

**The propagation of information and the establishment of communication from a
business management perspective**

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Abstract

The success of a project depends on the correctness of the project plan and the adequacy of the overall management elements constituted by the project management body of knowledge (PMBOK). Further, the success of the project depends on the ability of the project leader to communicate his or her ideas to each member of the project team and to lead them to change their behaviour in achieving their aims and objectives. In this paper, we examine the communication process between the sender and receiver of information within an organisation based on the concept that the smooth distribution and communication of information should be the key element for business success. In other words, we attempt to identify and suggest the factors critical in communicating a leader's ideas and intentions to the staff within organisation, encouraging them to change their behaviour to achieve business success.

Keywords: information propagation, threshold, behavioural change, communication, threshold model

1. Introduction

In large projects, the project members are rarely old acquaintances. Further, most members are recruited to the project for a specific period of time. In a joint venture project, the members are drawn from several companies. It is also quite possible that the members will not know the person appointed as project manager at all.

The following question should thus be asked: If the project is carefully planned, and the management elements required by the project management body of knowledge (PMBOK) are fully controlled, will the project always be successful? In this research, we will look at some of the ways in which communication bottlenecks between leaders and team members can hinder project success. In this context, the purpose of communication is to ensure that the project leader's ideas are conveyed accurately to each project member and that each member's behaviour conforms to the project leader's directions (Zulch, 2014). This paper examines the relationship between information decay and thresholds to understand what it means for a leader's 'ideas' to spread and inspire members.

2. Academic discussion

2.1 Defining information and communication

First of all, it is important to define what information is. According to Kojien (2018), 'Information is news about a matter or knowledge through various media that is necessary to make a decision or take action' (taken from a Japanese encyclopaedia). Information is a snapshot of a moment in time: (a) it has no weight, shape or volume; (b) its quantity can be quantified using bits and pieces; (c) its quality is the product of the content and the freshness desired by the recipient; and (d) its value changes with the recipient. However, if we view information chronologically, its nature changes as follows: (a) its quality deteriorates (known content and freshness decreases information's value), (b) it gets mixed up with other information, (c) it is forgotten by people, and (d) it becomes useless. In other words, from a chronological standpoint, we can assume that information decays and proceed with the discussion.

Next, 'communication' should be defined. Fukada (1998) argues that communication is established when information causes changes in the receiver's own thinking and

behaviour, which are then fed back to the sender. In line with this discussion, Lee et al. (2021) have emphasised the criticality of managing information sharing, which is the basis for effective collaboration not only within organisations but also with competitors. First, communication is directly proportional to the product of the quality and quantity of the information and inversely proportional to the time. Second, it is perceived as being related to information energy at the moment it leaves the sender's hand. Third, it has a vector (direction of transmission).

According to Prochaska and Velicer (1997), the steps of behavioural change when people are exposed to information include (a) an indifference period, (b) an interest period, (c) a preparation period, (d) an execution period, (e) a behaviour maintenance period and (f) a termination period. To understand the process of information delivery and behavioural change in recipients is critical for managers because the building of resilient organisations can be accomplished by strategic internal communication, which also leads to robust organisation–employee relationships (Kim, 2021). In the next section, we will discuss information propagation and information decay.

2.2 How information is transmitted

2.2.1 *Directionality of information*

When information is transmitted and intended for an unspecified number of people, it spreads in concentric circles. This is the case, for example, when the mass media aims to inform an entire population. However, in most cases the sender assumes an individual or group to be informed. In other words, we believe that transmitted information has a direction or vector (Yamaoka & Oe, 2008b). For this reason, this paper uses the fan model instead of the concentric circle model as the form of information propagation in project management. As shown in **Figure 1**, if information has a fixed area, the narrower the angle of the fan, the more 'pizza' (with a longer radius) will be cut out on one side. As an example, dividing a circle into nine equal parts shows that the radius will be extended by a factor of three for the same energy level.

