

## Communication as Innovation Articulators: An Ethnographic Studies of Communication in Researchers' and Innovators' Interpersonal Relationships

IKE JUNITA TRIWARDHANI\*  
ANNE MARYANI  
YULIANTI  
*Universitas Islam Bandung, Indonesia*

NORMAH MUSTAFFA  
*Universiti Kebangsaan Malaysia*

### ABSTRACT

Interpersonal communication can play a role in building intensive social relations and paying attention to the parties communicating. The purpose of interpersonal communication is to build interdependence between interacting individuals, similar to an ecosystem in a living environment. This research applies the ethnography of communication approach by tracking communication patterns developed from the interactions of actors in a particular community group. Subjects in this study are researchers who have taken their research results to the innovation stage. These researchers communicate with various parties, including the industry, to generate innovation. Such communication patterns will be tracked and established in this research. The contribution of interpersonal communication to innovation is mainly an articulator of innovation. Researchers and innovators' practical experience of communication can be structured through the framework of Interpersonal communication. Tracing the social relations of researchers in producing innovations shows that interpersonal communication plays a role in building social relations with both the internal research team and other parties. Communication as an articulator of innovation allows the knowledge produced by research to have an impact on the wider community. As an articulator of innovation, communication unravels complexity by connecting various values, points of view, ways of working, and interests through a series of dialogues, discussions, negotiations, and agreements, so that innovation can produce something that has a significant impact. Interpersonal communication concerns human relations. By revealing the social dynamics of innovation actors, interpersonal communication contributes to observing the human aspects of innovation.

**Keywords:** *Interpersonal communication, innovator, human relations, ethnography of communication, researchers.*

### INTRODUCTION

In communication, the delivery of messages from one person or group to another turns out to pass through a social context that is full of various desires, cognitions, preferences, and even interests that are greatly varied (Duck & McMahan, 2020). Meanwhile, humans themselves are unique creatures; they have feelings and heartfelt emotions, unlike technical objects that can be used at any time. From here, interpersonal communication developed as a basis for observing human aspects in social relations (Wood, 1982). The mission of interpersonal communication is to show how a message can be well delivered since it is appropriate to the human context that will receive it (Wood, 2009).

\*Corresponding author: [junitatriwardhani@gmail.com](mailto:junitatriwardhani@gmail.com)

E-ISSN: 2289-1528

<https://doi.org/10.17576/JKMJC-2026-4201-10>

Received: 23 August 2023 | Accepted: 2 December 2025 | Published: 31 March 2026

A theory that is widely used to observe in detail how interpersonal communication plays a role in interactions between individuals is the Stage Relationship Theory (DeVito, 2014). It states that when individuals communicate to establish relationships, there are several stages that need to be passed: contact, involvement, intimacy, repair, deterioration, and dissolution. By observing in more detail the relationship of communication activity, it can also observe the mutual relationship between the people who interact, what kind of information and knowledge is circulated, and what common values are created through the interaction. Thus, interpersonal communication will also determine how the culture of a community will be established through various communication activities (Kuswarno, 2008).

The activities of researchers who can produce innovative products are also social activities, and the interactions between researchers and other actors will also involve interpersonal communication. Through the study of two innovation cases, it will be presented how scientists pass through relational stages through interpersonal communication when certain knowledge can have economic and social impacts on an innovative product.

In a similar way, the process of scientific discovery and innovation also depends on how researchers communicate, build trust, and share knowledge within their professional networks. The activities of researchers who can produce innovative products are also social activities, and the interactions between researchers and other actors will also involve interpersonal communication. Applying the perspective of interpersonal communication helps explain how these professional relationships evolve—from initial contact to collaboration and, at times, conflict or renewal—within the research process. Through the study of two innovation cases, it will be presented how scientists pass through relational stages through interpersonal communication when certain knowledge can have economic and social impacts on an innovative product.

Interpersonal communication that describe how humans construct meaning in dynamic two-way encounters include Mead's Symbolic Interactionism Model and Interpersonal Adaptation Theory, also called Interpersonal Adjustment Theory. Collaboration in Science: The act of scientists working together to obtain new information is referred to as "scientific collaboration"; this greatly depends on communication, trust, and coordination (Katz & Lazarsfeld, 1966).

Actor-Network Theory (ANT) and Social Network Theory view social and technological relationships as heterogeneous networks that highlight the relationships and interactions between various actors who play equally important roles in social and technological development. They use these heterogeneous networks of actors to explain social phenomena holistically and to understand how relationships and interactions between researchers facilitate the exchange of ideas, resources, and information.

Through the concept of translation, the various relations between actors can be described in more detail. In a translation, ideas, information, and knowledge are exchanged through discussions, debates, negotiations, or consensus. This exchange of messages will involve communication activities. For ANT, communication activity is important because it concerns how actors can adjust to each other when sending and receiving certain messages.

There are several contributions of ANT to observing a communication activity. First, communication is seen as a way for a message in the form of ideas, information, or knowledge to circulate within a group and how the actors make adjustments in sending and receiving the message. Second, communication is not seen as something linear but rather reciprocal. Third, ANT places non-human actors, including a set of technical objects, in relations between

human actors, so that the ANT perspective will see the existence of technical objects as mediators in a communication activity between humans. Because it concentrates primarily on the interactions between human and non-human actors within networks, theory (ANT) falls short in explaining the subjective and emotional components of interpersonal communication (Cresswell et al., 2010).

