Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development
Vol. 23, Issue 4, 2023
PRINT ISSN 2284-7995, E-ISSN 2285-3952

EXPLORING THE STRUCTURE OF INTERNAL COMMUNICATION OF AGRICULTURAL HOLDINGS: AN ANALYSIS THROUGH THE NETWORK APPROACH

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Abstract

The present work studied the role and efficiency of internal communication in the production activities within the agricultural structures in the Western Region of Romania. Internal communication can be a key element in addressing and solving the major challenges posed by the current competitive environment in the field.This research provides a comprehensive analysis of communication processes within organisations with an agricultural profile, addressing a knowledge gap in the research literature in this field, enhancing the understanding of the role of communication in agriculture. In this context, the main aim of this researchis to investigate various factors like flow, coordination, barriers, communicational efficiency, actuality, frequency, and the effectiveness of communication channels in the context of Western Romania's agricultural holdings. The present study employs a quantitative approach, surveying 503 respondents from 40 agricultural holdings, and uses network analysis and correlation matrices in order to understand communication patterns and the relationships among these factors. The findings highlight the need for customized communication strategies to accommodate differences in age, education, and professional backgrounds among staff. They also stress the importance of using multiple communication channels for timely information exchange, the impact of channel choice on information flow, and the importance of addressing communication barriers. Overall, the study underscores the significance of strategic communication in agriculture for efficiency and coordination among employees, suggesting potential future research in this area.

Key words**:** *internal communication, agricultural holdings, production processes*

INTRODUCTION

In the 21st century, the financial success of agricultural enterprises is based on the company's ability to have good communication between employees on the one hand, but also with beneficiaries, consumers, and stakeholders [9]. There are noticeable differences from one agricultural structure to another in terms of productions and communication management, which involve a variety of strategies, methods and techniques that must be used to increase the profitability and efficiency of agricultural production processes [32].

Two fundamental pillars that must be included in every organizational strategy, to facilitate the restart of competition in the industrial sector of agribusiness, are innovation and creativity. Every high-performing organization has these two pillars in its internal communication strategy, which add value and are success factors. Organizational communication processes are constantly evolving and changing, so that every agricultural enterprise must anchor itself to the current environmental conditions to survive a dynamic market, considering that today, the Internet has had a major impact, revolutionizing both the social and the professional environment [36].

Internal communication is a process through which employees of agricultural structures share information, ideas, opinions, different

professional relationships are established [14], the foundations of valuesand an organizational culture are laid, and the relationships developed as a result of this type of communication lay the foundations for the functioning and development of the structures in the sector agricultural [2, 15]. The complexity of the internal communication process contributes to motivating employees, to increasing their level of confidence, but also to strengthening the organizational culture [6, 18]. Regarding the distribution of internal information, this is done through two types of internal networks, formal and informal [8, 39]. In the formal type network, messages are transmitted through the official channels, predetermined by organization[30]. Informal communication involves the transmission of information, using unofficial communication channels [19]. Most of the time this is done through spontaneously chosen channels. An important aspect in this case is the fact that this type of communication cannot be banned or abolished, as it has two advantages: on the one hand, it provides the organization with utilitarian value, contributing to bonding between employees, but also a therapeutic role [29]. There are three types of internal communication: vertical, horizontally and diagonally [24, 30]. Vertical communication, in turn, can be upward or downward. Vertical upward communication takes place from the subordinate to the manager, respectively from the lower hierarchical positions to the higher ones. The role of this type of internal communication is to provide feedback from subordinates to managers. The effects of such communication are significant, both on productivity and on the working climate [29]. Without information from subordinates, managers would not have at their disposal the data necessary to carry out their work, nor would they have information about how employees perform tasks, solve problems encountered by them. Without upward communication, problems become more acute and harder to solve. Downward vertical communication takes place from the manager to the subordinate, from the higher hierarchical positions to the lower ones. Through this type of communication, the manager can exercise his specific functions of planning, coordination, organization, control, can establish long-term and short-term objectives and can transmit the decisions taken.

Horizontal or lateral communication is a process of sending information from peer to peer [21], between departments or between different functional structures. The last type of communication is the diagonal one, in which information is exchanged directly between managers for example and employees of different departments, but who belong to distinct hierarchical levels. Agricultural structures are legal entities [2, 15] that should be rooted in strong organizational core values, with forward-looking institutional vision and mission. Organizational communication is much more than a simple tool nowadays [7], and can instead be considered an field utilising scientific methodologies, which have been developed over time, from the simplest communication theories and models to complex networks and types [38]. Technological evolution was the main vector that gave a strong impetus to the development of the branch of communication, becoming today's complex science [17].

