

How to Submit Proof Corrections Using Adobe Reader

Using Adobe Reader is the easiest way to submit your proposed amendments for your IGI Global proof. If you don't have Adobe Reader, you can download it for free at <http://get.adobe.com/reader/>. The comment functionality makes it simple for you, the contributor, to mark up the PDF. It also makes it simple for the IGI Global staff to understand exactly what you are requesting to ensure the most flawless end result possible.

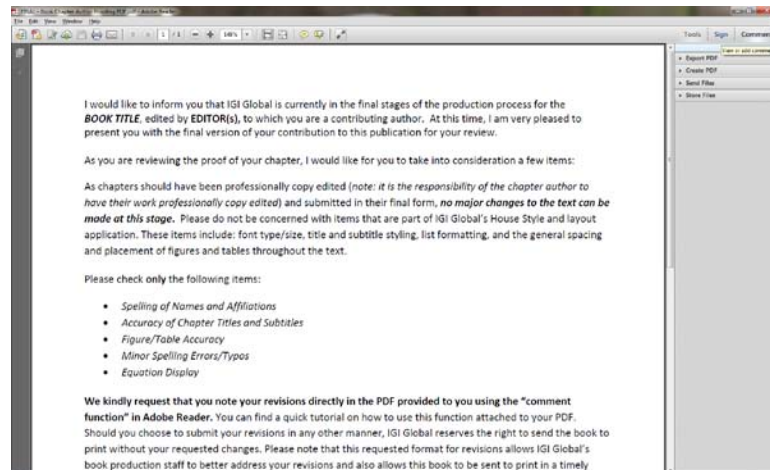
Please note, however, that at this point in the process the only things you should be checking for are:

Spelling of Names and Affiliations, Accuracy of Chapter Titles and Subtitles, Figure/Table Accuracy, Minor Spelling Errors/Typos, Equation Display

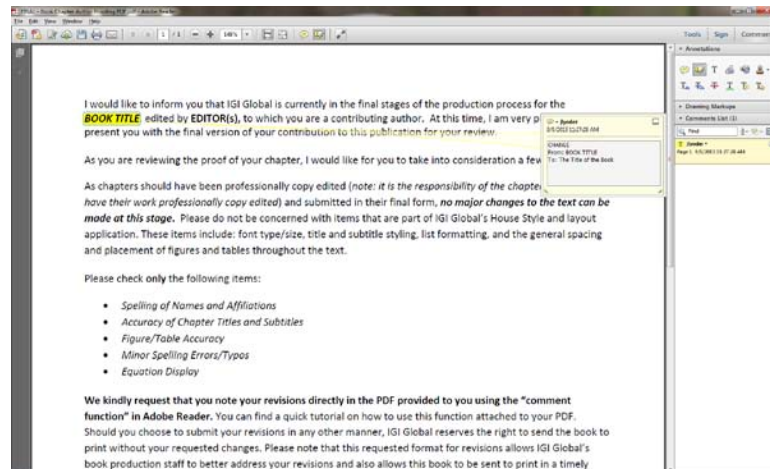
As chapters should have been professionally copy edited and submitted in their final form, please remember that **no major changes to the text can be made at this stage.**

Here is a quick step-by-step guide on using the comment functionality in Adobe Reader to submit your changes.

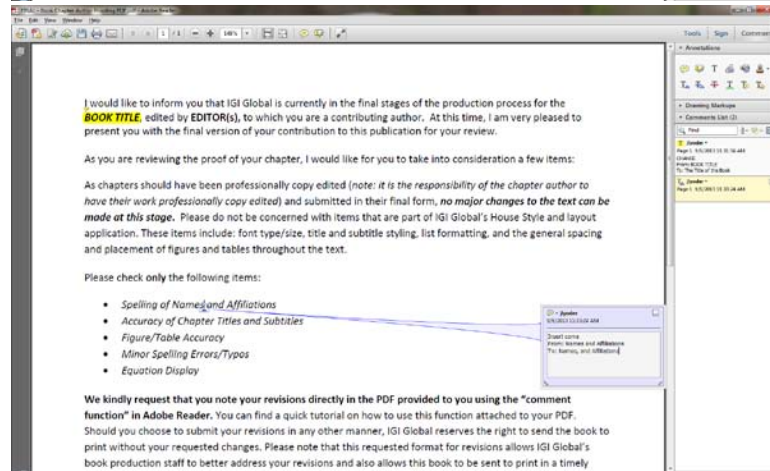
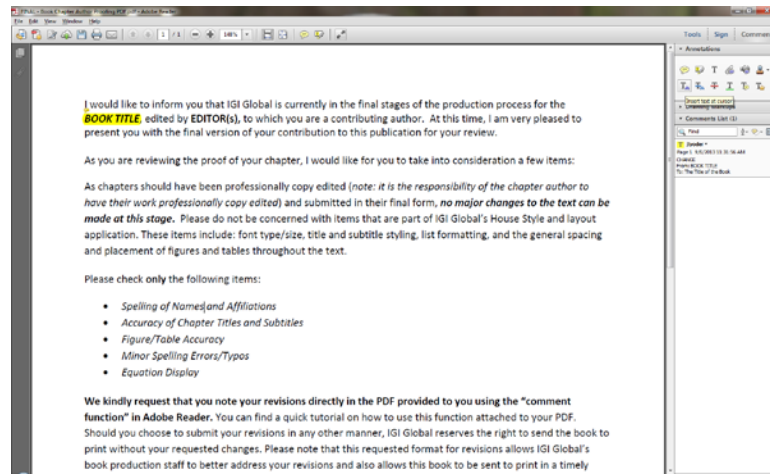
1. Select the **Comment** bar at the top of page to View or Add Comments. This will open the **Annotations** toolbar.