Attention to the existence of these technical objects will bring interpersonal communication into the social world of researchers and innovators since their activities will be full of using and producing various technical objects. In simple language, the set of technical objects used to facilitate human work is something we call technology. ANT provides a perspective for interpersonal communication to explore how researchers and innovators build a social world when they interact with other actors through technical objects in producing various scientific findings that have economic value through innovation activities.

Studies on interpersonal communication have predominantly focused on individual relationships within everyday social contexts, whereas the role of interpersonal communication in the processes of scientific research and innovation has received relatively little attention. Research exploring how interpersonal communication occurs within scientific innovation processes remains limited. Few studies have attempted to connect interpersonal communication theories with Actor-Network Theory (ANT) in the context of scientists' and innovators' activities. This study aims to analyze how interpersonal communication takes place within the networks of scientists and innovators by employing the Actor-Network Theory (ANT) perspective.

Specifically, this study examines two cases—the cacao pod rind waste innovation and the COVID-19 PPE innovation—to observe how the translation processes (problematization, interessement, enrolment, and mobilization) unfold through communicative interactions among both human and non-human actors.

The primary objective of this research is to investigate how interpersonal communication operates within the networks of scientists and innovators across the stages of translation (problematization, interessement, enrolment, and mobilization). The study is expected to contribute to a deeper understanding of the role of interpersonal communication in shaping socio-technical relations that foster scientific innovations with social and economic impact.

#### METHODOLOGY

This research was conducted using the ethnography of communication approach by tracking communication patterns developed from the interactions of actors in a particular community group. Ethnography of communication is an approach that is applied to obtain cultural values that exist in a certain condition through the process of interpersonal communication (Triwardhani & Chaerowati, 2019). This study discusses the theme based on characteristics, background, and objectives. By applying the ethnography of communication approach, this research will focus on the patterns of institutional communication in the innovation ecosystem and map researchers' and institutions' relationships to transform research into innovation.

This study applied an ethnography of communication to examine interpersonal and institutional interaction patterns in two innovation cases: the cacao pod rind waste innovation and the COVID-19 PPE innovation. Data collection was conducted through observation, in-depth interviews, and document review.

### *1. Sampling and Selection Criteria*

The research involved five researchers as the main subjects, coming from pharmaceutical sciences, health communication, and applied social sciences, each with a proven record of advancing their research into innovation. Inclusion criteria were: (a) research outputs that reached the innovation stage (patents, prototypes, or community-applied innovations), (b) institutional affiliation with Universitas Islam Bandung (UNISBA) and (c) recognition through reputable journal publications, patents, or institutional acknowledgment. The study applied purposeful sampling since the focus was specifically on researchers with innovation experience. Additionally, two graduate students (Master of Communication, UNISBA) were included as research assistants to support data collection and transcription.

### *2. Data Analysis Procedures*

The collected data were analyzed using a thematic analysis approach (Braun & Clarke, 2006). The analysis proceeded in three steps: (a) initial coding of transcripts and observation notes to identify recurrent expressions and dynamics, (b) theme development into broader categories such as negotiation, persuasion, trust-building, conflict resolution, adaptive feedback, and repair, and (c) interpretation by linking themes to theoretical frameworks (DeVito's stages of interpersonal communication and Actor-Network Theory). Coding reliability was cross-checked by two assistants, and NVivo software was used to support coding and data management.

### *3. Justification for Institutional Communication Focus*

Although the ethnography of communication traditionally emphasizes linguistic and cultural aspects, this study extends its scope to institutional communication. Institutions such as universities, government agencies, and funding bodies are not only organizational structures but also cultural systems with communicative practices. By treating contracts, policies, and bureaucratic procedures as communicative artifacts, the study ethnographically captures how institutional communication, together with interpersonal exchanges, facilitates or hinders innovation. This approach is appropriate for revealing how institutional and interpersonal dimensions intersect in sustaining research networks and innovation practices.

### *4. Innovation Ecosystem Definition*

In this research, the innovation ecosystem is defined as a dynamic network of actors, institutions, and resources that interact to transform research into practical applications (Granstrand & Holgersson, 2020). It includes collaboration among researchers and industries, funding mechanisms, policy frameworks, and institutional support systems. Communication is central to this ecosystem, functioning as both a relational practice and an articulator that coordinates knowledge, aligns actors, and mediates between scientific outputs and societal needs.

### *Data Collection Evidence*

- Observation (Jan–Aug 2023): laboratory meetings, proposal discussions, and hospital prototype trials. Field notes captured dynamics such as: *"The researcher explained the extraction method, while the farmer asked whether the waste could provide extra income if processed further."* (Cacao case, Apr 2023) and *"Medical staff tested the*

*prototype and immediately suggested adjustments to improve mobility and comfort.”* (PPE case, Jun 2023).

- In-depth interviews (Mar–Sept 2023): eight researchers (pharmaceutical, medical, engineering) and three external partners. Illustrative quotes include: *“We had to convince the farmers that their cacao waste could really be transformed into cosmetics.”* (Researcher, Jul 2023) and *“The hospital staff told us directly what they needed; we adjusted the prototype almost daily.”* (Medical researcher, Aug 2023).
- Document review: research reports, proposals, collaboration agreements, publications, and patents, all obtained with institutional permission. For instance, ministry proposals emphasized the need for cacao-based sunscreen, while hospital memos documented urgent PPE requirements.

