Article

Organizational Culture and Safety: Taking the Hungarian Electricity Industry as An Example

Fanni Vasvári [1],*, Márta Juhász [1] and Katalin Gerákné Krasz [1]

[1] Department of Ergonomics and Psychology, Faculty of Economic and Social Sciences, Budapest University of Technology and Economics, Budapest (1117), Hungary

* Correspondence: vasvari.fanni@gtk.bme.hu

Abstract: Introduction: This study focuses on one of the largest Hungarian companies with a century-long history in the electricity supply business. It aims at examining the relationship between leadership style and safety-awareness in the perceptions of leaders and subordinates. Method: Middle-level managers (N=163) completed the MLQ. Subordinates (N=650) completed the MLQ and expanded with specific subscales, along which employees judged the leadership style of their managers. We relied on some approaches and on analysis of the interviews with participants. To measure safety-awareness, we use 3 different scales. Results: Based on the results, in the subordinates' sample, all scales of Transformational leadership positively significantly correlated with all component of safety-awareness, while all scales of Transactional leadership negatively significantly correlated with every component of safety-awareness. In the managers' sample, both the Transformational and Transactional leadership showed a significant positive correlation with all component of safety-awareness except for the Laissez-Faire leadership, where a negative significant relationship was found. Conclusions: In case of subordinates, safety-awareness is associated with their leader's transformational leadership. From the perspective of managers, it appears that a basic level of safety-awareness is associated to Transactional leadership traits, while a higher level of safety-awareness requires a Transformational leadership.

Keywords: Safety Culture; Safety-awareness; Transactional Leadership Style; Safety-specific Transformational Leadership Style

1. Introduction

Many high-risk organizations around the world have explicitly recognized the critical role that subordinates, leaders and organizational risk factors play in accidents [1]. An analysis of the major accidents that have occurred throughout history shows that these hazards cannot be explained solely by random equipment failures, but also by a combination of workers and leadership human, non-technical factors. Many incident investigations show that human factors such as inadequate driving are at the root of incidents, collectively neglecting the visible signs of a potential accident and only reacting after the event has occurred. In many cases, circumstances and situations override human intention and will, leading to errors. In these serious situations, human personality, ability, knowledge, experience, courage, motivation, creativity, and resilience all help the individual to deal with these situations.

The concept is very popular across a broad spectrum of industries with different types of accident hazards, work site activities, and risk scenarios [2] e.g aircraft maintenance [3], chemical industry [4], electricity service, construction [5] and mining [6]. What these areas have in common is that they all qualify as high-risk organizations. High-risk organizations are characterized by strenuous work, workers have low control, and they typically work in shifts and perform a monotonous activity, work in a chased rhythm, have little opportunity for development and receive low level of social support from their peers working in the organization.

In the following section our aim is to give an overview of the safety culture and to show the impact of leadership on safety culture and safety-awareness of employees in the organization. Therefore, we write about organizational and safety culture in general explaining the concept of safety-awareness and the role of the leader in developing safety-awareness in organization. In addition, the links between leadership style (transactional, transformational, and safety-specific transformational leadership style) and safety-awareness will be examined.

2. Organizational and Safety Culture

Organizational culture is a concept often used to describe shared corporate values that affect and influence employees' attitudes and behaviors. It refers to the attitudes, beliefs, and perceptions of those working in the organization that collectively define patterns of behavior and human interactions within the organization and provide a common framework for interpreting incoming information and developing common thinking [7].

There are several models of organizational culture [8-11], which describe organizational culture along different characteristics which is transferred to the workplace, to the life of the organization, to the way people relate to work and to the norms and values related to safety. In the Hofstede model, the Power Distance dimension can determine the employees' questioning behavior, their patterns of communication and relationship with the supervisor. Hofstede's other much studied dimension of Uncertainty Avoidance determines the way employees in the organization deal with ambiguous, uncertain situations. Organizations with a high uncertainty avoidance are characterized by employees tend to focus on structured situations, training to increase safety-awareness behavior becomes less effective, there is less ambition to innovate in the organization and there is more reliance on regulations and protocols; there is less willingness to admit mistakes for fear of situational consequences; there is reduced tolerance for different opinions and ways of handling situations [1].

Safety culture is an aspect of organizational culture that is about how shared norms and values shape safety practices in the organization [7]. Pidgeon [12] suggests that safety culture can be grouped under three headings: norms and rules for dealing with risk, safety attitudes, and the capacity to reflect on safety practices. The culture of safety observed by Rochlin [13] is a dynamic and emergent property not just at the individual, but also at the intergroup level. How the workers operate safely is a property of the interactions, rituals, and myths of the social structure and beliefs of the entire organization.

The various safety culture definitions reflect the fact that both managers and subordinates in the organization prioritize safety and act accordingly [1].

The level of a safety culture is influenced by the role and commitment of the leader, as well as the willingness and motivation of the subordinate. Organizations typically go through three phases

in developing and strengthening safety culture: control of safety, guarantee of safety and total safety [1]. Phase 1.: Safety is compliance driven and is based mainly on rules and regulations. At this stage, safety is seen as a technical issue, whereby compliance with externally imposed rules and regulations is considered adequate for safety. In the first stage, improvements are often gained primarily by improving the engineered safeguards of the plant in line with and introducing basic systems and procedures to control hazards. Phase 2.: Good safety performance becomes an organizational goal and is deal with primarily in terms of safety targets or goals. This stage involves the use of frameworks developed by the organization. Phase 3.: Safety is seen as a continuing process of improvement to which everyone can contribute. An example of the workers' participation to improve safety culture [1].

In connection with the development of a safety culture, it is essential to mention the Bradley-Curve by Vernon Bradley known to most safety professionals. The Bradley-Curve was created by the American chemical company DuPont in 1995, which, in addition to continuing to focus on safety, also fostered innovation in industrial safety. This tool allows professionals to monitor and track the development of safety culture in an organization a model which relates the safety culture to performance [14].

