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Context-Considered Leadership Development: Quasi-Experiment in a Russian Mining Company

Marina Kravtšuk[1] *

[1]*Estonian Business School, Tallinn, 10114, Estonia*

*Correspondence to: Marina Kravtšuk, Estonian Business School, Tallinn, 10114, Estonia.
E-mail: kravtsukm@hotmail.com

Abstract: Scholars argued that leadership development approaches should be deeply contextualized and explain how to develop leadership. This article aimed to answer a research question: how to develop leadership in the context of a Russian mining organization. For that purpose, a quasi-experiment using a pre-and post-intervention was conducted in a Russian mining organization by an immersed researcher. Multiple levels of management were involved. Multifactor Leadership Questionnaire was used as a major measurement tool for leadership styles and effectiveness that had objective criteria. The results indicate that the leadership development was driven by the executives and mirrored by middle managers and supervisors. A cascade of frequency of utilization of leadership styles was observed, which led to an increase in effectiveness. Generally, the intervention caused statistically significant changes with low-to-large effect sizes. To the best of the author's knowledge, no similar studies were conducted with the reported level of contextualization and details, allowing us to expand the body of knowledge and provide guidance for the practice of leadership development. The study limitations include the following: research was conducted in a real-life context and could be difficult to repeat. The author acted as an associate of the managers, and effectiveness measures transactional outcomes.

Keywords: context, MLQ, quasi-experiment, Russia, transformational leadership.

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INTRODUCTION

Since leadership is a complex process through which a person is influencing a group of people with an aim of achievement of a common goal (Northouse, 2019), the importance and the need for leadership development are recognized by businesses in many countries (Hieker & Pringle, 2021). Currently, the field is dominated by practitioners that apply best practices and popular tools, as opposed to theory-based, proven approaches, so there is an actual need in explanation of how to develop leadership (Day & Thornton, 2018). Scholars are arguing that successful leadership development is supported by a solid theoretical foundation (Day, 2014) and is sustainable since it allows for meeting the current goals and sets a good ground for meeting the future goals of individuals and organizations (Xuecheng et al., 2022; Jones et al., 2017; Avolio, 2011; Bolden, 2005), whose working environment and practical issues stimulate the development (Holman 2000).

Based on the meta-analytic review of 25 years of research, leadership development can be defined as a process, focused on improving the individual knowledge, skills, and abilities of a leader, establishing interpersonal commitments and relationships, necessary to effectively achieve set goals in an organizational

context (Day, 2014; Day, 2000). The main purpose of leadership development is to ensure effective leadership and its sustainability (Igbal & Piwowar-Sulej, 2022; Avolio, 2011).

The complexity of leadership has not allowed developing a universally accepted theory yet (Turner, 2019) and there are numerous theories available (Xuecheng et al., 2022; Xuecheng & Igbal, 2022; Northouse, 2019; Alhammadi, 2019; Bass & Bass, 2008): trait-based, behavioral, contingency, and leader-member exchange theories, also transformational, authentic, sustainable leadership, and others. One of the most popular leadership theories for the past several decades is the "New Leadership" paradigm that represents the theory of transformational leadership (Antonakis & Day, 2018; Mhatre & Riggio, 2014), which attempts to explain the relationship between leader effectiveness and leadership styles based on the empirical findings in the military, church, higher education, banking, and other industries from predominantly western cultures (Bass & Riggio, 2014; Avolio, 2011; Avolio & Bass, 2002).

The transformational leadership theory has led to the development of a Full Range Leadership Development (FRLD) approach (Bass & Avolio, 2018), which takes a leader through the following cycle: Awareness – context is specified, self-image is challenged; Application – problems are reviewed, solutions and implementation plans are developed and agreed upon; Adoption – agreed solutions are implemented, feedback, coaching and mentoring are provided, reflection is done; Achievement – a deeper understanding of leadership impact, accountability, and responsibility for the development of the subordinates, perpetuation and continuous improvement of effectiveness are achieved. Nevertheless, Moldoveanu & Narayandas (2019) argue that traditional leadership development approaches meet the needs of neither organizations nor managers and require deeper contextualization, namely, cultural, industrial, organizational, and managerial contexts need to be specified. In addition to the above-mentioned, Vogel et al. (2020) argues that multiple organizational levels need to be specified and outcome evaluation done. Also, it is important that the development is done with consideration of sustainability, so that achievement of the goals supports the future (Xuecheng & Iqbal, 2022)

A review of the suggested FRLD approach (Bass & Avolio, 2018) from the guiding principles (Gosling & Mintzberg, 2004) point of view has provided support to the above-listed arguments and allowed to identify additional research gaps. First, leadership is known to be culture-and context-dependent (Lord, 2019, Adler, 2008); however, most of the research has been conducted in western cultures (Mhatre & Riggio, 2014). This calls for more research to be conducted in non-western cultures and contexts, with a specification of organizational needs (Moldoveanu & Narayandas, 2019; Avolio, 2011; Bolden, 2005) and practical issues that should be used to facilitate the development (Holman, 2000). Second, the approach does not specify who should be considered for participation in the development intervention, which creates a risk for an organization that a random leader would be selected without consideration of the complexity of the organizational context and settings, namely its structure, functions (Lord, 2019; Nijstad, 2009). Research participants should represent multiple levels (Vogel et al., 2020; Lord, 2019; Avolio et al., 2009) to facilitate the required interactions, solve practical issues, and meet the organizational needs. Third, the FRLD approach relies on the Multifactor Leadership Questionnaire (MLQ) for the measurement of leadership styles (Bass & Avolio, 2004), the most widely accepted tool for that purpose (Bass & Avolio, 2018; Bass & Riggio, 2014). Usually, employees of the organizations are filling out the MLQ (Bass & Avolio, 2018; Bass & Riggio, 2014; Bass & Avolio, 2004), which creates a risk of subjectivity because employees of an organization are not necessarily familiar with the constructs of leadership, tend to think of leadership in general and use episodic memory to make the evaluation, which can lead to a common method bias (Lord, 2019; Jacquart et al., 2018; Lowe et al., 1996). Evaluators must have a clear understanding of the measured constructs and use context-specific memory (Lord, 2019; Mhatre & Riggio, 2014; Antonakis et al.,

2004). Also, the effectiveness criteria are usually not specified (Lord, 2019) and are perception-based (Avolio, 2004). Researchers could immerse themselves in the organization and conduct the evaluation specifying the objective effectiveness criteria (Northouse, 2019; Mhatre & Riggio, 2014; Avolio et al., 2009), thus reducing common method bias (Avolio et al., 1991).

