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Evaluation of Effectiveness of Feedback's Amount

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Anotace

Informační vazby jsou nedílnou součástí fungování každého reálného systému (ať již jde o biologické systémy, ekonomický systém státu či řídicí systém firmy). Pro správné fungování systému je nutné mít přesně definované informační vazby, a to jak: přímé, nepřímé a zpětné vazby. Práce je zaměřena na problematiku zpětných informačních vazeb. Celkově vzato se nelze ubránit dojmu, že problematika zpětných vazeb je považována za výsostně teoretickou doménu a praktickým důsledkům správné funkce či disfunkce zpětných vazeb v reálném životě se soustavně nevěnuje náležitá pozornost. Je opomíjena potřeba cílevědomého využívání a zdokonalování zpětných vazeb v rámci budování či udržování systémů všech úrovní a oblastí, řídicí systémy nevyjímaje. V odborné literatuře nepanuje zcela jednotný názor na existenci a množství zpětných vazeb, které jsou – nehledě k jejich struktuře a kvalitě – limitujícím faktorem praktické výkonnosti řídicích systémů. Tento článek se zaměřuje na rozlišení (resp. selekci) zpětných vazeb, relevantních pro efektivní plnění funkcí komunikačního procesu v řídicích a organizačních strukturách vybraných zemědělských podniků ČR a na kvantitativní vyjádření vztahu jejich počtu a spolehlivosti přenosu řídicích a zpětnovazebních informací. Výzkum byl realizován ve 178 zemědělských podnicích. Teoretickým a praktickým výstupem výzkumu je navržen matematický model testování informačních vazeb. Tento model byl aplikován na příkladu řízení informačních vazeb v rámci obchodních procesů a je rovněž popsán v článku.

Klíčová slova

Informační vazby, komunikace, efektivní komunikace, manažer, informační zpětná vazba, relevantní zpětná vazba, nežádoucí zpětná vazba, pozitivní a negativní zpětná vazba.

Abstract

Information links are an integral part of the functioning of any real system (whether it is a biological system, the economic system of the state or the control system of the company). For proper operation of the system is necessary to have a well-defined information flows both: direct, indirect and feedback. The work is focused on feedback information links. Overall, the issue of the feedbacks is considered eminently as a theoretical domain and the practical consequences of the correct function or dysfunction feedbacks in real life are systematically not paying proper attention. It is ignored the need of purposeful use of feedback and improvement within the building or maintenance of systems at all levels and areas, including control systems. In the literature does not exist consensus on the existence and amount of feedback, which are - regardless of their structure and quality - the limiting factor in the practical performance of control system. This paper is focused on the resolution (or selection) feedbacks relevant to the effective performance of the functions of communication in the process of management and organizational structures of selected companies in the Czech Republic and quantitative expression of their relationship and the transmission reliability control and feedback information. The research was implemented in 178 farms. The output of theoretical and practical research is designed of mathematical model testing information links. This model was applied to the example of management information links within business processes and is also described in the paper.

Key words

Information links, communication, effective communication, company, manager, information feedback, feedback, relevant feedback, unwanted feedback, positive and negative feedback.

Introduction

The competitiveness of enterprises is (whether directly or indirectly) influenced by many factors. One of these factors is determinate importance of the effectiveness of communication. In the literature, there is no consensus on many aspects of the issue of effective communication. The authors hold different views on this issue; they are not always practical differences motivated research based rather predetermined starting or current experience. It can be accepted fairly logical assumption those authors who have concluded that feedback plays an important role in communication. The initial consideration was one of the motives for our research; its general character at textbook examples inspired us, however, to attempt a deeper and more systematic analysis of the relationship between quality and quantity of feedback between efficiency and corporate communications. Therefore, this paper will deal with the evaluation of effectiveness and the amount of feedback in communication. The authors can be found in the literature, who deals with the issue of feedback systematically.

For example Veber et al. (2000) claimes, that the core of effective communication are the human feedbacks not electronic feedbacks. Although communication is in all areas of management, the greatest importance has for the management leadership. Effective communication is the lifeblood of a successful organization and it reinforces the organization's vision, connects employees to the business, fosters process improvement, facilitates change, and drives business results by changing employee behavior (Bulent, Adnan, 2009).