The Bradley-Curve distinguishes four levels of development (I. Reactive, II. Dependent, III. Independent, IV. Interdependence levels), which help us to identify the level of development of the safety culture at an individual, at the group, and even at the organizational level. The individual level can mean both management and employee level. A manager's safety-awareness level can be defined based on how the manager evaluates his/her own leadership style, or safety-awareness focus on leadership behavior, as well as on how subordinates perceive their managers' safety-awareness. Meanwhile, subordinates can evaluate themselves based on their safety-awareness behavior, and the environment can also detect the presence of different safety-awareness attitudes in employee behavior and attitudes at work [15]. There are several theories that correspond to the Bradley-Curve e.g. Robert Kegan's [16] theory of mental complexity, Herbert Kelman's [17] model of social influence.

3. Safety-awareness and Its Levels

Safety-awareness is a set of attitudes, behaviors and activities based on a state of consciousness, which is aimed at maintaining and, if necessary, increasing the level of safety in a planned and systematic way. Safety-awareness depends on individuals' perception, the quality of their knowledge and experience. The more thorough the knowledge of the employees, the more experience they have in various activities, the more accurate the information and the more effective solutions they can apply [18].

Studies have shown that levels of knowledge, experience, and activities acquired and practiced significantly influence the efficiency and effectiveness of safety-awareness behaviors. Fundamentally instinctive or emotionally based behavior can be taken in an increasingly conscious direction as knowledge expands. It can be a great help to raise awareness if the employee is aware of the expectations, rules and values that must be met in the workplace [18].

Griffin and Neal [19] described safety performance as an individual way of working related to organizational safety. They have shown that safety performance influences the number of accidents, supporting the validity of this design and demonstrating the importance of employee behavior for

organizational safety outcomes [20]. Based on Griffin and Neal's [19] safety performance framework consists of two different forms of safety behavior: safety compliance and safety participation. These are distinct safety behaviors, for which employees have different organizational safety goals.

Workers in high-risk organizations are directly affected by workplace hazards and accidents, so it can be concluded that if workers perceive a high risk, they are likely to take steps to comply with safety standards to avoid or mitigate the risks. Safety compliance, as a manifestation of prescribed safety behavior, represents the basic activities that individuals must perform to maintain safety at work. Its purpose is to ensure that employees adhere to safety procedures and regulations within the organization. Such conduct includes the performance of mandatory actions to maintain safety at work, such as adherence to safety procedures, wearing protective equipment, adhering to normal work methods, and performing work safely. These actions are likely to prevent workers from being injured or involved in an accident in a direct and effective manner [18, 21].

In addition to complying with safety standards, participation in safety is an effective and particularly proactive approach to reducing the risks of increased complexity and unsafe conditions in the workplace. The term "safety participatory behavior" is used to describe behavior that does not directly contribute to an individual's personal safety but helps to create an environment that supports safety. It includes activities such as participating in voluntary safety activities, promoting safety programs, assisting employees with safety issues, and attending safety meetings [21-22].

Besides the two safety behaviors, third safety behavior is mentioned in the literature [23-24]. Safety motivation indicates behavior where the individual is willing to try to introduce safety behavior and demonstrates the behavior associated with it. Employees are more motivated to follow safe work practices and participate in safety activities if they feel that there is a positive safety atmosphere in the workplace [23].
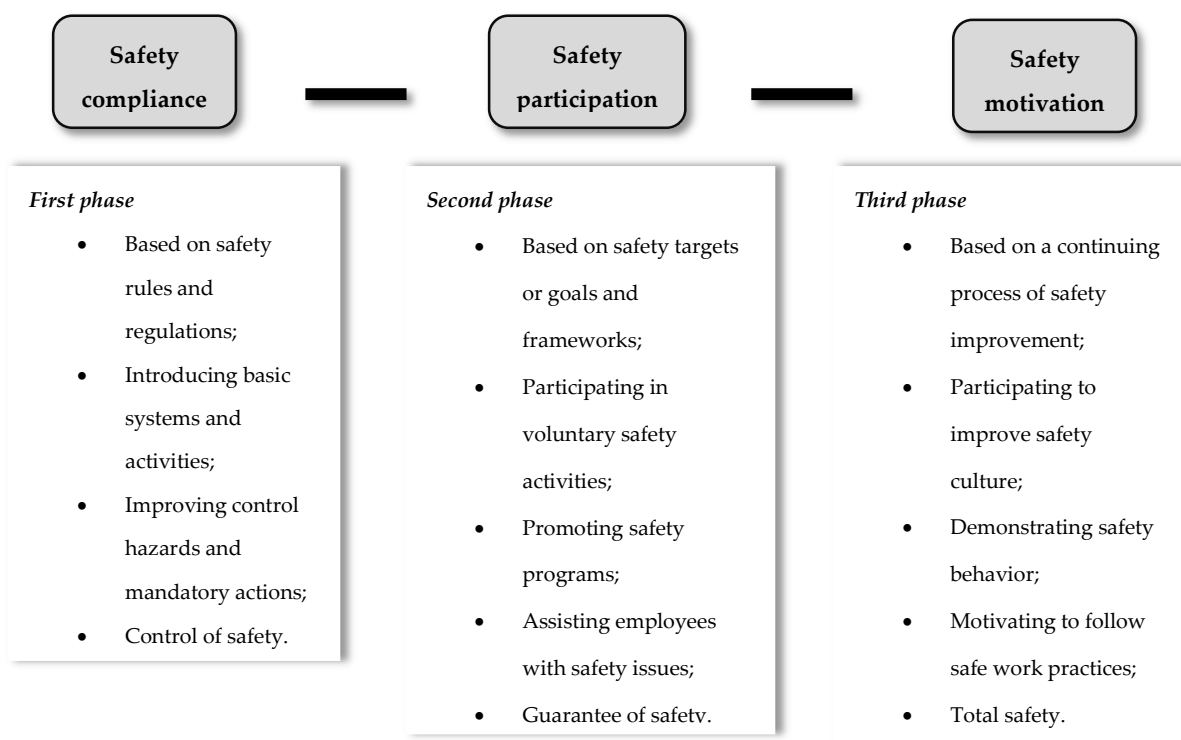

Safety compliance		**Safety participation**		**Safety motivation**
First phase • Based on safety rules and regulations; • Introducing basic systems and activities; • Improving control hazards and mandatory actions; • Control of safety.		*Second phase* • Based on safety targets or goals and frameworks; • Participating in voluntary safety activities; • Promoting safety programs; • Assisting employees with safety issues; • Guarantee of safety.		*Third phase* • Based on a continuing process of safety improvement; • Participating to improve safety culture; • Demonstrating safety behavior; • Motivating to follow safe work practices; • Total safety.