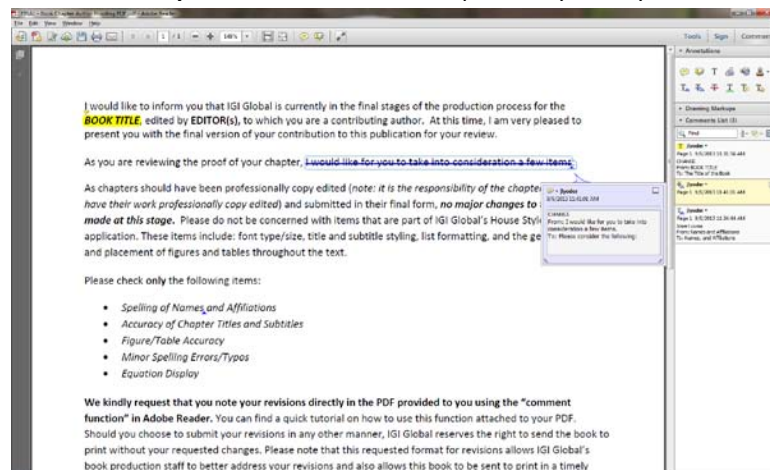
2. To note text that needs to be altered, like a subtitle or your affiliation, you may use the **Highlight Text** tool. Once the text is highlighted, right-click on the highlighted text and add your comment. Please be specific, and include what the text currently says and what you would like it to be changed to.



3. If you would like text inserted, like a missing coma or punctuation mark, please use the **Insert Text at Cursor** tool. Please make sure to include exactly what you want inserted in the comment box.



4. If you would like text removed, such as an erroneous duplicate word or punctuation mark, please use the **Add Note to Replace Text** tool and state specifically what you would like removed.



IJANTTI Editorial Board

Editor-in-Chief:	Arthur Tatnall, Victoria U., Australia
International Advisory Board:	Wojciech Cellary, Poznan U. of Economics, Poland Allan Pitman, U. of Western Ontario, Canada Lorna Uden, Staffordshire U., UK
Associate Editors:	Chris Bigum, Griffith U., Australia Tiko Iyamu, Tshwane U. of Technology, South Africa Stoyan Tanev, U. of Southern Denmark, Denmark Ivan Tchalakov, Sofia U., Bulgaria Jonathan Tummons, Durham U., UK Nilmini Wickramasinghe, RMIT U., Australia

International Editorial Review Board:

Ali Ahmad Alawneh, Philadelphia U.-Jordan, Jordan
Magdalena Bielenia-Grajewska, U. of Gdansk, Poland
Antonio Cordella, London School of Economics, UK
Bill Davey, RMIT U., Australia
Antonio Diaz Andrade, Auckland U. of Technology,
New Zealand
Jose Figueiredo, Technical U. of Lisbon, Portugal
Tony Gilding, Charles Darwin U., Australia

Fernando Gonçalves, CEG-IST, Portugal
Stephan Kaiser, WHL Lahr, Germany
Mary Anne Kennan, U. of New South Wales, Australia
Rennie Naidoo U. of the Witwatersrand, South Africa
Allan Pitman, U. of Western Ontario, Canada
Johanes Priyatma Eko Sanata Dharma U., Indonesia
Markus Spoehrer U. of Konstanz, Germany

IGI Editorial:

Jamie M. Bufton, Managing Editor	Jennifer Yoder, Production Manager
Adam Bond, Editorial Assistant	Adrienne Freeland, Publishing Systems Analyst
Jeff Snyder, Assistant Copy Editor	Ian Leister, Production Assistant



IGI PUBLISHING

WWW.IGI-GLOBAL.COM

INTERNATIONAL JOURNAL OF ACTOR-NETWORK THEORY AND TECHNOLOGICAL INNOVATION

July-September 2013, Vol. 5, No. 3

Table of Contents

EDITORIAL PREFACE

- iv *Arthur Tatnall, Department of Information Systems, College of Business, Victoria University, Melbourne, VIC, Australia*

RESEARCH ARTICLES

- 1 **Information Systems and Actor-Network Theory Analysis**
Tiko Iyamu, Department of Business Computing, Polytechnic of Namibia, Windhoek, Namibia
Tefo Sekgweleo, Department of Informatics, Tshwane University of Technology, Pretoria, South Africa
- 12 **A Critical Review of the Ontological Assumptions of Actor-Network Theory for Representing e-Government Initiatives**
Johanes Eka Priyatma, Department of Informatic Engineering, Sanata Dharma University, Yogyakarta, Indonesia
- 25 **The (Re-)Socialization of Technical Objects in Patient Networks: The Case of the Cochlear Implant**
Markus Spöhrer, Department of Literature, University of Konstanz, Konstanz, Germany
- 37 **Two Computer Systems in Victorian Schools and the Actors and Networks Involved in their Implementation and Use**
Bill Davey, School of Business IT and Logistics, RMIT University, Melbourne, VIC, Australia
Arthur Tatnall, Department of Information Systems, College of Business, Victoria University, Melbourne, VIC, Australia
- 47 **How Using ANT Can Assist to Understand Key Issues for Successful e-Health Solutions**
Imran Muhammad, RMIT University, Melbourne, VIC, Australia
Manuel Zwicker, RMIT University, Melbourne, VIC, Australia
Nilmini Wickramasinghe, RMIT University, Melbourne, VIC, Australia & Epworth HealthCare, Richmond, VIC, Australia

Copyright

The **International Journal of Actor-Network Theory and Technological Innovation (IJANTTI)** (ISSN 1942-535X; eISSN 1942-5368), Copyright © 2013 IGI Global. All rights, including translation into other languages reserved by the publisher. No part of this journal may be reproduced or used in any form or by any means without written permission from the publisher, except for noncommercial, educational use including classroom teaching purposes. Product or company names used in this journal are for identification purposes only. Inclusion of the names of the products or companies does not indicate a claim of ownership by IGI Global of the trademark or registered trademark. The views expressed in this journal are those of the authors but not necessarily of IGI Global.

The *International Journal of Actor-Network Theory and Technological Innovation* is currently listed or indexed in: Australian Business Deans Council (ABDC); Bacon's Media Directory; Cabell's Directories; DBLP; GetCited; Google Scholar; INSPEC; JournalTOCs; MediaFinder; The Index of Information Systems Journals; The Standard Periodical Directory; Ulrich's Periodicals Directory

A Critical Review of the Ontological Assumptions of Actor-Network Theory for Representing e-Government Initiatives

Johanes Eka Priyatma, Department of Informatic Engineering, Sanata Dharma University, Yogyakarta, Indonesia

ABSTRACT

The potential contribution of Actor-Network Theory (ANT) for representing e-government initiative flows from its ontological assumptions. However, these assumptions have never been critically reviewed using real e-government cases. Using two e-government cases in Indonesia, the paper tries to provide real evidence on how meaningful are all ontological assumptions of ANT for representing e-government.

