Actor-Network and Translation in Engineering Laboratory: A Case Study of Universitas Indonesia Civil Engineering Testing Laboratory

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Abstrak

Penggunaan Teori Aktor-Jaringan (TAJ) di Indonesia telah diterapkan di berbagai bidang, seperti kajian kredit mikro, budi daya terumbu karang, kontestasi energi terbarukan, dan relasi sipil-militer. Namun, di Indonesia TAJ masih sangat jarang digunakan untuk meneliti laboratorium sebagai perkumpulan *(assemblage)* yang berjalan, kendati peranannya yang penting dalam memproduksi pengetahuan teknis. Guna mengisi kekosongan tersebut, artikel ini bertujuan untuk menggambarkan penerapan TAJ pada kerja laboratorium, khusus di Laboratorium Struktur dan Material serta Laboratorium Uji Teknik Sipil Universitas Indonesia menggunakan konsep proses translasi. Artikel ini menemukan bahwa laboratorium tersusun bukan hanya oleh aktor manusia, seperti ahli-ahli yang otoritatif, tetapi juga aktor non-manusia –cth. gedung dan peralatan atau mesin. Seiring performanya, laboratorium membentuk asosiasi, yang tidak hanya menbangun tetapi juga memutus atau memilih relasi sesuai dengan kebutuhan jaringan tanpa harus seluruh aktor menyadari akan proses tersebut. Hal ini mengindikasikan keterbatasan ANT dalam mendeteksi ihwal-ihwal di luar tindakan dalam pembentukan jaringan. Pendekatan metode kualitatif diterapkan mengingat itulah yang paling tepat untuk dapat menerapkan prinsip pelacakan aktor dalam TAJ.

Abstract

Actor-Network Theory (ANT) has been implemented to study various topics in Indonesian contexts such as microcredit, coral reef, contestation within the sustainable energy project, and civil-military relations. However, ANT is seldom used to examine laboratories as working assemblages in Indonesia, despite its crucial role in producing technological knowledge. In order to fill that research gap, this article intends to illustrate ANT implementation in studying the work of a laboratory, specifically at the Materials and Structure Lab and Civil Engineering Testing Lab of Universitas Indonesia using the concept or process of translation. This study found that a laboratory consists not only of human actors, such as authoritative experts, but alsoof non-human actors—e.g. buildings and equipment or machines. During its performance, the laboratory establishes an association, which is not only by creating, but also cutting off or choosing relations in accordance with the needs of the network, without all the actors being fully aware of it. This shows ANT's limit in investigating elements outside the actions of actors in creating a network. The qualitative methodological approach is utilized with the consideration of better meeting the principles of ANT in following or tracing actors.

Keywords: actor-network theory; translation; laboratory; civil engineering

INTRODUCTION

The laboratory is the place where technologies are researched, developed, and made. Although it is uncommon that social studies of sciences examine "… what occurs daily at the laboratory bench or in the interactions between scientists" (Latour and Woolgar 1986:11), sociology can analyze laboratories as a definite research subject matter. It begins with the premise that says sociology is the science which examines not only human relations, but also the world we create, the ideas we believe, and the artifacts we use (Bauchspies et al. 2006). However, the scope of 'the social' must be, firstly, broadened.

Moreover, as a consequence of the narrow definition of the social in conventional sociology, technologies, despite their importance, were never seen as actors that actively shape human society, at least before Latour et al. introduced actor-network theory (ANT) to the body of science and technology studies (STS). Technology is, indeed, never fully absent in conventional sociology, but according to Law (1991:8), "… technology does not appear to be productively integrated into large parts of the sociological imagination." It happens because, as stated by Law, "there was no methodology able to treat and explain equally the social as well as the technical. When sociologists talk about the social, they put aside the technical. They cannot speak about both at the same time. It is the condition of distribution in sociology—distribution of humans on one side and distribution of machines on the other."

Latour also called technology that is still ignored by conventional sociology as the missing masses (2010:152). Conventional or traditional sociology marginalizes the non-humans from the constitution of society. The so-called society only applies to human actors and their relations. On the contrary, ANT grows as an approach that reconceptualizes the building blocks of society. What is social for ANT is a temporary association between anything that is not exclusive for only humans. The social is always in a constant state of becoming or making and remaking, depending on actors' involvement and actions. In that sense, to use Latour's allegory (Latour 2005:64), the social is not a shelf within an aisle in the supermarket world. There is no economic shelf nor culture shelf, for example, that exist independently, so we can clearly differentiate one from one another. The whole supermarket is social, for it is always creating or recreating associations in a specific dimension of time.