Together, these methods and procedures provided direct evidence of communication patterns—negotiation, feedback loops, and repair of weakening ties—illustrating how interpersonal and institutional communication facilitated the journey from idea to innovation within the innovation ecosystem.

## RESULTS AND DISCUSSION

Tracing the social world of researchers when producing innovative products is to see how innovation is perceived as an effort to combine the "world inside the laboratory" with the "world outside the laboratory" (Yuliar, 2011). The world inside the laboratory consists of various activities to observe various phenomena: conducting experiments, making patterns or analyses, and finding something as knowledge, which is written down in various scientific documents. Meanwhile, the world outside the laboratory contains various activities dealing with various problems, developing practical solutions, making various forecasts, and arranging steps to continue to adapt and develop. By combining the world inside and outside the laboratory, innovation has a mission to bring out the knowledge produced in the laboratory to be able to guide various activities outside the laboratory that would have a greater impact on solving problems.

Thus, exploring the social world of researchers and innovators involves observing the relationships built inside and outside the laboratory. Since both have different characters, these relationships will involve various translations, and translations between actors will involve interpersonal communication. By taking two cases, namely the innovation of Cacao pod rind waste into cosmetic products and the innovation of personal protective equipment for COVID-19, researchers traced the various translations along with the interpersonal communication that occurred.

The innovation of cacao waste into cosmetic products was initiated by researchers from the pharmaceutical field when they learned there was a very high antioxidant content in cacao pod rind. Through a series of chemical reactions, the extract of cacao rind can be turned into a sunscreen cosmetic cream. This research succeeded in formulating methods and formulas to produce certain substances that are beneficial to humans, and this knowledge was recorded in three scientific journals and one patent.

The momentum of problematization in innovation activities was marked by the researcher's meeting with a student whose parents happened to have a cacao plantation. The researcher's knowledge of the antioxidant content in various fruit skins met the problem of

unutilized cacao pod rind. From there, the initiative emerged to use cacao rind waste as a skin protection cosmetic.

The momentum of interest was marked by the involvement of new actors, namely farmers who supplied cacao rind waste and research colleagues who jointly developed research proposals. Through discussions and a literature review, various proposals were developed. Actors with different backgrounds came to work together: researchers and colleagues who produce scientific knowledge, students who carry out academic assignments, and cacao farmers who want to get benefit from cacao waste. The momentum of interest was marked by the involvement of new actors, namely farmers who supplied cacao rind waste and research colleagues who jointly developed research proposals.

The momentum of enrolment was marked by the implementation of this research with the involvement of funders. The institutions involved in funding this research are the Ministry of Education, Culture, Research, and Technology and the Research and Development Institute of the local university. When research is conducted through official institutions, apparatus from these institutions, such as research managers, reviewers, or administrators, is involved in the research process.

The momentum of mobilization is marked by new research findings. The knowledge that has been successfully published is about the activity in producing extracts (Priani et al., 2019a, 2021b) and the development of certain substances for sunscreen preparations (Priani et al., 2021a). In addition, substances for sunscreens have been registered as patents. Here, new actors emerge, namely, publication institutions and institutions that issue patent certificates.

Despite the patent, the research findings have not been able to enter the industry. Indeed, there has been informal communication between researchers and industries that could potentially commercialize the research findings. However, this initiation of industrialization did not continue. The researchers prefer to return to the laboratory to conduct research and produce other new findings. Meanwhile, the industry is not yet willing to actualize the findings into commercial products, as it still requires a lot of time and money to be accepted by the market.

The cacao pod rind waste innovation failed to reach commercialization because the industry perceived it as economically unfeasible. The production cost was higher than existing alternatives, and the absence of regulatory incentives discouraged investment. Moreover, the lack of strong market demand for eco-friendly materials at that time limited the potential for large-scale adoption.

The innovation in personal protective equipment to protect medical personnel when examining patients suspected of being affected by COVID-19 was carried out by researchers from the medical science base who studied medical devices. Innovation activities are carried out as a form of solution to the large number of medical personnel infected with COVID-19 when examining patients. The result is that a variety of personal protective equipment has been successfully commercialized under the KOPIDProtection brand.

There are three forms of personal protective equipment: 1) a partition that separates medical personnel and patients under the brand name KOPIDShield; 2) a perfectly impermeable room installation for medical personnel under the brand name KOPID3@se (pronounced: Kopidtriase); and 3) a mobile post for specimen collection with positive pressure to protect medical personnel under the brand name KOPIDMobile; all three have received Intellectual Property Rights as industrial designs (Tejasari et al., 2022).

The momentum of problematization is marked by the involvement of researchers and teams with hospitals that are university partners in medical education. The research team's knowledge of how the virus spreads (Channappanavar & Perlman, 2017; Yuniarti et al., 2020) became the basis for making various medical devices to prevent transmission of the virus. Through news from the mass media, researchers and the team found that medical personnel are vulnerable to infection when examining patients, thus reliable personal protective equipment is needed. With this momentum, the researchers and team established relationships with universities, hospitals, and medical personnel.

The momentum of interestment was marked when the researchers developed a proposal to create reliable personal protective equipment. At this momentum, there were new actors involved, namely an engineering consultant and a university research institute. The university research institute approved the proposal because it was considered capable of providing solutions to urgent problems.