Keywords: Actor-Network Theory (ANT), e-Government, Initiative, Ontological Assumption, Ontology

INTRODUCTION

Many strategies have been proposed to better manage the development of e-government for its failure is very high (Heeks, 2003). However, a good development strategy should be based on the most appropriate conception of e-government. To achieve this, one should focus on the ontological level of understanding to e-government. As a complex socio-technical system that involves many issues and actors (Ciborra, 2005; Krishna & Walsham, 2005; Stanforth, 2006; Yildiz, 2007; Akther et

al.,2007), e-government could be conceptualized from different perspective and assumption. One promising perspective is offered by Actor-Network Theory (ANT) as used by some researcher (Madon et al.,2004; Stanford, 2006). Unfortunately, there is no study to review how meaningful are all ontological assumptions made by ANT to represent e-government that in turn will be useful for developing it.

Ontology is a branch of philosophy that deals with theories about the nature of things in general. It concerns with claims and assumptions about the nature of social reality or

DOI: 10.4018/jantti.2013070102

about what exists. It focuses on answering the question of “existence” or “being”. Therefore, ontology aims to discuss how to foundationally represent reality in such a way that it could fully reflect or mirror what we believe to exist. As Actor-Network Theory (ANT) provides “new perspectives on sociological method, notably through analysis of deconstruction and representation, reflexivity and ‘otherness’, managerial power and organizational technologies, and the ontological status of theories” (McLean & Hassard, 2004 p. 516), it is relevant to question how some of its ontological assumptions provide meaningful ways of representing the nature of an e-government initiatives. It is especially important as e-government is a promising technological innovation but its implementation is always problematic. Moreover, the interaction and involvement of ICT as its non-human entity in e-government increasingly define its existence.

Since ANT has four ontological assumptions in perceiving social reality as an actor-network, its representational meanings will be related with each of them. They involve issues of dualism, asymmetry, actors, action and power (Castree, 2002). Based on findings from two e-government project cases, the paper will critically review how each of these ontological assumptions provides meaningful understanding of the dynamic development of an e-government initiative.

LITERATURE REVIEW

The literature review focusing on ontological assumptions of ANT and the role ANT in e-government development aims to identify the knowledge gap in philosophical level of using ANT for e-government development.

The Ontological Assumption of ANT

Using the metaphor of heterogeneous network, the core assumption made by ANT is that realities are all effects generated by networks or relationship of diverse entities (Law, 1992). All

human and non-human involved in this network are labelled as actors or actants. This network is constructed in the mind of the researcher and there is more than one possible network. The constructed network depends on the researcher’s concern that affects which actors are to include and which are not. It also affects the kind of relationship that ties the actors in this network. In this respect, “social reality is constructed by particular social actors, in particular places, at precise times. We always operate in local situations in the context of interactions.” (Harrison & Laberge, 2002, p. 501).

In understanding reality as an actor-network, ANT makes assumptions that include three aspects, namely agnosticism, generalized symmetry, and free association (Callon, 1986; Michael, 1996; Doolin & Lowe, 2002). Meanwhile, Castree (2002, p.117) discusses the ontological assumption of ANT in a more detailed manner and, therefore, he includes also the aspect of conceptualizing actors and action, and a “de-centered” understanding of power. In addition, Castree (2002) relates the issues of binarism/dualism, asymmetry, and actors to refer the ontological assumption given by Callon (1986) respectively. Although the issues of action and power are consequences from those three ontological assumptions given by Callon (1986), Castree (2002) provides description how to understand them appropriately. For this reason, the four issues given by Castree (2002) will be discussed and later used to answer question related to the ontological assumption of ANT.

Binarism/Dualism

ANT holds basic ontological assumption that social reality is a complex network of relationship that always involves human and non-human entities/actors (Law, 1992). There is no purely social or purely technical world but rather a socio-technical one (Law, 1992). ANT rejects dualism by levelling the “Great Walls” that separate between the social (human) and the technical (non-human). ANT offers ontology to transcend this dualism by postulating that strict separation of human and non-human

entities should be ignored. Alternatively, ANT argues that there is neither purely human nor purely non-human because reality consists of hybrid entities. Latour (2005) claims that ANT is a response to the limitation of social theories of modernity and variations of postmodern that tend to divide nature and society into two incommensurable poles. Modernity assumes that nature is only observed and never human-made whereas society is only made by humans. ANT brings the hybrid reality of nature and society into its analytical domain. ANT aims to show that the separation introduced by modernity and postmodern is artificial (May & Powel, 2008 p.139). It is because reality is “simultaneously real, like nature, narrated, like discourse, and collective, like society” (Latour, 2005 p.6).

Asymmetry

ANT has no a-priori assumption on the superiority of humans or non-humans in determining the stability of phenomenon as an actor-network. Therefore, ANT moves beyond the asymmetrical approach to non-humans (nature) by recognizing humans (the society) and nature as co-constructive within a myriad of networks. This symmetrical assumption does not mean that the natural entities and the social entities exist independently of each other. Rather, it is an understanding that it is possible and necessary to attend to the “ontological, causal and moral particularities of natural entities...without reverting to the notion that nature is, should or could be a/social” (Castree, 2002, p. 120). In this light Latour (1999 p.308) comments that nature “is not considered as the commonsense external background of human and social action but as the result of a highly problematic settlement.”

Conceptualizing Actors and Action

Because ANT rejects dualisms and focuses on co-construction, agency is then a relational effect generated by interacting components whose activities are constituted in the networks of which they are parts (Castree, 2002). Consequently, ANT does not focus on acting as a

human-centered activity. The approach attempts to accept actors as being a combination of both social and natural, calling “for a conception of action and actors which is multiple, contingent and non-essentialist” (Castree, 2002, p. 121), where action is conceived of not requiring “speech or intentionality as we normally understand it” (Castree, 2002, p. 121). This allows agency to be conceptualized in such a way that opens the possibility to include, or at least consider, diverse forms of action and, in turn, diverse actors.