A meta-analytic review of the MLQ-based studies (Lowe et al., 1996) has indicated that on all transformational leadership styles and on transactional leadership style of management by exception low-level managers had higher mean scores than high-level managers, while on contingent reward the scores were almost the same at both levels. Recent studies indicate that the transformational leadership of CEOs has a positive impact on firm performance (Jensen et al., 2020). Poturak et al. (2020) reviewed 10 studies that examined the influence of transformational leadership on effectiveness among different cultures: USA, Israel, Germany, Swiss, Egypt, China, Bosnia, Herzegovina, and Iraq, which indicated: in 5 cases the influence was positive, in 3 cases there was no difference, and in 2 cases the influence was lower. A quasi-experiment conducted by Arthur & Hardy (2014), where leadership behavior, group cohesion, and training outcomes were measured using pre-and post-test measurements showed positive and statistically significant results.

A meta-analytic review of leadership development impact (Avolio et al., 2009) indicated that most of the conducted research was based on field surveys, which restricts the possibility to verify the conclusions, also suggests using more experimental or quasi-experimental designs. This is supported by Arthur & Hardy (2014) that suggest strengthening the quasi-experimental research by an explanation of how leadership was influenced (Day & Thornton, 2018; Hackman, 2012).

Based on the above following research question was formulated: How to develop leadership in the context of a Russian mining organization? This article aims at answering the posed question by conducting a quasi-experiment in a context of a Russian mining organization, involving multiple levels of management, using MLQ as a measurement tool with the specification of effectiveness criteria by an immersed researcher. To the best knowledge of the author, there were no other similar studies conducted.

METHODS

As suggested by scholars (Arthur & Hardy, 2014; Avolio et al., 2009) quasi-experiments should be more frequently used in leadership development research since they allow to test for causality by influencing independent variables, such as leadership development intervention program, without random assignment of the participants and utilization of control groups, which is not always possible in the real-life context, and with small sample size (Rogers & Révész, 2019; Harris et al., 2011), and to evaluate the outcomes (Chiang et al., 2015), that are representing dependent variables.

The research was conducted in 2018 in a Russian mining company, selected based on the solicited interest of the general manager. The company was engaged in the open-pit mining of limestone, sand. The general manager has provided information about the most underperforming process – overburden removal with a list of managers at different levels, which influenced it. Managers met the criteria of being in the leadership role for at least 12 months before the start of the research, and there were no interventions with the leadership styles they used during that period, which minimized the risk for internal validity (Chiang et al., 2015). A sample of 11 managers from different levels was selected (Harris et al., 2011), which consisted of 2 executives (18.2%), 3 middle managers (27.3%), and 6 supervisors (54.5%) from the production, maintenance, and quality functions (Table 1).

Table 1 Sample of Managers by Organizational Level

Organizational level	Function	Position	Headcount	% of Sample
Executive	General, Operations	General manager – 1 person, Chief engineer – 1 person.	2	18.2%
Middle Manager	Production, maintenance, quality	Mining manager – 1 person, Maintenance manager – 1 person, Quality manager – 1 person.	3	27.3%
Supervisor	Production, maintenance	Mining shift supervisor – 4 people, Maintenance supervisor – 2 people.	6	54.5%
Total Sample Size			11	100.0%

The MLQ (5X – short form) was used to measure leadership styles and effectiveness, it consists of 45 questions (Table 2) that are broken down into the following categories: 36 questions related to leadership styles, 9 questions related to extra effort, effectiveness, and satisfaction. The questions were answered using a 5-point Likert scale (Bass & Riggio, 2014): 0 = not at all, 1 = once in a while, 2 = sometimes, 3 = fairly often, 4 = frequently, if not always.

Table 2 MLQ Sample Questions

Transformational leadership	Idealized influence (attributed charisma)	A leader instills pride for being associated with him or her
	Idealized influence (behaviors)	A leader specifies the importance of having a strong sense of purpose
	Inspirational motivation	A leader articulates a compelling vision of the future
	Intellectual stimulation	A leader seeks differing perspectives when solving problems
	Individualized consideration	A leader spends time teaching and coaching
Transactional leadership	Contingent reward	A leader makes clear what one can expect to receive when performance goals are achieved
	Management by Exception – Active	A leader focuses attention on irregularities, mistakes, exceptions, and deviations from standards
	Management by Exception – Passive	A leader shows that he or she is a firm believer in "If it ain't broke, don't fix it"
	Laissez-Faire	A leader delays responding to urgent requests

Source: Composed by the author based on Bass & Riggio (2014).

MLQ (5X – short form) form is the only version that is currently used, it has two sub forms: Leader Form – which allows a leader to rate their behavior, and a Rater Form – allows associates of leaders to rate the leader (Bass & Avolio, 2004). Interviews were conducted to collect the necessary data using the Rater Form (Mind Garden, 2021), from which only 40 questions related to the subject of the research were answered: 36 questions on leadership styles and 4 questions on effectiveness. Interviewees were asked to provide examples of reports, meeting logs, standards, describe situations that would prove the answers to the questions. The effectiveness criteria were selected based on the accountabilities of the managers (Table 3).

