
Intra-Organizational Communication in Project Management Under COVID-19 Conditions: A Longitudinal Case Study

Submitted 10/09/24, 1st revision 25/09/24, 2nd revision 21/10/24, accepted 30/10/24

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Abstract:

Purpose: The aim of the paper is to identify and evaluate changes in intra-organizational communication in project management arising from the COVID-19 pandemic in 3 specific areas: advanced forms, vertical direction and functions of communication.

Design/Methodology/Approach: This aim has been achieved through theoretical considerations and empirical research conducted as a longitudinal case study of Apator company from Poland. On the basis of literature review 3 research questions have been posed. As a detailed research method, participant observation of 6 teams implementing projects within the matrix structure was used.

Findings: Research has shown that the COVID-19 pandemic caused a sudden and permanent popularization of advanced forms of intra-organizational communication among employees and project managers of the studied organization. Crisis situation had the greatest impact on intra-organizational communication at the lowest levels in project management. COVID-19 pandemic conditions also triggered an increase in the instructional, motivational and integrational functions of intra-organizational communication in project management.

Practical Implications: The results obtained can serve as a benchmark for other enterprises analyzing dynamics of their response to COVID-19 pandemic conditions.

Originality/Value: The results significantly extend discussion and provide new insights on team work organizational flexibility, resilience and agility under conditions of uncertainty and crisis.

Keywords: Project management, communication management, intra-organizational communication, COVID-19 pandemic, longitudinal case study.

JEL Code: D83, M12, M15.

Paper type: Original research paper.

Acknowledgements: The authors disclose receiving support for long-term scientific development from the Faculty of Management, University of Lodz, Poland (institutional support) and Apator SA, Poland (financial support).

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1. Introduction

Communication is a vital component of business management, essential for performing managerial and management functions, enhancing organizational performance, and ensuring effective teamwork and coordination. Managers have to develop strong communication competencies to lead effectively and interact with their peers and teams (Lee, 2022).

Additionally, communication plays a significant role in professional success and is crucial for both internal and external business interactions (Szkudlarek, Osland, Nardon, and Zander, 2020). From a long-term perspective, effective communication strategies are fundamental to the growth (Sutrisno, Kuraesin, Siminto, Irawansyah and Ausat, 2023) and performance of organizations (Kalogiannidis, 2020; Musheke and Phiri, 2021).

Communication is also strongly related to project work, which has become the most popular way of human activity in contemporary business and society. Projects are synonymous with goal-directed actions, effective resource utilization and personal dedication.

The modern project concept encourages originality, flexibility, interpersonal collaboration and development (Jessen, 2010). This trend, known as “projectification” is transforming traditional work structures and challenging established organizations (Ekstedt, 2019)

Among the types of organizational communication, it is possible to distinguish intra-organizational communication, which by its nature plays a vital role in project management (Järvenpää, Pavlik, and Gustavsson, 2021; Ruão, Marinho and Silva, 2022). It is under constant evolution triggered by a number of internal and external factors, which in recent years may include the COVID-19 pandemic (Khanna, Cicinelli, Gilbert, Honavar, & Murthy, 2020; Grima *et al.*, 2020; Khan *et al.*, 2020).

Taking this into account, the aim of this paper is to identify and evaluate changes in intra-organizational communication in project management arising from the COVID-19 pandemic in following areas, advanced forms, vertical direction and functions of communication. This aim has been achieved through theoretical considerations and empirical research conducted as a longitudinal case study of Apator company from Poland.

This paper is organized as follows. In the first part, a literature review is presented. Based on theoretical deliberations 3 research questions are formulated. The following sections present the research methodology (including company characteristics) and research results. The final section is conclusion with answers to research questions as well as with limitations and future directions of research.

2. Literature Review and Research Questions

Communication is the process of exchanging information in a form of verbal (e.g., ideas, thought, facts) and non-verbal (e.g., emotions, feelings or impressions) signals/stimulli between individuals of groups through a specific channels (Prusty, Kumar, and Dhole, 2022; Kimani and Scott, 2023). It has process nature described at the theoretical level in the form of specific communication models, such as classical, linear, non-linear, multidimensional, action, transactional, and convergence models (Narula, 2014; Prusty, Kumar, and Dhole, 2022).

As an example the linear Shannon-Weaver Model (Elhmaidi and Omar, 2023) may serve. It consists of the following components: (1) sender as information source, (2) encoding – converting the idea into signals/stimulli that convey meaning, (3) transmitting with specific channel including noises, (4) decoding by receiver at destination spot – translating the message from encoding form into meaning.

This model is often supplemented with such components as feedback (e.g., from Lasswell's Model) including verbal and non-verbal responses (Kiranmayi, Mrudula, Thripureswari, Rao, Ragini, and Swamy, 2022) as well as specific context (e.g., from Gerbner's Model) including physical, social, chronological, cultural and relational framework (McQuail and Windahl, 2013).

Communication understood in this way is transactional, inevitable, purposeful, multidimensional, multidirectional and irreversible (Hargie, 2022). It plays an important role in all aspects of socio-economic activity. However, it becomes especially important in business management.