Power

Since agency is a relational effect then ANT conceptualizes power as “a *shared* capacity, involving myriad natural actants as much as social ones, which is thoroughly *decentred* in different networks” (Castree, 2002, p. 121). Power does not come from an actor somehow “possessing” it, but rather from his being able to enrol, enlist and convince other actors to allow the initial actor to represent them (Murdoch, 1995).

To integrate the separate domains of nature, language and society, ANT grants actor status to human as well as to non-human entities in which they are integrated into networks and sometimes encapsulated in black boxes (May & Powel, 2008 p.139). These networks can be read through the inscription in the intermediaries, which circulate within those networks. The resulting form of these networks varies. It can be an organization, a technology artefact, an information system, or an e-government system.

ANT and E-Government Research

Although ANT has been used as a theoretical framework for many IS related research but it is rarely used for e-government research (Heeks & Stanforth, 2007). These few research focus on how to understand the creation, expansion and stabilization of an actor-network. Madon et al. (2004) employed Callon (1991) four moments of translation framework to discuss the story of property tax reform process. They argue that such a perspective helps to go beyond

studying innovation processes through the lens of “technology diffusion” and provides a more interesting and insightful perspective of “technology translation”. Lines (2005) uses ANT translation and inscription to understand the process of coupling and decoupling happened in the development of a health care system in Norway and he concludes that decoupling is just a special case of coupling. He also concludes that the notion “IT as an enabler” for e-government reform is not appropriate. Esnault et al. (2006) applies ANT to define a methodology used in Participatory Design Approach that will foster the participation of heterogeneous stakeholders during the development of developing interoperable services for helping communities of practices in Europe. It is found that ANT concepts are useful to analyse the design context. Heeks and Stanforth (2007) use ANT local/global framework to explain the trajectory of an e-Government case study. This ANT perspective provides a valuable insight into the local and global actor-networks that surround e-government projects. The mobilization, interaction and disintegration of these networks underpin the course of such projects. In relation to power in a network, Heeks and Stanford found the relevance of the concept of ‘power to’ as a dynamic exercise of power to replace the concept of ‘power over’ which tend to be static and passive. In the public sector IS, Mitra and Campoy (2008) use ANT framework to demonstrates the important role that perceptions of success tend to play within large scale implementation of IS project such as Common Wealth Game IS project. They then propose to organizers, scholars, and public sector specialists to recognize the important role of alignment of actor networks for such large organizational information systems. Lastly, Ochara (2010) used ANT to trace inscription process in the development of e-government in Kenya and found that global actors’ interest were stronger inscribed than the local actors’ interest.

From those researches, the ontological assumptions made by ANT are taken for granted. Very few authors (Callon, 1986; Collins & Yearley, 1992; Doolin & Lowe, 2002; Klecun,

2004; Cordella & Shaikh, 2006) question about them and almost no research relate them with e-government development research. Therefore, the paper can be positioned as filling this gap since most research on e-government using ANT focus on using actor-network as metaphor but never question its underlying assumption.

METHODOLOGY

Data used for this interpretive case study were gathered in 2009 to 2010 from two e-government projects in Indonesia. Yogyakarta Cyber Province Initiative (YCPI) and Sragen One Stop Service Initiative projects were selected. These two projects are the appropriate cases since the first is considered as problematic but the second is a successful one. Data gathered include factual (numerical), textual, audio, and visual event. Data were collected by observing at the two project sites, inspecting archival documents, browsing their websites, and recording semi structured interviews. The interviews were conducted in local language and involved 22 and 15 personnel respectively. All interview sessions lasted from 30 to 90 minutes. Recorded interviews were transcribed fully before they were analysed thematically.

CASES DESCRIPTION

Case 1: Yogyakarta Cyber Province Initiative (YCPI)

Realizing the potential contribution of ICT to improve the low quality of public services from the provincial administration of Yogyakarta, YCPI aimed to promote a new model of managing province in such a way that it would transform the way the state government efficiently and effectively delivered its services to public. The model aimed to enable the provincial government to be more public service-oriented and to speed-up the state development by intensively using ICT. To solve this transformational problem, YCPI involved many actors. The description of actor’s roles,

interest and conditions could better be described by a network of interests owned by each actor as presented in Figure 1. This network represented the fact that government transformation would only happen if an alliance amongst (a) The head of various offices want to fully participate in government reform program to serve people better; (b) Province Information Office (PIO) staffs are consistently willing to manage the implementation of YCPI; (c) The Governor of Yogyakarta keeps wanting to serve people better; (d) ICT infrastructure functionally operates well; (e) Team for Innovation and Change is continuously supporting change initiatives; (f) Partnership for Government Reform Organization wants to make governance reform successful.

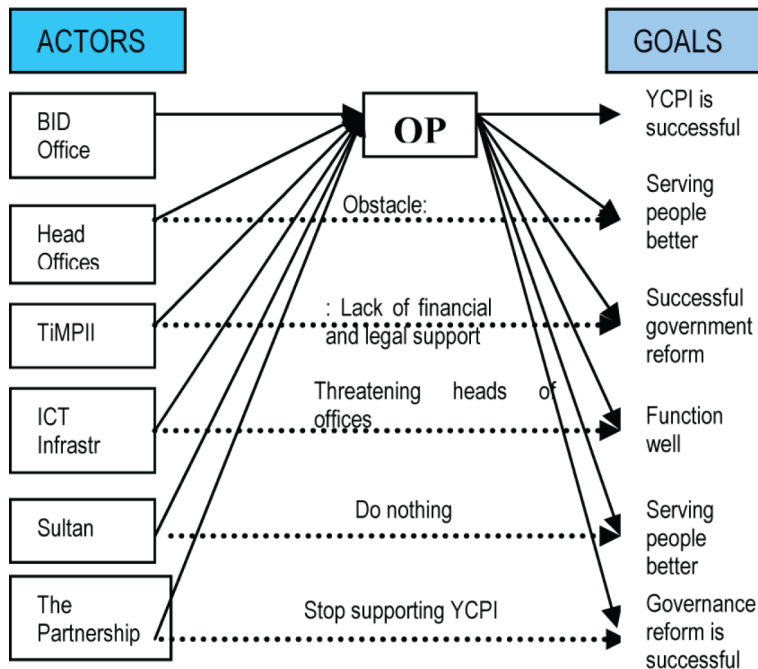
To solve the above mentioned problems, YCPI involved six offices to develop its own service of excellence as follows:

- **Education Office:** To improve education quality through Yogyakarta learning gate-

way, regional digital library and knowledge centre network;

- **Industry and Commerce Office:** To improve revenue and welfare of the society by enhancing commercial growth. It is achieved by increasing access to global as well as regional market and building SME (Small Medium Enterprise) business centre;
- **Agriculture Office:** To improve farmers' welfare through agro-business programs by providing information on agro-business and market;
- **Transportation Office:** To improve regional economic activities through the development of a good transportation services;
- **Tourism Office:** To improve people's welfare and competitiveness through tourism promotion;
- **Fishery Office:** To facilitate the development of fishery community and their competitiveness.