Within this context, the aim of this research endeavour is to explore the effects of various factors, including flow and direction, coordination/information exchange, barriers in communication, communication efficiency, actuality, and the frequency and efficiency of communication channels, on communication practices in agricultural holdings in Western Romania. In doing so, we address a knowledge gap in the field of agricultural communication, specifically the role of internal communication within agricultural holdings.

MATERIALS AND METHODS

The primary objective of this study is to evaluate the significance of communicational practices within agricultural enterprises.

Our investigation employs a quantitative approach, primarily focusing on the analysis of variables relevant to the communication process. To this end, the data collection procedures entailed a comprehensive survey administered to respondents within the agricultural sector.

The questionnaire comprised 31 items, which were grouped into 7 variables of interest. Besides those variables of interest, we also collected some limited information regarding the demographic characteristics of the respondents and their position within the workplace. The questionnaire was developed in Romanian, as this is the native language of the respondents.

The list of variables and items are evidenced in Table 1.

Table 1. Variables studied and number of items

Variable name	Number of items
Flow and direction	6 items
Coordination/information exchange	6 items
Barriers in communication	3 items
Communication efficiency	4 items
Actuality and punctuality	4 items
Frequency of communication channels	2 items
Efficiency of communication channels	6 items

Source: Own elaboration, based on review of literature.

The flow and direction variable encompasses assessments of communication between managers and their subordinates (classified as vertical communication) and communication between co-workers (classified as horizontal communication) [7, 41].

Coordination and information exchange is a variable through which we examined the easiness and naturalness of communication within the organization [6].

Communication barriers addresses challenges related to difficulties in mastering the technical jargon relevant to the profession, partial and truncated information exchange between departments, as well as difficulties in intercultural and foreign language communication [41].

Communication efficiency is a variable comprised of items that evaluate the level of detail and quality in communication, with managers, co-workers, both in the same and in a different department [28, 40].

Actuality and punctuality refers to items assessing the timeliness of managerial communication and its role in preventing missed deadlines [31].

The frequency of communication variable quantifies the variety of ways through which communication is attained within the organization [27].

On the other hand, efficiency of communication channels examines the overall effectiveness of the communication channels mix employed by the organization [16].

In conducting the survey, we assembled a sample of 503 respondents drawn from 40 agricultural holdings located in Timiș County, which is situated in Western Romania. This sample includes individuals occupying diverse roles within these agricultural enterprises, encompassing both operational and managerial positions. Moreover, our selection criteria involved exclusively those agricultural holdings employing more than 15 hired workers, where communicational patterns and issues might be more apparent than in smaller, family-operated structures.

Informed consent was obtained from all participants in the study and all legislation pertaining to the protection of personal data was observed. No ethical concerns were identified by the researchers while undertaking this study.

The data collection phase for our study occurred from July 3rd to August 3rd, 2023.

After collecting the results from the respondents, an extensive data input and screening process was undertaken.

Following data collection and cleanup, we performed network structure estimation using the R software suite, utilizing the packages "bootnet" and "qgraph" [10, 11]. This analytical approach allowed us to explore the intricate relationships and patterns within the communication practices of agricultural enterprises while maintaining a graphical and mathematical construct that is accessible,

through the usage of the Gaussian Graphical Model, where positive relationships are shown as green edges (lines) between nodes (variables), while negative relationships are shown as red edges between variables [13]. Additionally, this approach allowed us to test for existing relations between variables simultaneously, reducing the risk of a Type-I error or false positive findings associated with repeated testing [26]. Furthermore, we conducted an analysis of centrality measures within the network to assess the contribution of each variable to the network [4, 5].

In addition to the network analysis, we also constructed pairwise and partial correlation matrices using Spearman and Pearson formulas for the variables presented in the study. The pairwise correlations are calculated independently between two variables, while the partial correlation coefficient is calculated between two variables by taking into consideration all other variables as controls [23]. We consider this a way to verify and compare the findings of the more elaborate network statistics methods utilized.

RESULTS AND DISCUSSIONS

Several descriptive statistics pertaining to the demographic characteristics of the respondents and to their answers in the questionnaire are detailed as follows:

The gender distribution of the respondents is slightly biased towards male respondents, who amount to 55.27% of the sample, while females represent 44.73% (Fig. 1). No respondents self-reported non-binary gender identities.