Figure 1. Safety-awareness flowchart.

As the figure below shows (Figure 1) the three phases (control of safety, guarantee of safety, total safety) discussed above correspond to the three types of safety behaviors. The first phase, the control of safety can be paired with safety compliance; the second, the guarantee of safety can be the same as safety participation; and the third, total safety can be coupled with the safety motivation stage.

4. Leadership Role in Safety

The definition of safety culture shows that the concept is based on leaders' and subordinates' attitudes, and behavior, as well as structural and technical aspects of the organization. In practice, this means that everyone working in a high-risk organization must correctly grasp the attention to safety, so that absolute priority must be given to all other factors. Thus, the attitude and behavior of the leader towards safety are extremely important among subordinates [22].

The relationship and communication between employees and leaders have also been shown to affect specific employee behaviors such as safety performance [25]. Hofmann and Morgeson [26] found that employees who have higher quality relationships and better communication with their manager are more likely to feel free to raise safety concerns, which can ultimately lead to fewer accidents assuming manager acts on those concerns. From a safety perspective, a supervisor's leadership style provides an opportunity for increasing workplace safety that goes beyond ergonomic design of facilities or implementation of physical changes to meet regulatory standards [27]. Employees' safety performance should improve when they have a clear understanding of safe operating procedures, the consequences of unsafe behaviors and when their safety behaviors are supported by their leader [26].

In addition, the managers will be credible if they can identify with safety standards and are aware of the levels of safety-awareness. The manager needs to find ways to increase the safety awareness and attitude of employees. The different leadership tools, traditional and modern leadership approaches, are well integrated in a transformational-transactional leadership model, which we applied in our research [25, 28-29].

4.1. Transactional Leadership Style

The purpose of transactional leadership behavior is to monitor and control employees using rational or economic means. Leaders representing a transactional leadership style support the achievement of the goal among their employees by clarifying the relationships between safety performance requirements and organizational culture to achieve the results desired to address change. Leaders who exercise this leadership style are characterized by rewards and/or punishments that are made performance-dependent; this is called contingent reward [30]. Conditional rewards point to managerial behavior focused on exchanging resources. That is, leaders provide various forms of support and resources to employees in return for their efforts and performance. Transactional leadership theory focuses on specific interactions between leaders and subordinates as a process based on reciprocity [31]. In military work, Yammarino and Bass [28] also split contingent reward into promises (e.g. "clarifies what I will get if I succeed") and rewards (e.g. "gives me what I want in exchange for showing my support for him/her"). Contingent reward leadership practices on the supervisors have been demonstrated to improve the safety-related behavior of subordinates,

including greater compliance with safety procedures, increased use of personal protective equipment, and decreased injury rates [22].

Leaders who practice this leadership style show management-by-exception leadership, in which case leaders only communicate with their subordinates if they act differently than usual, so they only receive information that requires intervention. Not only for subordinates, but also for workflows, they only intervene if they deviate from the standard session. Management by exception splits into an active factor such as "arranges to know when things go wrong" and a passive factor such as "subscribes to the belief that if it 'isn't broke, don't fix it" [28]. Generally, active managing-by-exception is likely to be more effective than passive managing-by-exception. In extreme cases of the passive management by exception is the laissez-faire leadership, the avoidance of leadership, such as "is absent when needed", and "takes no action even when problems become chronic" was strongly associated with subordinate dissatisfaction, conflict, and ineffectiveness [28]. In this case leaders do not care about their subordinates, this is a passive approach, the leaders do not participate in the life of their group, intervene if the problems become severe and give employees a free hand in choosing the way they work and, at best, provide the resources needed to do the job. For this reason, it included empowerment such as "lets me decide on matters about which I know best"; empowerment by the leader implied giving followers' autonomy, but these items were later removed from this factor [28]. Bass in his early works [29] included laissez-faire factor under the transactional leadership label, though it can be thought of as non-leadership or the avoidance of leadership responsibilities, but later in the Multifactor Leadership Questionnaire the Laissez-fair factor was treated separately [28-30, 32].

4.2. Transformational Leadership Style

Transformational leadership refers to the interaction between leaders and subordinates, in which each elevates the other to a higher level of ethics, morality, and motivation. Leaders following this approach strive for subordinates to think beyond their self-interest for the sake of the organization, while further expanding their desires, goals, and aspirations [33].

Transformational leaders see their main task as aligning the needs of the organization and employees while trying to consider the individual characteristics of employees [28]. Just as in the transactional leadership style, Bass [29] also defined the four dimensions of transformational leadership behavior. The first transformational leadership behavior is the idealized influence that applies to leaders who have a high level of moral and ethical behavior, who are highly respected, and who elicit loyalty from their subordinates. In their leadership, inspiration and motivation tailored to the needs and requirements of the individual appear, as they communicate high expectations to employees while encouraging them to perform better. Inspirational motivation applies to leaders who have a strong vision based on values and ideas [29]. In addition, these leaders can stimulate the enthusiasm of subordinates; inspire employees through symbolic actions and persuasive use of language. In addition, intellectual stimulation appears as a characteristic. Representatives of this leadership style encourage creativity and innovation, which is seen as a value to the organization [34]. They encourage divergent thinking and encourage their subordinates to develop innovative strategies. Finally, employees also receive individualized consideration; leaders also function as coaches, listen to subordinates, and pay personal attention to their problems. By

solving a problem, they show people a new perspective and can help others with their personal development through their feedback [33].