Figure 1. Actor-network of YCPI



Staffs of PIO expressed differently in perceiving the progress of YCPI ranging from being realistic to pessimistic. Those who were realistic consider YCPI as a long term dream and it would automatically be successful as public's readiness and demand increases over time. Those who were pessimistic argued that such similar initiatives had been introduced many times long before the notion of e-government existed and had never been successful. One of PIO staffs who had been actively involved in developing computer-based application for government sectors expressed his pessimistic stance by saying:

Though there are many small-scale IT applications that have been used to support government activities like SIMPEG (personnel records system), but after waiting for a long time many people keep questioning what the real contributions to society of all these initiatives are?

Among the six services of excellence, only education and commerce programs were considered moving to achieve their goals. The education service of excellence even received support from Ministry of Communication and Information (Menkominfo) through a Japan-funded project to strengthen school ICT-readiness by distributing computers and connecting school computers to the province's library network. The industry and commerce service of excellence program managed to setup and maintain the so called Yogyakarta Business Service Center (YBSC) to help business community easily get support and exchange information with government agencies and business communities. This centre offered several services to SME (Small Medium Enterprise) in the form of advice, consultation, and training in the area of marketing, management, ICT adoption, and partnering.

Although the Governor of Yogyakarta officially launched the *Agricenter* (the service of excellent of Agriculture Office) on July 1st, 2009 but less than one year later (May 2010) *Agricenter* was down and could no longer be accessed. When the staffs managing the website

in Agriculture Office were interviewed, one of them explained that:

... honestly we have no competence to manage this. Now we have only one non-permanent staff who has ICT background and we are still planning to hire one more staff.

Transportation Office planned an ambitious transportation information system by integrating it with IP-based digital camera installed in some crowded main road in Yogyakarta. The system was projected to provide real time vehicles traffic situation in some main roads in down town Yogyakarta. Unfortunately, until March 2010 the transportation information systems had never been implemented. the head of Transportation Office explained why its service of excellence could not be successfully implemented as follows:

Obstacles from our office to implement our service of excellence include low understanding, readiness and commitment of our staffs. We also face organizational and financial problems. Besides, I think for the last 4 years of implementing YCPI, the even bigger problems were found in the provincial level...

The tourism service of excellence program has been developing a good website to promote tourism in Yogyakarta. The website published some tourist destination sites, hotels, events, and the tourism activities. It also published news related to tourism and tourism office activities. Unfortunately, the website was written only in the Indonesian language. Many foreigners were disappointed and felt cheated since the name of the website was www.visitingjogja.com which is an English term. Though the published information was very interesting and could help tourists when visiting Yogyakarta, they were neither accurate nor complete as reflected by many visitors' complaints in its guest book.

A promising result from fishery service of excellence was the development of Fishery Business Center. It was a website (<http://fbc>).

perikanan-diy.info/home.php) to effectively connect buyers and suppliers of fish products. Buyers could easily distribute their demand via SMS (Short Messaging Systems) to Fishery Office that subsequently distributed them to all registered suppliers. Conversely, anytime a supplier could send information about their available products by sending message to Fishery Office that will forward it to all registered buyers. Although the initiative was in line with the formulated service of excellence from Fishery Office but the number of users of this facility was very limited. As of March 2010, there were less than 20 registered suppliers and less than 15 registered buyers. More importantly, the recorded activities of selling and buying fishery products were limited and were not done daily.

Not only those implementation failures that affected YCPI performance but the introduction of government regulation No. 41/ 2007 made YCPI uncertain. This regulation that limits the number of offices in the province as well as in local administration level had eventually been used to dissolve the existence of PIO and was finally reduced into just a section of the Transportation and Communication Office.

Case 2: Sragen One Stop Service Initiative (SOSSI)

The main idea to establish SOSSI was very simple but fundamental, namely how local administration of Sragen regency fulfilled its mandate to better serve public license inquiry by providing simple, transparent, accountable, and one-stop service. This new kind of service tried to replace the common practice of government service where citizens had to undergo complicated and unclear process as through several different offices. Using this idea, the local administration of Sragen tried to implement not only an effective and efficient government administration but also a new paradigm of work culture that focused on treating citizens as government's customers.

The most crucial part in establishing SOSSI was to get support from various heads of offices

who were currently holding authority to issue licenses. It was common that not only the head office but also some lower-level government staff abused "power" and authority to manage, control, and complicate the issuance of licenses for their personal benefits. Another problem was how to efficiently run the one-door service just like a private entity. To manage this situation, the head of Sragen regency (the common term for the head of regency in Indonesia is "Bupati") conducted many meetings to promote, explain and solicit support by involving related heads of offices, some important personnel from his own office and other local legislative bodies. He then problematized the establishment of SOSSI by defining the roles of each involved actor. Figure 2 provides the description of the roles and relationship of some important actors involved in the problematisation process. This description precisely portrays that the establishment of this one stop service involved complex actor-network of heterogeneous elements.