Almamari and Kolluru (2020) underline that „management and communication complement each other, and there is no successful management, without the existence of effective communication“. From an organizational point of view, the following types of communication play a key role in management (Shalini, 2015; O'Sullivan and Carr, 2018; Ahlf, Horak, Klein, and Yoon, 2019):

- interpersonal communication – taking place between individual members of the organization as individuals,
- intradepartmental communication – taking place within organizational units or work teams, ensuring primarily the continuity of operation of these units,
- interdepartmental communication – carried out between organizational units or work teams, mainly related to the implementation of organizational functions, processes, or projects,
- intra-organizational communication occurs inside an organization and typically engages organizational members. It is also called workplace communication and is understood as the exchange of information between one person and another person or group (team) communication in an organization (Yusof and Rahmat, 2020),

- interorganizational communication – occurring between individual organizations, e.g., partners, customers, competitors or suppliers,
- mass and personal communication – covering the company's external communication addressed to a wide, anonymous recipient, e.g., customers, markets, and press.

In addition to the division proposed above, communication in management as a multi-aspect process can also be considered in several other dimensions (Pierścieniak, 2013), taking into account:

- characteristics of social communication (what is social communication?): e.g., formal, informal, simple, complex, oral, written, visual, verbal, positive, negative, persuasive, trustworthy, untrue,
- the subject of social communication (what is communication used for?) e.g., building an image, transferring knowledge, building attitudes, motivating, achieving organizational goals, providing information,
- forms of social communication (what communication tools can be used?) e.g., meeting, conversation, dialogue, discussion, letters, e-mails, telephones, advertising boards, leaflets, posters.

Communication also plays a very important role in managing modern projects. Projects are understood here as unique, complex activities carried out by project teams for a specific purpose (product), characterized by a specific scope and three key performance features: adequate quality, acceptable costs and a specific time of implementation collectively treated as iron triangle of project management (Hamta, Ehsanifar, and Sarikhani, 2021; Uddin, Ong, Lu, and Matous, 2024).

All these components are dependent on each other and must be considered together. It is not possible to change one of them without affecting the others. In more complex models above features are supplemented by such aspects as risk and resources (Mahdiraji, Sedigh, Hajiagha, Garza-Reyes, Jafari-Sadeghi, and Dana, 2021).

Intra-organizational communication is a critical factor in determining the success of various types of projects, especially innovation (Lievens and Moenaert, 2000), new product development (Badir, Büchel, and Tucci, 2009) or construction projects (Muneer, Khan, HussainShuai, Khan, Farooq, Moawwez, and Tariq, 2022). Previous studies indicate that effective intra-organizational communication:

- reduces task, technological, and market uncertainties in innovation projects management, increasing project performance through collaborative relationship, leadership, information sharing, trust formation, and joint decision-making (Fanousse, Nakandala and Lan, 2021),
- enhances synergy effects among internal organizational units and cross-functional project teams (Peters and Fletcher, 2004), enabling employees to

- align their decision-making with organizational objectives (Valiyeva and Thomas, 2022),
- facilitates knowledge sharing between organizational units performing project tasks, leading to better project outcomes (Suzuki, Ando, and Nishikawa, 2019),
 - positively affects project performance (Cheung, You, and Lam, 2013), especially in high-performing teams (Chiocchio, 2007), in the later stages of the project life-cycle and when standardization of organizational methods and tools is low (Brodbeck, 2001).

Moreover, Oliveira, Argyres, and Lumineau (2022) found that the style of intra-organizational communication, including cost and information orientation, informality, precision, and authenticity, significantly impacts the quality of adaptation to interorganizational project disruptions.

To achieve above effects Galvis-Ardila, Colmenares-Perdomo, and Rueda-Varón (2024) suggest that communication should be viewed holistically as a strategic, integral part of project management rather than just a short-term, operational tool.

This approach involves planning, managing, and monitoring communications throughout the whole project lifecycle Including the specificity resulting from the following stages: (1) conception stage, (2) beginning stage, (3) planning stage, (4) execution stage, (5) monitoring and control stage, (6) closing stage and even (7) post-closing stage.

Samáková, Babčanová, Chovanová, Mesárošová, Šujanová (2018) recommend a step-by-step approach to project communication, encompassing communication strategy, organizational structure, channels, methods, tools, and feedback systems. By integrating these elements, organizations create a comprehensive communication framework that supports effective project management and enhances overall project performance.

Research on communication needs to be constantly updated, because communication as a social process is constantly evolving. Significant recent changes include, among others, exploiting the potential of social media (Cartwright, Liu, and Raddats, 2021) and artificial intelligence (Rese, Ganster, and Baier, 2020) in dynamic business communications, further progress of wireless communication technologies (Zhu, Ma, and Zhang, 2023) as well as development of satellite communications (Kodheli *et al.*, 2020) and technologies for 6G communications (Viswanathan and Mogensen, 2020).

These changes bring certain challenges to the development of communication such as: (1) privacy and security issues, (2) misinformation and fake news, (3) addiction and overuse of specific media channels, like social media apps, online gaming, and streaming services, (4) polarization and echo chambers creation as well as (5)

limited access to information due to income inequality and digital divide (Dhiman, 2023).