In early 2020, we interviewed 35 managers about how they are improving the safety awareness of their staff. After the interview, they completed the MLQ questionnaire so that we could determine the dominant leadership behaviors of the leader. Then, by analyzing the interview transcripts, we were able to highlight some examples of both transformational and transactional leadership:

- E.g. of transactional leadership:

"they have to be told", "they have to pay attention because they do not follow the rules", "I require", "I am a believer in rigor", "the control is very important", "enforce", "we control", "follow the rules", "hard expectation", "but this is the requirement", "they do it when I check them"

- E.g. of transformational leadership:

"I motivate them", "I consider leadership to be very important", "I encourage them", "we involve them", "I consider it important to set an example", "I need to speak to them in an appropriate communication", "find another solution", "tell each other", "I try to involve them"

4.3. The Safety-specific Transformational Leadership Style

Changes in the labor market have demonstrated that efficiency requires leaders who work in a transformational leadership style with their subordinates. Transformational leadership also affects several work-related outcomes, including the performance of subordinates [35], organizational commitment [36], and leadership satisfaction [37]. Based on these studies, Barling et al. [27] proposed the structure of safety-specific transformational leadership and showed that this leadership can influence subordinates' awareness of workplace safety issues and judgments about organizations' safety policies and practices [18, 24, 27].

In building safety-awareness in the organization, it is useful for leaders to adopt a transformational leadership attitude, which not only rewards and punishes when employees break the rules, but also has the capacity to take care of their people, while raising awareness of safety by not only sticking to the rules, referring to regulations, but also emphasizing the protection of themselves and others, and social responsibility, in which they themselves set a personal example [38].

Transformational leaders are not necessarily safety leaders. Therefore, to ensure that workplace safety is a priority, it is necessary to strengthen the display of safety-specific transformational leadership behavior among leaders that results in better safety outcomes than general transformational leadership. A safety-specific transformational leader engages in behavior that is characteristic of the components of transformational leadership, yet specifically focuses on inspiring and promoting positive safety-related practices. This behavior is specifically designed to promote and develop a safe work environment. Studies indicate that leaders with such an approach communicate their ideas about workplace safety and become role models by promoting workplace safety rather than focusing on performance and benefit in practicing safe work [27]. Employees are encouraged to evaluate current safety practices and policies, and to develop innovative and improved practices and address safety issues. They develop and disseminate a vision for a safe workplace and encourage all members of the organization to actively participate in occupational health and safety practices. Finally, they are actively interested in the well-being of their subordinates, including their physical safety. Members of the organization are motivated to create

and maintain a safe work environment because they believe in the value of safe work practices rather than adhering to punishment avoidance policies. However, there is empirical data that suggests that leaders may be transformational leaders in one aspect of the work and passive in other areas. There is a need for a leadership style that is specifically focused on encouraging and achieving positive safety attitudes and behaviors in organizations. Both specific and general leadership style can lead to positive safety results [38-39].

However, evidence suggests that safety-specific leadership design is increasingly contributing to predicting safety outcomes as well as greater safety compliance and employee safety participation beyond the overall style of transformational leadership. In addition, the predictive effect of a transformational leadership style on safety participation and safety compliance is cancelled out all cases when managers show passive leadership in terms of safety outcomes. Transformational leadership style and safety motivation are positive drivers of correct safety behavior. Studies show that there is a strong correlation between transformational leadership style, lower injury rates, and employee perceptions of health and safety commitment. Transformational leaders can trigger safety performance or behavior among employees by encouraging employees to engage in group or organizational safety goals and employee engagement contributes to safety motivation [20].

This does not mean that the Transactional leadership style has no place in the organization, especially when a high level of performance needs to be achieved. Clarke [40] argued that safety leadership can be most effective when it incorporates aspects of both transformational and active transactional leadership. In his meta-analysis study, Clarke showed that active transactional leadership, which includes tracking and correcting errors, goes beyond transformational leadership in terms of safety compliance [21]. Transformational leadership can increase the impact of transactional leadership on the performance of subordinates. In the same sense, different leadership behaviors may interact with each other to have an enhancing effect [32]. We can rely on the self-regulation framework to identify managerial behaviors that affect employee safety performance. Self-regulation refers to the psychological processes that aim to achieve and maintain regular goals where the goals represent the desired states from within. Through self-regulation processes, the individual assigns their cognitive, affective, and volitional resources to set and achieve goals [41].

There are several possible self-regulation mechanisms for individuals to achieve their goals, which include planning, control, motivation, and emotional control. Self-regulation is becoming increasingly important in understanding individual workplace behavior, while employees deal with the way they work in a self-regulated, goal-oriented way [41]. Accordingly, employees will continue to perform in accordance with their safety objectives. Thus, by safety leadership, we mean the behavior whereby leaders commit themselves to helping employees create and achieve safety.

Based on the self-regulation framework, we can distinguish three safety-specific leadership behaviors. The first is safety inspiration, which refers to the extent to which a leader presents a positive vision of safety that is appealing and inspiring to employees. This concept resembles the inspiring motivational dimension of a transformational leadership style [29]. Safety inspiration can help the subordinates participate in safety because it can allow them to learn about the meaning and value of a supportive environment. In terms of self-regulation motivation, individuals tend to be more interested in the activities they value [42]. Similarly, when a leader presents an inspiring safety vision to employees, employees are more willing to devote time and effort to performing safety activities designed to achieve that vision.

The second form of behavior is safety monitoring, which shows how well a leader monitors and responds to safety-related errors and mistakes of subordinates. This resembles the transactional leadership style dimension in that the leader retains his/her control function [29]. In the self-regulation literature, control is seen as a critical self-regulation mechanism because it allows the individual to be aware of the discrepancy between current and desired conditions. This awareness can motivate the individual to allocate cognitive abilities and influence the resources leading to the desired states. In the context of safety leadership, safety monitoring can serve as an external source of control to help employees be aware of their unsafe actions or behaviors that do not comply with current safety procedures. With this awareness, employees will know where to focus and develop [42].