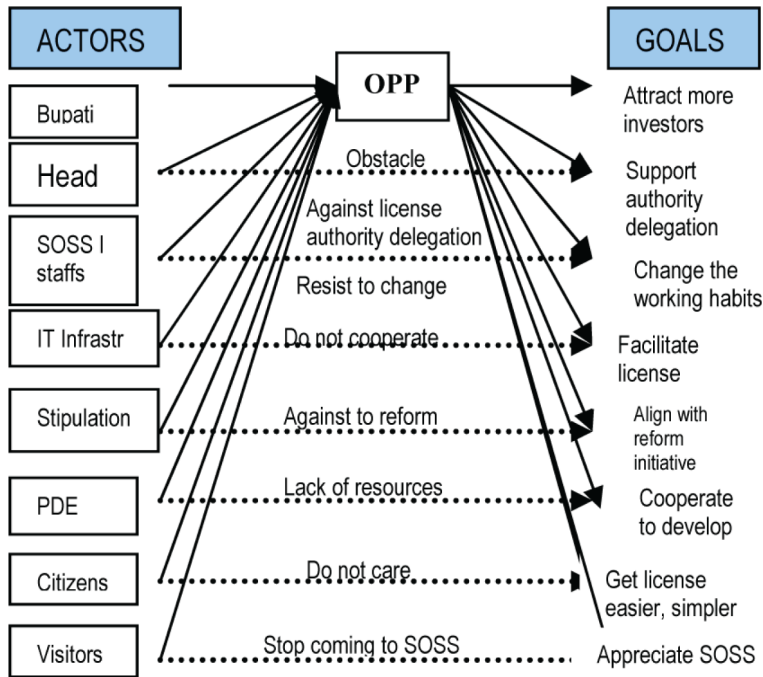
The Bupati attempted to influence and stabilize all the actors he defined in the previous step by introducing several attractive programs. These programs extended and materialized the hypothesis he made concerning the success of SOSSI which included:

1. License inquiry should be simple, fast, and transparent;
2. Offices involved should support by returning its authority back to Bupati;
3. SOSSI staffs could be transformed to become professional workers;
4. ICT and private sector practice could be fully adopted;
5. Excellent license services would attract more investors.

Using these hypotheses, Bupati implemented three new important interestment devices which are:

1. Granting SOSSI unit an authority to issue licenses after retracting that authority from various offices;

Figure 2. The problematisation network of SOSSI



2. Facilitating SOSSI to adopt corporate work culture and management equipped with new reward system;
3. Providing incentives to members of the business community who wants to initiate operation in Sragen.

Some indicators could be attributed to account for the success of SOSSI. From the citizens' point of view, the simple, transparent, and accountable services are found satisfactory for them. Based on service satisfaction survey with 150 respondents conducted twice a year, the customer satisfaction index increased from year to year. On the last two surveys, the customer satisfaction index scored 83.995% and 84.005% respectively. The index involved 14 variables to measure overall SOSSI performance in serving its customers. This index was developed using guidelines provided by the Indonesian Ministry of Government Staffs

Empowerment and Discipline. One customer who was also an entrepreneur justified SOSSI performance by saying:

This SOSSI is very beneficial for business since I always get help whenever I apply a business license. To get a business license I do not have to wait for a long time, I am provided with convenience facilities and served excellently by SOSSI staffs. Based on my experience, I just needed less than one week to get license to start my business.

From some government and non-government organizations' point of view, SOSSI has also been considered as a good model of a quality public service provider. It was no wonder then if SOSSI got some recognition from different parties starting from non-government organization, local government nation-wide, to the president of Indonesia. Moreover, the central government

of Indonesia had chosen SOSSI as the best practice public service agency in Indonesia and encouraged other local government to use it as a model. Consequently, many times Sragen had been appointed by central government to be the consultant in developing some government stipulations on public services. Sragen was recently (December 2008) also consulted by Indonesian Commission on Anti-Corruption because the way SOSSI promoted transparency, was able to minimize corruption practices.

From the Sragen local government point of view, SOSSI was really something to be proud of. Now, local government and people of Sragen were so proud of having at least two visitors coming to SOSSI every day doing comparative studies. Being proud as a model of service excellence, staffs in SOSSI eventually felt confident that they were able to contribute good things not only to the people of Sragen but to people and government of Indonesia at large. This kind of accomplishment also happened particularly every time Sragen was invited by other local government to help the establishment of similar services. Staffs of SOSSI now started believing that employing new paradigm of work to serve public and not to be served was really meaningful and got valuable rewards.

From the economic point of view, SOSSI has managed to directly and indirectly increase revenue and investment to local government. In 2002 Sragen's revenue was only IDR 22.56 billion but in 2006 it rose to IDR 72.77 billion. Similarly, total investment to Sragen was only IDR 592 billion in 2002 but it increased to IDR 1.2 trillion in 2006.

Throughout the project cycle of SOSSI, only few individuals were directly involved and became the spokesperson to represent other individuals who chose to be silent. Some of these representations will be reviewed to understand the role of a legitimate spokesperson. During the design stage of SOSSI, Bupati represented citizen of Sragen in general and business community in particular who demanded excellent licenses processing service. Bupati was a legitimate spokesperson of Sragen's citizen since people had voted him as their top leader.

Though there was no process to appoint him as representative of the business community but his long experience as a manager in a private company made him a legitimate spokesperson for them. After being inaugurated as Bupati, he was officially also a legitimate spokesperson of central as well as provincial government that had concern to improve public services quality.

In promoting his idea to establish SOSSI, Bupati stressed that ICT would be intensively used. In many occasions Bupati unintentionally became a legitimate spokesperson of voiceless ICT too especially when he himself frequently used ICT to present his ideas. One day he even removed old-fashioned media of over-head projector (OHP) from his meeting room to condition all his staffs to used laptop and projector instead. Bupati also acted as a legitimate and powerful spokesperson of ICT when he strongly encouraged KPDE to come up with a computer-based system which enabled him to digitally monitor all office performance at any time.

DISCUSSION

As ontology is concerned with the set of assumptions about the nature of reality, answering this question relates to the discussion on how some assumptions made by ANT help understand the dynamics in the development of an e-government initiative. Using evidences from the two cases (YCPI and SOSSI) as described in previous sections, the section will discuss how ANT ontological assumptions can be meaningfully used as a foundation to represent some related aspects of e-government initiative.

Overall, the use of network as a metaphor to represent the essence of an e-government initiative provides rich vocabulary in such a way that all related issues can be appropriately brought into consideration. These include the involvement of human and non-human entities, their relationship that affect the stability of the network, their competing interest toward the obligatory passage point and the realization that their capability to act are just an effect

of a network. For this richness, ANT has no “othering” process because everything can be included in the network. However, it makes ANT a complicated representation tool to understand an already complex e-government initiative. It will be more complicated if all identified relationship among actors is also represented at the same time.