An example of a significant misinformation challenge could be greenwashing, understood as conveying a false impression or misleading information about a company's pro-environmental activities (Netto, Sobral, Ribeiro, and Soares, 2020). In an ecological context, research on assessing the impact of new forms of communication on environmental burdens, mainly carbon emissions, is also becoming important (Wang, Hu, and Li, 2024).

All these challenges are leading to the development of new types of communication, which include, among others, green communication (Cahyadi, Candrasa, Cen, Cahyadi, and Pratama, 2023), unified communication (Reisinger, Wagner, and Boiten, 2023), semantic communication (Yang *et al.*, 2022), vehicular communication (Arena and Pau, 2019 or communication based on deep learning (Wang, Lin, Hao, Xu, and Tian, 2022).

The most recent event modifying the existing nature of communication was the COVID-19 pandemic. Chen *et al.* (2023) underline that this pandemic „dramatically changed the nature of social interaction, creating negative impacts and challenges, but also opportunities for progressing how we communicate, as humans“.

These changes are primarily seen in accelerated technological communication. As a result, digitally mediated channels became crucial for information sharing and communication across a wide spectrum of human activities in personal and professional lives. As the study by Dolot (2020) indicate as many as 85.6% of people worked remotely 5 days a week during the pandemic, compared to 1.9% of respondents previously.

However, the results of the research do not provide clear conclusions in this regard. Maurer, Bachand, and Oertel (2022) found a reduction in e-mail communication in favor of more advanced forms of electronic coordination of project work. On the contrary, Mischczak (2023) found high and continuing popularity of e-mail communication and the untapped potential of tools designed for team and project work.

Therefore, the potential arising from technological change has not been achieved everywhere. This consequently leads to the formulation of the first research question:

RQ1: How has the COVID-19 pandemic affected the use of advanced forms of intra-organizational communication in project management?

Intra-organizational vertical communication in project management has also become a challenge under pandemic conditions. Research by Urbancová, Vrabcová, and

Pacáková (2024) has shown the important role of bottom-up communication in improving organizational climate, stabilization of employees and preventing conflicts in project teams.

Moreover, Ibrahim, Ibrahim, and Alias (2023) found significant and positive relationship between upward and downward communication and remote working of project teams. They argue organizations that uses effective upward and downward communication can successfully make a positive outcome for the tasks given as it could toughen their teamwork and could break any communication blurriness among them during team communicating.

Vertical communication plays a special role when using project management methodologies. These approaches are most often classified as (Strojny and Szmigiel, 2015; Volovyk and Harmash, 2022):

- sequential (traditional) PM methodologies (e.g., Waterfall, Critical Path Method, Critical Chain Method), based on the project life cycle, which identifies the sequence of steps that must be taken to implement a given project,
- agile PM methodologies (e.g., Scrum, Scrumban, Crystal), based on activities that add value, aimed at eliminating unnecessary administrative steps and used in project environments where there is high uncertainty and precise planning of the entire project in time is not possible,
- hybrid PM methodologies (e.g., PRINCE2, PMBOK, PMI, or IPMA) benefit from the rigid structure of the sequential (traditional) approaches and the flexibility of the agile approaches.

One of the most widespread PM methodologies is PRINCE2 (Peszek, 2023; Simonaitis, Daukšys, and Mockienė, 2023), in which vertical communication runs between 4 levels: (1) team members, (2) team managers, (3) project manager and (4) the project board (AXELOS, 2019). This leads to second research question:

RQ2: How has the COVID-19 pandemic affected vertical intra-organizational communication in project management?

Many conditions related to the role of intra-organizational communication in project management were also subject to post-pandemic changes, resulting primarily from the implementation of remote work principles. They are concerned with the role of communication in implementing responsibilities, goals and ensuring the effectiveness of project teams work in modified organizational conditions (Sirait and Nugroho, 2021), the use of communication to provide leadership and effectively motivate project team members (Muhammad *et al.*, 2023), as well as the role communication in solving emerging psycho-social problems and tensions as well as barriers in project work (Leonardi, Parker, and Shen, 2024).

These conditions expressed changes in the functions of intra-organizational communication in teamwork, which, from a theoretical perspective, include (Głowik, 2004; Frączek, 2012; Kuzior, Kochmańska, and Marszałek-Kotzur, 2020):

- control function – including providing information about the duties and responsibilities of employees as well as the norms and scope of social control,
- motivational function – related to providing incentives to carry out tasks and achieve various types of goals,
- emotional function – including the expression of emotions and feelings,
- information function – related to obtaining information necessary to make decisions, fulfill obligations, achieve goals,
- instructional function - regarding the transmission of various orders, as well as explaining the scope of responsibilities to individual employees,
- integration function – aimed at supporting socialization and professional assimilation, bonding a team of employees into a whole,
- educational function – focused on transferring knowledge and supporting employees' professional development.

This leads to third research question:

RQ3: How has the COVID-19 pandemic affected functions of intra-organizational communication in project management?