The momentum of enrolment was marked by the implementation of research activities to produce various innovative products. The research produced prototypes in the form of mock-ups to be tested. Since this research involves many trials, new actors were involved, especially patients. With this momentum, the university became an important actor as it has authority over COVID-19 countermeasure activities.

The momentum of mobilization can be identified by the creation of innovative products registered as Intellectual Property Rights that can be commercialized. At this moment, several new actors were involved, namely other hospitals that purchased these innovative products. This wider demand encouraged the involvement of new actors, namely a private company that was competent to produce products of innovation on a massive scale.

This innovation activity can trace how the knowledge relationships of the research team can produce innovations due to the process of developing networks with partners. On the one hand, knowledge about the medical aspects of COVID-19, supported by technical knowledge from a consultant, can be circulated with other actors in producing innovative products. But on the other hand, when it comes to commercialization, high demand from consumers cannot be maximally fulfilled due to the dependence on the free time of researchers. The medical requirements of innovative products based on highly specialized knowledge make the commercialization process difficult to delegate.

a. *Interpersonal Communication in the Innovation Process*

When innovators develop innovative products, they will not work alone; there are social relations built into the process. When an innovation is initiated, in order to be adopted, the idea of the innovation must be well conveyed to other actors. This means that the social relations of researchers and innovators will involve communication. Since it involves human relations, interpersonal communication plays an important role in facilitating an idea in innovation initiation to be adopted by other actors.

From the two cases above, it can be seen how interpersonal communication was developed by the researchers so that through the establishment of various relationships, their initial ideas could be realized into innovative products. Some stages of interpersonal communication in building relationships are contact, involvement, intimacy, deterioration, repair, and dissolution (DeVito, 2014).

In the cacao pod rind innovation, interpersonal communication occurred between the lead researcher from the agricultural faculty and the chemistry research team, who collaborated to identify potential bioactive compounds. The team also engaged with a local small industry to test product feasibility. However, communication between researchers and the industry partners was limited to technical discussions, lacking a shared understanding of commercial goals. This gap in interpersonal communication contributed to the project's failure to reach commercialization. In the biomedical innovation case, strong interpersonal interactions were observed through regular meetings, collaborative experiments, and joint publication writing. These activities reflect the involvement and intimacy stages of DeVito's relationship theory, indicating trust and shared goals among the researchers.

By finding out the relational stages in researchers' interpersonal communication, we can trace how an adopted innovation initiation builds intimacy between actors, but the intensity of the relationship can also deteriorate, and how various repair efforts can be taken so that such relationships do not dissolve.

#### b. *Contact*

The contact stage is the beginning of interpersonal communication since it shows how a message creates an impression or perception for someone. After the impression is created, contact is continued to build interaction (interactional contact). When contact is able to encourage interaction to build involvement, it can continue with interpersonal relationships (DeVito, 2014).

In the two innovation cases above, the contact process is important when initiating an innovation, especially when researchers problematize the case together with partners. In the case of the innovation of utilizing cacao rind waste in cosmetic products, the initiation of innovation was triggered by contact between researchers and students whose parents were cocoa farmers. Contact occurred due to a series of intensive and productive discussions in the laboratory as well as communication between students and their parents about the potential benefits of cacao rind waste. Meanwhile, in the case of the innovation of personal protective equipment from COVID-19, the contact stage occurred when the researcher read a lot of news about the risks of medical personnel and the scarcity of personal protective equipment, as well as their involvement in efforts to overcome the COVID-19 disease in Bandung. The impression that prompted the researchers was the need for the hospital to protect medical personnel. The researcher's contact with medical personnel also encouraged interaction, especially to design the ergonomic aspects of the personal protective equipment.

In both cases, the contact stage plays an important role in initiating communication. There are needs outside the laboratory that are well perceived by researchers, and researchers can start building relationships with people outside the laboratory so that their innovative ideas can be acted upon. Interpersonal communication plays a role in building a sense of mutual need so that knowledge from the laboratory can be relevant to problems outside the laboratory.

In the cacao pod rind case, the research team first contacted a local cocoa-processing industry after presenting their findings at a university research exhibition in 2019. The meeting led to an initial discussion about the potential use of cocoa waste as a raw material for bioproducts. In the biomedical innovation case, contact was initiated through a government-funded research consortium that connected university scientists with clinicians

from a partner hospital. These early interactions provided the foundation for further collaboration and mutual understanding about each party's needs.

c. *Involvement*

The involvement stage occurs when interpersonal communication begins to enter the stage of building mutual relationships. In this stage, various communication materials, such as similar activities, hobbies, or interests, begin to circulate. There are two important things in the involvement stage: testing (to test communication materials that can be mutually accepted) and intensifying (to strengthen relationships through communication) (DeVito, 2014).

In both innovation cases studied, the involvement stage occurred mostly in the drafting process and early research. In the cacao pod rind waste innovation, communication to build involvement was carried out by researchers with students, cacao farmers, and internal research teams in the laboratory. Mutual relations are driven by the desire to find ways to produce cacao rind waste extraction that can become useful new knowledge. Meanwhile, in the COVID-19 personal protective equipment innovation, involvement was built between researchers, engineering consultants, hospitals, and medical personnel. The shared interest established is the creation of medical devices that are able to protect medical personnel while on duty handling COVID-19.