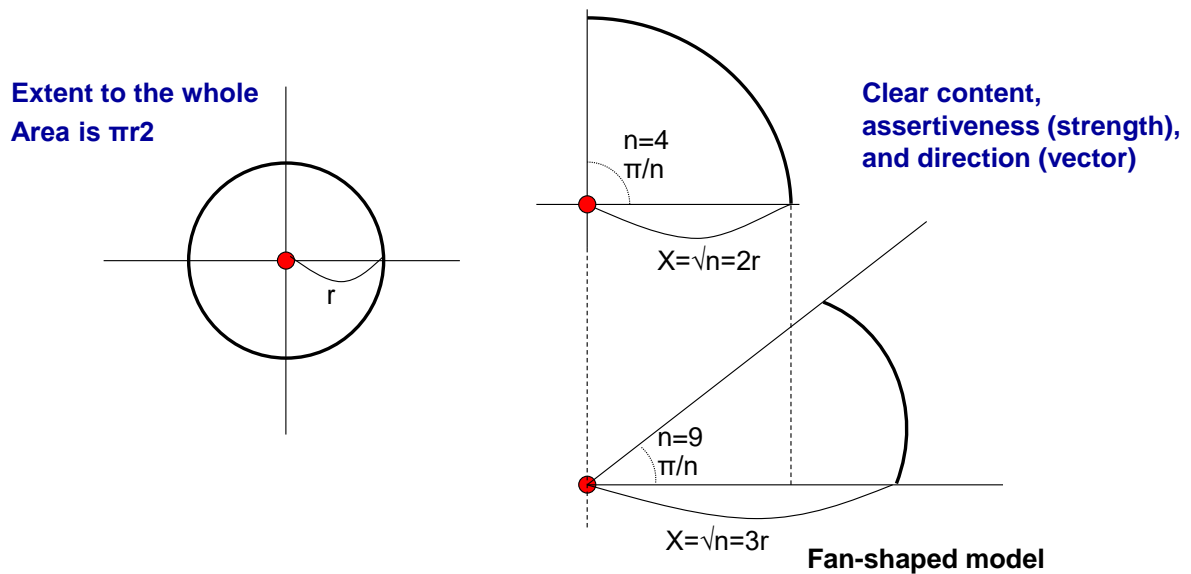


Figure 1. Concentric circle model and fan model (Yamaoka & Oe, 2008a)

2.2.2 Decay of information

Referring to the fan-shaped model of information propagation, we call the critical point of information decay the threshold of information, where the energy transmitted by information is inversely proportional to the square of the distance and decays as it moves outwards, though it can affect others within a certain distance. If the receiver receives an energy higher than the threshold, excitation occurs, and the receiver is affected by the information. If the outgoing energy is constant, the conditions for the excitation of the receiver are a function of the rate of decay of the energy and sensitivity of the receiver.

In this paper, we assume that the receiver's sensitivity is constant, as it is assumed that the members of a project have a certain basic knowledge. We then focus on the rate of information decay and the distance the information travels. In other words, we put 'time' on the x-axis and 'sender's information energy' on the y-axis. As shown in Figure 2, when the information reaches the receiver, the following two conditions are required for the receiver to be excited beyond the threshold (Yamaoka & Oe, 2008b).

If a medium with high attenuation is used, the receiver must be within a certain time period immediately after the transmission. To excite the receiver at a place it takes a long time for the information to travel to, the information must be sent out using a medium with low attenuation. These two conditions are schematically illustrated in **Figure 2**.