3. Research Methodology

Aiming to achieve the aim of the paper and to answer the research questions, the authors conducted own empirical research using case study approach (Yin, 2018). As the subject of the study, Apator company was selected. The company was purposefully selected (Emmel, 2013) for the study based on the following reasons:

- basing a significant amount of the company's business operations on project activities. As a result, the company can be described as a project-based organization with a strongly developed project-based organizational structure (Söderlund, 2023). This enabled the research to be conducted in the company's specific project environment,
- continuing business operations during and post the COVID-19 pandemic. COVID-19 pandemic as a crisis black swan event (Raza and Siddiqui, 2024) caused significant negative disruptions for many enterprises leading to many business failures across the globe (Jebran and Chen, 2023; Zia, Shamim, Zeng, Awan, Chromjakova, Akhtar, and Orel, 2023). This made it possible to reliably assess the impact of the COVID-19 pandemic conditions on intra-organizational communication processes in project management at the company under study,
- linking one of the authors to the company, which facilitated direct and

reliable empirical research in the organizational environment of the selected enterprise.

Apator is a joint stock company located in Torun (Poland). The company was founded in 1949 as Pomorskie Zakłady Wytwarzany Aparatury Niskiego Napięcia. Transformed in 1992 into a joint-stock company, it currently operates in the metrology industry, designing, manufacturing and selling measuring equipment and systems. The company manufactures, among others, electronic electricity meters and creates solutions enabling the transmission and collection of reading data from measuring devices.

The offer also includes low-voltage switchgear and surge protection equipment. The company employs approximately 900 people, and its revenues for 2023 amounted to PLN 475,284,000. In strategic terms, the company is part of the Apator Group - an international capital group of manufacturers of measuring devices, systems, and solutions dedicated to work in power, water, and gas networks (Apator. O nas; Apator. Dane finansowe i raporty okresowe).

Apator Company bases its activity, to a large extent, on project teams that are responsible for the implementation of various projects focused on designing and implementing innovative solutions.

To capture the dynamics of changes in intra-organizational communication in project management, the study was conducted in the form of a longitudinal case study (Blazejewski, 2011) by collecting empirical material in three time periods:

- study no. 1 was conducted in the period August - October 2020, carried out approximately six months after the announcement of the COVID-19 epidemic threat in Poland (Regulation of the Minister of Health of March 13, 2020),
- study no. 2 was conducted in the period March-May 2022,
- study no. 3 conducted in the period November 2023 - January 2024, approximately six months after lifting the COVID-19 epidemic threat in Poland (Regulation of the Minister of Health of June 14, 2023).

The research was conducted in all periods using the participant observation technique (Jorgensen, 2020). An electronic observation sheet was used as a research tool, thanks to which the researcher focused on key aspects from the point of view of the scope of the research, including:

- using advanced forms of intra-organizational communication in project management,
- changes in vertical intra-organizational communication in project management,
- changes in the function of intra-organizational communication in project management.

Three project teams implementing three projects in a similar time period were observed: The analyzed projects can be classified as (Jasińska, 2015):

- external, due to the origin of the order (as a response to customer demand),
- object-oriented because their products were components of intelligent measurement systems,
- strategic, because they implemented the company's strategy directly,
- platform, because they introduced a new generation of existing products (electricity meters, communication modules, software),
- critical due to the deadline.

Teams that participated in the research were led by three project managers, each comprising approximately ten members. Projects were implemented within the matrix structure (Elezaj, Morina, and Kuqi, 2020). Members were assigned to implement the projects according to the needs of departments specializing in specific areas of product development.

According to the matrix approach, project team members reported individual task completion to team managers. Team managers reported task packages to project managers, and project managers reported the progress of projects to the steering committees appointed for each project. This division of roles is typical of the PRINCE2 methodology (AXELOS, 2019).

The synergetic combination of research results from all three observation periods made it possible to make dynamic, valid and reliable analyses of changes occurring in intra-organizational communication in project management in the studied company under COVID-19 conditions.

4. Research Results and Discussion

4.1 Communication between Project Team Members

During the first observation period, approximately 75% of employees worked remotely. Therefore, the basic condition for maintaining the efficiency and effectiveness of intra-organizational communication in the initial period of the pandemic was a quick transition from direct communication to communication using forms of remote communication.

As a result, communication between project team members who had direct contact with each other before the pandemic began to take place mainly via e-mail (MS Outlook) and chat (MS Teams). Teleconferencing (MS Teams) was used less frequently. During the period covered by the first study, there were situations in which a teleconference with several participants was preceded by telephone contact to make sure that all participants already had applications installed enabling them to participate in the organized event (communication control function).

About 70% of employees had MS Teams installed.

The company's headquarters were mainly staffed by employees who had to have access to specialized equipment, the use of which, by occupational health and safety rules, was only possible in properly prepared rooms. These employees performed their work while maintaining all necessary precautions, about which they were informed via the intranet, the importance of which has increased in implementing the informative function of communication.

Although communication via electronic channels extended the time it took for the recipient to receive the message (especially in the case of e-mail), the increase in the substantive value of the message compensated for this inconvenience. As a result of this change, a limitation was observed in the possibility of deepening the discussion on the issues raised.

On the other hand, the transition to electronic communication has made the messages more factual and devoid of unnecessary context. The increased use of electronic tools minimized the possibility of expressing emotions in the messages transmitted (limitation of the emotional communication function).

During the second observation, it was noticed that the number of employees working remotely had dropped to approximately 40%-50%, despite the company still allowing this form of work. This state of affairs was the return of employees' children to full-time education. Employees who returned to the company's headquarters communicated directly with each other, provided they shared the same workroom.