Table 3 Effectiveness Criteria

Organizational level	Function	Position	Effectiveness criteria
Executive	General	General manager – 1 person	EBIT
Executive	Operations	Chief engineer – 1 person	Cost of production
Middle Manager	Production	Mining manager – 1 person	Productivity
Middle Manager	Maintenance	Maintenance manager – 1 person	Availability
Middle Manager	Quality	Quality manager – 1 person	Reclamations
Supervisor	Production	Mining shift supervisor – 4 people	Volume transported
Supervisor	Maintenance	Maintenance supervisor – 2 people	Downtime

Quantitative analysis was conducted on the collected MLQ data. To ensure consistency of the measurements and their reliability Cronbach's alfa reliability test was done, which is widely used in the leadership field (Hur-yagba, 2016; Singh, 2015; Tavakol & Dennick, 2011). To identify the differences between the pre-intervention and post-intervention leadership styles and effectiveness profiles, a paired samples t-test was calculated, and effect sizes were analyzed (McLeod, 2019; Swift & Piff, 2014; Thyer, 2012). The analysis allowed for a comprehensive understanding of the starting position that resulted in the leadership development intervention program development and implementation, as well as the measurement of the improvements caused by the intervention.

The quasi-experiment used a pre-intervention and post-intervention design (Chiang et al., 2015; Harris et al., 2011). The independent variable, represented by a context-considered leadership development intervention, was implemented to change the leadership style and effectiveness of the local managers at different levels, which represented a dependent variable. The total duration of the research was 16 calendar weeks, which is sufficient for the collection of reliable data and assessment of the results (Arthur & Hardy, 2014). During calendar weeks 1-2, the author of the research conducted a pre-intervention measurement. The intervention program started on calendar week 3 of the research project and lasted until week 14, in total 12 calendar weeks. During the program, the training workshops were conducted in weeks 3-6; problem-solving workshops were held in weeks 4-7; improvement solution implementation occurred during weeks 5-14; individual coaching sessions were held in weeks 3-14; performance monitoring and correction occurred during weeks 3-14. During calendar weeks 15-16, the author of the research conducted a post-intervention measurement (Table 4).

Table 4 Context-Considered Leadership Development Intervention Program Design

Calendar week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	Pre-intervention measurement		Intervention program												Post-intervention measurement	
			Training workshops													
				Problem-solving workshops												
					Improvement solution implementation											
			Individual coaching													
			Performance monitoring and correction													

To conduct the pre-intervention measurement of leadership styles and effectiveness author conducted individual 2-hour MLQ interviews with 11 managers, that is, 22 hours of interviews completed. The MLQ measurement of the effectiveness has been done using objective criteria (Table 3). To ensure consistency and reliability of MLQ leadership style measurements Cronbach's alpha reliability test was performed using the IBM SPSS Statistics version 28 software. The MLQ results were split by organizational levels, that is, overall sample, executives, middle managers, and supervisors. Based on the analysis, the pre-intervention profiles of each level were identified.

Based on the results of the pre-intervention measurements, an intervention program was developed and executed with consideration of sustainability requirements, ensuring that all the changes support the future of the organization (Xuecheng & Iqbal, 2022). Participation in the program was mandatory for the selected managers. The program consisted of 4 training workshops that lasted for 4 hours each and the total duration of the training workshops was 16 hours. The workshops covered the following topics: 1) Leadership and effectiveness (Nijstad, 2009; Bass & Bass, 2008; Bass & Riggio, 2014); 2) Full range of leadership model (Bass & Avolio, 2018; Hur-yagba, 2016), self-image challenge; 3-4) Tools that can help to perpetuate appropriate leadership styles (Liker, 2020; Jaques, 2010).

In addition, 4 problem-solving workshops were held, which lasted for 4 hours each, the total duration of the workshop lasted 16 hours. The workshops covered topics that could help to connect previously explained theory and contextual issues of goal setting and communication to ensure internal alignment, planning and task assignment, standardization, performance monitoring, analysis, and reviews. As a result of the problem-solving workshops, 8 different solutions were developed, implementation plans were agreed upon and executed.

All the workshops were followed by individual coaching sessions aimed at helping managers to apply and adopt the received information. The sessions lasted for a minimum of 1 hour each. A total of 88 individual coaching sessions were held, that is, 88 hours of coaching were completed. Performance indicators were tracked and monitored weekly throughout the research project, covering 12 calendar weeks. The results were discussed, and actions were taken by the managers, if necessary.

To conduct the post-intervention measurement of leadership styles and effectiveness individual 2-hour MLQ interviews with the 11 managers were conducted, that is, 22 hours of interviews completed. The MLQ measurement of the effectiveness has been done using objective criteria (Table 3). To ensure consistency and reliability of MLQ leadership style measurements the Cronbach's alpha reliability test was repeated. The MLQ results were split by the organizational levels, that is, the overall sample, executives, middle managers, and supervisors. Based on the conducted analysis, the post-intervention profiles for each level were identified. Then, post-intervention profiles were compared to the pre-intervention profiles using a paired samples t-test, which allowed to determine the change caused by the intervention. All the computations have been done using IBM SPSS Statistics version 28 software.

The author of this research acted as an associate of the managers, an outsider that cooperated with the insiders to conduct the research (Herr & Anderson, 2015; Bass & Avolio, 2004). This approach was chosen due to the specifics of Russian culture, where people of authority are strongly respected (Grachev et al., 2007), due to which subordinates would not be able to objectively evaluate leadership styles and the effectiveness of their managers. The author of the research was an independent person, so the managers did not have authority over her, which allowed for objective evaluations. The author of the research was responsible for the management of the research project and the achievement of its purpose by conducting data collection and analysis, development, and execution of the intervention program.

Besides real-life context, research needs to specify cultural, industrial, organizational, and managerial contexts with the specification of organizational levels and outcomes (Vogel et al., 2020; Moldoveanu & Narayandas, 2019), which will allow for better understanding and interpretation of the results.

