start-up environments. A causal relationship would imply that gender directly influences leadership behaviours, which subsequently impact IWB. For instance, societal expectations or cultural norms may shape perceptions of leadership effectiveness based on gender, leading individuals to adopt specific leadership styles deemed appropriate for their gender. This could result in differences in the prevalence of transformational leadership behaviours between male and female leaders within start-up organizations. However, establishing causality in observational studies such as this one is challenging due to confounding variables and the inability to manipulate variables directly. Additionally, reverse causality may also be at play, where leadership behaviours influence perceptions of gender roles within the organization. To address these challenges and establish causality more definitively, future research could employ longitudinal or experimental research designs. Longitudinal studies would allow for tracking changes over time and examining how gender influences the development of leadership behaviours and their subsequent impact on IWB. Experimental designs, such as randomized controlled trials, could involve interventions aimed at promoting specific leadership styles among individuals of different genders within start-up environments, enabling researchers to directly assess the causal effects on IWB.

The non-confirmation and partial confirmation of the hypotheses 1 and 2 could be attributed to several factors. Firstly, differences in sample characteristics, such as the demographic diversity or industry sector of the start-up organizations surveyed, may have influenced the results. Additionally, contextual factors inherent to start-up environments, such as fast-paced operations and resource constraints, could shape leadership behaviours differently compared to established organizations (Stevens & Campion, 1994). Moreover, cultural differences in the Netherlands and Germany, where the survey was conducted, compared to other contexts studied in the literature, could contribute to discrepancies in leadership styles and gender roles (Hofstede, 1980). Methodological variations, such as adaptations made to survey instruments like the Multifactor Leadership Questionnaire (MLQ) to suit the start-up context, may also impact the alignment with previous findings (Avolio & Bass, 1999). Furthermore, differences in sample characteristics, including demographic composition and professional backgrounds, as well as limitations in sample size and response rates, could affect the generalizability and statistical power of the study's outcomes (Babbie, 2016). Additionally, the imbalance in the number of female-led start-ups (20 out of 109) compared to male-led ones could also be a limiting factor in the analysis, potentially affecting the reliability of the findings. Moreover, changes over time in societal attitudes towards gender roles and leadership may have influenced the discrepancy between the study's findings and those of previous research (Eagly & Carli, 2007). Finally, variations in the effects of control variables, such as education, age, and organizational tenure, across different contexts and industries could also contribute to differences in outcomes (Baer et al., 2003; West & Anderson, 1996; Wiersema & Bantel, 1992; Jung et al., 2003). Addressing these factors through robust research designs and comprehensive data analysis techniques is crucial to enhancing the validity and generalizability of future studies.

The findings of this research hold significant implications for practitioners, particularly managers and policymakers, in the start-up ecosystem. Understanding the relationship between leadership behaviours and IWB is crucial for fostering a culture of innovation within start-up organizations. The confirmed positive effect of transformational leadership on IWB underscores the importance of cultivating transformational leadership qualities among leaders in start-ups. Additionally, while this study did not find significant differences in transformational leadership prevalence between women-led and male-led start-ups, it highlights the need for continued efforts to promote gender diversity and inclusivity in leadership roles. Practitioners should strive to create environments that value diverse leadership styles and perspectives, as research suggests that diverse leadership teams contribute to enhanced organizational performance (Eagly & Carli, 2007). Overall, practitioners can leverage these insights to develop leadership training programs, implement diversity

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initiatives, and foster a culture of innovation that drives sustainable growth and success in start-up organizations.

In conclusion, this research investigated the relationship between gender, transformational leadership, and IWB within start-up environments. The findings revealed that while gender was a significant predictor of IWB, with females exhibiting slightly higher levels than males, no significant influence of gender on transformational leadership behaviours was found. However, transformational leadership positively correlated with IWB, emphasizing the importance of cultivating such qualities among start-up leaders. These findings offer theoretical insights into leadership dynamics and gender roles in fostering organizational innovation. Practically, they underscore the need for leadership development programs and initiatives promoting gender diversity in leadership roles to drive innovation in start-ups. Despite valuable insights, limitations such as sample size and gender imbalance suggest avenues for future research to explore. Addressing these can further enhance our understanding of leadership, gender dynamics, and innovation, guiding the development of effective organizational strategies for sustainable growth and success for women and men in start-up environments.

