COORDINATION AND COOPERATION IN E-GOVERNMENT: AN INDONESIAN LOCAL E-GOVERNMENT CASE

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ABSTRACT
The implementation of e-government systems often involves many different agencies and actors. Their different characteristics and the need to work together make the relationships between them complex. Coordination and cooperation have become important issues in harmonizing the many actors that support the implementation of e-government systems. This study examines how coordination and cooperation shape the implementation process of local e-government systems that may be acquired or developed internally. A case study of local e-government systems implementation in Indonesia is presented and analyzed from the perspectives of coordination and cooperation between internal and external actors and agencies. Our findings suggest that dynamic coordination and cooperation have influenced the success of e-government systems implementation at local government (regency) level in Bali, Indonesia. The regency practiced coordination and cooperation, both vertically and horizontally, with central government agencies, other regencies, private companies, and with internal institutions. The ability of the regency to gain from these practices offers insights into e-government implementation for other local governments.

KEY WORDS: e-government implementation, coordination, cooperation, local government, Indonesia

1. INTRODUCTION
E-government refers to the implementation of Information and Communication Technology (ICT) initiatives that alter the structure and processes of government organisations in order to improve performance (Mofleh et al., 2009). At the local government level, e-government aims to improve the provision of local public services and transform local government organizations. The implementation of e-government tends to involve many actors or agents to accomplish a project, often due to the need to alleviate resource dependencies, such as finance, skills, and information exchange. This causes complex relationship among the many stakeholders (Traunmüller & Wimmer, 2003) and requires effective coordination and cooperation among the actors to harmonize project implementation.

The influence of effective coordination and cooperation on the success of e-government project implementation has been addressed in previous studies (e.g: Fang, 2002; Ho, 2002; Jaeger & Thompson, 2003; Mecella & Batini, 2001). Effective coordination among actors has been shown to lead to a clear understanding of goals and objectives of e-government projects and harmonization of the actors towards the implementation (Grant & Chau, 2006). Cooperation enables the actors to reduce the resources gap and contribute towards achieving the aim of the e-government implementation objectives. In contrast, a lack of coordination and cooperation among actors in e-government implementations, particularly
in developing countries, is held to cause major challenges in a project (e.g: Evans & Yen, 2006; Eynon & Margetts, 2007; Jaeger & Thompson, 2003; Torres et al., 2005). Such challenges include the duplication of e-government projects and the duplication of expenditure on similar tools used for the project implementation (Schware & Deane, 2003).

Despite a growing understanding of the need for coordination and cooperation in e-government implementation they are often ignored in public sector reform projects (Aichholzer & Schmutzer, 2000) and rarely addressed in the context of local government. In fact, inter local government cooperation (e.g. inter municipalities) provides opportunities to capture economies of scale and reduce cost in public services provision (Citroni et al., 2013).

This study addresses e-government implementation in a developing country (Indonesia) to examine how local government actors and agencies are able to use coordination and cooperation. It contributes to extending research into how coordination and cooperation are practiced by internal government agencies (such as between departments) and with external agencies (such as with private companies and other governments institutions) as well as the role of central government.

For the purposes of this study we use Nwana, Lee, & Jenning’s definition of coordination as “a process in which agents engage in order to ensure their community acts in a coherent manner” (1996, p. 79). Cooperation is defined as “a wilful contribution of personal effort to the completion of interdependent jobs” (Wagner, 1995, p. 152).

This study was carried out at a Regency (local government) level in Indonesia where a high level of autonomy is granted by central government, but where the majority of their e-government systems were transferred from the central government. The aim of this study is to provide practical and theoretical knowledge regarding the types of coordination and cooperation practiced by the local government and how they utilize them to support e-government adoption and implementation. In conducting this study, we attempt to answer the following research question:

What types of coordination and cooperation are there and how does the local government practice them in e-government systems implementation?

This paper first examines existing literature on e-government implementation at local levels, as well as coordination and cooperation perspectives within organizations and e-government. The methodology is then presented along with a summary of the case context. The findings of this research are presented with a discussion and conclusion followed by the implications for research and practice and suggestions for future research.