Russian history extends over one thousand years (Dimnik, 2007). It is a unique country due to its size, geography, history, culture, and development potential (Elenkov, 1998). In 2007 (Grachev et al., 2007), an extensive cross-cultural study of organizational leadership (GLOBE) was conducted. The project included a study of 450 Russian middle managers from the food processing, financial services, and telecommunication industries. The results indicated that Russian culture is shifting from collectivistic to more individualistic. People with privileges and authority are strongly respected. The transition requires more assertive behavior from the managers that need to be tough to ensure the survival and transformation of businesses; however, it might not be demonstrated for different reasons, such as family ties and nepotism. Successful performance might be achieved by ignoring ethical standards and rules of morality. Nevertheless, some businesses demonstrate socially responsible behavior. In the transition period, people have a higher need for security and direction. Stability is highly valued because it allows for strategic thinking and acting. Russian managers are successful in networking and cooperation, where they utilize both formal and informal ties.

The Russian mining industry is underinvested and has many opportunities for cost reduction and productivity increase (Global Business Reports, 2012). Digital solutions are becoming actively used in the industry; however, effective process management based on modern standards for safety, performance, quality management, staff training and development need to be worked on (Vostrikov et al., 2019). The lack of highly skilled workers is among the top 10 problems of the Russian mining industry (KPMG, 2021).

The major customers of the company were construction and manufacturing organizations. The structure of an organization consisted of production, maintenance, quality, and other administrative departments. The total headcount was 400 full-time employees. The company experienced problems with overburden removal, which operated 24 hours, 7 days per week. It was confirmed that over the past 12 months, there were no changes in neither structure nor technology of the organization, which could impact the leadership styles and effectiveness profiles of the managers. Thus, risks for internal validity, such as history and maturation (Chiang et al., 2015) were minimized.

Historically, the manager was a formal role holder and "statistician," who collected the data and did nothing with it, primarily due to the lack of profile education and training among supervisors and middle managers. People were appointed to positions based on their interests and the beliefs of the top management in their capabilities. In case of problems, workers were expected to solve them autonomously, only serious problems were reported. Management did not clearly communicate existing strategic plans, which caused confusion with the setting of the performance expectations that were perceived as recommendations. Also, the level of standardization of the operations was low, which resulted in miscommunication and delays in daily operations. Performance results were reviewed once per month by the top management that shared very limited information with the rest of the company. The performance fluctuations were not formally investigated, which cemented the existing problems and lead the management to a state of helplessness.

RESULTS AND DISCUSSION

The conducted study aimed at explaining how to develop leadership in the context of a Russian mining organization. To do that a quasi-experiment using a pre-and post-intervention was done on a sample of multiple levels of managers that represented overall sample, executives, middle managers, and supervisors of a Russian mining organization. MLQ served as a major measurement tool for leadership styles and effectiveness that had specified criteria. The research was conducted by an immersed researcher.

The results of the conducted quasi-experiment suggest that the leadership development that occurred in the context of a Russian mining organization was driven by the executives and mirrored by middle managers

and supervisors, a certain cascade of frequency of utilization of leadership styles was observed. The results indicated that the intervention caused mostly statistically significant changes with effect sizes ranging from low to large, details are explained below.

Managers of all levels went through training and problem-solving workshops, as well as coaching aimed at solving the identified contextual issues in an organization. As a result, the following was performed: organizational strategic and operational goals were set and communicated to all levels of the organization, the set goals were incorporated into the plans at all levels and performance expectations were set for each role. The roles and responsibilities of the managers were discussed and agreed upon. Standards for task assignment, shift changeover, performance monitoring, analysis, and review meetings were developed and implemented to reduce delays and miscommunication. An Excel database for performance variance recording and analysis was developed and implemented. Daily and weekly functional and cross-functional performance review meetings at all levels were developed and implemented. To ensure sustainability of the change, implementation was done by incorporating the developed tools and procedures into the existing management system.

The conducted overall sample evaluation of the leadership styles and effectiveness using MLQ has shown high reliability and internal consistency, ranging from 0.804 during pre-intervention and 0.792 during post-intervention evaluations (Tavakol & Dennick, 2011).

The results of the paired samples t-test for the overall sample have indicated that the change was positive, and statistically significant at $p = 0.05$ except for idealized influence (behavior) leadership style, indicating that the change was not due to a chance (Sullivan & Feinn, 2012). Effect sizes ranged from low to medium, indicating that the change was not trivial and obvious to an observer (Sullivan & Feinn, 2012) (Table 5).

The positive results of the intervention support the results of a meta-analysis conducted by Arthur & Hardy (2014) and Avolio et al. (2009). The effects analysis indicated that the biggest changes were achieved by an increase in the frequency of utilization of intellectual stimulation, reduction of passive management by exception leadership styles, and an increase in the utilization of individual consideration. This suggests that managers focused on leadership styles that allowed them to solve specific issues while helping each other to improve, which also supports the results of the GLOBE study for Russia (Grachev et al., 2007). Overall results indicate that the deeply contextualized leadership development approach used allowed to achieve statistically significant changes of non-trivial magnitude in the leadership styles of the managers.

The change in the specified leadership styles allows expecting high sustainability of the achieved effectiveness (Xuecheng & Iqbal, 2022), the effect size of which was medium, making it obvious to the observers (Sullivan & Feinn, 2012).

The results of the paired samples t-test for the executive level indicated that the change was positive, statistically insignificant at $p = 0.05$ with low to large effect sizes (Table 7). Statistical significance is dependent on the used sample size; however, it is not always possible to achieve statistical significance in a small group of executives studied in a real-life context, so, in the given situation, it is more important to understand what the effect size or magnitude of change was, which is not dependent on the sample size (Sullivan & Feinn, 2012). The effect size that was achieved because of the intervention suggests that the change was of a non-trivial magnitude and obvious to the observers (Sullivan & Feinn, 2012).