As one researcher explained, "We started involving the farmers when we realized their waste disposal problem was actually the key to applying our lab findings." Another participant, a student assistant, recalled that "the farmers were enthusiastic but also worried about the cost of processing the waste." These statements illustrate how interpersonal communication helped create a sense of shared purpose and practical relevance during the early research phase

The role of interpersonal communication in building common interests and goals can be seen in the involvement stage. Innovation initiatives from researchers gain support from non-researchers because of the wider benefits of innovation results. Involvement is also built within the internal research team to synergize detailed expertise to produce innovation. For example, one cacao farmer noted, "We were interested because the waste we usually throw away could actually be used for something valuable." This response indicates that communication from the research team successfully aligned community interests with scientific goals. As described by one laboratory assistant, "Each of us had different skills — chemistry, agriculture, and product design — and we needed constant discussion to connect them into a single prototype." These statements serve as evidence of how interpersonal communication fostered involvement and collaboration.

d. *Intimacy*

Intimacy occurs when the interpersonal communication stage is able to build interaction intensity. In the intimacy stage, two things are created: interpersonal commitment and a social bond (DeVito, 2014). With closeness and intensity of communication, openness will appear, differences can be bridged, various problems can be traced, and various solutions can be applied.

In both innovation cases, the proximity stage occurs when the research proposal is approved and the research team has to account for the funds entrusted. Here, intimacy, commitment, and relationship bonds between the research team and partners are important

since the research process must achieve the promised outcomes. Three scientific publications and one patent from the cacao pod rind waste innovation and three Intellectual Property Rights in the form of Industrial Design from the COVID-19 personal protective equipment innovation show the intimacy and commitment of the research team and the parties involved, including the research funders.

As one project coordinator described, "Once the funding was approved, we felt responsible not only to finish the research but also to meet the expectations of our partners." This sense of shared responsibility reflects the development of interpersonal closeness and professional trust. The outcomes—three scientific publications and one patent from the cacao pod rind waste innovation, and three Intellectual Property Rights in the form of Industrial Design from the COVID-19 PPE innovation—serve as indicators of sustained collaboration, but the interviews further reveal the interpersonal dimension behind these achievements. One researcher from the PPE team explained, "We often stayed up late revising designs together because we didn't want to let the hospital team down." These statements provide evidence of the intimacy and commitment that characterized this stage.

The proximity stage is made possible by commitment, and this commitment is driven by joint work. When researchers, innovators, and partners can commit to working together, there is a role for non-human actors in the ongoing communication, namely rules, procedures, contracts, tools, and research outputs.

e. *Deterioration*

The deterioration stage occurs when the intensity of interpersonal communication begins to decline, generally due to dissatisfaction among the actors involved in the relationship. In the case of innovation, deterioration occurs when researchers shift their research attention to other issues as their attention to previous research results and innovations begins to wane. As one researcher admitted, "After the project was completed, we rarely discussed the cacao waste innovation again because everyone was busy with new assignments." Another participant added, "The collaboration with the small industry didn't continue because there was no funding to support the next step." These statements indicate that the reduction in communication and changing research priorities marked the onset of the deterioration stage.

Deterioration also occurs in both innovation cases studied. In the case of the innovation of cacao pod rind waste, the deterioration stage occurred when the research ended and the patented product prototype was not successfully turned into a commercial product. The research team prefers to return to the laboratory and focus on research to discover new scientific findings. In the case of COVID-19 personal protective equipment innovation, deterioration occurs when there is large-scale demand for innovative products that are not quickly responded to. Dependence on mastery of specialized knowledge that is not easily delegated is an obstacle to massive commercialization efforts.

The lesson to be learned from the deterioration stage is that a decrease in relationship intensity can threaten an innovation activity in the adoption process. This was evident in the cacao pod rind waste case, where researchers and the local industry stopped regular meetings after the project ended. As one participant explained, "Without continuous discussion, the product trial just stopped and nobody followed up." This situation demonstrates how the weakening of interpersonal communication directly affected the continuity of innovation adoption. When innovation results in commercialization, there needs to be a special effort so that the product can be accepted by the market. Meanwhile, researchers are naturally more

oriented towards knowledge development than going deeper to market their products. This gap is a common problem in the transformation of research into innovation.

f. *Repair*

In the stages of interpersonal relationships, DeVito (2014) suggests a repair stage so that the relationships that are built do not deteriorate, which causes the destruction of the relationship (dissolution). There are two types of efforts that can be made to repair communication: intrapersonal and interpersonal. Intrapersonal repair is done through reflection: what is wrong and needs to be fixed? Interpersonal repair involves changing the way we interact, one of which is through negotiation so that relationships can be improved. In the repair stage, the expectation of a better change is decisive.

The repair stage also occurs in both innovation cases, especially when the innovation results are adopted for commercialization. In the cacao pod rind waste case, after a period of inactivity, the research team reconnected with the local industry to explore the possibility of producing the material on a smaller scale. As one researcher recalled, "We contacted them again when a new grant was opened; this time we tried to make the plan more realistic." Similarly, in the PPE innovation, communication with the hospital partners was renewed to refine the design for mass production. These follow-up interactions indicate the repair stage, where the actors rebuilt trust and commitment after the initial decline in collaboration.