Finally, the third safety-specific leadership behavior is safety learning, which indicates the extent to which a leader encourages and supports safety-related learning. Given the rapid development of technology in today's industry, safety learning is important because it helps an organization effectively adapt to change and continually improve the status quo. Learning in an organizational context can be single-loop or double-loop [43]. In single-loop learning, individuals simply modify their behavior to achieve the results expected of them. Double-loop learning occurs when individuals attack and change existing systems, such as organizational values, regulations, and policies, that can contribute to unwanted behavior. The same learning processes can be applied to organizational safety learning. In single-loop learning, the leader encourages employees to learn from their own unsafe behaviors and to see such unsafe behaviors as an opportunity to learn. In double-loop learning, leaders encourage employees to question the current safety system, invent new ways to improve existing processes, and achieve better safety results.

5. The Current Study

Our study was carried out at one of the largest Hungarian companies with a century-long history in the electricity supply business. In our study, we conducted a survey with middle-level managers (N=163) and physical workers (N=650), measuring the safety-awareness behavior. The aim of our research was to explore how the managers' leadership style influences the subordinates' level of safety-awareness and to examine how the manager's transformational and transactional leadership style is related to their own safety-awareness behavior. We prepared an Ethics Statement, so this research was approved by the Joint Psychological Research Ethics Committee (in Hungarian: EPKEB). The Reference number is 2021-21.

Hypothesis 1:

In the perception of subordinates, the transformational leadership style shows a positive correlation, while the transactional leadership style shows a negative correlation with all three components of safety-awareness behavior of subordinates.

Hypothesis 2:

In the perception of middle-level managers, the transactional leadership style shows a positive correlation with the basic levels of safety-awareness behavior (safety compliance), while the transformational leadership style shows a positive correlation with higher levels of safety-awareness behaviour (safety motivation).

5.1. Participants

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Data for this study were obtained from two samples. Sample "A" was a sample of 163 middle-level managers. The managers in the sample are direct managers to their subordinates working in the physical staff in sample "B". Of the 163 managers 18 managers have been working in their current position for 0-5 years, 19 managers for 6-10 years, 24 managers for 11-15 years, 12 managers for 16-20 years, 17 managers for 21-25 years and 73 managers for more than 26 years.

Sample "B" was a sample of 650 physical workers. The sample consisted of 11 main experts, design workers, 589 manual workers, mechanics working in the field and 50 workers in dispatching positions. 253 people have been working in their current position for 0-5 years, 59 people for 6-10 years, 64 people for 11-15 years, 54 people for 16-20 years, 48 people for 21-25 years and 172 people for more than 26 years.

A total of 813 employees were identified, all participants belong to the same high-risk organization in Hungary and participated in the study anonymously. The response rate obtained was 100%. We looked at the two groups in general. Our aim is to get a general approach at both managerial and subordinate level.

5.2. Methodology

Participants (both sample "A" and "B") were asked to complete two questionnaires relating to leadership and another one questionnaire about safety-awareness behavior. All items were rated on a 6-point Likert scale with 1 indicating ''strongly disagree'' to 6 indicating ''strongly agree''. All questionnaires were filled in by the participants in Hungarian. Participants completed the questionnaires online during working hours in a mandatory and anonymous way, with a 10-15 minutes completion time.

All questionnaires were in English, we translated into Hungarian and translated back into English by a native English-speaking lecturer who also lives in Hungary and has a high level of Hungarian. Prior to completing the questionnaires, 35 managers were interviewed about what they thought about the level of safety-awareness in their organization and the level of safety-awareness of their subordinates. We asked them what they, as managers, could do to develop, improve, and maintain the safety-awareness of their subordinates.

5.2.1. Leadership Style Based on A Questionnaire Completed by Leaders

Middle-level managers completed the Multifactor Leadership Questionnaire (MLQ), which models their own leadership style. The (MLQ) has been developed and validated by Avolio & Bass [32]. The MLQ based on numerous investigations of leaders in public and private organizations, from CEOs of major corporations to non-supervisory project leaders. The major leadership constructs—Transformational leadership, Transactional leadership, and Passive/avoidant leadership—forms a new paradigm for understanding both the lower and higher order effects of leadership style [32].

The Cronbach's alphas of the scales are shown in Table 1, with the reliability indicators of the questionnaire completed by managers in the first column and those of the questionnaire completed by subordinates in the second column, in brackets.

The Transformational Leadership includes the following scales: Idealized Influence, Inspirational Motivation, Intellectual Stimulation, Individualized Consideration. Due to the flattening of the organizational hierarchy, the relationships of responsibility have also changed.

Highly qualified professionals are now treated more as colleagues than in subordinate relationships. Transformational leadership that promotes autonomy and challenging work has become an important source of job satisfaction for followers [44]. Transformational leadership elevates the follower's level of maturity and ideals as well as concerns for achievement, self-actualization, and the well-being of others, the organization, and society. Idealized Influence and Inspirational Motivation are displayed when the leader envisions a desirable future, articulates how it can be reached, sets an example to be followed, sets high standards of performance, and shows determination and confidence. Followers want to identify with such leadership. Intellectual Stimulation manifests itself in that the leader supports and helps the follower to become more innovative and creative. Individualized Consideration is displayed when leaders pay attention to the developmental needs of followers and support and coach the development of their followers. The leaders delegate assignments as opportunities for growth [44].

The Transactional Leadership consists of Contingent Reward, Management-by-Exception and Laissez-Faire. The Transactional Leadership behaviors [29] aimed to control employees' rational and economic means. Contingent Reward refers to leadership behaviors focused on exchange of resources. That is, leaders provide tangible or intangible support and resources to followers in exchange for their efforts and performance.

Management-by-Exception–active refers to monitoring performance and taking corrective action as necessary. The focus of management by exception is on setting standards and monitoring deviations from these standards. In the less active version of management by exception (Management-by-Exception–passive), leaders take a passive approach, intervening only when problems become serious in which the leader practices passive managing-by-exception by waiting for problems to arise before taking corrective action or is Laissez-Faire and avoids taking any action. Laissez-Faire comes under the transactional leadership label, though it can be thought of as non-leadership or the avoidance of leadership responsibilities [30].

5.2.2. Leadership Style Based on A Questionnaire Completed by Subordinates

The subordinates also completed the followers' version of the Multifactor Leadership Questionnaire [32].