The effects analysis has indicated that the biggest effect sizes were achieved by an increase in the frequency of utilization of individual consideration, reduction of passive management by exception leadership styles, and an increase in the utilization of intellectual stimulation and inspirational motivation. The results of the executives are aligned with the results of the overall group, suggesting that executives have initiated the change and served as role models to the rest of the organization, which is aligned with Jensen et al. (2020) and could be explained

by cultural specifics, so when executives demonstrated authority, provided direction, ensured training and support to their middle managers (KPMG, 2021; Grachev et al., 2007), the situation started to change.

The effectiveness of the executives also changed, the effect size was low, which can be explained by the specific criteria that were used to objectively evaluate the effectiveness and duration of the research project (Poturak et al., 2020; Jensen et al., 2020; Lowe et al., 1996); nevertheless, the change was not trivial (Sullivan & Feinn, 2012).

The results of the paired samples t-test for the middle manager level indicated that the change was positive, mostly statistically insignificant at p = 0.05, except for management by exception – passive and – active, contingent reward leadership styles, with low effect sizes (Table 7), also indicating that change was not due to a chance, the magnitude was non-trivial (Sullivan & Feinn, 2012). Similarly, to the executives, the sample size of middle managers was small, which influenced the results of statistical significance for most of the leadership styles, so effect size should be analyzed (Sullivan & Feinn, 2012). The effects analysis indicated that the magnitude of change was low to high, the biggest effects were achieved by an increase in the frequency of utilization of intellectual stimulation, individual consideration, and inspirational motivation leadership styles, which was similar to the results of the executives' and aligned with Grachev et al. (2007), suggesting that people of power and authority are respected, and their behavior is mirrored to some extent by the subordinates, which cannot be ignored in further studies.

The effect size of the effectiveness of the middle managers was medium, which also could be explained by the specific criteria that were used to objectively evaluate the effectiveness and duration of the research project (Poturak et al., 2020; Jensen et al., 2020; Lowe et al., 1996); however, the change was obvious (Sullivan & Feinn, 2012).

The results of the paired samples t-test for the supervisory level indicated that the change was positive, mostly statistically significant at p = 0.05, except for management by exception – passive, idealized influence (behavior and attributed), with low to medium effect sizes (Table 8), also indicating that change was not due to a chance and magnitude was non-trivial and visible to an observer (Sullivan & Feinn, 2012). The sample size of the supervisors was slightly bigger than that of executives and middle managers, which allowed to see improvement in the statistical significance indicators. The effects analysis indicated that the highest effect size was achieved by the increase in intellectual stimulation, contingent reward, and idealized influence (attributed) leadership styles, which, to some extent, was also similar to the results of the middle managers' group and aligned to Grachev et al. (2007).

The effect size of the effectiveness of the supervisors was medium, which also could be explainable by the specific criteria that were used to objectively evaluate the effectiveness and duration of the research project (Poturak et al., 2020; Jensen et al., 2020); although, the change was obvious (Sullivan & Feinn, 2012).

The conducted study allowed to expand the leadership development literature by conducting a quasi-experiment in the real-life context in a non-western culture – Russian, mining industry, covering three levels of managers, and objectively evaluating the extent of change in their leadership style and effectiveness profiles using MLQ with specified effectiveness criteria by an immersed researcher. The study explained step by step how the leadership was developed with all the actions that were taken to achieve the change in the leadership style and effectiveness of the selected managers, providing empirical evidence of the achieved results and enabling comparison with similar studies. To the best knowledge of the author, no similar studies have been conducted previously.

The results of the study provide evidence that leadership development intervention conducted in a real-life environment with consideration of cultural, industrial, organizational, and managerial context, allowed to improve objectively measured leadership effectiveness by changing the leadership styles used by executives, middle managers, and supervisors in 16 calendar weeks in a statistically significant way with low to high effect sizes.