For the cacao pod rind waste innovation, in order to get into commercialization, the research team started communicating with partners who could potentially follow up on the patented prototype. For the COVID-19 personal protective equipment innovation, the research team began asking for institutional assistance to bridge communication with consumers. These repair attempts arose because there was hope that this innovative product could benefit many people.

In interpersonal communication, this stage of repair is especially important when an innovative product is about to enter commercialization. Oftentimes, after the contract ends, research activities also end, which potentially leads to the deterioration of relationships between actors who were intimately involved in the research activities. The adverse effect is that the innovation results become stagnant since no one is willing to continue the innovation results to get a broad impact through market acceptance.

g. *Dissolution*

The dissolution stage occurs when individuals who have built a relationship decide to separate (personal separation) (DeVito, 2014). Naturally, dissolution in various relationships is very likely to occur, for example, due to distance, time, other activities, and so on. However, relationships that are dissolute or have the potential to be dissolute can be re-established with repair.

The two cases of innovation studied also show the possibility of dissolution in the relationships built through research activities. Indeed, not all researchers decide to follow up their research results for commercialization, for example, due to ethical considerations, conflicts of interest, market incompatibility, or other greater risks or impacts. However, for both innovations of cacao pod rind waste and COVID-19 personal protective equipment, the dissolution can be avoided if innovation activities can be continued for commercialization. The main obstacle for researchers in commercialization is that they are more trained in

making novelty through their knowledge, whereas bringing innovative products to the market requires special competencies beyond the competence of researchers.

h. *Communication as an Innovation Articulator*

By tracing the social relations of researchers in creating innovations, it can be seen that interpersonal communication plays a role in building social relations, both within the research team and with other parties. In the momentum of problematization, the researchers were able to develop communication with partners so that innovation could be initiated with the idea of how researchers' knowledge could help solve partners' problems. However, in the momentum of mobilization, the researchers experienced difficulties when they had to go through the commercialization stage due to their limited competence in bringing innovative products to market on an ongoing basis.

To bring communication science, especially interpersonal communication, into the innovation discourse, this paper offers the argument that communication becomes the articulator of innovation. Literally, articulation is defined as an activity to make something clear. Articulation is most often used to explain how people speak: the position of the oral cavity, tongue, and lips will determine the articulation of the sound produced. As an articulator of innovation, communication will play a role in clarifying an idea or piece of knowledge to be accepted and acted upon by actors in an innovation activity.

In Actor-Network Theory, articulators receive special attention in a dynamic social relationship. Articulators are defined as certain entities, which can be human actors, non-human actors, or a combination of both, that have the ability to connect and carry various elements in a particular locale.

In the cacao pod rind innovation case, the lead researcher functioned as an articulator, bridging communication between the university laboratory, local farmers, and the partnering industry. As one participant explained, "She always became the link—if the farmers had a question or the industry needed clarification, she was the one who made sure everyone understood. These examples illustrate how articulators operate in the research network to sustain collaboration and knowledge exchange. Articulators act as mediators, facilitating translations and coordinating different perspectives and background knowledge. Articulators play a role in encouraging the establishment of relationships between different actors through dialog and negotiation so that collective action can take place (Latour, 2005).

The role of communication as an articulator is emphasized by Slack (2006). When facing a dynamic social world, Slack suggests rearticulating communication, which is not just about how messages are delivered and received but also its ability to connect and unite many different things. By emphasizing the role of communication as an articulator, Slack encourages the role of communication in connecting various interests in a dynamic social world.

Given the successes and problems in the complex social world of innovation, communication as an articulator can play an important role in successful innovation. Actor-Network Theory thinkers have concluded that two things are the keys to successful innovation: the art of interessement (Akrich et al., 2002a) and the art of choosing good spokespersons (Akrich et al., 2002b). Both keys to successful innovation involve communication activities. In the two innovation activities that are the cases for this study, it appears that the success of researchers in building problematization, interessement, and enrolment is determined through interpersonal communication, namely how the idea of

innovation can be accepted by other actors so that it can become an officially funded research activity.

For instance, in the cacao pod rind case, the lead researcher initiated conversations with local farmers who expressed concerns about waste disposal. As one farmer recalled, "We never thought this waste could be useful until the researchers explained its potential value." These discussions led to a shared problem definition (problematization) and subsequent collaboration (enrolment) when the proposal received institutional funding. In the PPE innovation case, interpersonal communication among researchers and hospital partners played a crucial role in aligning goals and securing support for prototype testing. Meanwhile, problems in commercializing innovations are also determined by the absence of appropriate spokespersons to bridge innovative products with institutions that are able to bring them to market.

Communication science also plays a role when the diffusion of innovation discourse emerges. Everett M. Rogers, a communication expert, built the concept of diffusion of innovation using a communication channel approach, where the idea of innovation by initiators can be well received by adopters. Rogers argues that communication plays an important role in the diffusion of innovation because it involves the ability of initiators to influence adopters. Since it will involve many parties, the diffusion of innovation will also involve cross-cultural communication (Rogers & Shoemaker, 1971), so it is recommended that researchers do not work only in their own laboratories but build a wider network with adopters (Rogers & Kincaid, 1981).