Table 1. In parentheses are the reliability indicators based on the results measured on our sample.

Leadership based on a questionnaire completed by leaders (N=163)		Leadership based on a questionnaire completed by subordinates (N=650)
Transformational leadership	Idealised Influence ($\alpha = 0.621$)	Idealised Influence ($\alpha = 0.892$)
	Inspirational Motivation ($\alpha = 0.753$)	Inspirational Motivation ($\alpha = 0.850$)
	Intellectual Stimulation ($\alpha = 0.547$)	Intellectual Stimulation ($\alpha = 0.930$)
	Individualised Consideration ($\alpha = 0.796$)	Individualised Consideration ($\alpha = 0.897$)
Transactional leadership	Contingent Reward ($\alpha = 0.724$)	Contingent Reward ($\alpha = 0.559$)
	Management-by-Exception ($\alpha = 0.708$)	Management-by-Exception ($\alpha = 0.556$)
	Laissez-Faire ($\alpha = 0.528$)	Laissez-Faire ($\alpha = 0.627$)

5.2.3. Safety Behavior

To measure safety-awareness behavior, we use 3 different scales. Participants in both samples completed the same safety-awareness measures based on Neal & Griffin et al. (2000) items; we used three scales in our study. In detail, Safety compliance (α = 0.603), Safety participation (α = 0.600) and Safety motivation (α = 0.825).

Safety compliance features two items "I mostly follow the safety rule when my manager is also present." (Leaders did not have this item.) and "I follow the safety regulations and procedures to do my job." were used to measure participants' views on their own behavior in terms of safety compliance. Due to the low Cronbach's alpha reliability index, one item had to be removed:" I follow all rules to the letter because I fear the consequences of making mistakes."

Safety participation has got two items: "I am willing to change my behavior if it is needed to work more safely.", "When I notice danger in my work, I immediately warn others." were used to measure participants' views on their own behavior with respect to safety participation. Removed item due to the low Cronbach's alpha:" I deviate from rules and regulations when the situation warrants it."

Safety motivation has also got two items "I am in favor of new initiatives to increase our safety-awareness.", "I take part in all initiatives and conversations that can make our work safer." were used to measure participants' views on their own behavior with respect to safety motivation. Removed item:" Mostly looking out for each other's safety when working."

As shown above, we have taken one item from each scale. During analysis, it was observed that the responses to the omitted items were not normally distributed and weakened the reliability indicators. It is likely that for these three omitted items, the participants did not dare to answer honestly because they felt the statements were too sensitive, which is why the results would have been biased.

6. Results

6.1. Perception of Subordinates

Table 2. Correlation between Transformational leadership style and subordinates' safety-awareness behavior.

Index	Transformational Leadership Style			
Subordinates' Safety-awareness scales N=650	Idealized Influence	Intellectual Stimulation	Inspirational Motivation	Individualized Consideration
Safety compliance	0.381**	0.344**	0.331**	0.360**
Safety participation	0.323**	0.294**	0.282**	0.303**
Safety motivation	0.349**	0.345**	0.336**	0.336**

Note: **$p < 0.01$.

Due to a non-normal distribution, Spearman correlation analysis was used to identify the relationship between perceived leadership style and safety-awareness of the subordinates' behavior. As shown in the table below (Table 2), the results indicate that all four scales of transformational leadership style (Idealized Influence, Intellectual Stimulation, Inspirational Motivation, Individualized Consideration) show significant positive correlations with all three levels of

subordinates' safety-awareness behavior. The correlation is positive, but weak. The effect of Idealized Influence is the strongest on safety-awareness of employee behavior.

A Due to a non-normal distribution, as shown in the table below (Table 3), based on the results of the Spearman correlation analysis, the transactional leadership style scales show a significant negative correlation with all three levels of subordinates' safety-awareness behavior. The correlation is negative, certain, but weak for the Laissez-Faire leadership style with all three levels of subordinates' safety-awareness behavior.

Table 3. Correlation between Transactional leadership style and subordinates' safety-awareness behavior.

Index	Transactional Leadership Style		
Subordinates' Safety-awareness scales N=650	Contingent Reward	Management-by-Exception	Laissez-Faire
Safety compliance	-0.218**	-0.273**	-0.334**
Safety participation	-0.100*	-0.116**	-0.254**
Safety motivation	-0.138**	-0.179**	-0.239**

Note: **$p < 0.01$; *$p < 0.05$.

The first hypothesis that "in the perception of subordinates, the transformational leadership shows a positive correlation, while the transactional leadership shows a negative correlation with all three levels of safety-awareness behavior", was confirmed, since the transactional leadership traits are negatively correlated, and the transformational leadership traits positively correlated with the three levels of subordinates' safety-awareness.

6.2. Perception of Leaders

Due to a non-normal distribution, the relationship between leadership style and levels of leader safety-awareness was examined using Spearman correlation analysis.

Our hypothesis is that the scales of transformational leadership style show the most positive correlation with Safety motivation. As shown in the table below (Table 4), correlation values of medium strength show a significant positive relationship between the measured variables.

The Transactional leadership style scales are also most closely related to safety motivation. Correlation scores of medium strengths show a significant positive relationship with Contingent Reward and Management-by-Exception and a weak negative relationship with the Laissez-Faire style. The Laissez-Faire style shows a weak negative relationship with both Safety participation and Safety motivation.

Our second hypothesis "In the perception of leaders, the Transactional leadership style shows a stronger positive correlation with the basic levels of safety-awareness behavior, while the transformational leadership style shows stronger positive correlation with higher levels of safety-awareness behavior" is not fully confirmed.

We expected Safety compliance to show a stronger correlation with Transactional leadership style, while Safety participation and motivation showed a lower correlation with Transactional leadership. However, we should see that Safety motivation is shaped by both Transactional and

Transformational leadership styles (Contingent Reward and Individualized Consideration, Intellectual Stimulation). Both are necessary for the development of safety-awareness behavior.

Table 4. Correlation between Transformational and Transactional Leadership Style and leaders' safety-awareness behavior.