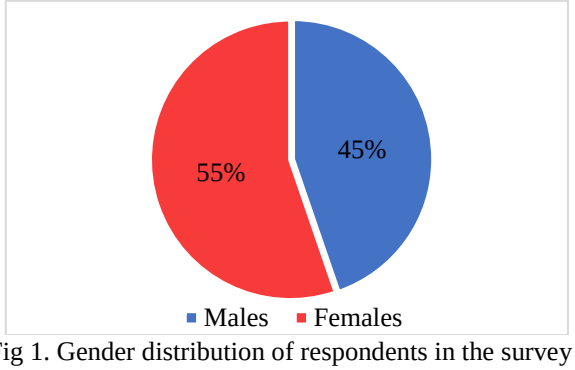

Fig 1. Gender distribution of respondents in the survey
Source: Based on the data from the survey.

The average age of respondents was 44 years. Categorizing respondents by age groups, we find that 32% fall within the 46-55 years category, 28% in the 36-45 years category, 23% in the 27-35 years category, and 17% in the 56-65 years category (Fig 2).

In terms of the education level of the respondents, a notable plurality, constituting 48% of the sample, had completed high school.

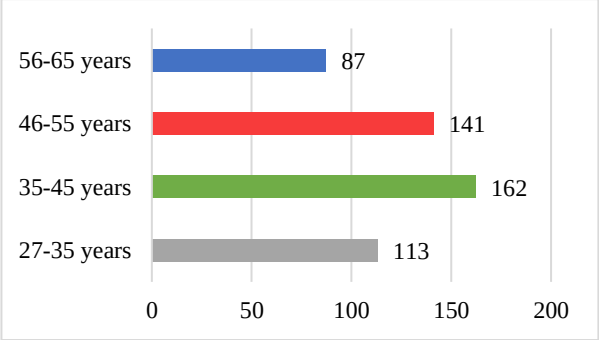

Fig. 2. Distribution of respondents by age
Source: Based on the data from the survey.

A significant portion, representing 31% of the respondents, possessed some form of higher education. In contrast, 21% of the participants had achieved only a middle school education (Fig. 3). This distribution underscores the diverse educational profiles of the surveyed population and can underline the need for effective communication policies and practices between people of different skill and education levels [27].

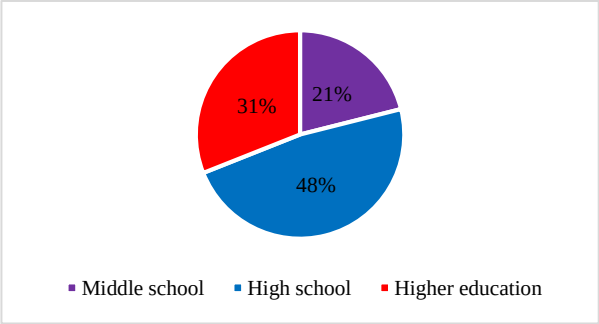

Fig. 3. Distribution of respondents by education level
Source: Based on the data from the survey.

Furthermore, with respect to the professional background of the respondents, it is noteworthy that the sample comprises a diverse array of professions. Among the respondents, 20.15% are categorized as

unskilled laborers, 16.4% as engineers, 14.22% as technicians, 11.46% as tractor drivers, 7.9% as caretakers, 7.5% as mechanics, and 5.7% as managers. The remaining respondents hold positions as accountants, veterinarians, human resources personnel, and researchers. This broad spectrum of professions underscores the multifaceted nature of the agricultural workforce and emphasizes the need for efficient communication practices, given the varied roles and responsibilities within both the surveyed sample, the agricultural sector as a whole and in individual enterprises [27].

Table 2. Descriptive statistics for variables

Variable	Mean	St. dev.	Min	Median	Max
Actuality	17.96	4.06	9	19	25
Barriers	8.95	2.54	3	9	14
Channel Efficiency	20.94	5.90	8	23	30
Channel Frequency	21.73	4.37	12	23	30
Coordination	18.42	3.63	9	19	26
Efficiency	11.61	3.42	5	12	20
Flow	17.01	4.53	6	18	24

Source: Own elaboration based on the data from the survey.