The meaningful representation of actor-network is to describe the problematisation moment of translation. This representation, as given in Figure 1 for YCPI and Figure 2 for SOSSI, provides a big picture how each selected actor has positive intentions and also experiences obstacles toward the obligatory passage point (OPP) of the network. This is a very useful one because the designer of e-government can define and introduce some appropriate intersement strategies to better enroll actors toward the OPP.

To comprehensively answer the ontological question, the ontological stance of ANT that includes issues of: binarism/dualism, asymmetry, conceptualizing actors and action, and a “centered” understanding of power will be employed consecutively.

Binarism/Dualism

From the description of the two cases of e-government initiatives, it has been apparent that they involve both human entities and non-human entities, namely the ICT infrastructure and its systems of office technology such as CCTV and air conditioning sets, government staffs, government regulations, citizens and government offices. Figure 1 for YCPI and Figure 2 for SOSSI denote these entities that have been equally represented as actors. For naming purposes, there is no problem at all to designate any involved entity as an actor but to qualify non-human entities as actors has led to difficulties in its operationalization. As actors, non-human entities should be analysed as if they could speak for themselves. One way to deal with this difficulty was to undertake a “semiotic turn” in which all non-humans become semiotic devices that create “texts” along with the texts

which are created by the humans; and these texts are analysed with no consideration given to the nature of their producers (Pouloudi & Whitley, 2000). However, there are still some problems, such as how they are to be articulated, how these non-human actors speak, and how the researcher can be assured that he reliably reports what they are saying.

Using the mechanism of mobilization outlined by Callon (1986), the “semiotic turn” for non-human entities was operationalized via a representation process in which some human actors functioned as the spokespersons for non-human actors.

In the case of YCPI, the head of PIO played this role as he many times and in different occasions convinced his staffs that the implemented ICT infrastructures and its systems need to cooperate. At the same time, the jargon of “Tono-net” also represented a “semiotic turn” in such a way that the implemented computer network failed to convince users that it could be used safely and easily. Office of finance was using a “Tono-net” instead of PIO’s computer network. “Tono” was a staff of finance who went from one office to another to copy financial data and reports using thumb drive. From the SOSSI case, most of the time the Bupati of Sragen took the role as a legitimate spokesperson for various non-human actors, such as the ICT, the CCTV, the ISO standard, and some regulations.

Although the effects of these two representation processes to the actor-network stabilization in YCPI and SOSSI were different, both cases treated humans and non-humans as actors. The analysis was simplified since no assumption was made whether it was human or non-human which was superior in determining the stability of the actor-network.

Asymmetry

Both cases showed that humans and non-humans played equally important roles. In the YCPI case, the jargon of “Tono-net”, the execution of Central Government Regulation No. 41/2007, and the low participation of heads of offices supported this assumption. In the SOSSI case,

similarly, the roles which the ICT, CCTV, ISO, and regulations played were as important as the staffs' commitment and the Bupati's leadership style in stabilizing the one-stop service actor-network.

Since humans and non-humans are equally important, ANT further assumes that what matters is the relationship or association among them. Again, both cases have showed that their mutual relationships determined the stability of the network. In the SOSSI case, these relationships were richer, effectively designed and well maintained; but in the YCPI case, these relationships were not so well designed. As a result, the staffs of SOSSI responded creatively in dealing with the problem triggered by the Indonesian Central Government's regulation and the ICT performance. Their struggles to challenge Central Government Regulation No. 41/2007 ended with a new organizational structure of SOSSI. They also accepted the limitation of their operated ICT infrastructure. Conversely, most heads of offices involved in YCPI resisted to the ICT infrastructure and the BID office was finally liquidated as the consequence of Central Government Regulation No. 41/2007.

Conceptualizing Actors and Action

The assumption that agency is a relational effect helps understand why almost all actors involved in YCPI felt powerless. The PIO head expected the Sultan to use an "iron hand" approach as a precondition for him to act faithfully. Similarly, the head section of the ICT infrastructure in the PIO office also expected heads of offices and their staffs to change their work culture so that the operated computer network could be optimally used. He also expected the finance office to implement a new reward system that previously had been approved by Sultan. Thus, from this observation one can conclude that although using a relational effect is helpful in understanding the role of the agency in e-government development, it is almost impossible to trace the complete chain of these relations in order to enlist all actors.

On the contrary, in the SOSSI case, almost all actors acted positively toward the objective of their e-government project because of the relational effect triggered by the Bupati. The new work culture equipped with the new reward system made all SOSSI staffs behave positively to every problem they encountered along the development of the project. They responded appropriately to any technical problem related to the performance of their ICT-based office system. Moreover, they perceived Central Government Regulation No. 41/2007 as not a threat but as an opportunity to reform their SOSSI organizational structure. Again, although the notion of agency as a relational effect helps explain the capacity of each actor to act, it is almost impossible to completely trace all components that have produced positive effects on the Bupati, who had such an enormous willingness to make SOSSI successful.

Although Callon (1986, p. 6) in his analysis to the role of three researchers in the domestication of the scallops in St. Brieuc Bay, France resolved this problem by simply stating "Where they (researchers) came from and why they act is of little importance at this point of the investigation. They are the *primum movens* (primary movers) of the story analysed here." Further, Latour (2005, p.148) took a weird stance by saying "You stop (describing) when you have written your 50,000 words, or whatever the format is, I always forget." However, for the present researcher following their approach is problematic. The approach used to solve this problem in this study has been applying a contextual analysis by linking the Bupati's action to his social and political context. This kind of approach has been used by some researchers (e.g. Gao, 2005; Heeks & Stanforth, 2007).

Centred Understanding of Power

Since agency is a relational effect, ANT conceptualizes power as "a *shared* capacity, involving myriad natural actants as much as social ones, which is thoroughly *decentred* in different networks" (Castree, 2002, p. 121). Power does

not come from an actor somehow “possessing” it, but rather from his being able to enrol, enlist and convince other actors to allow the initial actor to represent them (Murdoch, 1995). This concept helped explain why the Sultan who is in fact the King of Yogyakarta province was not so successful in enrolling all related actors to support his initiative. It was because his “positional power” was almost meaningless since it had not been appropriately manifested or materialized in some interessement devices/strategies to enrol related actors. Meanwhile, the Bupati of Sragen, who is of course less powerful in the sociological term compared to the Sultan, managed to enrol all related actors to his initiative because he implemented strong and relevant interessement devices.