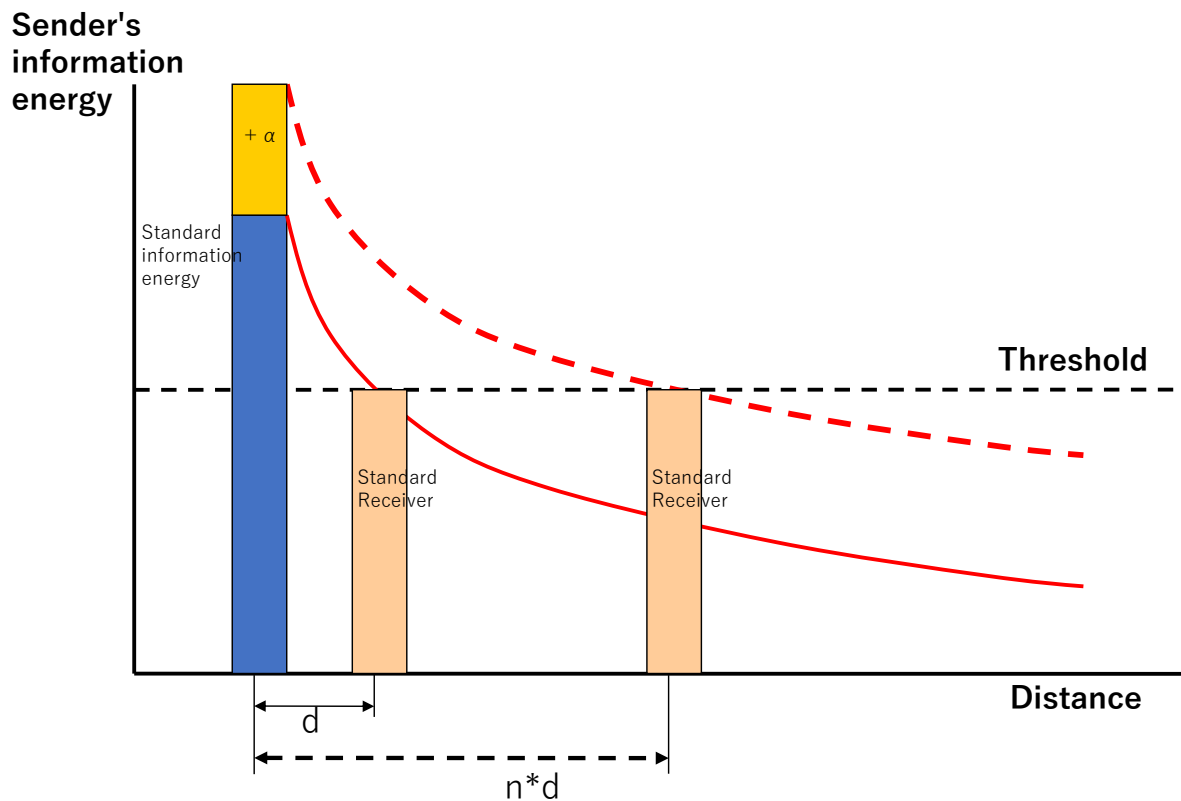


Figure 2. Two conditions for receiver excitation (Yamaoka & Oe, 2008b)

2.3 Motivating and communicating behavioural change

When receiving information, the recipient deciphers the sign of the information, but the way in which this is done differs according to culture and corporate culture. In this regard, it is possible for the same word to mean something completely different. Such information is what Hippel (1994) calls ‘sticky information’. According to Hippel’s model, it takes a great deal of energy to transfer information from one place to another if it is strongly sticky at its source. Hippel (1994) says that this is made possible by repeated, intense, face-to-face exchanges of information based on trust.

In solving various socio-economic problems, it is important to encourage people to change their behaviour and work collectively. The question that always arises is how to efficiently build a consensus among the people involved and bring about a change in behaviour. In the context of the disruptive environment brought about by the COVID-19 pandemic, effective internal communication and information sharing among employees

is especially critical for organisational performance (Svec & Mura, 2020). The impact of information sharing among employees is also endorsed by Quirke (2017), who discusses internal communication as a basic strategy for organisations to sustain their businesses.

In this regard, Yamaoka and Oe (2008a) propose a throwing model and emphasise the importance of information dissemination and the need to focus on maximising the understanding and empathy of recipients, transforming them into actors. For the information sent out to be reorganised with enthusiasm on the part of the receiver and result in action, there must be a relationship of trust and interaction between the sender and the receiver, and the receiver must accept the sender's message, digest it, and then change their behaviour. Lee and Kim (2021) suggest that this aspect of communication is critical, especially for organisational innovativeness and sustainable business performance, and they also suggest that internal communication is the key trigger in enhancing employee creativity and innovation. Mei et al. (2021) also discuss the impact of information sharing and communication management within organisations as antecedents for strategic ambidexterity in innovative organisational actions.

If there is a lack of shared cultural, social background, and/or values on the part of the sender and receiver, it can be difficult to establish an interaction. One example of this is the case in which the receiver is caught up in sticky information and is unable to perceive the sender's intentions accurately and sympathetically. A suitable mechanism is needed to move recipients who belong to different cultures and are caught up in sticky information.