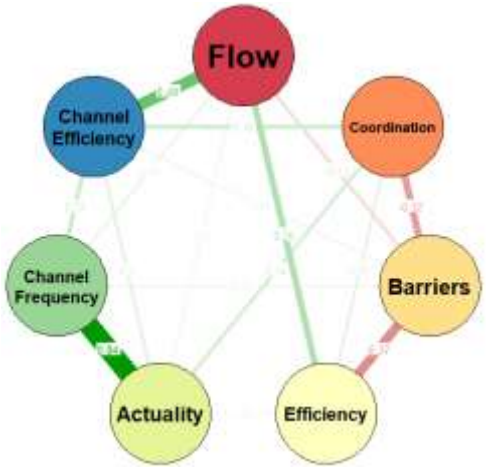

Fig. 4. The network model obtained from the dataset
Source: Own concept.

Following this, the questions assessed the variables of interest for the study, as detailed in the previous section. Central tendency parameters and descriptive statistics for the variables mentioned are presented (Table 2).

A Gaussian Graphical Model for the network was modelled using the partial correlation method [12, 22] (Fig. 4).

The strongest relationships in the dataset are between channel frequency and actuality, suggesting that by utilizing a larger number of communication channels allows workers to access up to date information from the management and to convey their own observations, grievances, and information, allowing them to better perform on the job. The findings imply that as the agricultural workforce utilizes a greater variety of communication channels, there is a corresponding improvement in the punctuality and timeliness of communication with managerial personnel and other staff. This may indicate that a diversified communication approach, encompassing various channels such as face-to-face interactions, phone calls digital platforms, and other modes of communication, contributes to more efficient managerial exchanges within the sector. Such a robust positive correlation underscores the practical significance of adopting multiple communication avenues in enhancing the timeliness of managerial communications, a factor of paramount importance in the agricultural domain where timely decisions and actions are often imperative for successful operations and resource management, for example in pest-control operations, animal feeding or veterinary operations [3, 33].

Secondly, the observed relation between communication flow and channel efficiency within the organizational context suggests an intriguing dynamic. Specifically, it indicates that the effectiveness of the communication channels employed by the organization is intricately linked to the flow and direction of communication among employees. This finding implies that the organization's chosen mix of communication channels significantly influences how smoothly and efficiently communication occurs both vertically, between managers and subordinates, and horizontally, among co-workers. A positive correlation between these variables may signify that when communication channels are optimized for effectiveness, it positively

impacts the overall flow and direction of information exchange within the organization. This insight underscores the interplay between communication channels and the structural aspects of communication flow, highlighting the importance of a strategic approach to channel selection in achieving efficient communication dynamics within the organizational framework.

A weaker relationship was observed between channel efficiency and coordination, suggesting that efficient communication networks are of some importance to coordination efforts within the organizations.

Other relatively weak relationships were identified between actuality and coordination, as well as between flow and efficiency and channel efficiency and frequency.

The identified negative relationships between communication barriers and efficiency, coordination, and flow within the organizational context also signify noteworthy dynamics. These findings suggest that as communication barriers, such as difficulties in mastering technical jargon, incomplete information exchange, and intercultural communication challenges, increase in prevalence, there is a corresponding decrease in the overall efficiency, coordination, and flow of communication within the organization. This observation underscores the detrimental impact that impediments to effective communication can have on organizational processes. It implies that mitigating communication barriers is crucial for enhancing the efficiency, coordination, and flow of information exchange, which are essential components of effective organizational communication. Consequently, addressing these barriers through targeted interventions and strategies may be imperative for optimizing communication dynamics within the organizational context, thereby fostering smoother operations and improved coordination among employees.

Some centrality indices for the network were calculated (Fig. 5). The nodes actuality, channel frequency, and flow exhibit the highest strength centrality, suggesting that these nodes are strongly connected to a number of other nodes within the network [25]. On the other hand, channel efficiency emerges as the node with the highest betweenness centrality, signifying that it frequently falls on the shortest paths between other nodes and thusly plays a significant role in moderating the effect of other nodes [25]. Additionally, channel efficiency also attains the highest closeness centrality, implying that, on average, it is relatively close to all other nodes in the network [25]. Interestingly, actuality stands out as having the lowest betweenness and closeness centrality indices, indicating that while the relation between actuality and channel frequency is very strong, its impact on the overall network is significantly reduced.

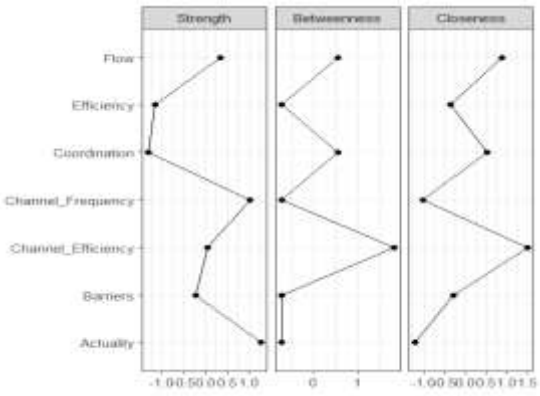

Fig. 5. Centrality indices for studied network
Source: Own determination.