The authors say that if it is an international organization, it should prepare their employees to work and communicate with people of other nationalities, cultures and religions. The most common mistake in communication is typing and stereotyping, which would be workers should avoid (Charvát, 2008).

Vlachos (2009) claims, that „*…sharing of information may have a dual effect: Firstly, it conveys employees the right meaning that the company trusts them. Secondly, in order to make informed decision, employees should have access to critical information. Communicating performance data on a routine basis throughout the year help employees to improve and develop.*"

Střížová (2006) claims that: *„Communication does not mean a link that allows reciprocal understanding and real cooperation, in the organization. It's not just about formal compliance obligations to ensure that the information given on time at the right place, but much more. Workers generate and clarify opinions on everything that is happening, what is the order of the values of the organization. The reputation of organization speaks to the stuff, objectives, internal atmosphere, quality of management, successes, failures, traditions, rituals, rules, compensation, penalty, interest of managers to employees, the culture of the working environment, the level of job aids, know - how, the level of negotiations with customers and public."*

Šilerová and Kučírková (2009) says, that: "*A number of information, both external and of course internal, creates the requirements for their quality ensuring. It requires to set inner firm's channels effectively, to aggregate the data properly and to stipulate differentiating values.The processes in the firm are supported by various information systems and organizational procedures connected with them because of optimalization and data exchanges, information and knowledge among single organizational units of the firm.*

The quality of this process is dependent on the way of firm's section managing that ensures the development and managing of information systems and information and communication technologies."

Roese and Sikström (2014) claim that: …"*communication is argued to be an important means of forming and executing strategy, particularly if that strategy involves change.*" Lososová and Zdeněk (2013) claim that: "*One of the important elements of the evaluation is to assess the economic performance of management efficiency…*".

In our literature is described more inspiring procedures, using the feedback mechanism at work - both in terms of pure information, and in terms of interaction between people, e. g. for the purposes of education and self-education. One of them is called „targeted feedback". In the Czech context, is also known as reflection, review or debriefing (Reitmayerová, Broumová, 2012).

On the other hand and last but not least, communication is not only technical transfer of information. There are many of points of view, how to use them to improve level and quality

of knowledge base, i. e. "*knowledge management represents an ongoing relationship between and among people, processes and technology systems involved in designing, capturing and implementing the intellectual infrastructure of an organization*" (Charvát, Gnip, 2010).

It turns out that in terms of communication links is also very important the internal organizational structure of the units. This highlights the innovative activities investigated units, such as the introduction of a new product design or location services on the market.

It was found that the speed of implementation, whether new or a change of products, has a significant influence of the internal communication links with other units of the company. Very isolated units without internal links takes longer product introduction, while less isolated units with greater communication link handle often already in half the time.

In addition to communication links is also very important that the correct type of communication used. Basically, it is possible to distinguish two types of information:

- Explicit, specific, „hard" information,
- Unspecified with different interpretations, „soft" information.

The first group of explicit information, it can be included such as market data, production results, simple software codes, financial results, the results of research. This information can be distributed quickly and easily.

The non-specific information includes technical expertise, use of production technologies, operational know-how. This information need high degree of interpretation, it cannot be transferred automatically.

These characteristics lead to the conclusion that each type requires a different way of information transmission mechanism. Unspecified information need high level meeting „face to face", such as conferences, meetings, training courses so that the participants reached a common and consistent interpretation of unspecific information. Conversely explicit information can be transmitted electronically without personal contact.

Improper use prevents communication link services are able to effectively communicate and exchange information. If the company seeks to use the free connection, egg intranet database to communicate unspecified information, communication will fail. On the contrary, it would be a waste of time to transmit explicit information on meetings and meetings. According to research, those companies that transmit explicit information loose connections, introducing new products by 25% of the time sooner than those used for the transmission of this type of information sessions and meetings. However, if the free concentration unspecified transmitted information, then the time is extended by the introduction of 20%.