Although ANT has been applied to many types of research outside STS—history of art, literature, environmental studies, communication studies, philosophy, etc. in the last three decades (Tresch 2013:302)—we may find utilization of ANT as an approach still rarely implemented in the Indonesian academic world, especially in sociology. Only one study in sociology used ANT as an approach, i.e. "Jaringan Purnawirawan TNI dalam Politik Relasi Sipil-Militer Pasca Reformasi TNI" by Soesilo (2013). This condition can be considered ironic given ANT is considered to possess more advantages than any other approaches in the sociology discipline; the most important feature of ANT being its ontological definition of what is social, as mentioned above.

However, there are several studies, specifically in Indonesia, which put ANT in the application. Fatimah and Yuliar (2009) analyzed that the development trajectory of bio-fuel in Indonesia cannot be separated from the outside of the laboratory context. To put it in a different way, biofuel research in Indonesia is not isolated and value-free. Another example is Middleveld's (2012) research on the coral reef environment in Wakatobi National Park. This research has some similarities with Callon's (1984) examination about scallops in St. Brieuc Bay. Non-human actors' participation within the association remained the main topic of ANT research. Priyatma (2013), similar to Middleveld, studied how the web of non-human and human actors are both involved to carry out a certain program. His case study involved e-government initiatives in Yogyakarta and Sragen. The last instance for ANT research is the small and micro enterprises' network of social media by Sarosa (2012). Sarosa argues that a network formation will be successful if the main or key actors are able to persuade other actors to join their network.

ANT as an approach in Indonesia has not been used to specifically study a laboratory, the way Latour studied Salk Institute, an independent research facility. This study focuses on a college engineering laboratory, for at least two reasons: First, in Indonesia, laboratories are usually administered under university management. In Universitas Indonesia, for example, in 2015 there were at least 214 laboratories, more than what the Indonesian Institute of Sciences (LIPI) has, with only 43 units. From 214 listed laboratories, 56 were under the faculty of engineering. Second, engineering laboratories differ from pure sciences laboratory. Engineering laboratory is the very site for students to convey their theoretical knowledge into applied ones (Fiesel and Rosa 2005).

To study a laboratory, ANT can be considered to be the proper approach. ANT, as Law and Callon (1988:284) said, is "a method of social analysis that takes the technical aspects of the engineer's work to be profoundly social." This means ANT can be used to study the 'social' character of something that seems far from social, like laboratorial works. So, this article aims to describe the actors' relation and how the process of translation happens within an engineering laboratory. This article takes the Structure and Materials Lab (Laboratorium Struktur dan Material, hereinafter LSDM) and Civil Engineering Test Lab of the Civil Engineering Department (Laboratorium Uji, hereinafter LU) in Universitas Indonesia as its case study.

However, this article finds that ANT does not seem to incorporate the knowledge, if not to say consciousness factor, within the actors' mind in the process of network-making. One of the informants said that he did not know why some of his fellow technicians in LSDM were not selected to join the LU. He thought every technician/lab staff in LSDM is also a member of LU. This means, the identification and negotiation process, especially along the interessement stage of translation, was not carried out transparently to make sure each actor are fully informed about why and how they are picked to join the 'new' network. This can only happen because the two laboratories as a network are closely linked, made up of more or less same actors.

In this article, firstly, we will briefly overview what ANT (probably) is. After that, we will discuss the methodological implication of using ANT as an approach. Later, the case study of this research, its translation and 'the missing' point of view of lesser actors will also be described. Nevertheless, it must be stated that this research was conducted in 2015, so it is possible that much of the facts and data in the field have changed.

RESEARCH METHOD

Conventionally, this article is written based on a research uses a qualitative approach. A qualitative approach is thought to be the most suitable methodological approach to implement ANT's methodological dictum, which is "to follow the actors themselves"(Latour 2005:12). In accordance with qualitative methods, traditional data collecting techniques such as observation, in-depth interview, documentation and so on, are practiced.

Conducting research using ANT means we are following the actors –paying attention to those, either humans or non-humans, which act upon or change the course of force within the network—and tracing the circulation from which identity and reality of the actors sprang. Although the networking process should be left alone to the actors, researchers hold a crucial role in how network reality is being extracted and presented through the theoretical and methodological application in their research. Ruming explains it nicely:

"As a methodology ANT allows us to recognize those that we enroll and mobilize for the purpose of research translation and to contemplate how these impact on the final research translation–we enroll and translate as much as an actor in the research network... This relational actor identity has significant methodological implications given that all research is the translation of a situated and selective network created by the researcher–research is nothing but a network translation... Research and methodology are therefore a series of translations of network actors in relation…The power of the translator is that it speaks on behalf of these actors, yet…we tell stories different to those that our research subjects would express, for our own purposes" (Ruming 2009:454)

In other words, ANT, with its concepts and methods, is a meta-translation process. The translation process of actors in the field is being translated by the researcher according to her/his research aims and goals. Therefore, it is very possible that a researcher may be missing a certain trace of the actors or overlooking the bigger network in which actors practice its trial of force. Some adjustments, limitation, delimitation, and also our own failure as researchers to notice some parts—e.g. actors, actions, bigger networks, etc.—of the networking processes that can be defined as another translation process in itself, an inevitable and inherent part of this research.