Finally, complementary to the network approach, we modelled the pairwise correlation matrices between the studied variables by using Pearson and Spearman correlations, respectively (Figs. 6 and 7). It is discernible that in all cases, the Pearson correlation coefficient surpasses the Spearman coefficient, indicating the presence of a predominantly linear relationship among these variables [35, 37]. Moreover, disparities emerge between the partial correlations employed within the network model and the pairwise correlations depicted in the figures. Particularly noteworthy is the inverse association observed between barriers and all other variables, while robust correlations manifest among the remaining variables.

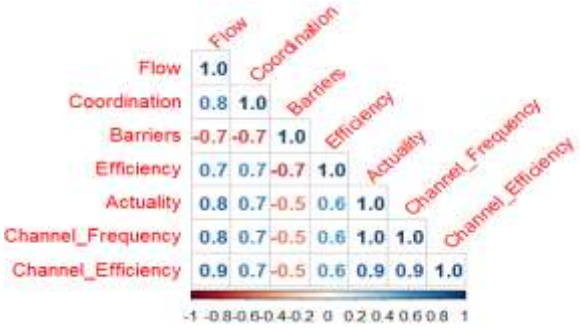

Fig. 6. Pearson correlation matrix
Source: Own determination.

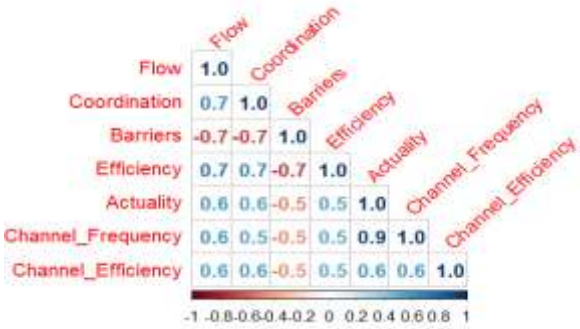

Fig. 7. Spearman correlation matrix
Source: Own determination.

Considering the linear relationship between the variables, we model the partial correlation matrix using Pearson correlation coefficients (Fig 8).

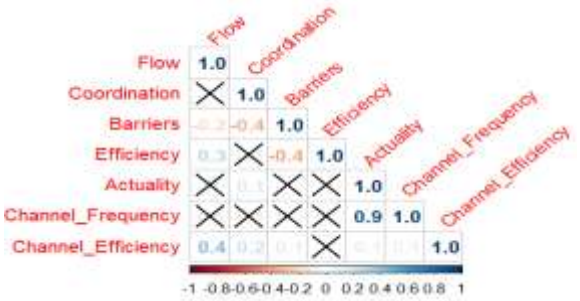

Fig. 8. Partial correlation matrix
Source: Own determination.

The obtained results align more closely with those derived from the network approach. Statistically insignificant correlations have been appropriately marked. An additional noteworthy distinction between the partial and pairwise correlation matrices is the unexpected positive association between barriers and channel efficiency, which warrants further scrutiny as it may represent a spurious correlation. Consequently, we contend that the incorporation of pairwise correlations into future research endeavours can serve as a valuable complement to more computationally intensive statistical techniques, aiding researchers in the detection and mitigation of such spurious associations. It should however be noted that previous works in psychometry found that pairwise correlations to be more prone to error, as such we consider that further references to the literature should be presented in the case of differing results [34]. In our case, we can assume that barriers in communication cannot have positive relations with the other variables, as they signify positive aspects of communication [1].

CONCLUSIONS

After analysing the answers provided by the 503 respondents, it was proven that the internal communication process is essential for the proper functioning of any agricultural structure. A major advantage of good internal communication is increased efficiency and productivity within the agricultural structure, since when team members are well informed about the company's goals and activities, they can work more efficiently and collaborate better to achieve common goals.

The results of the questionnaire show that a faulty internal communication can have negative effects on the organization, the lack of information or erroneous communication, quantified as communicational barriers, leading to the loss of time and resources. In today's times, when digitization increasingly dominates the professional environment, employees tend to communicate mainly in writing. A message can have different meanings for different employees, depending on their age, educational or professional background, and for clarity, we see the utilisation of different communication channels, suited to different employee categories as a possible solution.