The chat option was mainly chosen for communication with employees outside the office, and people used it even more willingly than the desk phone. There has been a decline in the popularity of telephones and e-mail in favor of chats or spontaneous teleconferences via the MS Teams application. Additionally, most employees with work phones installed mobile versions of the applications mentioned above (MS Outlook, MS Teams), which contributed to accelerating the exchange of information. Therefore, there was a noticeable increase in digital competencies in this area.

Half a year after the end of the pandemic was announced (during the third observation), remote work was only occasional. Most often, only employees who lived far from the workplace and did not require a specially prepared workplace used remote work.

It is worth noting that members of project teams communicated mainly via chats, even if they worked in the same room. Messengers have come to be seen as standard work tools. It was also noticed that employees felt so comfortable using chats that they began to communicate using them not only on topics directly related to their

work. This form of communication also began to fulfill an integrative function. Moreover, after returning to work in a stationary form, the popularity of the intranet decreased significantly.

4.2 Communication between Members and Team Leaders

In the first research period, communication between team members and team managers took place primarily in the form of scheduled teleconferences using MS Teams and, if necessary, via e-mail. At the beginning of the first observation, team members were better prepared in terms of installed MS Teams applications (approximately 70%) than the management staff, who had previously not used chats and preferred in-person meetings instead of teleconferences. However, after the first week of observation, all team managers had already installed the MS Teams application.

During the first teleconferences, project team members felt a sense of discomfort related to the strictly limited time frame of the teleconference. Some people needed help selecting the most important information for management staff. This situation meant that employees could have provided the required information accurately, initially resulting in dissatisfaction between employees and managers. Unlike relationships between project team members, the emotional function of communication was, therefore, more noticeable in relationships with team managers.

The conditions of the COVID-19 pandemic caused additional difficulties that had to be faced as part of ongoing projects. For example, the need for components available on time or difficulties in obtaining access to specialized tools and external laboratories. The consequences of these difficulties, much more often than before the pandemic, was the introduction of necessary changes in the scope and schedules of projects and, consequently, the need to accept new or modified work packages.

In this situation, the importance of team managers' motivational communication function has increased. Managers had to motivate employees in the face of the changing project environment and often focus on explaining the validity of adjustments to requirements and schedules, which employees initially needed more time to identify. It was necessary to assure the team members that the changes were the optimal solution that would guarantee the completion of the project with the expected benefits.

Due to the unique situation resulting from the COVID-19 pandemic, managers' actions were burdened with high risk and even implementation uncertainty and limited ability to predict effects. Despite this, during the study, all tasks were communicated understandably, and managers received current information on the progress of the projects.

In this situation, the task of project managers was to organize communication so that

employees had constant contact with management on key issues related to the project being implemented. Morning fifteen-minute status conference calls were implemented three times a week. It was noticed that project managers participate in all teleconferences of team managers and team members despite the invitation being optional.

Thanks to this, they felt they had greater control over project risks in the new situation. The importance of the control function of communication has increased. Additionally, project managers felt responsible for the additional motivation of team members, which was noticeable during the first two observations. It is also worth noting the clear presence of the instructional function of communication, which was reflected in messages from team managers regarding work rules during the pandemic, e.g., compliance with health and safety regulations (e.g., masks, keeping distance).

During regular status meetings, the exchange of information became more and more concise, to such an extent that during the second observation, it was noted that team managers met with the teams twice a week, and during the third observation, only once a week as scheduled.

From the second observation period, the meetings were hybrid - on-site, optionally remotely. Employees have become accustomed to the constant scenario of official status meetings. No one mentioned any discomfort related to time pressure. Due to the time limit, the messages provided by employees were more factual and specific, making the message clear to other team members and the management staff.

Project team members became more open to project changes (schedule, scope) resulting from the lack of available components or research facilities. Communication has even been reorganized in such a way as to be prepared for this type of inconvenience. Team leaders often asked, "...what will we do if...?" Employees seemed more engaged in such considerations and better understood these situations. As optional participants in these meetings, project managers were actively involved in approximately 75% of planned events with the participation of team managers and team members.

Additionally, as part of the third observation, it was noted that any possible doubts regarding the tasks performed were discussed between employees outside official status meetings. Employees have developed a sense of which topics require discussion on the forum and which in a smaller group. Deepening of selected topics during status meetings took place very sporadically.

Moreover, despite the improvement of the situation in the component market, a more restrictive approach to reporting possible risks and controlling individual project stages could be noted. Tasks by team managers were formulated systematically and related more to design procedures and checkpoints designated by project managers.

It was also observed that project managers during the third observation period rarely participated in team manager meetings with team members, which could indicate the feeling that the pandemic situation had already been stabilized.

The third observation in this area also showed that despite most employees returning to work in a stationary form, the option of joining a teleconference remotely was still possible, and more importantly, it was not perceived any worse.

4.3 Communication between Team Leaders and Project Managers

As part of the next (higher) level of project communication, the exchange of information between team managers and project managers was observed. During the first study, it was noticed that people performing the abovementioned roles exchanged the most important information once a week. It was worth noting that although most employees (including managers) initially worked remotely, status meetings at this level were held on-site.