This article takes a case study of LSDM and LU. Both labs are administered by the Civil Engineering Department of the Faculty of Engineering, Universitas Indonesia. What is unique about these two laboratories is that both have roughly the same personnel, operating in the same building, but performing two different roles.

ACTOR-NETWORK THEORY

Defining ANT is not an easy task. There are two reasons why it is so. First, ANT has many names with, of course, different ideas and practices behind them. Second, within the ANT corpus itself, there is an ongoing debate and few clarifications about what it actually is. Different ANT concepts contain different ideas and contribution from each of its pioneers. There are at least three concepts of ANT that will be explained here: from Latour, Law, and Callon.

Latour calls ANT as the sociology of association (2005). He calls ANT that way to differentiate his sociology with conventional or Durkheimian sociology that he labels as the sociology of the social. Conventional sociology to his ANT or sociology of association is analogous to pre-relativism physics to post-relativism physics (Restivo in Ritzer and Stepinsky 2011:531). As mentioned above, conventional sociology limits its definition of what is social—thesocial. Inside conventional sociology, there are things that cannot be studied, as a consequence of its limitation. What is beyond or cannot be reached byDurkheimian sociology is the missing masses, according to Latour. Moreover, Latour emphasis the original definition of 'socius' in sociology. Etymologically, socius derived from a Latin verb seq- or sequi which means 'to follow.' Meanwhile,socius itself is defined as "a companion, an associate" (Latour 2005:6). From that root word, the definition of social evolves into "… following someone, then enrolling, and allying, and lastly, having something in common" (Latour 2005:6). From that conception, Latour develops his methods in ANT, that is following the actors themselves, which will be discussed later.

ANT's second conception comes from John Law. The law calls ANT as a method or material-semiotic tools. To be precise:

> "Actor-network theory is a disparate family of material-semiotic tools, sensibilities, and methods of analysis that treat everything in the social and natural worlds as a continuously generated effect of the webs of relations within which they are located. It assumes that nothing has reality or from outside the enactment of those relations." (Law 2009:141).

First, we should pay attention to the word 'semiotic' in what Law has claimed. ANT takes many different theoretical inspirations in order to stand its ground. What Law means by semiotic is not constrained only

to linguistic realities. The first attempt in ANT tradition to use semiotic beyond linguistics is made by Latour, inspired by Greimas semiotics (Lenoir 1994). Semiotics is taken to material realities that are more than just signs but to the broader scope of non-humans (Akrich and Latour 2010). Secondly, from Law's argument, we can comprehend that ANT is the tool to investigate a web of heterogeneity in actors' relation. For Law, it does not matter if the actors are human beings, machines, animals, ideas, organizations, inequalities, or geographical arrangements. So, this semiotic material tools may be more descriptive than explanative, for its main purpose is to study the process and characters of the web of actors.

The last one is from Callon, who prefers to call ANT as a sociology of translation (1984:196). Translation, which is the concept used in this research, is a process of how a collective of actors forms a network. Translation occurs in four steps. First, problematization happens when focal actors propose a problem and assemble a set of other actors to construct an obligatory passage point. Second, after problematization, thenetwork of actors enters the interessement phase, when several actions are being programmed and run by the main actors to stabilize their network identity. Callon (1984:204) explains that interessement is obtained by weakening unnecessary connection of actors from links outside the network. The third step is enrollment, being the phase where the alliance has been formed, so it is capable of moving towards its goals. But within the enrollment phase, there are always negotiations taking place in order to make sure actors are really secured to join the network. The last phase is mobilization, this stage being characterized by the presence of representatives or spokesmen.

The second reason why defining ANT is problematic is because there are ongoing debates and clarifications within the theory itself. We may inspect a problematic nature of ANT from at least two of Latour's publications: first, "On using ANT for studying information systems: a (somewhat Socratic dialogue)" (2004) and "On actor-network theory. A few clarifications plus more than a few complications" (1996). The first one is a fictional dialogue between a system information professor and a doctorate student who wants to employ ANT in his/her research. Take the term of the network, for example, the professor said, "[b]ut you should not confuse the network that is drawn by the description and the network that is used to make the description…With Actor Network you may describe something that doesn't at all look like a network; conversely, you may describe a network which is not all drawn

in an Actor-Network way" (Latour 1996:370). Implicitly, here, Latour blames Callon for his preference to use the term 'network' for it may confuse "the object with the method". According to Latour, ANT is a method, so it says nothing about the shape of what it may describe. The point is one who wants to apply ANT as his/her method in conducting research, she/he has to prepare to abandon the underlying framework of the research including ANT itself.