This proves that the company effectively created an organizational structure has better conditions for effective communication and faster response to market needs. The importance of good communication links, however, managers are beginning to realize if the company gets into serious trouble. Each random thoughtless process of creating communication networks has significant negative economic consequences. Managers are encouraged to plan communication network very thoughtfully and carefully with a view to the future. The first step is to specify the information and knowledge they will need, and then create an appropriate communication network to provide the necessary knowledge with minimal cost. Authors say, that „*In the world there is considerable emphasis on the work of knowledge, through which it is possible to achieve the desired results.*" (Dunford, Snell, Wright, 2001).

It should be noted that the information necessary for the management system is composed of the several layers and subsequent functional purpose subsystems. In addition to the specific management information has growing importance of information (interactive) background as a source of factual, cognitive, and other reference information for the execution of the main mission of the information system. This is inseparably linked with Internet technologies. A significant contribution represents a set of graphical database systems through services such as eg. map outputs in the web application development needs of farms and regions.

Vaněk, Brožová, Masner, Šimek and Vogeltanzová (2013) describes level, structure and forms of their use in terms of organic farms in the Czech Republic. They confirms, that projects and solutions requiring support, such as e.g. Map Portal for Regional Development Version 2.0 (MPRR) solution significantly can contribute to an effective informational support of regions, i. e. can it support many different kinds of regional

activities, including the organic farming sector.

Rydval, Bartoška and Brožová (2014) solve the problem of mutual information links differently. Rather than concentrate on the feedback separately, but they understand all information flows in terms of their possible impact on information asymmetry. These authors deals with the describing, modelling, and analysis of the factors affecting our rational thinking, our ability to make rational decisions; in particular, with the framing effect in decision - making process and its graphical representation and quantification, using semantic networks and analysis with the Analytical Network Process (ANP method). The suitable method to map and quantify the distortion of information which occurs in the decision-making may be based on the semantic networks, which can capture the basic elements of the information frames and their mutual relationships to express the possible loss of information and its asymmetry.

The communication networks are the technical means for transmitting, processing and storing information. It often happens that the technical component of the communication network changes in the preferences of managers from among the part of the objectives of work. Stusek emphasizes that „*Executives must promote such technological innovation architecture of information systems that are open and their components will be capable of relatively independent development.*" (Štůsek et al., 2008). An essential part of communication networks, however, are people - and it all. Therefore, building and securing appropriate communication network means not only to their formal organizational position but also the use of informal competencies selecting teams, work allocation and release of information adapting to the current situation. This leads to the spread of tacit knowledge and information, the selected workers creates effective feedback and act as a reference source of information. In such an environment, it is easier to block unwanted information feedback and strengthen those feed backs that contribute to the accuracy of the information and to minimize noise.

Materials and methods

The aim of the research was to valorize the effectiveness and the amount of feedback in the communication process in companies in the Czech Republic and to suggest the calculation of the required design (ultimate or optimum) amount of feedback to ensure effective communication, which will lead to a higher quality of communication and thereby support business performance.

The theoretical bases were formulated from the analysis of the literature review, which served to define relevant feedbacks selected types (desirable, stabilizing, homogeneous, substitution).

Quantitative research was carried out to a limited number of feedbacks. Quantitative research was conducted through a questionnaire survey in the file of 3671 respondents. From this file was generated with the random selection 1685 respondents. These respondents were asked for the cooperation in this research. From these respondents were filtered respondents on the law of transitivity. The final file was 176 respondents for those workers who have been designated as the default theoretical analysis of structural elements (resources, creators, transmitters of information, information consumers, modifiers or prominent wearers) relevant information within the enterprise communication system. In quantitative research was determining the deduction method that allows the general assertion deduce concrete conclusions. To verify and supplement the results was also used qualitative research. Furthermore, was used the method of induction for the formulation of the problem of mathematical relationships.

Newly discovered facts and dependence were compared with theoretical assumptions and subsequently described in the conclusion.

Results and discussion

Answers in questionnaire showed, that there is very important to know in which virtually the respondents were unable to agree. This information was knowledge of informal channels, their function and content in terms of reliability and representation of desirable or undesirable feedback. Their use is thus practically available informal and active (responsive) to members of social groups. Thus the company is preparing a powerful tool for efficient communication.