Managers wanted to have better contact with the organization. The meetings were held while retaining the required precautions, such as distance between participants and mandatory masks. Security measures were followed, and information about them was available on the intranet, company newsletters, and dedicated information screens at the company premises. Participation in these meetings was only possible remotely for people who belonged to the risk group (quarantine, symptoms of illness).

The situation changed with subsequent observations - during the second and third observations, it turned out that managers contacted each other more and more often remotely. Regarding the PRINCE 2 methodology, at this stage of communication, team managers reported deviations from the plan to project managers much more often than before the pandemic, when this phenomenon occurred rather sporadically.

This situation was related to need of bigger access to components necessary to implement projects during the COVID-19 pandemic. The reported problems resulted in adjustments to schedules. Project managers, therefore, had to pay special attention to ensuring the project's continued business viability (defined in PRINCE 2 as one of the principles). Team managers communicated with project managers in an increasingly concise and systematic way.

The status meetings became increasingly repetitive and each meeting necessarily ended with a reassurance note. All the most important aspects of individual projects were properly addressed and always had implementation dates assigned. They were the basis for settling the status of tasks during the next interaction.

The detailed notes proved that in a situation perceived as uncertain, great attention was paid to the project management documentation. Greater attention was also paid

to documenting justifications for decisions made or recommendations later presented during meetings with the project board.

The second observation noted that a larger part of the meetings than in the previous study is devoted to discussing risks in projects and potential solutions that can counteract emerging threats. It was also noted that project managers formulated tasks emphasizing strictly defined control points.

To facilitate communication in a multi-project environment, information began to be standardized by creating shared files (using the MS OneDrive platform), which were uniform templates ready to be completed to exchange information on work status.

These files supported the control function of communication. More frequent references were made to the stages of project management defined in the management system instructions. Interestingly, the form of meetings changed - when managers became sure that communication between them was effective, they started communicating remotely (teleconferencing), which was confirmed by the second and third observations. The frequency of meetings remained unchanged, i.e., once a week.

It was also noted that team managers, despite the officially ended pandemic, paid more attention to events that could hurt ongoing projects. After the end of the pandemic, shared files containing information on the readiness to pass subsequent checkpoints also came into permanent use, which was intended to compensate for any lack of information on project progress.

It was noticed that these files had been modified to the previous observation, which added more detailed information about issues related to the implementation of projects (for example, about the status of preparation of specific stations included in the production line). These modifications were aimed at improving the information function of communication. Additionally, the frequency of file updates has been systematized (at least once a week).

4.4 Communication between Project Managers and Projects Boards

During scheduled meetings with the project board (once a month), project managers often reported other issues related to COVID-19, such as schedule changes and project business justifications. From all three observation periods, it appears that communication via electronic channels did not hurt managers' periodic reporting of project progress to the project board. The only change was introducing a remote form of communication after the pandemic was announced.

The methodology of conducting projects in the examined organization at this stage of communication requires prior preparation of reports required by the project board, which is described in the approach to communication.

The meeting of project managers with the project board was a presentation of previously prepared data, and changing the communication channel had no impact on its effectiveness.

Communication at the highest level of the project had control and information functions. During all three observations, project managers reported project activities using the same reports to the project board that had been adopted in the company for several years.

These meetings were held once a month. Meetings with the project board took a hybrid form the second observation period. This fact proves that the communication medium used at this level of project management had no impact on the effectiveness of communication.

5. Summary of Observations Made

Based on the observations made, the conclusions were summarized, referring directly to the research questions, as presented in Table 1.

Table 1. *Summary of conclusions from observations made*

Analysis area	Observation 1	Observation 2	Observation 3
Organization of work			
Percentage of people working remotely	Approximately 75% of employees work remotely.	Approximately 40 – 60% of employees worked remotely.	Remote work occasionally.
Communication between project team members			
The use of advanced forms of communication	E-mail (MS Outlook): often – access to all employees. Chat (MS Teams)/often – accessed by approximately 70% of employees at the beginning of the observation period. Teleconferencing (MS Teams)/frequently – access for approximately 70% of employees at the beginning of the observation period.	E-mail (MS Outlook also in the mobile version)/ less frequently than in the first study. Chat (MS Teams also as the mobile version)/often – access by approximately 100% of employees. Teleconferencing (MS Teams also as the mobile version)/frequently - access by approximately 100% of employees.	E-mail/rarely (MS Outlook) – access for all employees. Chat (MS Teams)/very often – access by approximately 100% of employees. Teleconferencing (MS Teams)/frequently – access by approximately 100% of employees