We can track ANT's core assumptions through Harman's observation on Latour. In his book 'Prince of Network' (2009), Harman outlines four main ideas for Latour to develop ANT. First, Latour sees the world is made up of actors or actants. Every object, from raindrops, a central bank, a state, an individual, stand on the same plane of the ontological level. So basically, all entities are no different from one another. This view contrasts to the Aristotelian assumption that different objects have different substance within themselves. For Latour, "a thing is so utterly concrete that none of its features can be scraped away like cobwebs or moss. All features belong to the actor itself" (Harman 2009:14). Second, it's the principle of irreduction. No object can be reduced or explained to any other. For example, we cannot explain the whole phenomenon of religion to psychological factor or evolution of tribalism. Third, linking one actant to another is done by going through the process of translation. For instance, a series of mediations occur between actors to practice a program. Every part, every element in the network, is giving something to the way the program's carried out; every transmission of force from one actant to another is being translated, being mediated, or changed. Fourth, the actant's power resides in its ability to create an alliance. An actant performs when they adjust or inflict its force to another.

Without a doubt, ANT is quite known for its emancipation for non-humans. We may trace its root back to the principle of generalized symmetry that ANT possesses (Lenoir 1999). To be symmetrical, ANT emancipates objects which have been neglected or marginalized from mainstream social theories. This move is not something new in the social sciences. It was pioneered by Foucault who brought bodies into the center stage of social sciences. We can see Foucault's influence in Law's claim that said ANT is an implementation of discursive or episteme methods in minuscule scale (2009:145). Meanwhile, Mialet (2012) identified some of the Latourian characters, one of which is Latour obsession to integrate social and natural sciences. However, this

Latourian moment is only possible because of the academic context in which when he started his career, he was moving towards the proliferation of hybrid concepts and ideas in grand scale (Restivo 2011). He witnessed concepts like cyborg, cloned animals, etc. became real before his eyes.

TRANSLATION

As stated above, the concept of translation is central in what ANT is all about (Crawford 2005). The centrality of the concept explained by Law:

"This (translation), then, is the core of the actor-network approach: a concern with how actors and organizations mobilize, juxtapose and hold together the bits and pieces out of which they are composed; how they are sometimes able to prevent those bits and pieces from following their own inclinations and making off; and how they manage, as a result, to conceal for a time the process of translation itself and so turn a network from a heterogeneous set of bits and pieces each with its own inclinations, into something that passes as a punctualized actor" (Law 1992:385).

Callon's translation focuses on the stages through which a network of association emerged, meanwhile, compared to Latour's sociation (2005), sociation emphasizes the activities or practices where a network is formed. In short, translation is "the methods by which an actor enrolls others" (Callon, Law, and Rip 1986: xvii). The translation is also related to ANT's conception of power. According to Crawford (2005), ANT sees the power in the relational and distributional term, as a consequence of the actors' ordering struggle. The more aligned and coordinated a network is, the higher its convergence level gets. Higher convergence between actors creates a stronger tie within the network. And with more convergence, its irreversibility will also become higher, or to put it in a simpler term, the harder for another translation unrolling the existing network, i.e. more durable.

There are 3 triangular elements in translation: "translator, something that is translated, and a medium in which that translation is inscribed" (Callon 1990:143). A translates B through the medium of X. As simple as it may seem, translation happens in four stages. First, problematization, which can be defined as the step where focal actors

propose a problematization and determine a set of other actors with their identities and goals, hence an obligatory passage point is initiated. The obligatory passage point is the end of a funnel that converges actors to a certain definition. Callon stated that "the problematization describes a system of alliances, or associations, between entities, thereby defining the identity and what they want" (1984:206). The second phase is interessement. In this stage, the set of activities are practiced to impose and stabilize those identities proposed on problematization stage. In other words, this stage is about "how the allies are locked into place". The third phase is called enrollment, done only if the previous stage is considered successful. Enrollment starts when alliances have been formed, or actors are successfully tied to the proposed identities. Each identity contains roles that should be played out to achieve the objectives of networks or alliances or project. The last stage is mobilization. To speak about mobilization is to address who is in charge to mobilize the alliance. Callon proposed that alliance should have a spokesmen representative or "small number of individuals speaks in the name of the others" (1984:214). Other actors may represent themselves or be represented by spokesmen. On one hand, these spokesmen become the connector to the entities of focal actors in regards to the project alliance. On the other, focal actors access the whole heterogeneous other actors through these spokesmen. Callon also added that mobilization renders series of displacement and reassembling. In his research for instance, "scallops are transformed into larvae, the larvae into numbers, the numbers into tables and curves which represent easily transportable, reproducible, and diffusible sheets of paper" (1984:217). This mutation or transformation in forms is something that allowsthe alliance to be understood and presented, thus mobilized as single entity/agent.