Index	Transactional Leadership Style			Transformational Leadership Style			
Leaders' safety behaviour scales N=163	Contingent Reward	Management-by-Exception	Laissez-Faire	Idealized Influence	Intellectual Stimulation	Inspirational Motivation	Individualized Consideration
Safety compliance	.392**	.357**	-.138	.342**	.469**	.332**	.491**
Safety participation	.317**	.410**	-.193*	.329**	.338**	.275**	.430**
Safety motivation	.589**	.553**	-.218**	.430**	.575**	.445**	.597**

Note: **$p < 0.01$; *$p < 0.05$.

Both the Transactional leadership style (Management-by-Exception) and the Transformational leadership style (Individualized Consideration) also play a major role in achieving Safety participation.

Our graph below (Figure 2) summarizes the above results. Overall, the results show that the Transactional leadership style is perceived by leaders to be applicable at the level of Safety compliance, while the Transformational leadership style is applied at the level of Safety participation and motivation. Meanwhile, the perceptions of subordinates show that the Transformational leadership style is present at all three levels of safety behavior. Finally, for both leadership styles, safety specificity can appear if the leader's leadership style focuses on safety and builds his/her leadership attitude around it. Our table below (Figure 2) provides a summary of the above results.
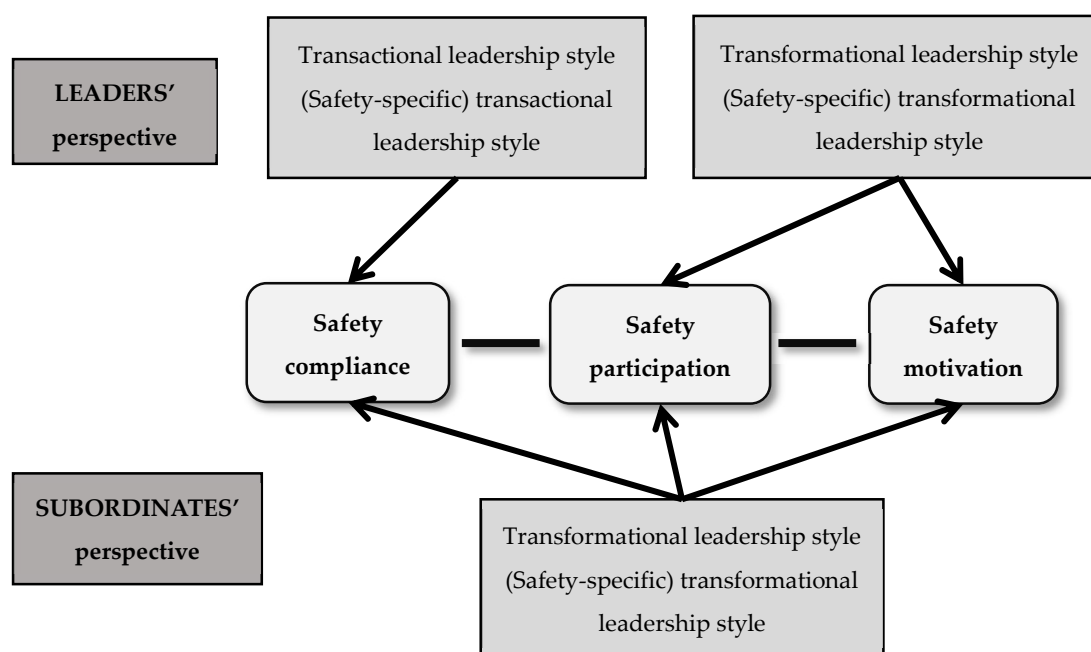

Figure 2. Relationship between the Transactional-Transformational Leadership Style and the Safety-awareness.

7. Discussion

The results suggest that higher levels of subordinates' safety-awareness behavior occur when their leaders are in a Transformational leadership style and lead according to this style. The level of safety-awareness of subordinates reaches a higher level when their leaders display the traits of a Transformational leadership style appropriate to that level.

It seems that Idealized Influence has the strongest relationship with subordinates' safety-awareness. In organizations that are at the forefront of safety-awareness, management discusses what it will do to ensure safety. They develop a routine for their team that permeates the whole process. They discuss what to look for in terms of safety before starting work. When they are in the field, their behavior tries to set an example, such as wearing safety equipment, checking on their subordinates and helping to resolve the situation. After work, they collaborate with the team to discuss current safety issues and dilemmas and help subordinates work as efficiently and safely as possible [45].

In our research methodology, in the case of safety compliance as the first, basic level of safety-awareness behavior, we are talking about compliance with an external norm set by the organization or the leader. Here, trust between employees and management begins to develop, but the safety-awareness behavior of the manager does not yet have a significant impact on the safety-awareness behavior of subordinates.

At the second level of safety-awareness, namely Safety participation, it is important that subordinates can participate independently and actively in safety. Through Stimulating Independence and Idealized Influence trust between them is developed yet, giving subordinates the confidence to actively shape safety-awareness in the organization. To do this, the leader must be able to communicate effectively and embed this ability in a pattern of behavior and conduct that is appropriate for the organization and subordinates. The leader can adapt his/her behavior to the demands of the situation, e.g. Hersey and Blanchard's situational leadership (SL) model [46]; Fiedler's Contingency theory [47]; Ohio State University's model (OSU) [48]. In addition, the way in which the manager makes decisions and the extent to which he involves his/her subordinates in the decision-making process, e.g. Vroom-Yetton model [49]; Tannenbaum-Schmidt model [50] is important, as at this level subordinates are already actively and autonomously involved in safety-related initiatives. With all these tools, the leader should be able to assess the psychological maturity of subordinates and, depending on this, train them to work independently for the effective functioning of the organization. It is essential for the leader to assess where each subordinate is in the organization and develops them accordingly, using appropriate leadership style traits such as emotional intelligence [45].