Impact on vertical communication	<p>Extended time to receive messages. Limiting the possibility of delving deeper into issues. Messages without unnecessary context. Increase in the substantive value of the message.</p>	<p>Despite being present at work, frequent communication via chats and spontaneous teleconferences. Accelerating the exchange of information thanks to mobile versions of applications - mainly MS Teams. Exchange of information in the form of conversation mainly with people from the same room.</p>	<p>Despite being present at work, there is frequent communication via chat, even between employees working in the same room.</p>
Impact on communication functions	<p>The most important function was the informative function of communication. Control function supported by project managers. Reduction of the emotional function of communication.</p>	<p>The most important function was the informative function of communication. Project managers continue to support the control function.</p>	<p>The most important function was the informative function of communication. Communication using electronic tools began to serve an additional integration function.</p>
Communication between members and team leaders			
The use of advanced forms of communication	<p>E-mail/frequently (MS Outlook) – access to all managers and employees. Chat (MS Teams)/ very rare - in approximately 70% of employees and 40% of managers at the beginning of the observation period. Teleconferences (MS Teams) / planned three times a week - access by approximately 70% of employees and 40% of managers at the beginning of the observation period.</p>	<p>E-mail/frequently (MS Outlook) – access to all managers and employees. Chat (MS Teams) / very rarely – access to all employees and managers. Meetings in a hybrid form (on-site or MS Teams) / planned twice a week - access to all employees and managers.</p>	<p>E-mail/frequently (MS Outlook) – access to all managers and employees. Chat (MS Teams) / very rarely – access to all employees and managers. Meetings in a hybrid form (on-site or MS Teams)/planned once a week - access to all employees and managers.</p>
Impact on vertical communication	<p>Status meetings - three times a week. Participation of project managers (optionally invited) in almost all meetings. Discomfort related to time pressure among some employees. Problem with selecting important information.</p>	<p>Status meetings - twice a week. Participation of project managers (optionally invited) in approximately 75% of meetings. Factual and specific messages conveyed. Acceptance of frequent changes in the scope of work.</p>	<p>Status meetings - once a week. Very rare participation of project managers.</p>

	Dissatisfaction with changes in the scope of work on projects more often than usual.		
Impact on communication functions	Noticeable emotions related to time pressure (emotional function of communication). Increased importance of the motivational function of communication - the need to convince team members of the validity of frequent changes in the scope of projects. Increased importance of the instructional function - team managers informed about new standards of work after the announcement of the pandemic. Support from project managers in motivating team members.	No emotions related to the time pressure of status meetings. Still occurring messages about working rules during the pandemic from team managers.	No emotions related to the time pressure of meetings - deepening the topics discussed outside of status meetings. The proactive approach of employees to controlling possible threats (increased control function).
Communication between team leaders and project managers			
The use of advanced forms of communication	On-site meetings planned once a week while maintaining safety precautions. E-mail/frequently (MS Outlook) – access to all managers and employees.	Meetings in a hybrid form (on-site or MS Teams)/planned once a week - access to all team managers and project managers. E-mail/frequently (MS Outlook) – access to all managers and employees. Shared files for exchanging information about projects (MS OneDrive)/unsystematized update frequency - access by approximately 80% of team managers and project managers.	Meetings in a hybrid form (on-site or MS Teams)/planned once a week - access to all team managers and project managers. E-mail/frequently (MS Outlook) – access to all managers and employees. Shared files for exchanging project information (MS OneDrive) / updated at least once a week - access to all team managers and project managers.
Impact on vertical communication	Status meetings once a week. A noticeable willingness to provide information in a concise and systematic way. Repeatable scenario of status meetings. Great attention is paid to the project's management products.	Status meetings once a week. Frequent references to project management manuals.	Status meetings once a week. Very much importance is attached to reporting risks in projects.

Impact on communication functions	The desire to control the new situation (control function) - a sense of obligation to meet at the company's headquarters. More frequent reports related to delays (control function). Documenting justifications for decisions made (control function).	Greater attention to risk reporting (control function). The control function is implemented through increasingly popular shared files for information exchange.	Communication control function seen as the most important aspect of status meetings between project managers and team leaders.
Communication between project managers and projects boards			
The use of advanced forms of communication	Teleconferences (MS Teams)/planned once a month. Standardized reports stored on the Confluence platform.	Meetings in a hybrid form (on-site or MS Teams)/planned once a month. Standardized reports stored on the Confluence platform.	Meetings in a hybrid form (on-site or MS Teams)/planned once a month. Standardized reports stored on the Confluence platform.
Impact on vertical communication	Status meetings once a month. There is no noticeable impact of the pandemic on communication at the highest level in the project.	Status meetings once a month. There is no noticeable impact of the pandemic on communication at the highest level in the project.	Status meetings once a month. There is no noticeable impact of the pandemic on communication at the highest level in the project.
Impact on communication functions	Only the communication control function was observed.	Only the communication control function was observed.	Only the communication control function was observed.

Source: Own elaboration based on the conducted research.

6. Conclusions

The conducted qualitative research and analyzes of the collected empirical material contributed to achieving the aim of the work and made it possible to answer the research questions:

RQ1: How has the COVID-19 pandemic affected the use of advanced forms of intra-organizational communication in project management?

Research has shown that the COVID-19 pandemic caused a sudden popularization of advanced forms of communication among employees of the studied organization. The best preparation for the situation regarding the number of communication channels was recorded among team members, less among the management staff.

This disproportion was eliminated already during the first observation. Chats became the most popular among employees during the COVID-19 pandemic, and

over time, they began to be used even in mobile form (MS Teams), while the use of e-mail decreased.

No changes were noticed in the approach to teleconferencing, which was always used for vertical communication rather than between project team members. In communication with team managers, the importance of teleconferencing has increased, especially during the first observation period when project meetings were conducted only remotely. Later, they took a hybrid form (still using MS Teams). At this level of communication, each additional exchange of information throughout the period took place via e-mail, which was also very popular.