Table 5 Overall Sample – Paired Samples Statistics

Paired Samples Statistics						Paired Samples Test								Paired Samples Effect Sizes				
Leadership styles		Mean	N	SD	SE Mean	Paired Differences					t	df	Significance		Effect Size (ES)	Standardizer[a]	Point Est.	95% CI
						Mean	SD	SE Mean	95% CI Dif. Low	95% CI Dif. Up			1-Side p	2-Side p				Low	Up
Pair 1	Laissez-Faire: POST	0.52	11	0.51	0.15	-0.52	0.18	0.05	-0.64	-0.41	-9.90	10	0.00	0.00	Cohen's d	0.18	-2.98	-4.39	-1.56
	Laissez-Faire: PRE	1.05	11	0.53	0.16										Hedges' cor.	0.18	-2.87	-4.22	-1.50
Pair 2	MBE – Passive: POST	1.20	11	0.55	0.16	-0.36	0.42	0.13	-0.65	-0.08	-2.85	10	0.01	0.02	Cohen's d	0.42	-0.86	-1.54	-0.15
	MBE – Passive: PRE	1.57	11	0.79	0.24										Hedges' cor.	0.44	-0.83	-1.48	-0.14
Pair 3	MBE – Active: POST	1.66	11	0.30	0.09	0.75	0.30	0.09	0.55	0.95	8.41	10	0.00	0.00	Cohen's d	0.30	2.54	1.28	3.77
	MBE – Active: PRE	0.91	11	0.38	0.11										Hedges' cor.	0.31	2.44	1.23	3.62
Pair 4	Cont. Reward: POST	1.75	11	0.42	0.13	0.75	0.32	0.10	0.54	0.96	7.87	10	0.00	0.00	Cohen's d	0.32	2.37	1.18	3.54
	Cont. Reward: PRE	1.00	11	0.61	0.18										Hedges' cor.	0.33	2.28	1.13	3.40
Pair 5	Intellect. Stimul.: POST	1.55	11	0.29	0.09	0.80	0.51	0.15	0.45	1.14	5.17	10	0.00	0.00	Cohen's d	0.51	1.56	0.65	2.44
	Intellect. Stimul.: PRE	0.75	11	0.62	0.19										Hedges' cor.	0.53	1.50	0.62	2.35
Pair 6	Inspir. Motiv.: POST	1.09	11	0.55	0.17	0.30	0.27	0.08	0.11	0.48	3.63	10	0.00	0.00	Cohen's d	0.27	1.10	0.32	1.84
	Inspir. Motiv.: PRE	0.80	11	0.44	0.13										Hedges' cor.	0.28	1.05	0.31	1.77
Pair 7	Ind. Consider.: POST	1.23	11	0.36	0.11	0.32	0.39	0.12	0.06	0.58	2.71	10	0.01	0.02	Cohen's d	0.39	0.82	0.11	1.49
	Ind. Consider.: PRE	0.91	11	0.65	0.20										Hedges' cor.	0.40	0.79	0.11	1.44
Pair 8	Ideal. Infl. (beh.): POST	0.82	11	0.36	0.11	0.07	0.12	0.04	-0.01	0.15	1.94	10	0.04	0.08	Cohen's d	0.12	0.58	-0.07	1.21
	Ideal. Infl. (beh.): PRE	0.75	11	0.32	0.10										Hedges' cor.	0.12	0.56	-0.07	1.17
Pair 9	Ideal. Infl. (att.): POST	0.89	11	0.23	0.07	0.23	0.26	0.08	0.05	0.40	2.89	10	0.01	0.02	Cohen's d	0.26	0.87	0.15	1.56
	Ideal. Infl. (att.): PRE	0.66	11	0.30	0.09										Hedges' cor.	0.27	0.84	0.15	1.50
Pair 10	Effectiveness: POST	1.68	11	0.46	0.14	0.45	0.37	0.11	0.21	0.70	4.10	10	0.00	0.00	Cohen's d	0.37	1.24	0.42	2.02
	Effectiveness: PRE	1.23	11	0.47	0.14										Hedges' cor.	0.38	1.19	0.41	1.94

a. The denominator used in estimating the effect sizes. Cohen's d uses the sample standard deviation of the mean difference. Hedges' correction uses the sample standard deviation of the mean difference, plus a correction factor.

Table 6 Executive Level – Paired Samples Statistics

Paired Samples Statistics						Paired Samples Test									Paired Samples Effect Sizes				
Leadership styles		Mean	N	SD	SE Mean	Paired Differences					t	df	Significance		Effect Size (ES)	Standardizer[a]	Point Est.	95% CI	
						Mean	SD	SE Mean	95% CI Dif. Low	95% CI Dif. Up			1-Side p	2-Side p				Low	Up
Pair 1	Laissez-Faire: POST	1.00	2.00	1.06	0.75	-0.63	0.18	0.13	-2.21	0.96	-5.00	1.00	0.06	0.13	Cohen's d	0.18	-3.54	-8.08	0.45
	Laissez-Faire: PRE	1.63	2.00	0.88	0.63										Hedges' cor.	0.31	-1.99	-4.56	0.26
Pair 2	MBE – Passive: POST	1.50	2.00	0.00	0.00	-1.00	0.71	0.50	-7.35	5.35	-2.00	1.00	0.15	0.30	Cohen's d	0.71	-1.41	-3.54	0.80
	MBE – Passive: PRE	2.50	2.00	0.71	0.50										Hedges' cor.	1.25	-0.80	-2.00	0.45
Pair 3	MBE – Active: POST	1.88	2.00	0.18	0.13	0.38	0.18	0.13	-1.21	1.96	3.00	1.00	0.10	0.20	Cohen's d	0.18	2.12	-0.65	5.01
	MBE – Active: PRE	1.50	2.00	0.35	0.25										Hedges' cor.	0.31	1.20	-0.37	2.83
Pair 4	Cont. Reward: POST	2.38	2.00	0.53	0.38	0.38	0.18	0.13	-1.21	1.96	3.00	1.00	0.10	0.20	Cohen's d	0.18	2.12	-0.65	5.01
	Cont. Reward: PRE	2.00	2.00	0.71	0.50										Hedges' cor.	0.31	1.20	-0.37	2.83
Pair 5	Intellect. Stimul.: POST	1.75	2.00	0.35	0.25	0.25	0.35	0.25	-2.93	3.43	1.00	1.00	0.25	0.50	Cohen's d	0.35	0.71	-1.00	2.24
	Intellect. Stimul.: PRE	1.50	2.00	0.71	0.50										Hedges' cor.	0.63	0.40	-0.57	1.26
Pair 6	Inspir. Motiv.: POST	1.63	2.00	1.24	0.88	0.50	0.35	0.25	-2.68	3.68	2.00	1.00	0.15	0.30	Cohen's d	0.35	1.41	-0.80	3.54
	Inspir. Motiv.: PRE	1.13	2.00	0.88	0.63										Hedges' cor.	0.63	0.80	-0.45	2.00
Pair 7	Ind. Consider.: POST	1.50	2.00	0.35	0.25	0.13	0.88	0.63	-7.82	8.07	0.20	1.00	0.44	0.87	Cohen's d	0.88	0.14	-1.28	1.51
	Ind. Consider.: PRE	1.38	2.00	1.24	0.88										Hedges' cor.	1.57	0.08	-0.72	0.85
Pair 8	Ideal. Infl. (beh.): POST	1.38	2.00	0.53	0.38	0.13	0.18	0.13	-1.46	1.71	1.00	1.00	0.25	0.50	Cohen's d	0.18	0.71	-1.00	2.24
	Ideal. Infl. (beh.): PRE	1.25	2.00	0.35	0.25										Hedges' cor.	0.31	0.40	-0.57	1.26
Pair 9	Ideal. Infl. (att.): POST	1.25	2.00	0.35	0.25	0.38	0.18	0.13	-1.21	1.96	3.00	1.00	0.10	0.20	Cohen's d	0.18	2.12	-0.65	5.01
	Ideal. Infl. (att.): PRE	0.88	2.00	0.53	0.38										Hedges' cor.	0.31	1.20	-0.37	2.83
Pair 10	Effectiveness: POST	1.63	2.00	0.53	0.38	0.63	0.18	0.13	-0.96	2.21	5.00	1.00	0.06	0.13	Cohen's d	0.18	3.54	-0.45	8.08
	Effectiveness: PRE	1.00	2.00	0.71	0.50										Hedges' cor.	0.31	1.99	-0.26	4.56