THE ASSOCIATION WITHIN AND BETWEEN THE TWO LABORATORIES

Here firstly I will describe the locus or the case this article is dealt with. It is deemed important to lay out the case separately in order for us to grasp the horizon of actors and their works that this article studied. After that, the analysis will be presented below in this section.

As mentioned above, although LSDM accepts requests for several testing services, it is also responsible to facilitate academic activities, or in our informant's words, "it serves as a teaching laboratory." However,

LU only operates as a Unit Pelayanan Pada Masyarakat (UP2M) or Community Service Unit, with no academic assignment. LU serves specifically concrete cubes and cylinder strength test, and concrete beam elasticity tests. So, it can be said that these laboratories picture dual roles of a laboratory: academic and public performances.

Chronologically, LSDM was established long before LU. LSDM was a unification of three separate laboratories: concrete/material lab, asphalt lab, and structure lab. Those three laboratories were merged in 2007, initiated by that year's the former Head of Civil Engineering Department. The unification was not only motivated by similarity in an academic sense but also to reorganize and to optimize in providing services. Informant ET said, there is "a continuing spectrum, so, if they are separated, there could be overlapping…. Previously no one had predicted, for example, there were external requests for structure tests. Some were taken up by the materials lab, also there was a structure lab" (interview September 10, 2015).

LSDM works mainly for academic purposes. Practicums held in LSDM are integrated with courses that students take. Practicum syllabus in every course can be seen as an obligatory passage points (OPP)—a mandatory stage by which all parts of the Civil Engineering Department, whether it be the students, lecturers, laboratory technicians and administrators, and machines, must pass. With the written syllabus as a rule or guidance, all actors will be projected to converge in practicum activities.

In addition to its academic responsibility, LSDM also provides services for the construction industry community. Those services cover from research activities, testing, building feasibility test, and structural design. In general, there are three classes of testing provided by LSDM: concrete and steel tests (e.g. pressure test, special designed test, bonding test, permeability test, non-destructive test covermeter, Schmidt Hammer test, UPV test, etc.), asphalt tests (e.g. strength test, field density test, Marshall test, etc.), and material test (e.g. Los Angeles abrasion test, soundness test, sand equivalent test, etc.).

Along the way, in 2014 a new laboratory was established. LU was initiated by informant ET who has been the Head of LSDM since 2007. As mentioned above, LU specifically formed as UP2M, which means it does not have any academic responsibility to the Civil Engineering Department. LU was created purely as a professional testing laboratory. Informant ET was fully aware that in today's global economy, there is an

opportunity for professional, independent and certified or standardized laboratory. ET said:

> "Now, with regards to quality, we can compete with others, especially as with globalization many foreign companies are entering [Indonesia]. All of them, when they are doing tests, everything has to be standardized…. Otherwise the customers would not trust us." (Informant ET, interview September 17, 2015)

After LSDM received grants from the Ministry of Research and Higher Education in 2012, ET and the selected members from LSDM that joined LU prepared to gain an official accreditation. By the 10th of July 2015, LU was credited with Accreditation Decree ANI ISO/IEC 17025:2008 and certification bythe National Accreditation Committee. According to ET, LU became the first accredited university laboratory in Indonesia. This process of accreditation, in the next section of this article, will be regarded as the OOP that triggered the translation process.

Furthermore, although those two laboratories formally separated to serve different services, the dynamic of practices between the two is more fluid than what is written in the official documents. Located in the same building, the two laboratories differ in several aspects. First, as previously mentioned, LSDM has more services to offer to the public than LU. Officially, LU is only accredited to provide two kinds of services: concrete pressure test for cylinder and cubes, and elasticity test for the concrete bar. Meanwhile, LSDM covers more services, not only running tests that produce number results but also deliver deep analysis type of services. Moreover, LU and LSDM are distinct in terms of their workflow. This differentiation is the effect of accreditation or ISO standardization. LU with its ISO standard has a longer and more precise workflow. For example, the samples brought by the customer must be reviewed first. There are specific criteria about the age and shape of the sample according to the standard. Another step that differs LU from LSDM is that customers must witness the testing process in order to give their validation to the test. Also, the number of tests done in LU is limited to 70 concrete samples per day. This rule is made to keep the machines' condition optimal.

Another significant difference caused by standardization or ISO accreditation is the changing roles of staffs. For example, the

administration staff (informant F) said that if a customer requests for LU services, her role will be more like a receptionist. However, if there's an order for LSDM, she performs not only as a receptionist, but also responsible for inputting test results. Four out of seven LSDM technicians (laboran) are also working for LU. But this division of labor is actually not so rigid, instead, it has been planned to overlap. The four staffs who work for both laboratories are in charge of specific machines and tests according to their tasks in LU. For instance, one technician (informant Y), who works for both labs, is responsible in LSDM for registering elasticity machines and tools maintenance form, capping process, reviewing samples, and cleanliness of the lab. From those responsibilities, the managers (one of which is informant E as an executive assistant manager or *Wakil Manajer Puncak*) of LSDM have been plotting the four technicians to be responsible for the job they carry out in LU. So, there are intended overlapping technicians' roles in LSDM and LU. In other words, we can infer that ISO 17025 performs as another actor/actant within those laboratories network.