The use of chats for communication between project managers and project teams, as well as between team managers and project managers, was not observed. The management staff was the only group that, at the beginning, met in person despite the announcement of the pandemic while taking precautions and wanting to maintain direct contact with the organization.

In subsequent observations, planned MS Teams teleconferences (status meetings in a hybrid form) and shared files (MS OneDrive) were used to exchange information in a very standardized form. The pandemic had the least impact on communication tools with project project boards.

Here, as before the pandemic, standardized reports stored on the Confluence platform were used during all three research periods.

The last (third) observation confirmed that new tools adopted in the organization during the pandemic, even after its end was announced, did not cease to be useful and were permanently adopted. Moreover, they were treated as standard work tools.

RQ2: How has the COVID-19 pandemic affected the vertical intra-organizational communication in project management?

The new situation had the greatest impact on communication at the lowest levels in projects. Employees began to communicate with each other more concisely and substantively. The extended time of receiving messages observed at the beginning, caused by the change in forms of communication, was offset by the increasing use of mobile versions of applications supporting communication in the later period and the increased popularization of the MS Teams application. Members began to pay special attention to the chat function within teams.

After the announcement of the pandemic, communication between team managers and their members was immediately reorganized to a remote form and its frequency increased to three times a week. It was at this level of communication that, despite the best technical preparation, great discomfort was observed among project team members related to the time pressure of status meetings and problems with selecting

the most valuable information to managers.

However, subsequent studies showed that teams adapted to new, more restrictive working conditions. As team managers and team members became accustomed to working in new conditions, the frequency of status meetings eventually dropped to one meeting per week and took on a hybrid form.

Additionally, during the first observation period, it was observed that project managers also participated in most such meetings because they felt the need to have more control over the project. However, their activity in this area gradually decreased, and it was sporadic in the last observation period.

The management staff (team managers and project managers) was the group that communicated with each other in a face-to-face form for the longest time, which was caused by the desire to maintain direct contact with the company and the sense of responsibility for the success of ongoing projects. Ultimately, the exchange of information at this management level took a hybrid form and began to be supported by regularly completed shared files containing information on progress in individual projects.

There was no record of the COVID-19 pandemic affecting communication between project managers and project boards because it was based on prepared report templates presented by project managers before the change in working conditions due to the pandemic. Their content has remained unchanged.

RQ3: How has the COVID-19 pandemic affected the intra-organizational communication functions in project management?

The research proved that the COVID-19 pandemic had the greatest impact on communication functions between team managers and their members. Team managers, being closest to employees, were obliged to constantly inform employees about new work rules during the pandemic (increased importance of the instructional function of communication). In this area, most of the emotions were also recorded, mainly from team members who had to quickly adapt to the limited time for effective communication and the increasing level of uncertainty in projects.

Due to this, during the first and second observation periods, the management staff motivated employees by justifying changes in the scope of projects. There was a sudden increase in the importance of the motivational function. The third observation noted a very proactive attitude of employees aimed at counteracting possible future risks, even despite the officially ended pandemic. At the highest levels of project structures, the communication control function invariably played the most important role.

Communication played an information function in all observation periods at all

levels of project structures, and it can be concluded that it was equally important all the time. Additionally, it was noticed that chats, which became very popular after the pandemic period, especially among team members, began to fulfill, apart from the information function, also an integration function.

In conclusion, it should be noted that the pandemic significantly affected intra-organizational communication in project management in the examined company. The dynamic nature of the study made it possible to diagnose the course of these changes and demonstrated their permanent nature. The results obtained can serve as a benchmark for other enterprises, allowing them to compare the implemented solutions with those used at Apator company.

From a theoretical perspective, the results are part of a broader discussion on team work organizational flexibility resulting from the COVID-19 pandemic (Charoensukmongkol and Pandey, 2023; Li and Song, 2023). They also contribute to the development of research on project management resilience and agility under conditions of uncertainty and crisis (Kadenic and Tambo, 2023; Marciano and Moodley, 2024).

When implementing the obtained results into business practice, the limitations of research should be taken into account (Geletkanycz and Tepper, 2012). These include a small sample size of only 1 enterprise. Therefore, the results cannot be considered representative, which limits the universal character of the formulated conclusions and recommendations. On the other hand, limiting the investigation to one case study only made it possible to conduct an in-depth and dynamic study of impact of COVID-19 pandemic on intra-organizational communication in project management.

The second weakness is the potential impact of observer subjectivity on the results obtained and their interpretation. To reduce this negative impact, an objectified observation sheet was used as a research tool. In addition, the results were interpreted independently by the both authors, which increased the reduced subjectivity of factual judgments.

The obtained results also open up new areas for research on intra-organizational communication in project-management under crisis conditions. Based on the identified communication practices and changes, it is possible to operationalize the research problem, create measurement scales and conduct quantitative research on a larger sample of enterprises in different internal and external contexts.

An interesting approach would also be to conduct in-depth case study research from the perspective of different groups of stakeholders engaged in intra-organizational communication in project management, e.g., project managers or member of project teams. All of these studies would deepen the understanding and interpretation of changes in intra-organizational communication in project management under the

volatility and uncertainty of the socio-economic environment.

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