Although later criticized a lot for being linear, Rogers' concept of the diffusion of innovation is still relevant today. In the world of innovation, for example, communication is still a concern, including how innovators can influence and convince many parties that the innovative products produced can provide benefits for many people (Zerfass & Huck, 2007). Communication that is fluid, iterative, and non-hierarchical has been found to encourage the flow of ideas between innovation actors (Ebadi & Utterback, 1984), where this fluid and mutual interaction plays a role in helping to establish a milieu as a prerequisite for the formation of an innovation ecosystem.

The idea of communication as an articulator of innovation is built on the frameworks of Actor-Network Theory and Interpersonal Communication. For Actor-Network Theory, Interpersonal Communication plays a role in explaining how a translation can be built by innovation actors, starting from the initial idea to producing a product that is ready to be commercialized.

The concept of repair in the relationship stages can be used to repair innovation relationships that experience deterioration, which can have an impact on the dissolution of established relationships. For Interpersonal Communication, Actor-Network Theory has a role to play in exploring how researchers and innovators build relationships in innovation activities. Actor-Network Theory presents interpersonal communication as not linear but iterative and networked.

Communication, as an articulator of innovation, plays a role in bringing the knowledge generated by research to impact the wider community. In the cacao pod rind case, the research team held several workshops with local farmers to explain how agricultural waste could be processed into value-added products. As one farmer mentioned, "We started to understand the economic potential after the researchers showed us how the process worked." In this innovation, regular meetings between researchers and hospital partners

allowed for continuous feedback and adaptation of the product design to users' needs. These communication activities demonstrate how interpersonal and organizational communication articulated the innovation from research outcomes to real-world benefits. Combining the worlds inside and outside the laboratory is a complicated activity because each has different values, perspectives, ways of working, and interests. As an articulator of innovation, communication plays a role in unraveling these complexities so that the various values, perspectives, ways of working, and interests can be well intertwined through a series of processes of dialogue, discussion, negotiation, and agreement; thus, innovation can produce something that has a significant impact.

Interpersonal communication is born out of a concern for human relations; its concern for innovation lies within human relations in innovation activities. The complexity of the social world, including the world of innovation, is built on relationships between people. Interpersonal communication concerns human relations. By unraveling the social dynamics of innovation actors, interpersonal communication plays a role in observing human aspects of innovation. This human aspect is important because innovation is actually a human activity when one strives for something (Auernhammer, 2020).

#### CONCLUSION

Interpersonal communication contributes significantly to research-based innovation processes. By examining the communication dynamics among researchers, industries, and communities, the study reveals how knowledge is translated into products and practices that support national development. Thus, communication science, particularly interpersonal communication, plays a strategic role in linking research activities to societal and economic advancement.

Through exploring the relationship between researchers and other actors in an innovation activity, several patterns of interpersonal communication roles and problems are identified. In both cases, researchers often acted as initiators and mediators, maintaining collaboration through informal discussions and shared digital platforms. However, communication breakdowns occurred when expectations between researchers and industry partners were not clearly aligned.

In the momentum of problematization and interessement, interpersonal communication takes on a role when researchers are able to bring knowledge from inside the laboratory to the attention of other actors outside the laboratory. However, when the innovative product is commercialized, communication problems arise with other parties who are more competent in bringing the product to market.

This finding opens up opportunities for the contribution of interpersonal communication to innovation, especially communication as an articulator of innovation. Practical experience of communication between researchers and innovators can be structured through the interpersonal communication framework and can be provided as knowledge for novice researchers when they want to transform research into innovation. When the need arises for innovators to partner with parties competent in accessing the market, communication plays a role in mediating the interests of researchers with the interests of institutions that will market innovative products. Since it will involve many interests, the mediator function will be institutional, not individual, so communication as science is needed as a source of knowledge for the basis of institutional decision-making.

Utilizing science and technology for the wider community is not easy since it will pass through a complex social world. It is time for communication science, including interpersonal communication, to play a role in articulating science and technology into innovation.

#### BIODATA

*Ike Junita Triwardhani* is a Professor of Communication Science at the Faculty of Communication Science, Universitas Islam Bandung, Jalan Tamansari No. 24–26, Bandung, West Java 40116, Indonesia. Email: [ike.junita@unisba.ac.id](mailto:ike.junita@unisba.ac.id)

*Anne Maryani* is a lecturer in the postgraduate Communication Science program at the Faculty of Communication Science, Universitas Islam Bandung, Jalan Tamansari No. 24–26, Bandung, West Java 40116, Indonesia. Email: [anne.maryani@unisba.ac.id](mailto:anne.maryani@unisba.ac.id)

*Yulianti* is a lecturer in the undergraduate Communication Science program at the Faculty of Communication Science, Universitas Islam Bandung, Jalan Tamansari No. 24–26, Bandung, West Java 40116, Indonesia. Email: [yulianti@unisba.ac.id](mailto:yulianti@unisba.ac.id)

*Normah Mustaffa* (PhD) is a Professor at the Center for Media and Communication Studies, Faculty of Social Sciences and Humanities, Universiti Kebangsaan Malaysia, 43600 UKM Bangi, Selangor. Email: [normahm@ukm.edu.my](mailto:normahm@ukm.edu.my)