Employees' Safety motivation is most affected by the Stimulating Independence, which is part of the Inspirational Motivation leadership in our study. Giving feedback is part of Individualized Consideration and Helps subordinates understand and accept the rules is part of Intellectual Stimulation. These leadership behaviors have a formative power in shaping employees' safety-awareness behavior and engagement. The leader needs to give his/her subordinates feedback that they hear, that reaches them and has an impact on their attitude and behavior. The leader must motivate them in a way that is most effectively linked to the achievement of their personal goals and keep them focused on those goals in the long term. To achieve this, several researches and theories have been developed, including Herzberg's two-factor theory [51]; McClelland's achievement

motivation theory [52]; Maslow's hierarchy of needs theory [53]; Alderfer's modified hierarchy of needs model [54]; and Expectancy-based process theory models [49].

Overall, we believe that Idealized Influence, Stimulating Independence, and Inspirational Motivation, which are transformational leadership, play an important role in building employee safety-awareness.

Managers can make safety-awareness behavior even more effective by using style cues appropriate to the developmental level of their employees. As we can see, transformational leadership, in this case called safety-specific transformational leadership style, is the most effective way to develop safety-awareness in the employees. In our sample, the safety-awareness of suborders, at all three levels, is negatively correlated with the leadership style of managers when the manager has a Transactional leadership style. The baseline level of safety-awareness of managers is also attainable with higher Transactional leadership style traits. In the case where this leadership style is applied by the leader with a specific focus on safety, the development of a safety-specific transactional leadership style is also achievable.

This specific leadership style is reinforced by a few management tools. The safety walk is a well-established system among leaders. During a safety walk, the leader goes out into the field, alone or with a safety specialist, and conducts a safety inspection of his/her subordinates during the work to check that they are wearing safety equipment and that all work is being carried out in accordance with safety regulations. If any discrepancies are found, they are recorded and appropriate changes are made. Safety talk is now a qualitatively higher management style tool, whereby the leader talks through safety procedures with his/her subordinates, if there is a personal safety-related story, the subordinate concerned shares the incident with his/her peers so that they can learn from the incident together [55]. In addition to these tools, leaders with a safety-specific transactional leadership also have in their toolbox the tools of rewarding, punishing, and highlighting exceptional events and subordinates. Recognizing the shortcomings of their toolbox, the organization could develop its leaders to expand their toolbox and leadership traits. Development can be through training, workshops, coaching techniques.

The results show that Idealized Influence, Stimulating Independence, and Inspirational Motivation play an important role in the development of subordinates' safety-awareness, at least in their perception. Workers who are committed to working safely are perceived by their managers as actively following their work, engaging with them, talking to them about issues affecting their work and providing continuous feedback with the intention of improving and developing. These signs of transformational leadership styles are needed to achieve higher levels of safety-awareness. In this case, a safety-specific transformational leadership style can also emerge if leaders specifically put safety at the center of their leadership and apply the appropriate style traits in this area, rather than leading in general.

In addition to the Transformational leadership style, other research suggests that there are other modern leadership approaches that can also have a positive impact on safety-awareness, safety behavior and safety performance e.g. Authentic Leadership [56]; Ethical Leadership [57]; Servant leadership [58].

It is possible that leaders may unconsciously apply the old, classical leadership style traits, but misunderstandings may still arise with subordinates, as communication between them takes place at different levels. Organizational culture has a significant role to play in resolving the

misunderstandings. After all, culture must have an enlightening role in the organization that helps leaders to know consciously which style traits are appropriate for the organization and their subordinates. We plan to explore this communication misunderstanding in our next article, which is also reflected in the results of this research.

Leaders strongly practice traditional transactional styles in their perception of their own leadership style, which correlate significantly with the leader's safety-awareness behavior. The Laissez-Fair leadership style, on the other hand, is sharply different, as it is negatively correlated with all three levels of safety-awareness behavior. This means that in this safety-awareness organizational culture, the Laissez-Fair leadership style is a counter-indicator and there is no room for avoidance behavior by the leader.

It is easy to say that the transactional leadership style is traditional, but our research has also shown that it has a significant role in safety culture, an important tool in the hands of leaders in the perception of leaders. Therefore, it is very important to train managers and make them aware of the value of using leadership tools that are more effective in achieving the goal of the employees.

7.1. Limitations

Reliance on self-reported behavior and the absence of an objective safety behavior measure introduces the self-report bias and represents the most considerable limitation of the current study. For the three safety behavior scales, we used only two items per scale instead of three items per scale because the omitted items were not statistically appropriate, so we removed them from the survey. Besides, for the participants, there is no link between which subordinate belongs to which leader, so we can give a general picture of the group of leaders and subordinates. This study is limited regarding the generalizability of its findings to other industries as it focused on one part of the electricity supply sector in Hungary. This study could also be replicated in other sectors to allow for comparisons and more conclusive arguments.

7.2. Implications

This study adds to the discourse on safety leadership, highlighting the importance of intellectual stimulation and individualized attention to the transformational leadership construct in promoting employee safety-awareness behaviors. It delves into the full range leadership model to investigate the influence of some dimensions on safety within the Hungarian context. The study thus extends the theory of transformational and transactional leadership s and its relationship with safety behaviors of subordinates, especially regarding the role of transformational influence in the leadership-safety interplay. All things considered, the results facilitate the understanding of the relationship between leadership and safety-awareness in the perception of leaders and subordinates working in a high-risk organization, and intervention points identified the leadership development in safety behavior.

8. Conclusions

The limitations of this study notwithstanding, the results extend the current research by examining the relationship between leadership and safety-awareness in the perceptions of both leaders and subordinates in Hungarian electricity supply business and providing empirical evidence that leadership influences safety-awareness behavior. Subordinates appear to develop

safety-awareness behavior well when their leaders show signs of a transformational leadership. While from the perspective of managers, it appears that a basic level of safety-awareness is achieved in the organization when transactional leadership traits are applied. A higher level of safety-awareness requires a transformational leadership: a leadership characterized by intellectual stimulation and individualized consideration appeared to be the most effective. These findings provide valuable guidance to both researchers and practitioners for improving safety in manufacturing and construction industries.

Further expanding on this knowledge, a content analysis of the transcripts of the personal interviews with the managers in the research would reveal how the leadership styles mentioned in the article are manifested at the communication level. In addition, we consider it important to identify the personality traits displayed by employees and which personality traits are linked to safety awareness, strengthening, or weakening it.

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