Some practical insights have helped substantiate the deduction of the general starting points very effectively. For example, were examined situations where the process of innovation (the product or service on the market, the application of the company as a supplier for a key customer, etc.) there are problems. It is a failure of quality, deadlines, finding the guilty, operating obstruction between teams of cooperating companies or other

typical symptoms

He found a major difference in the success of projects and strong communication „under the end of a good, all good." This eventually stated by one of the case studies of the management that in a crisis situation (negative trend of accumulation of problems, displacement and threats to key terms of the contract) to ensure immediate information feedback and came with not done but rapid information-style curriculum meeting the following example:

- We are at this stage, but according to plan, we should be here …
- Consequences if you are not going to change anything for the company following ...
- We have no choice, we must reverse the trend ...
- We caught up with this positive, which gives us confidence that we are able to complete the contract in time ...
- The biggest causes of problems are as follows ...
- We have problems with your partner and the customer, but the sweep in front of its own house
- We will strengthen capacities, but expect your higher deployment ...
- We will be more assertive towards its partners and negotiate better cooperation because we put its own house in order and we have already proved that these points are experts and responsible partners.
- We changed the organization of work, because what does not work, it has to change...
- We have changed the composition of personnel ...
- All of this was done from the perspective of top management, what we see and what we have response from you ... but we have deeper
- At the same time we are working hard to uncover the underlying causes, will lead to further change the style of work and organization - there is need feedback from you
- Discussing all this with you and then everything with our partner - and as we expected now the debate will contribute to change, which we started to do, so our changes will be affected by the limits of our partner - because later this week with you so we meet again meetings outside of any structure, so that you know what turned out to be unrealistic, or where the situation has improved, eventually. where it is necessary to reschedule orders.

These were examples of functional feedback from practice. The essence of an effective communication system, personal conversation. Communication between the recipient and the sender in this case works best. The reason for greater efficiency and immediate feedback.

This is confirmed by Veber, stating that, regardless of whether it is an internal or external communication, it is essential to ensure adequate feedback. At the beginning of this process carries you need to convince the other party that is interested in her opinion, it is extremely important to her (Veber et al, 2000).

Functioning of feedback has visibly reflects on other activities that at time communication effectiveness increased.

Sender (communicator) transmits information through the communication channel. The shipper must properly articulate their message (news, information) and select the appropriate vehicle for his message to the recipient. The receiver then given information it receives and interprets. An integral part of the communication process is feedback. Some resources (tools, channels) enforce feedback, but it only allow (egg email asking for permission to deploy a new software release can be completed by a supervisor read receipt and a copy of the worker, on the contrary executive order to deploy the software is effective to provide a hidden copy of all whose activity is dependent on the software failure)

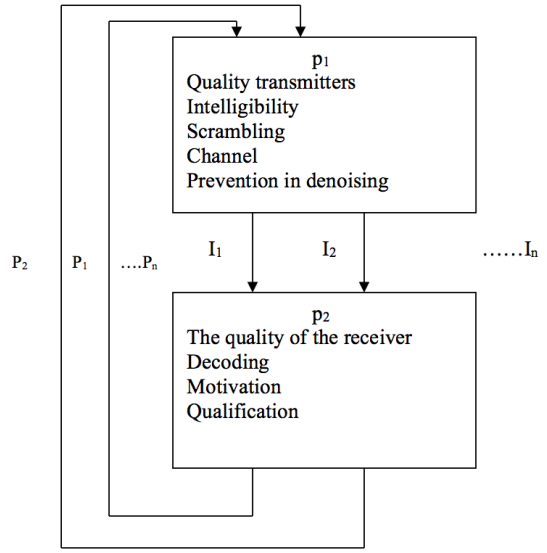
Střížová (2006) states that: „*The managers are the bulk of the responsibility for the level of communication within the organization. You will need to provide their employees properly explain all the relevant rules and modalities. They must also ensure that they were properly understood, support the functioning of feedback. If employees do not respond to communications management activities according to their expectations, is eighty percent of the cause of poor communication lines. Responsible is always the one who is at a higher hierarchical level. It should not happen that the communication between subordinates and superiors will be influenced by human desire to control and manipulate. Although subordinate does what the boss wants, but it remain distrust*

in him, reluctance to continue talking."