a. The denominator used in estimating the effect sizes. Cohen's d uses the sample standard deviation of the mean difference. Hedges' correction uses the sample standard deviation of the mean difference, plus a correction factor.

Table 7 Middle Managers Level – Paired Samples Statistics

Paired Samples Statistics						Paired Samples Test									Paired Samples Effect Sizes				
Leadership styles		Mean	N	SD	SE Mean	Paired Differences					t	df	Significance		Effect Size (ES)	Standardizer[a]	Point Est.	95% CI	
						Mean	SD	SE Mean	95% CI Dif. Low	95% CI Dif. Up			1-Side p	2-Side p				Low	Up
Pair 1	Laissez-Faire: POST	0.42	3	0.29	0.17	-0.50	0.25	0.14	-1.12	0.12	-3.46	2	0.04	0.07	Cohen's d	0.25	-2.00	-4.11	0.14
	Laissez-Faire: PRE	0.92	3	0.52	0.30										Hedges' cor.	0.31	-1.60	-3.28	0.11
Pair 2	MBE – Passive: POST	1.17	3	0.29	0.17	-0.42	0.14	0.08	-0.78	-0.06	-5.00	2	0.02	0.04	Cohen's d	0.14	-2.89	-5.73	-0.11
	MBE – Passive: PRE	1.58	3	0.38	0.22										Hedges' cor.	0.18	-2.30	-4.57	-0.09
Pair 3	MBE – Active: POST	1.92	3	0.14	0.08	0.92	0.14	0.08	0.56	1.28	11.00	2	0.00	0.01	Cohen's d	0.14	6.35	0.84	12.28
	MBE – Active: PRE	1.00	3	0.00	0.00										Hedges' cor.	0.18	5.07	0.67	9.80
Pair 4	Cont. Reward: POST	1.75	3	0.00	0.00	0.83	0.14	0.08	0.47	1.19	10.00	2	0.00	0.01	Cohen's d	0.14	5.77	0.73	11.18
	Cont. Reward: PRE	0.92	3	0.14	0.08										Hedges' cor.	0.18	4.61	0.59	8.92
Pair 5	Intellect. Stimul.: POST	1.67	3	0.14	0.08	0.83	0.72	0.42	-0.96	2.63	2.00	2	0.09	0.18	Cohen's d	0.72	1.15	-0.44	2.64
	Intellect. Stimul.: PRE	0.83	3	0.80	0.46										Hedges' cor.	0.90	0.92	-0.35	2.11
Pair 6	Inspir. Motiv.: POST	1.17	3	0.52	0.30	0.33	0.38	0.22	-0.62	1.28	1.51	2	0.13	0.27	Cohen's d	0.38	0.87	-0.57	2.20
	Inspir. Motiv.: PRE	0.83	3	0.63	0.36										Hedges' cor.	0.48	0.70	-0.45	1.75
Pair 7	Ind. Consider.: POST	1.42	3	0.52	0.30	0.25	0.43	0.25	-0.83	1.33	1.00	2	0.21	0.42	Cohen's d	0.43	0.58	-0.72	1.77
	Ind. Consider.: PRE	1.17	3	0.88	0.51										Hedges' cor.	0.54	0.46	-0.58	1.41
Pair 8	Ideal. Infl. (beh.): POST	0.67	3	0.14	0.08	0.08	0.14	0.08	-0.28	0.44	1.00	2	0.21	0.42	Cohen's d	0.14	0.58	-0.72	1.77
	Ideal. Infl. (beh.): PRE	0.58	3	0.14	0.08										Hedges' cor.	0.18	0.46	-0.58	1.41
Pair 9	Ideal. Infl. (att.): POST	0.83	3	0.14	0.08	0.17	0.14	0.08	-0.19	0.53	2.00	2	0.09	0.18	Cohen's d	0.14	1.15	-0.44	2.64
	Ideal. Infl. (att.): PRE	0.67	3	0.14	0.08										Hedges' cor.	0.18	0.92	-0.35	2.11
Pair 10	Effectiveness: POST	2.08	3	0.14	0.08	0.50	0.43	0.25	-0.58	1.58	2.00	2	0.09	0.18	Cohen's d	0.43	1.15	-0.44	2.64
	Effectiveness: PRE	1.58	3	0.58	0.33										Hedges' cor.	0.54	0.92	-0.35	2.11

a. The denominator used in estimating the effect sizes. Cohen's d uses the sample standard deviation of the mean difference. Hedges' correction uses the sample standard deviation of the mean difference, plus a correction factor.