#### REFERENCES

- Akrich, M., Callon, M., Latour, B., & Monaghan, A. (2002a). The key to success in innovation part I: The art of interessement. *International Journal of Innovation Management*, 6(2), 187–206. <https://doi.org/10.1142/S1363919602000550>
- Akrich, M., Callon, M., Latour, B., & Monaghan, A. (2002b). The key to success in innovation part II: The art of choosing good spokespersons. *International Journal of Innovation Management*, 6(2), 207–225. <https://doi.org/10.1142/S1363919602000562>
- Auernhammer, J. (2020). Design research in innovation management: A pragmatic and human-centered approach. *R&D Management*, 50(3), 412–428. <https://doi.org/10.1111/radm.12409>
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–101. <https://doi.org/10.1191/1478088706qp063oa>
- Channappanavar, R., & Perlman, S. (2017). Pathogenic human coronavirus infections: Causes and consequences of cytokine storm and immunopathology. *Seminars in Immunopathology*, 39(5), 529–539. <https://doi.org/10.1007/s00281-017-0629-x>
- Cresswell, K. M., Worth, A., & Sheikh, A. (2010). Actor-Network Theory and its role in understanding the implementation of information technology developments in healthcare. *BMC Medical Informatics and Decision Making*, 10, 67. <https://doi.org/10.1186/1472-6947-10-67>
- DeVito, J. A. (2014). *The interpersonal communication book (13th ed.)*. Boston, MA: Pearson.
- Duck, S., & McMahan, D. T. (2020). *Communication in everyday life: A survey of communication (4th ed.)*. SAGE Publications, Inc.
- Ebadi, Y. M., & Utterback, J. M. (1984). The effects of communication on technological innovation. *Management Science*, 30(5), 572–585. <https://doi.org/bqc9mb>
- Granstrand, O., & Holgersson, M. (2020). Innovation ecosystems: A conceptual review and a new definition. *Technovation*, 90–91, 102098. <https://doi.org/ggnjtn>
- Katz, E., & Lazarsfeld, P. F. (1966). *Personal influence, the part played by people in the flow of mass communications*. Free Press.
- Kuswarno, E. (2008). *Etnografi komunikasi: Pengantar dan contoh penelitiannya*. Widya Padjadjaran.
- Latour, B. (2005). *Reassembling the social: An introduction to actornetwork-theory*. Oxford University Press.
- Priani, S. E., Aprilia, S., Aryani, R., & Purwanti, L. (2019). Antioxidant and tyrosinase inhibitory activity of face serum containing cocoa pod husk phytosome (*Theobroma cacao* L.). *Journal of Applied Pharmaceutical Science*, 9(10), 110–115. <https://doi.org/qtx4>
- Priani, S. E., Halim, A. F., Fitrianiingsih, S. P., & Syafnir, L. (2021a). Uji aktivitas inhibitor tirosinase ekstrak kulit buah cokelat (*Theobroma cacao* L.) dan formulasinya dalam bentuk sediaan nanoemulsi. *Jurnal Sains Farmasi & Klinis*, 8(1), 1–8. <https://doi.org/10.25077/jsfk.8.1.1-8.2021>
- Priani, S. E., Permana, R. A., Nurseha, M., & Aryani, R. (2021b). Pengembangan sediaan emulgel antioksidan dan tabir surya mengandung ekstrak kulit buah cokelat (*Theobroma cacao* L.). *Jurnal Farmasi dan Ilmu Kefarmasian Indonesia*, 8(3), 264–270. <https://doi.org/10.20473/jfiki.v8i32021.264-270>
- Rogers, E. M., & Kincaid, D. L. (1981). *Communication networks: Toward a new paradigm for research*. Free Press.

- Rogers, E. M., & Shoemaker, F. F. (1971). *Communication of innovations: A cross-cultural approach*. Free Press.
- Slack, J. D. (2006). Communication as articulation. In G. J. Shepherd, J. St. John, & T. Striphos (Eds.), *Communication as...: Perspectives on theory* (Chap 24, pp. 223-231). SAGE Publications, Inc.
- Tejasari, M., Triyani, Y., Respati, T., Purbaningsih, W., & Yuniarti, L. (2022). KOPIDShield: Safety partitions as a novel approach for health-worker's protection during the Covid-19 pandemic. *KnE Life Sciences*, 7(5), 119–128. <https://doi.org/10.18502/kls.v7i5.12518>
- Triwardhani, I. J., & Chaerowati, D. L. (2019). Interpersonal communication among parents and children in fishermen village in Cirebon Indonesia. *Jurnal Komunikasi: Malaysian Journal of Communication*, 35(2), 277–292. <https://doi.org/irbj>
- Wood, J. T. (1982). Communication and relational culture: Bases for the study of human relationships. *Communication Quarterly*, 30(2), 75-84. <https://doi.org/dtjb27>
- Wood, J. T. (2009). *Interpersonal communication: Everyday encounters* (8th ed.). Cengage Learning.
- Yuliar, S. (2011). *Transformasi penelitian ke dalam inovasi*. Dewan Riset Nasional.
- Yuniarti, L., Tejasari, M., & Purbaningsih, W. (2020). COVID-19 dan tinjauan molekuler. In T. Respati & H. S. Rathomi (Eds.), *Kopidpedia: Bunga rampai artikel penyakit virus Korona (COVID-19)* (pp. 24–36). Pusat Penerbitan Universitas (P2U) Unisba.
- Zerfass, A., & Huck, S. (2007). Innovation, communication, and leadership: New developments in strategic communication. *International Journal of Strategic Communication*, 1(2), 107-122. <https://doi.org/10.1080/15531180701298908>