3. Methodology

Using the qualitative method of participant observation, this study draws on findings from a workshop conducted with postgraduate students (in MSc in management and MBA programs) attending a Japanese university. The workshop open to students at Japanese national universities, regardless of their nationalities. Therefore, the study focused on the interactions between students of different nationalities and examined the 'trust relationship', the interaction between the sender and the receiver, the degree of change in the receiver's behaviour, and the receiver's communication process. We also focused on the degree of interaction between the sender and receiver, the degree of behavioural

change in the receiver and the evaluation of the receiver's communication process.

In this workshop, we did not focus on the establishment of the 'trust relationship' itself but rather on how the sender communicated the content he or she wanted to convey to the receiver and how the receiver evaluated the effectiveness of any innovations. In the post-workshop presentations, the workshop participants were asked what other unexpected effective factors they had noticed during their participation.

A total of 24 workshop participants were recruited by a convenient method and included seven Chinese, six Taiwanese, three Vietnamese, three Thai, and five Japanese. All had been living in Japan for more than three years and had no difficulty in speaking Japanese, but they had only taken approximately half of their courses in English, while the rest were taken in Japanese.

4. Findings and analysis

4.1 Transmission to a mixed team of diverse first languages

Assuming the excitation conditions represented in **Figure 2** in reverse, it is not possible to excite a recipient in a time-sensitive location using a medium with a high attenuation rate. The situation is similar in a direct interview. If the medium includes not only text but also image or sound, the attenuation rate can be reduced as much as possible, meaning there will be no time constraint to exciting the person.

However, if you have a face-to-face meeting with a person close by and/or use audio-visual information, the information always will not always reach the person and excite him or her. The information itself does not change its form with time, but from the moment it is received by the recipient, it becomes volatile, which can lead to forgetting or a loss of interest.

Communication cannot be said to have been established until the threshold is crossed, i.e., until the third stage of the behavioural change model (the preparation stage) as well as the execution stage (in which the receiver's behaviour changes) have been reached. It is not enough for the receiver to be interested and prepared for the information sent out. To reach a higher level of communication, something more is necessary. One way to achieve this is to provide the recipient with repeated input over a period of time. This is schematically illustrated in **Figure 3**, where the repeated transmission and retention of

excitation is shown (Yamaoka & Oe, 2008b).

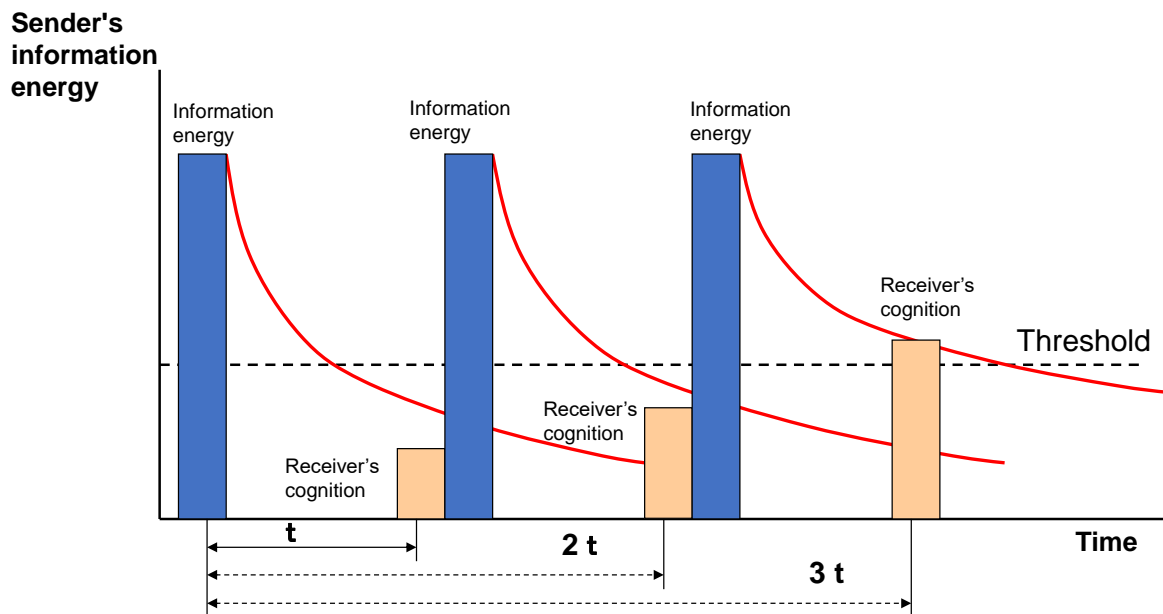


Figure 3. Repeated transmission and encouraging behavioural change (arranged from Yamaoka & Oe (2008a))