The following section will continue to the analysis after the context has been laid out above. Latour said "You discriminate between the human and the inhuman. I do not hold this bias (this one at least) and see only actors—some human, some non-human, some skilled, some unskilled—that exchange their properties" (Latour 2010:174). According to Latour, sociology is limiting, if not marginalizing important masses for the configuration of society. Non-humanactants are playing as the "necessary stabilizers of human collective" (Sayes 2014:137), so the 'human' society may grow into something complex, like ours now. This 'non-human friendly' kind of approach is more suitable for sociology to study different spheres in social life that is, let's say, commonly studied or regarded as the main focus by the discipline, like the field of sciences.

Latour's research (1993) about the work of Louis Pasteur, is one of the early examples using ANT in STS research. He tried to disprove common (mis)understandingsthat perceived Pasteur's big name and contribution to science was solely the result of an individual's excellence working in a laboratory. Latour claimed (1983), Pasteur's success came due to several other factors. For example, Pasteur had the skill to attract the attention of 'the outsiders of his lab' and made them be in the interest of his discovery. In other words, Pasteur was enrolling or

"capturing others' interest" in his works (Latour 1983:144). Obviously, what he meant by 'others' was also applied to non-human actors.

In our case, the laboratory will be conceived as an association or network of actors whether they are humans or not. Due to its more 'technical' nature than, say, peer group or family, the laboratory will illustrate ANT's ideas, particularly to include non-human actants in social analysis, in a more parsimonious way.

The first step the author did to trace non-human actors in this research is to locate their performance. In order forustoperceivemoreeasilythat non-humanshaveagency, which can be called as actors or actants, Johnson (1988) suggests that we only have to imagine if the non-humans do not exist. What is the agency of a door, for instance? Just picture if it disappears from where it stands. What will change, signifying the disappearance of that door's agency?

The first important non-human agent in the two labs association is the building. These two labs reside in the same 5 story building. The third, fourth and fifth floors are used for other labs like soil laboratory, air laboratory, etc. LSDM and LU are located on the first and second floors. All the spaces on the first floor are occupied by big test machines, accredited test machines, and the administration office. There is no teaching activity on the first floor. LSDM takes the second floor for teaching purposes and also the first floor to run heavy duty tests. Meanwhile, LU only operates on the first floor due to its zoning and lining standardization of OSHA. The offices for both labs are on the first floor, also merged into one office. Here, the social aspect is evident. If only the manager positions for both labs are occupied by different persons, the office will probably have to be separated. In the meantime, informant ET the manager positions of both labs. Although in LU she formally holds the position of vice head manager, she practically runs the lab from day to day, for the head manager position is held by the Head of Civil Engineering Department, and she is responsible to do formal tasks. So, the unification of the office is only possible and becomes more efficient because it is held by the same person.

One special aspect of the building itself is its capacity. Sayes (2014:135) makes a classification or typology for non-human agents in ANT's tradition. One of which states non-human as "a condition for the possibility of human society", or in other words, "necessary stabilizers of the human collective" (Sayes 2014:137). To make human collectivity stable is to give them a space they need to perform. In the case of

LSDM, after its initial construction in 1987, its capacity is waning due to the increasing numbers of students in Civil Engineering. Informant ET told me that the department has already planned to renovate and build a bigger laboratory. But the problem is, in ANT-ian perspective, to enroll significant or focal non-human agents is to make a whole new and different translation process. ET and her colleagues in the department need to make another proposal for grants from the Ministry of Research and Higher Education (*Pendidikan Tinggi/Dikti*). However, it won't be easy to capture Dikti's interest, because the department has already plotted the budget for education development in eastern Indonesia. Here, the Civil Engineering Department must make a strategic 'narrative' to seize Dikti's interest, something like the need for advanced labs in the age of global development and national government infrastructure programs.

Furthermore, we can identify easily another form of non-human actants, namely machines and tools. To recognize machines and tools as actants is to say that they possess agency. But what is actually an actor/actant in ANT's conception? Latour (1996:54) describes it in the simplest definition, the actor is "something that acts or to which activity is granted by others." Technicians grant activities to be carried out by machines. For example, technicians expect the machines to process a certain test and produce definite information in the form of numbers. Nevertheless, for ANT the focus is not about the actors' agency per se, but what makes that agency possible. Agency cannot be detached from the embeddedness of actors in the network. A machine can only act if there is a capable technician to delegate action to it. Likewise, a technician not only can act but can also be one if and only if there is a machine that she/he can perform his/her agency on.