7. Appendix

Appendix A: STATA Code

import delimited "U:\STATA\Thesis/Survey_data", encoding(windows-1252)

*summarizing data for statsitics table
gen female_data = gender if gender == 2
tab female
tabstat female
gen male_data = gender if gender == 1
tabstat male
sum male
sum female
gen secondary_school = 1 if educ == 1
sum educ
tab educ
tabstat educ
bysort educ: summarize educ, detail
tab TL_composite
sum TL_composite
tabstat TL_composite
bysort TL_composite: summarize TL_composite, detail
bysort TL: summarize TL, detail
tab IndividualizedConsideration
tabstat IndividualizedConsideration
bysort IndividualizedConsideration: summarize IndividualizedConsideration, detail
tab IndividualizedConsideration
bysort IndividualizedConsideration: summarize IndividualizedConsideration, detail
tab IdealizedInfluence
tabstat IdealizedInfluence
bysort IdealizedInfluence: egen sd_IdealizedInfluence = sd(IdealizedInfluence)
summarize IdealizedInfluence, detail
bysort IndividualizedConsideration: egen sd_IndividualizedConsideration =
sd(IndividualizedConsideration)

summarize IndividualizedConsideration, detail

tab IndividualizedConsideration

bysort TL_composite: egen sd_TL_composite = sd(TL_composite)

summarize TL_composite, detail

tab AttributedCharisma

bysort AttributedCharisma: egen sd_AttributedCharisma = sd(AttributedCharisma)

summarize AttributedCharisma, detail

bysort AttributedCharisma: summarize AttributedCharisma, detail

tab InspirationalMotivation

bysort InspirationalMotivation: egen sd_InspirationalMotivation =
sd(InspirationalMotivation)

summarize InspirationalMotivation, detail

tab IntellectualStimulation

bysort IntellectualStimulation: summarize IntellectualStimulation, detail

bysort IntellectualStimulation: egen sd_IntellectualStimulation = sd(IntellectualStimulation)

summarize IntellectualStimulation, detail

tab IWB

bysort IWB: summarize IWB, detail

bysort IWB: egen sd_IWB= sd(IWB)

summarize IWB, detail

tab gender

summarize gender, detail

tab male_data

sum male_data

sum OT

tab OT

bysort OT: summarize OT, detail

bysort OT: egen sd_OT = sd(OT)

summarize OT, detail

tab age

bysort age: egen sd_age= sd(age)

summarize age, detail

tab respondentid

sum respondentid

bysort respondentid: egen sd_respondentid= sd(respondentid)

summarize respondentid, detail

summarize respondentid, detail

summarize respondentid

bysort respondentid: summarize respondentid

tab educ

bysort educ: summarize educ, detail

bysort educ: egen sd_educ= sd(educ)

summarize educ, detail

*Cleaning & Labeling Variables

drop in 1

destring q10, replace

rename q10 gender

label define genderlbl 1 "Male" 2 "Female"

label values gender genderlbl

destring q9_1, replace

rename q9_1 OT

label define tenurelbl 1 "<1 year" 2 "1-2 years" 3 "2-3 years" 4 "3-4 years" 5 "4-5 years" 6 "5+ years"

label values OT tenurelbl

destring q8_1, replace

rename q8_1 age

label define agelbl 1 "18-24" 2 "25-34" 3 "35-44" 4 "45-54" 5 "55-64" 6 "65+"

label values age agelbl

destring q7_1, replace

rename q7_1 educ

label define educlbl 1 "No education or primary education" 2 "Secondary school or equivalent" 3 "Bachelor's degree" 4 "Master's degree" 5 "Doctoral degree or higher"