CONCLUSION

To sum up, an ontological stance of ANT offers an appropriate assumption and a rich vocabulary in describing the dynamic development of e-government. It deals with the social as well as technical aspects of e-government by integrating them in an actor-network. Since both cases confirmed that the social and technical are equally important in determining the stability of the network, the symmetrical stance of ANT lays a strong foundation to their relationship. The actor-network representation of an e-government initiative is also a rich picture because it provides complete description of all aspects of those involved that could be simply referred as actors respectively. Its richness also comes from the ability to represent relationship among actors. This is essential because the stability of the network depends on these relationships. Moreover, the ontological assumptions of ANT also entail agency as a relational effect of a heterogeneous network that fits the condition within which e-government exists. Consequently, it conceptualizes power not as positional or legal standing but as ability to enroll others by building a relationship that could be produced through the act of interes-

sement. This ontological stance makes ANT an appropriate approach to use in representing an e-government initiative beyond its common approach in order not only to include its information system aspect but also to capture its sociological aspects. These findings support what Scholl (2007) expects.

REFERENCES

- Akther, M. S., Onishi, T., & Kidokoro, T. (2007). E-government in a developing country: Citizen-centric approach for success. *International Journal on Electronic Governance*, 1(1).
- Callon, M. (1986). Some elements of a sociology of translation: Domestication of the scallops and the fishermen of St Brieuc Bay. In J. Law (Ed.), *Power, action and belief: A new sociology of knowledge?* (pp. 196–223). London, UK: Routledge.
- Castree, N. (2002). False antitheses? Marxism, nature and actor-networks. *Antipode*, 34(1), 111–146. doi:10.1111/1467-8330.00228
- Ciborra, C. (2005). Interpreting e-government and development. Efficiency, transparency or governance at a distance? *Information Technology & People*, 18(3), 260–279. doi:10.1108/09593840510615879
- Collins, H., & Yearley, S. (1992). Epistemological chicken. In A. Pickering (Ed.), *Science, practice and culture*. Chicago, IL: University of Chicago Press.
- Cordella, A., & Shaikh, M. (2006). From epistemology to ontology: Challenging the constructed “truth” of ANT. Department of Information Systems, London School of Economics and Political Science. Retrieved from <http://is2.lse.ac.uk/WP/PDF/wp143.pdf>
- Doolin, B., & Lowe, A. (2002). To reveal is to critique: Actor–network theory and critical information systems research. *Journal of Information Technology*, 17, 69–78. doi:10.1080/02683960210145986
- Gao, P. (2005). Using actor-network theory to analyse strategy formulation. *Information Systems Journal*, 15, 255–275. doi:10.1111/j.1365-2575.2005.00197.x
- Harrison, D., & Laberge, M. (2002). Innovation, identities and resistance: The social construction of an innovation network. *Journal of Management Studies*, 39(4), 497–521. doi:10.1111/1467-6486.00301

- Heeks, R., & Stanforth, C. (2007). Understanding e-government project trajectories from an actor-network perspective. *European Journal of Information Systems*, 16(2), 165–177. doi:10.1057/palgrave.ejis.3000676
- Klecun, E. (2004). Conducting critical research in information systems: Can actor-network theory help? *International Federation for Information Processing*, (143) 259-274.
- Krishna, S., & Walsham, G. (2005). Implementing public information systems in developing countries: Learning from a success story. *Information Technology for Development*, 11, 123–140. doi:10.1002/itdj.20007
- Latour, B. (1999). *Pandora's hope: Essays on the reality of science studies*. Cambridge, MA: Harvard University Press.
- Latour, B. (2005). *Reassembling the social: An introduction to actor-network-theory*. Oxford University Press.
- Law, J. (1992). Notes on the theory of the actor-network: Ordering, strategy, and heterogeneity. *Systems Practice*, 5(4). doi:10.1007/BF01059830
- May, T., & Powel, J. L. (2008). *Situating social theory* (2nd ed.). New York, NY: McGraw Hill.
- McLean, C., & Hassard, J. (2004). Symmetrical absence/symmetrical absurdity: Critical notes on the production of actor-network accounts. *Journal of Management Studies*, 41(3). doi:10.1111/j.1467-6486.2004.00442.x
- Michael, M. (1996). *Constructing identities: The social, the nonhuman and change*. London, UK: Sage.
- Murdoch, J. (1995). Actor-networks and the evolution of economic forms. *Environment and Planning A. Environment and Planning*, 27(5), 731–757. doi:10.1068/a270731
- Poulodi, A., & Whitley, E. A. (2000). Representing human and non-human stakeholders: On speaking with authority. In R. Baskerville, J. Stage, & J. I. De-Gross (Eds.), *Organizational and social perspective on information technology* (pp. 339–354). Denmark: Kluwer. doi:10.1007/978-0-387-35505-4_20
- Scholl, H. J. (2006). Electronic government: Information management capacity, organizational capabilities, and the sourcing mix. *Government Information Quarterly*, 23, 73–96. doi:10.1016/j.giq.2005.11.002
- Scholl, H. J. (2007). Central research questions in e-government, or which trajectory should the study domain take? *Transforming Government: People, Process and Policy*, 1(1), 67–88.
- Stanforth, C. (2006). Using actor-network theory to analyze e-government implementation in developing countries. The Massachusetts Institute of Technology Information Technologies and International Development, 3(3) 35–60.
- Yildiz, M. (2007). e-Government research: Reviewing the literature, limitations, and ways forward. *Government Information Quarterly*, 24, 646–665. doi:10.1016/j.giq.2007.01.002

Johanes Eka Priyatma has been lecturing in the field of Information Systems at Sanata Dharma University Yogyakarta Indonesia since 1994. Since then he lead the design and implementation of information system to support his university academics and management systems until 2006. He obtained his PhD in 2011 from Graduate School of Management of University Putra Malaysia in the area of e-government looking particularly on the potential contribution of Actor Network Theory to its development. Besides participating in several international conferences and publishing some articles in referred journals he is now also leading information systems projects in several private institutions.