4.2 Sensibility, empathy and behavioural incentives to move others

4.2.1 *The weight of information*

We have already seen that using a medium with images and sounds as well as text can reduce the decay rate as much as possible. In other words, this means that to excite another party, it is important to reduce the time constraint as much as possible; to remain in the mind of the receiver; and to make him or her sympathetic to the intention of the sender and accept the information favourably. This is the meaning of transmitting information with added value that surpasses the constraints of time, and it is where the importance of empathy in communication comes into focus.

4.2.2 *The idea of rapport: how to build rapport*

This study draws in particular on findings from workshops conducted for postgraduate students (in MSc in management and MBA programs) in Japan. Regardless of their

nationality, the participants of the workshop were students at Japanese national universities, and therefore, the discussion in this study was partly based on the Japanese term *shinrai kankei* ('trust relationship'). On the one hand, the phrase 'trust relationship' carries the image of a relationship that takes a long time to build up, but on the other hand, it is also possible to instantly feel at ease and have a heart-to-heart relationship with a person after meeting them for the first time.

The authors believe that trust can be built either over a long period of time or in an instant. Two words in the English language relate to trust relationships: trust and rapport. In this article, we will first consider rapport because it is an element that cannot be overlooked with regard to achieving a smooth transmission of information between a sender and receiver through communication and creating a change in behaviour on the part of the receiver. We will first consider rapport because the connotation of the word includes not only a smooth conduct of communication but also a willingness to cooperate.

We should then ask: What are the conditions for building rapport? The non-profit organisation Shigotono Mirai, a Japanese educational organisation that provides training in communication, has identified a number of such conditions (Shigotono-Mirai, 2020). In this paper, we focus on four newly proposed conditions from our workshop with the graduate students and propose these as the Four Strategies for Building Rapport, representing the main contribution of this paper.

Nonverbal elements

(1) Body posture, limb movements and facial expression

The first strategy includes body posture, limb movements and facial expressions. To promote interaction and communication in the simplest possible way and to create a good sense of chemistry, it is important for both parties to be mindful of the non-verbal aspects of the interaction. In other words, the challenge is to create a sense of unity in the communication space.

(2) Voice (tone and loudness, slowness pauses [*ma*])

It is also important to 'match' the volume, tone and rhythm of the voice in communication to accelerate the exchange of information, the understanding of the receiver and the response of the sender. *Ma* (pause) in Japanese is particularly important. It has also been

discussed that *rakugo* and *manzai* (Japanese traditional comic storytelling) storytellers who perform in Japanese are able to draw listeners in with a sense of rhythm and pause that is very effective in conveying information and promoting understanding.

(3) The content of the story (point and order)

The placement of important points, the order of the points, the volume of the voice, the use of slow and rapid pace and the repetition of points will contribute to the promotion of understanding in communication.

(4) Emotion (to show respect and understanding for the other person and to increase the level of empathy in the situation)

Showing empathy and respect for each other's information can help to facilitate an exchange of information between communicators. Therefore, Strategies 1–3 are inseparable elements. As is often pointed out, choosing words according to the 'emotional language' used by the other person creates even more empathy. Respect for the other person is also the foundation of empathy, and it is only on this foundation that we can reach deeper into the values of both parties and have smooth and productive communication.

4.3 Discussion

In recent years, it is becoming more and more common to have members not only with different ages and genders but also of different countries, regions, languages, cultures and religions working together, not only in large-scale projects but also in corporate bodies. Based on the above discussion, this paper proposes three methods for a leader to convey their message to the members. The first is to place members in close proximity, amplifying the energy of the transmitted information by physical distance and in this way stimulating them to change their behaviour. The second is to add a variety of value to the information transmitted (not only textual information but also audio, images, video, etc. in a form that will not quickly decay). The third is to build a total approach that includes making people listen and giving them time to digest, reflect on their own behaviour and change their behaviour without sticking to the concept of adhesive information, by repeated transmission and interaction. As a steppingstone towards this goal, Strategy 4 can be expected to work as an effective framework in the context of preparing an

environment for building rapport for communication.