Keeping in mind the human factor in communication, then according Plaňava (2005) may be apprehensive feedback and positive, and neutral understanding, understanding and negative, uncomprehending that needs precise.

Some authors argue that the most important is the existence of immediate feedback that can be achieved only in oral communication; on the other hand, other authors tend to ensure adequate feedback or deal with quality feedback.

Research has examined assessment required amount of feedback in companies. It was examined whether due to the increased amount of feedback have a positive effect in the management of personnel, or (purely mathematically), there is that potential.



Source: Charvátová, 2001

Figure 1: Illustration of feedback from employee to manager.

Here informational links I_1 and I_2 ..... I_n presents direct control information. P_1 and P_2 .... P_n represent feedback information (assuming their homogeneity, substitutability, and it is desirable for links). Then apply to the resultant transmission reliability of the information, and

therefore communication effectiveness (1,2 ..... n links):

$$\sum P = 1 - \prod_{i=1}^{n} (1 - p_i)$$

where $\sum P$ is the reliability of the task, more reliable transfer of information (the probability with which the controlling entity learns that a powerful element of the report was adopted, or anything done, or something learned.

The fulfillment of the tasks is the result of the aggregate number of other factors.

That relationship is valid only for a homogeneous network feedback - even though it is a theoretical calculation, the practice is implemented personal communication group of workers in a social group, working on the same task, which operates between tacit knowledge sharing and multiple channels of information equivalent toward superiors (barrier channels for information such as yes, no, what, when, where and what are the inputs, outputs, and which resources are missing to perform the task). In practice it is necessary to take into account the direction of feedback (negative, positive) and type of information, eventually, their value. There can be dispersed, but streamlined information.

If $n = 2$, then the change may be inferred that the reliability of information transmission, therefore, increases the potential of effective communication:

$$\Delta P = (P_{zb} - P_b)$$

where:

P_{zb} - a number of defined feedback

P_b - a number without feedbacks

Increasing the number of control or feedback in practice happens at zero cost. The problem is more complex in that the costs include the costs of technical-organizational and technological development and installation of communication channels N_{ich} and for their operation N_{pch} (channels can be shared by multiple information flows - feedbacks). Furthermore there include the cost of acquisition and preprocessing own information $N_{i.}$ Their sum constitutes the total cost *CN* that in deciding on the effectiveness with which reflected the positive feedback effect in control *PE* staff:

$$\sum PE = \Delta P * CN_{NE} - (t.n_t + V_n * q)$$

where:

ZP - feedback

PE - positive feedback effect in the management of personnel

CN - total costs

NO - ineffective communication

q - number of feedback from employee to manager

Vn - Cost of one implementation feedback

nt - Cost per unit of time

There is a certain limit or optimum value of the number of inbound links, over which it is inappropriate to increase their number. The benefit of further feedback has no economic justification; the risk is negligible unreliability to be included in the calculation of the total balance. In economic terms, it is theoretically useful to perform feedback if:

$$PE = (P_{ZP} - P_B) * CN_{NE} - (t.n_t + V_n * q) > 0$$

Indifferent (there are other reasons worthy of special consideration) economic benefit is not increased if applicable, that:

$$PE = (P_{ZP} - P_B) * CN_{NE} - (t.n_t + V_n * q) = 1$$

From an economic standpoint it is theoretically useful to increase the number of inbound links if applicable, that:

$$PE = (P_{ZP} - P_B) * CN_{NE} - (t.n_t + V_n * q) < 0$$

+ Positive	- Negative
Reliability	Time costs
The development of human resources in the organization	Cash costs

Source: Charvátová, 2001

Table 1 Evaluation of the amount of feedback.

The above relations were applied in companies while driving to meet business obligations in the supply of products, which was established as a destination complying with all parameters supplied at predetermined prices.

Managers used to control (issuing of control commands) direct links to subordinates. By default (original usual control procedure) was used only one type of feedback reports on the task in combination with the transfer of information to ensure delivery within the normal document flow.