label values educ educlbl

destring q6_1, replace

rename q6_1 IWB

destring q5_1, replace

destring q4_1, replace

destring q3_1, replace

destring q2_1, replace

destring q1_1, replace

gen TL = q1_1+q2_1+q3_1+q4_1+q5_1

rename q1_1 IdealizedInfluence

rename q2_1 AttributedCharisma

rename q3_1 InspirationalMotivation

rename q4_1 IntellectualStimulation

rename q5_1 IndividualizedConsideration

summarize IWB TL gender OT age educ

gen TL_composite = (IdealizedInfluence + AttributedCharisma + InspirationalMotivation +

IntellectualStimulation + IndividualizedConsideration) / 5

label define respondentidlbl 1 "Netherlands" 2 "Germany" 3 "Other"

label values respondentid respondentidlbl

*Tests

*Breusch-Pagan Tests

regress IWB i.gender OT educ age i.respondentid

hettest

outreg2 using Breusch_Pagan.doc, replace

*VIF Test

regress IWB i.gender OT i.educ age i.respondentid

vif

outreg2 using VIF.doc, replace

*Regression

// 1. Examine Direct Effects

// 1a. Regress IWB on gender, controlling for instrumental variables OT, educ, respondentid

and age

regress IWB i.gender OT i.educ age i.respondentid, robust

// 1b. Regress TL_composite on gender, controlling for instrumental variables OT, educ, respondentid and age

regress TL_composite i.gender OT i.educ age i.respondentid, robust

// 1c. Regress IWB on TL_composite, gender, and instrumental variables OT, educ, respondentid and age

regress IWB TL_composite i.gender OT i.educ age i.respondentid, robust

// 2. Test Mediation
// 2a. Include TL_composite in the regression model of IWB on gender, controlling for instrumental variables OT, educ, respondentid and age
regress IWB i.gender TL_composite OT i.educ age i.respondentid, robust

// 3. Bootstrap Method
// Define the mediation model
program define mediation_model, rclass
    regress TL_composite i.gender OT i.educ age i.respondentid, robust
    matrix a = e(b)

    regress IWB TL_composite i.gender OT i.educ age i.respondentid, robust
    matrix b = e(b)

    *scalar ab = a[1,1] * b[1,2]*
    return scalar ab = ab
end
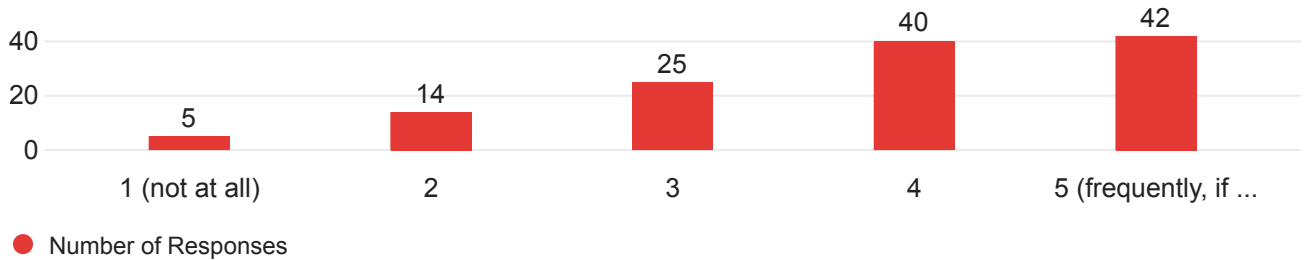*// Bootstrap to estimate the indirect effect*
bootstrap ab=r(ab), reps(5000): mediation_model