Table 8 Supervisory Level – Paired Samples Statistics

Paired Samples Statistics						Paired Samples Test								Paired Samples Effect Sizes				
Leadership style		Mean	N	SD	SE Mean	Paired Differences					t	df	Significance		Effect Size (ES)	Standardizer[a]	Point Est.	95% CI
						Mean	SD	SE Mean	95% CI Dif. Low	95% CI Dif. Up			1-Side p	2-Side p				Low	Up
Pair 1	Laissez-Faire: POST	0.42	6	0.38	0.15	-0.50	0.16	0.06	-0.67	-0.33	-7.75	5	0.00	0.00	Cohen's d	0.16	-3.16	-5.21	-1.10
	Laissez-Faire: PRE	0.92	6	0.38	0.15										Hedges' cor.	0.17	-2.92	-4.81	-1.01
Pair 2	MBE – Passive: POST	1.13	6	0.72	0.29	-0.13	0.14	0.06	-0.27	0.02	-2.24	5	0.04	0.08	Cohen's d	0.14	-0.91	-1.85	0.09
	MBE – Passive: PRE	1.25	6	0.79	0.32										Hedges' cor.	0.15	-0.84	-1.71	0.08
Pair 3	MBE – Active: POST	1.46	6	0.25	0.10	0.79	0.29	0.12	0.48	1.10	6.64	5	0.00	0.00	Cohen's d	0.29	2.71	0.88	4.50
	MBE – Active: PRE	0.67	6	0.20	0.08										Hedges' cor.	0.32	2.50	0.82	4.16
Pair 4	Cont. Reward: POST	1.54	6	0.29	0.12	0.83	0.34	0.14	0.47	1.19	5.98	5	0.00	0.00	Cohen's d	0.34	2.44	0.75	4.09
	Cont. Reward: PRE	0.71	6	0.37	0.15										Hedges' cor.	0.37	2.25	0.70	3.77
Pair 5	Intellect. Stimul.: POST	1.42	6	0.30	0.12	0.96	0.37	0.15	0.57	1.34	6.38	5	0.00	0.00	Cohen's d	0.37	2.60	0.83	4.34
	Intellect. Stimul.: PRE	0.46	6	0.29	0.12										Hedges' cor.	0.40	2.40	0.77	4.01
Pair 6	Inspir. Motiv.: POST	0.88	6	0.14	0.06	0.21	0.19	0.08	0.01	0.41	2.71	5	0.02	0.04	Cohen's d	0.19	1.11	0.04	2.12
	Inspir. Motiv.: PRE	0.67	6	0.13	0.05										Hedges' cor.	0.20	1.02	0.03	1.95
Pair 7	Ind. Consider.: POST	1.04	6	0.19	0.08	0.42	0.20	0.08	0.20	0.63	5.00	5	0.00	0.00	Cohen's d	0.20	2.04	0.55	3.48
	Ind. Consider.: PRE	0.63	6	0.14	0.06										Hedges' cor.	0.22	1.88	0.51	3.21
Pair 8	Ideal. Infl. (beh.): POST	0.71	6	0.19	0.08	0.04	0.10	0.04	-0.07	0.15	1.00	5	0.18	0.36	Cohen's d	0.10	0.41	-0.45	1.23
	Ideal. Infl. (beh.): PRE	0.67	6	0.20	0.08										Hedges' cor.	0.11	0.38	-0.41	1.13
Pair 9	Ideal. Infl. (att.): POST	0.79	6	0.10	0.04	0.21	0.33	0.14	-0.14	0.56	1.54	5	0.09	0.19	Cohen's d	0.33	0.63	-0.28	1.49
	Ideal. Infl. (att.): PRE	0.58	6	0.30	0.12										Hedges' cor.	0.36	0.58	-0.26	1.37
Pair 10	Effectiveness: POST	1.50	6	0.47	0.19	0.38	0.41	0.17	-0.06	0.81	2.24	5	0.04	0.08	Cohen's d	0.41	0.91	-0.09	1.85
	Effectiveness: PRE	1.13	6	0.31	0.13										Hedges' cor.	0.45	0.84	-0.08	1.71

a. The denominator used in estimating the effect sizes. Cohen's d uses the sample standard deviation of the mean difference. Hedges' correction uses the sample standard deviation of the mean difference, plus a correction factor.

CONCLUSION

The purpose of the study was to answer the following research question: How to develop leadership in the context of a Russian mining organization? The question was answered by conducting a quasi-experiment using a pre-and post-intervention that lasted for 16 calendar weeks in a Russian mining organization. Multiple levels of management were involved, specifically overall sample, executives, middle managers, and supervisors. MLQ was used as a major measurement tool for leadership styles and effectiveness that had specified criteria. The research was conducted by an immersed researcher. The results of the conducted study suggest that the leadership development that occurred in the context of a Russian mining organization was driven by the executives and mirrored by middle managers and supervisors, a certain cascade of frequency of utilization of leadership styles was observed, which lead to an increase in effectiveness. The results indicated that the intervention caused a statistically significant change among the overall sample, middle managers and supervisors with effect sizes ranging from low to large. The executives did not demonstrate a statistically significant change, due to small sample size, but demonstrated low to large effect sizes of the changes that took place. The conducted study allowed closing the identified research gaps and provide verifiable data. To the best knowledge of the author, no similar studies were conducted with the reported level of contextualization and details, allowing to expand the body of knowledge and provide guidance for the practice of leadership development. The described approach can be used for further scientific research and applied by practitioners as it is. Several limitations of the study must be highlighted. Research was conducted in the real-life environment within specific cultural, industrial, organizational, and managerial contexts and could be difficult to repeat; however, additional studies of the same design within similar or different industries in Russian or other cultures with the same or longer duration would further increase the external validity of the research. The author of the research acted as an associate of the managers and conducted measurements of leadership styles and effectiveness using objective data and criteria. The used approach is reducing the common method bias problem (Lord, 2019; Jacquart et al., 2018) and is well suited for Russian culture (Grachev et al., 2007); however, it also has an associated risk, that is, measures of effectiveness potentially capture primary transactional outcomes and less transformational (Lowe et al., 1996). In the future, the research with the similar design could be repeated, also the research could be done simultaneously by an independent immersed researcher and subordinates of the managers, effectiveness criteria could be expanded and include transformational outcomes along with transactional.

ORCID

Marina Kravtšuk https://orcid.org/0000-0001-7752-7036

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