Reliability of supply compliance parameters ranged from 0.8 to 0.9. The analysis revealed that the cause is the limiting low reliability of single feedback, ensuring the human element (reliability 0.8 to 0.9). Feedback circulating documents showed considerable delay, so that practically did not. Therefore, he was forced to perform control worker personal control condition, which caused the increase in costs (time spent checking his work also) and allow correction of unfavorable condition.

Therefore, it was designed:

a) To increase the likelihood of achieving the required parameters supplied by increasing the number of inbound links, comprising less reliable human element. To advance the desired confidence level 0.99 out minimum number of inbound links as follows:

$$\sum P = 1 - \prod_{i=1}^{n} (1 - p_i)$$

$$\sum P = 1 - \prod_{i=1}^{3} (1 - 0{,}85) = 1 - 0.003375 = 0.996625$$

The causal relation to this increase was the result of the potential for effective communication:

$$\Delta P = (P_{ZP} - P_B)$$

$$\Delta P = (3 - 1) = 2$$

The effectiveness with which reflected the positive feedback effect in the management of personnel, we expressed an indicator of *PE*:

$$\sum PE = \Delta P * CN_{NE} - (t.n_t + V_n * q)$$

$$\sum PE = 2 * 9{,}8 - (12 * 0{,}8 + 6{,}0 * 3) = -8.00$$

where total costs take into account time-saving control controller. The calculation also served as a control, which confirmed that it would not make economic sense to increase the number of inbound links through human elements (PE < 0).

b) To speed up the circulation of the documents so as to start and operate the feedback. The discrepancy between the original document circulation system, which served primarily recording, accounting and business statistics and the new system of document circulation, which was to ensure the management of online, was temporarily resolved at the cost of duplication. It was a comprehensive circulation of documents in electronic form, then adding formalities. It was technically assured double feedback notification messages (information on the results of operations) on your mobile manager.

This newly established feedback and at higher cost proved to be very reliable in itself (0.995) and there was no need to duplicate it further.

$$\sum P = 1 - \prod_{i=1}^{1} (1 - 0{,}995) = 1 - 0.005 = 0.995$$

The causal relation to this increase was the result of the potential for effective communication:

$\Delta P = (P_{ZP} - P_B)$

$\Delta P = (1 - 0) = 2$

The effectiveness with which reflected the positive feedback effect in the management of personnel, we expressed an indicator of PE:

$$\sum PE = \Delta P * CN_{NE} - (t.n_t + V_n * q)$$

$$\sum PE = 1 * 6.97 - (12 * 0.45 + 0.9 * 1) = 0.67$$

- total costs take into account time-saving control of the management staff, the cost of duplicating documents in circulation (additional processing documents) and the unit cost advantage of the already established electronic channels. The calculation also served as a control, which confirmed that the intention to increase the number of feedback via electronic channels (PE > 0) has an economic justification.

Conclusion

Authors performed an analysis of opinions in the literature; it was found that the authors' views vary on the issue of feedback in communication. Some authors argue that the number of communication links plays an important role in the introduction of changes in the company. Other authors argue that there is a critical mass of communication links, but the important thing is to ensure immediate feedback, which can be achieved only through a tight, narrow, immediate feedback, e. g. oral communication. In contrast, other authors argue that it is important to ensure immediate feedback, but it is absolutely necessary for sufficient security, which makes increases over time, then the effectiveness of communication. Other authors deal with the quality of the feedback, but do not pay attention to the amount of feedback.

Research has confirmed that for effective control communication is important not only in structure, quality, type and nature of feedback, but also their number and security. It was found that the use of the necessary amount of feedback depends on the situation. This quantitative relationship was described above assumptions expressed mathematically.

Suggestions and practice recommendations is that the managers in companies, should verified secure communication in the presence of desirable feedback, their immediate scope and perform approximate calculation of the reliability of information links and the potential for more effective communication with at least the use of qualified cost estimate. If the output of the theoretical calculation positive growth effect of feedback in staff management, it may be decided to strengthen them and vice versa. Managers should approximate this method to verify whether their responsibility is in a favorable ratio of communication costs and reliability of communications (determined by the amount of feedback). After meeting these assumptions is desirable objective to focus on a mechanism that exploits the potential of effective communication so that their personnel information not only accepted, but she also understood and used effectively.

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