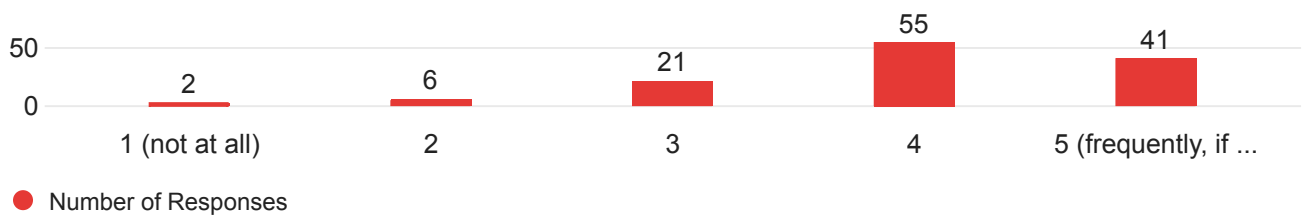Appendix B: Response Distribution Survey

Response Distribution Survey

Q1 The CEO at my company emphasises the importance of having a strong sense of purpose.
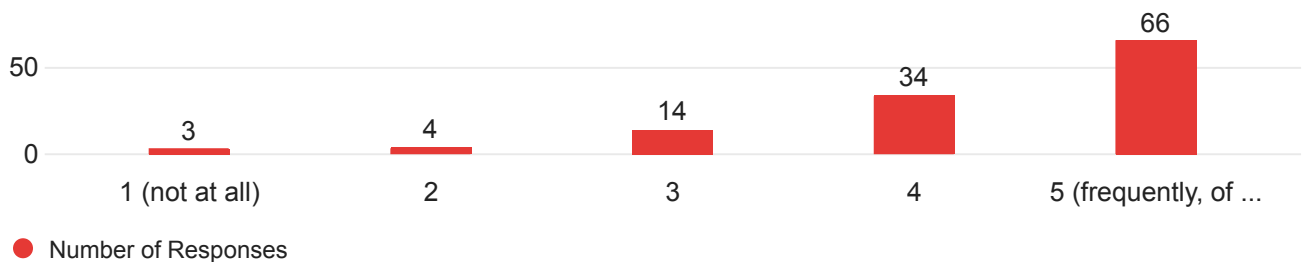
This resonates with me:

	1 (not at all)	2	3	4	5 (frequently, if ...
Number of Responses	5	14	25	40	42

● Number of Responses

Q2 The CEO displays a sense of power and confidence.

This resonates with me:

	1 (not at all)	2	3	4	5 (frequently, if ...
Number of Responses	2	6	21	55	41

● Number of Responses

Q3 The CEO talks enthusiastically about what needs to be accomplished.

This resonates with me:

	1 (not at all)	2	3	4	5 (frequently, of ...
Number of Responses	3	4	14	34	66

● Number of Responses
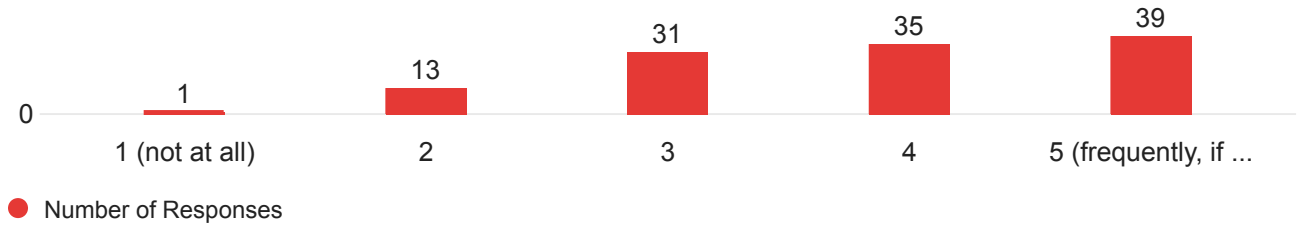
Response Distribution Survey

Q4 The CEO seeks differing perspectives when solving problems.