Thus, we propose some relevant solutions that contribute to the development and improvement of the communication chain in order to make the production processes within the agricultural structures more efficient. First of all, communication can be made more

efficient through discussions within the employee group. Meetings between employees of different generations make it easier to get to know each other and thus help to developeffective long-term communication. They can share experiences, cultural differences, favourite activities and discuss topics that bring them closer together. Thus, they can discover similar passions that unite them and which implicitly also help the unity of the group. At the same time, employees must be encouraged to express their point of view within the company, to share their opinions and knowledge. Bringing this knowledge to the group can make them feel valued and gain the confidence to tackle various issues. Feedback is also a very important element that contributes to the efficiency of communication within agricultural structures. Constant feedback from employees is required to improve existing procedures. In this way, the long-term objectives of the agricultural structure can be protected and the employer brand can be improved. Effective internal communication is possible through flexibility regarding the preferences of each employee, through a close connection between employees, but also through continuous support from the HR department and team managers. In today's conditions, keeping employees motivated and connected is a constant challenge for which the agricultural structure must create a coherent internal communication program, based on a personalized strategy in order to meet the needs of employees and support them in their daily activity. Thus, emphasis is placed on the training of employees, through various training courses [11, 20], foreign language courses, technical courses to develop their communication capacity, thus reducing the communication barriers found at the level of agricultural structures, on the one hand, but also to have wider access to bibliographic documentation resources. The organization of interdepartmental meetings, of meetings at the level of the entire agricultural structure to facilitate the exchange of information, so that employees receive the information in a timely manner in order to perform their tasks effectively. At the same time, actions such as talk shows can be organized monthly to highlight employees (discussions about their passions, problems), as well as new initiatives in business and the development of but also to have a wider access to the bibliographic documentation resources. Any organizational culture is the product of the employees in the respective agricultural structure and the values of that business, and it has several elements in its composition: the dress code and its possible absence, the rules of the agricultural structure, the attitude towards the program and towards the technology used, reporting to people in higher hierarchical positions, the stress experienced by employees. An aspect that agricultural structures must take into account for effective internal communication is the adoption of weekly wellness initiatives. Wellbeing is a complex concept, which implies a constant physical and emotional comfort, including the satisfaction felt at work by the employee. In the present case, the level of belonging of the employees must also be developed - the feeling that they belong to a group, a collective, a team, the level of financial security, the need for respect. In this sense, we propose that the agricultural structures lay the foundations of a strategic, realized narrativethrough visible, communicative and committed leaders; managers/administrators involved in supporting their teams and giving employees the freedom to express themselves freely and creatively, but also to create a story about the agricultural structure they lead, with employees feeling more motivated when they feel part of the story and the history of a business; to have a systematic and systematized approach to the problems of the organization; feedback should be encouraged to understand communication barriers and ambiguities; to carry out specific trainings for each aspect that deserves to be integrated into the organizational culture.

In conclusion, this study provides valuable insights into the demographic characteristics of the surveyed agricultural workforce and their communication dynamics within the

organizational context. The demographic profile of the respondents reveals a sample with a wide range of ages and educational backgrounds. The diversity in professions underscores the multifaceted nature of the agricultural sector. These demographic findings emphasize the importance of tailored communication strategies that accommodate the varied skills, education levels, and roles of the workforce.

The analysis of communication variables reveals significant relationships between different aspects of communication. Notably, the positive correlation between channel frequency and actuality highlights the importance of using multiple communication channels to enhance the timeliness of managerial communications, a critical factor in the agricultural sector. Additionally, the link between communication flow and channel efficiency underscores the role of communication channel selection in influencing the overall flow and direction of information exchange within the organization. The study also identifies the detrimental impact of communication barriers on efficiency, coordination, and flow within the organization, emphasizing the need for interventions to mitigate these barriers. Finally, the centrality indices and correlation matrices provide further insights into the network dynamics of the studied variables, offering a comprehensive view of their interrelations.

Overall, this research contributes to our understanding of communication dynamics in the agricultural sector by highlighting the relations between various facets of communication. The findings underscore the need for organizations to adopt a strategic approach to communication channel selection and barrier reduction to optimize communication dynamics, enhance operational efficiency, and facilitate improved coordination among employees. Further research in this area can build upon these insights and explore the practical implications for enhancing communication practices in the agricultural domain.

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DOI: http://dx.doi.org/10.46827/ejes.v7i10.3299