On the basis of the discussion so far, the following items should be studied in the future. First, concrete measures to transmit information with high information energy should be investigated. Second, we need to develop a scheme that reduces the rate of information decay as much as possible and maintains the repeated transmission of information and the interaction between the sender and the receiver for a period of time until the receiver digests the received information and, within his own context, transforms his behaviour. To achieve this, the construction of a framework through standardisation and the standardisation of concepts as well as the construction of a systematic method of transmission and reception of information will help the sender and the receiver share a common language base, making it possible to achieve not only a one-to-one correspondence but also a one-to-one network externality. In addition, textual information written in rules according to which the sender and receiver are aware of each other (an area in which information and communications technology [ICT] is at its best) has a remarkably low rate of information decay. Such information will not deteriorate even after a considerable amount of time, making it an attractive medium for receivers who do not want to be bothered by time and place.

The third point, which calls for further interdisciplinary efforts on the part of our researchers, is the importance of non-verbal information in interpersonal communication, such as facial expressions, gestures, intonation, eye contact and hand movements, to facilitate communication between senders and receivers of information. In this respect, it is necessary to consider approaches that appeal to the senses and emotions.

5. Conclusion

5.1 Theoretical contributions

The first theoretical contribution of this research is the identification and presentation of issues that cannot be overlooked in evoking behavioural change in the recipient through the exchange of information between a sender and receiver. Information transmitters (e.g. project leaders and public sector managers) are able to move in space. In other words, they can move closer to the other side of the interaction. They can also consciously transmit information as many times as they wish. If one sends out the next piece of

information at the energy threshold of information decay, the impression will be more deeply felt by the receiver, who will be able to move from the level of interest to the next step of action. The most important feature and contribution of this study is, by drawing on the information propagation model, it attempts to present the implications of this process to the business field, and in particular, to the field of project management.

The second theoretical contribution of this study is that we have applied the findings of the information propagation model and the concentric circle model, which have been actively discussed in a variety of fields, to the development of concrete guidelines for the business field.

The study's third theoretical contribution is that it has highlighted the information sharing and communication issues that can be effective to address when we aim to encourage behavioural change in the people involved in communication to achieve some policy guidance or business objective. This point is discussed in the next section on future research directions.

5.2 Managerial contributions

In addition to proximity and repetition effects, as the workshop showed, the following factors must be considered when sending a message: (a) non-verbal elements, (b) voice (tone and loudness, slowness, pauses [*Ma*]), (c) the content of the story (point and order) and (d) emotion. When these factors are interwoven, the sender's message leaves a sawtooth trail and spreads the information he or she wants to convey far and wide (Yamaoka & Oe, 2008b).

The ability to achieve this is what defines a project leader in the age of internationalisation. It is also important to keep in mind the need to improve and refine the mechanisms that facilitate changes of behaviour in recipients through the evaluation of the effects of such mechanisms.

Thus, the biggest managerial contributions of this paper are the organisation of the findings from the workshop and the presentation the key points for communication that should be taken into account in practice. In particular, the findings from the workshop, which was conducted with diverse international participants, can be expected to provide a useful guide for smooth communication and information sharing within project teams

and organisations that include members with different backgrounds and cultural values.

5.3 Limitations and further research opportunities

Through a workshop designed on the basis of a literature review, this study attempted to extract participant evaluations and expectations regarding their words, actions and communication, and to identify issues for information sharing and smooth communication within organizations. However, the findings and suggestions made here need to be tested through more in-depth surveys and interviews with employees themselves.

Overall, we envisage two main directions for future research. The first is to quantitatively capture the influence and effect of information sharing and communication between the sender and receiver on the behavioural change of the receiver. By conducting surveys and quantitatively analysing the data, we should be able to obtain more precise and reliable results, and from these, we should be able to offer new suggestions for communications theory and organisational behaviour.

The second research direction is to explore how the employee–organisation relationship within an organisation can be changed by facilitating information sharing and communication and the factors that are useful in bringing about this change. Verčič (2021) has discussed the impact of information sharing from the aspect of its impact on employee engagement and organisational business performance. A number of future steps for the research have been planned, such as examining the impact of smooth internal communication on employee satisfaction. To this end, by quantitatively examining the results of an employee awareness survey, we will aim to make more concrete and practical proposals on what kinds of organisational support would be effective in achieving smooth internal communication.

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