This resonates with me:

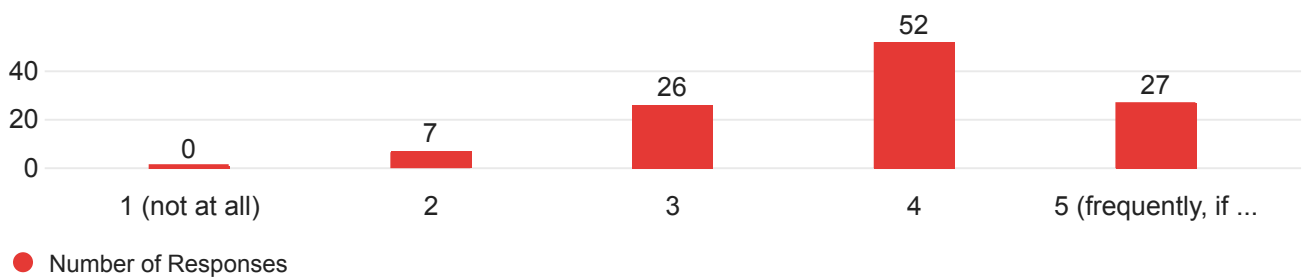|				
1	13	31	35	39
1 (not at all)	2	3	4	5 (frequently, if ...

● Number of Responses

Q5 The CEO helps me to develop my strengths.

This resonates with me:

11	18	33	33	21
1 (not at all)	2	3	4	5 (frequently, if ...

● Number of Responses
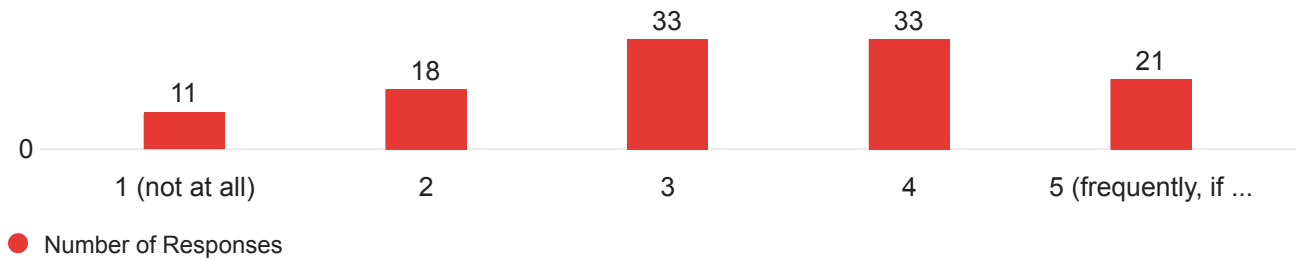
Q6 I generate original solutions to labour problems.

This resonates with me:

0	7	26	52	27
1 (not at all)	2	3	4	5 (frequently, if ...

● Number of Responses

Response Distribution Survey

Q7 How would you classify your level of education?

Level of Education

Category	Number of Responses
No education or ...	0
Secondary ...	9
Bachelor's degree	36
Master's degree	59
Doctoral degree ...	7

● Number of Responses
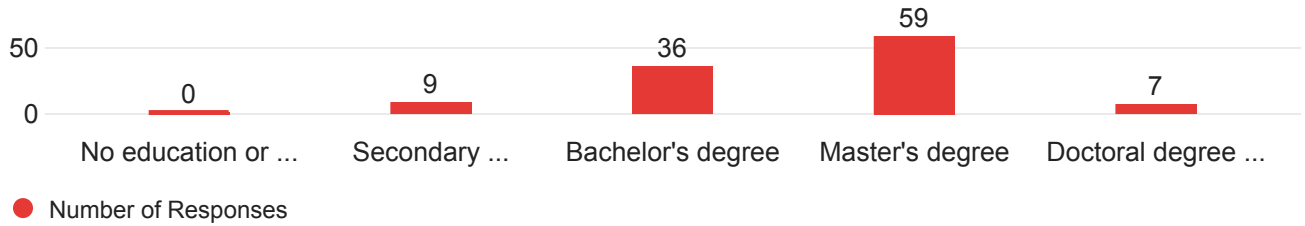
Q8 How would you classify your age group?