Another empirical and imaginable example of a machine or tool's agency in this research is the case of heat-resistant gloves and oven. In LSDM there is an oven for drying washed samples brought by the customer. There is a warning sign on the door of the oven, reminding people to wear heat-resistant gloves before operating the oven. What can we infer from this seemingly mundane process? The 'interaction' between technician (human actor) and oven machine (non-human actor) is only possible by the presence of another actant acting as an intermediary. Without the heat-resistant gloves, it is not only hard, but it would be dangerous for the other two actors to interact with each other. This triadic net of work consists of more than just a trial of force

or workflow. This technical relation also contains the 'moral' aspect. Latour's example of the seatbelt (2010) and speed bump (2005) illustrate how non-human actors are delegated not only with action but also with moral, in this case, is the value of safety in driving cars. One more instance is efficiency, precision, and credibility consideration to replace analogue scales with digital ones.

In the next discussion, we will examine the translation process in the case of LU. Latour and Callon ask "how can men act like 'one man'?" (Callon and Latour 279). Their argument is by going through a translation process. So, in simple words, translation is the process through which a network of actors is acting as one collective. As stated above, translation is divided into four steps. First of all, is the problematization. In this research, accreditation or ISO standard was the goal or OPP that sets in motion the constellation of the network in LSDM into LU.Here we can identify who were the focal actors that brought up the program as OPP or the problem of the network.

ET plays a crucial, for lack of better terms, role as an authoritative expert in bringing the ISO accreditation as the goal that has to be achieved by the new projected LU. She reads the opportunity, she foresees the prospects, for she understands the constellation of the construction sector in the national scope. Then, she and other managers set the limitation of the LU. Not all the tests in LSDM will be accommodated by LU. LU focuses only on pressure and elasticity test, whereas the other three are stationed to work for LSDM. Here the problematization stage is almost finished.

Next step is interessement, which is the process to not only 'recruits' actants into the network but also cuts the undesired ones. We can observe both processes by how four of seven technicians are chosen for their familiarities with tests served by LU. Furthermore, even though as a part of the LSDM, those four technicians are still granted responsibilities related to LU. The sole and only administration staff, informant F will take the overlapping position between LSDM and LU. The limitation of the test makes the LU concentrate on advancing two types of machines and other supporting machines or tools. And then, zoning is one of the most observable elements in establishing LU. In the second, third floor, and so on, we will not find any zoning and lining for safety purposes. This seemingly trivial attributes, if we examine closer, are injected with 'moral' contents to meet the ISO standard.

If these linings do not exist, the ISO standardization may possibly be withdrawn.

In our case, distinct from Callon's case of scallops domestication, LU can be formed by the time an official document from the Civil Engineering Department is published. However, as a network in ANT's sense, the official document is just the beginning. Formal enrollment may be finished, but for ANT-ian organizational study the focus is not about the organization as a discrete structural entity, but to study the process and practice of organizing (Alcadipani and Hassard 2010). So, the relevant examination in our case is about what the actors do within the network to keep the association intact and to increase the level of irreversibility in order to achieve a black box status—i.e. an association "contains that no longer needs to be reconsidered, those things whose contents have become a matter of indifference (Callon and Latour 1992:285). But the black box, once again, is not about substance since ANT rejects the idea, but is about subsistence, "maintenance in existence through the leap of reproduction" (Latour 2013:106).

In LU the enrollment stage, in which redefining and negotiating actors' identities happen, managed by several methods. For instance, training as actors, to upskill or diversify capabilities of the technicians, are held in LU once a month, or at least once in two months depending on the service orders or workload of LSDM and LU's staffs. The training is facilitated not only by the internal team members, like ET but also by experts from the Faculty of Mathematics and Natural Sciences, Metallurgy Department, etc. The trainings cover various topics related to testing, both practical (e.g. reading decimal measurement or operating computers) and theoretical (e.g. the characters of concrete) knowledge. As another strategy to keep the enrollment unharmed, ET implements a policy for the four laboratory technicians of LU where they are given shifts to operate both kinds of tests. So, the four technicians (for capability purposes) are able to carry out those two tests and (for human management purposes) prevent them from feeling bored for doing monotonous testing. In the end, mobilization, as the last stage of translation, is about resolved negotiation between actants and to mobilize alliance in achieving or maintaining its goals. To mobilize the entirety of alliance is to have representatives or spokesmen that "speak or act on behalf of other actors or forces" (Callon and Latour 1992:279). In our case, the spokesman, without a doubt, is ET.