Age Group

Category	Number of Responses
18-24	30
25-34	44
35-44	25
45-54	7
55-64	5
65+	0

● Number of Responses
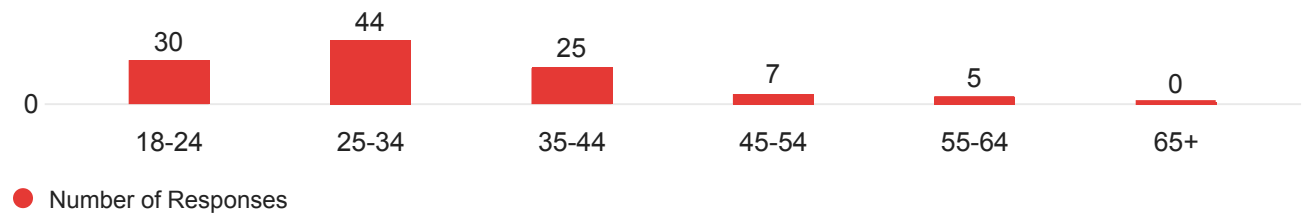
Q9 How long have you been working with your current employer?

Organizational Tenure

Category	Number of Responses
< 1 year	48
1-2 years	25
2-3 years	21
3-4 years	2
4-5 years	1
+ 5 years	7

● Number of Responses
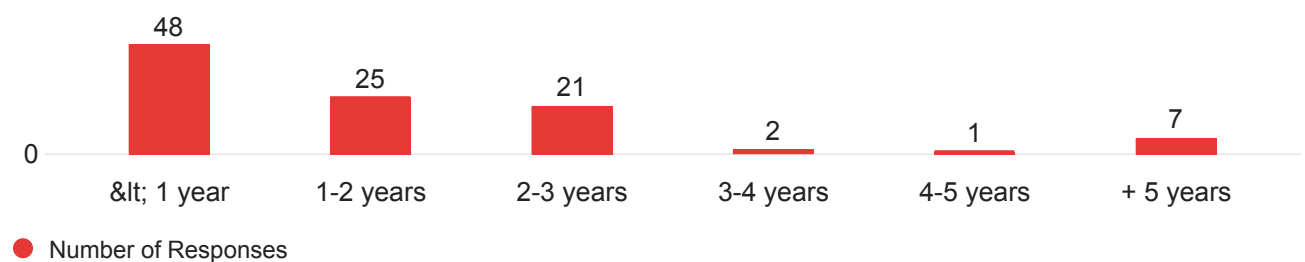
Q10 What is the gender of the CEO at your company?

● Number of Responses
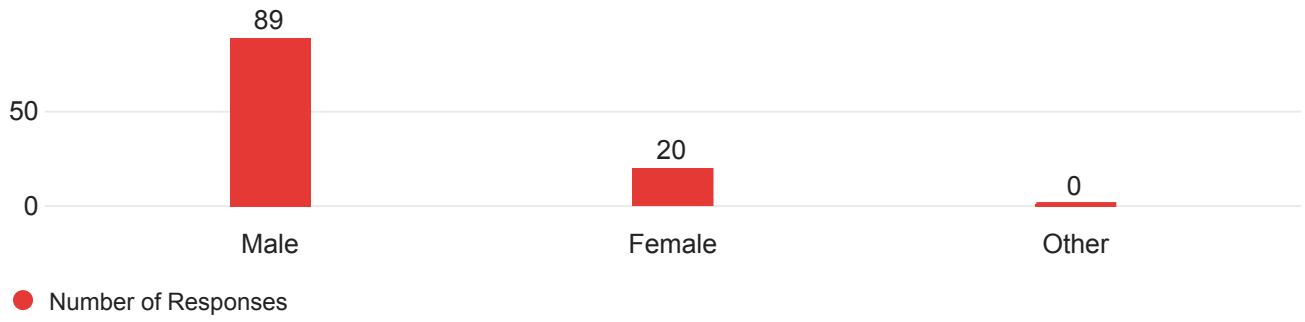
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