THE MISSING 'POINT OF VIEW'

There is a unique phenomenon observed in LSDM&LU. When I showed the organizational structure of LU to one of the LU technicians (informant Y), he was surprised to find out that some of his fellow laboran/technicians in LSDM are not mentioned in the document. He then gave his friend (informant K) a look at the document, and they discussed the names of LSDM technicians missing from the LU document for a while. He assumed that every LSDM technicians are also LU technicians. He based his assumption on the fact that all of the LSDM laboran are participating in every training, as an inclusion mechanism towards the working standard implemented in LU. His confusion indicates, at least, that the identification and negotiation process, especially along the interessement stage, was not carried out transparently to make sure each actor are fully informed about why and how they are picked to join the 'new' network.

Moreover, the fact that actors may not be recognized whether they are included or not into a certain network sometimes is not all up to their awareness or will. Within conventional sociology, the term 'top to bottom' illustrate that a social form or collectivity are brought into shape involving the help of a force if not coercion. The acceptance of bottom actors is not the main adhesive of such collectivity. ANT, in this regard, gives no help considering its focus on actors' act rather than its mental state about their membership or involvement in a network.

If we critically examine the LSDM process of specialization into LU, it is hard not to focus on informant ET's point of view of the importance of LU either for her faculty or for the construction industry in Indonesia. She is the one who understands the most about the role that LU can play out in the future. It is what makes her a focal actor in LSDM and LU networks. This centrality can be much more obscured if we stick to the generalized principle of ANT. ANT assumes all the actors play or act on a level plane to build a network whose friction examined by the flow of acts rather by other traditional concepts such as domination, inequality, etc.

Actually, this issue of implementing generalized principle is nothing new for ANT. It is not just about ANT sometimes failing to recognize the qualitative differences of the points of view among human actors; moreover, it runs deeper. According to Crossley (2011:44), ANT sociologists, no matter how interested they are in stressing the 'roles' of

non-human actors, still they are "at pains to emphasize the significance of the (non-human) actor's point of view but in practice this means to point of view of human actors." In other words, even ANT sociologist as Latour himself is facing a fundamental difficulty to shift their perspective into the non-human mind, if it has any sort of mind at all.

The point is, ANT's focus on network-making based on acts will overlook the non-active and non-actual elements in the dynamic process. The actors' willingness to be a part of a network is merely inspected or weighted by their action, not by their mental aspects, be it knowledge, well-informed awareness, reflexive consciousness, and so on. Thus, it will be a challenge for ANT to speak about a structure, or in their term, an irreversible network that is oppressive in their nature. A speed-bump is acting the same as the policeman that is to make drivers drive slowly. To put differently, those two actors circulate the same moral content in their action in regard to driving behavior. However, it is a totally different experience when people of color are facing a speed-bump and a policeman in Trump's America. Does this mean that a skin color also a non-human actor? What does it do within the network? Does it contain a certain action morality? These kinds of questions will be hard to answer if ANT limits its focus only on circulation of action, rather go somewhere deeper the way Bhaskar did. To use Harman's (2009) words, for Latour, and ANT in this sense, nothing transcends actuality. While Bhaskar based his philosophy on a transcendental question which asks what the "condition for some other practice, form of cognition, or activity" is (Bryant 2011:42), Latour only focuses on the trials of strength where actors grow stronger or weaker depend on joining or being cut off from associations, without scrutinizing deeper structural aspects of why one might be kicked out of any association. For people sometimes are cut off only because of their sex or skin color, and of course it is not merely because of those things. Those things hide or close something deeper, a mechanism that to some extent governs the 'upper layer' of it which is the actual itself. Thus, for its avoidance to go beyond what is actual, ANT "is proudly guilty of what Roy Bhaskar and Manuel DeLanda both call 'actualism'" (Harman 2009:16).

Nonetheless, in our case study, an alliance can still be mobilized even though some actors are not completely aware of the identification and negotiation processes. In other words, the boundaries within and between two laboratories are not drawn or demarcated in a rigid fashion. This is only possible because the interests and identities displacement

of the new alliance (LU) is very close to the previous actor-network (LSDM).

CONCLUSION

An association, be it formally/legally established or not, is the solidification of the activities practiced by the actors within the network, which in turn, makes the trial of forces/strength between actors doable. Like what Latour said, "no work, no group" (2005:34), the practices areprecisely what shape and bind a group together. In this research, we examine the laboratories as associations comprised of actor-network in which practices carried out, in order to sustain and increase the level of irreversibility.

Furthermore, the creation and transformation of actor-network have to pass through the process of translation. A distinctive piece of data in this research, regarding the last stage of the translation, shows that an alliance can still be mobilized even though some actors are not completely aware of the identification and negotiation processes, which were exercised through the interessement and enrollment stages. However, this happens only because there is a lot of similarities between the two associations, e.g. the locus, members, type of activities, of LSDM and LU. Furthermore, it also illustrates the limit of action-focused in the ANT framework.

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