2. E-GOVERNMENT IMPLEMENTATION

Technology implementation is defined “as an organizational effort directed toward diffusing appropriate information technology within a user community” (Cooper & Zmud, 1990, p. 124). Most organizations adopt an innovation to enhance their performance but this cannot be effected until the innovation is implemented and used (Damanpour, 1987). Similarly, government organizations adopt and implement innovations to improve organizational performance in management, services delivery to citizens, and government to government and government to business relationships. Such implementations increase government operational efficiency in terms of reducing the time, effort, and material resources needed to provide services to citizens (Dong et al., 2012; Reddick & Turner, 2012; Tan et al., 2005).

There is a need for multiple agencies to be involved in e-government initiatives (Heeks, 2007; Kumar & Best, 2006). The adoption and implementation of information systems (IS) within public sectors involve many actors such as providers, supporters, and controllers (Mantzana et al., 2007). These different actors need to coordinate and cooperate in a cohesive manner to ensure the IS project can be implemented smoothly. Coordination in IS project implementation involves not only individuals, but also groups, departments and units...
which have their own responsibilities and autonomy (Brazier et al., 1996). The actors need to harmonize task completion, delegation, and information exchange relating to task performance through an effective coordination process. The tasks between different agents, then, are performed collectively through cooperation (Brazier et al., 1996) by utilizing resources collectively and helping other agents cope with difficulties. As a result, an IS project can be accomplished with no or limited barriers. Cooperation across functional IS individual, team, and organizational units has been found significantly to determine IS project implementation success (Biehl, 2007).

Similarly, e-government projects involve many agencies that require coordination and cooperation. In a study of the implementation of a tele-kiosk in the Dhar District of Madya Pradesh, India, the agencies involved were local government staff, a software vendor, a telecommunication company, and government departments (Cecchini & Raina, 2004). Although the project was successfully implemented, it was not sustainable over a period of time because of the lack of coordination and cooperation among the actors involved. For example, the system provided by the vendor was not compatible with local infrastructures because the vendor did not cooperate with local ICT staff, who were not involved in the system building. Coordination was also an issue between local government employees, the project manager, and villages’ operators and resulted in lack of regular contact between agencies to monitor the project.

Since many functional agencies are involved in e-government project implementation, coordination and cooperation among those agencies are crucial to ensure the projects achieve their objectives. In contrast to the Dhar case, the positive impact of coordination and cooperation in e-government systems implementation is illustrated by the implementation of the e-tax system in Singapore (Tan et al., 2005).

During e-government implementation, a department or unit may require resources from other departments and units. The resource gap between departments can be solved through cooperation among them. For example, each e-service may require data from different agencies such as from different government departments and private sectors (Sethi & Sethi, 2006). To enable data sharing for the e-services purposes, all agencies that are involved in the projects need to cooperate with each other. This cooperation might be coordinated under a regulation or organized by a Body formed by government to ensure cooperation among different departments and government levels (Sachdeva, 2006).

3. Coordination and Cooperation within Organizations

Collaboration is seen as a difficult and complex task within and between organisations. Gulati et al. (2012) see the two indispensible facets of collaboration as coordination and cooperation. The former relates to the alignment of actors’ actions to achieve jointly determined goals and the latter is concerned with the relational aspects of collaboration, or as suggest by Nwana et al (1996), the actions of the community. Both are an integral and necessary part of IS innovations and become more important where the relationships between actors are voluntary and self-defined rather than mandated by a higher authority (Smith et al., 1995). In organisational settings with a high level of autonomy, collaboration becomes a strategic management activity and harmonisation is required to encourage coordination and cooperation to achieve effective implementation of innovations. Therefore, an understanding of these constructs is a necessary part of organisational collaboration.

3.1 Coordination

Coordination, which can be practiced through a formal hierarchical structure and an informal relation (Tsai, 2002), integrates and links together different people at all levels and parts of the organization to achieve a set of collective tasks (Van De Ven et al., 1976). Through
coordination people are able to work harmoniously to complete sub-divided tasks according to their roles and positions within an organization. People within organizations are interdependent and need to work together in performing and achieving the tasks which involves identifying goals, transferring goals to activities, assigning activities to people, and managing the relationships among them (Malone & Crowston, 1990).

The aim of coordination is to ensure agents act in a purposeful, consistent, and synchronized manner to achieve their objectives with the available resources and avoid redundancy in problem solving (Jennings, 2001). The reasons to practice coordination in an organization might be determined by task uncertainty, task interdependence, and unit size (Van De Ven et al., 1976). Task uncertainty relates to the nature of tasks such as difficulty and complexity of the task accomplishment. Coordination is required due to the fact that most task completions are interdependent on other individuals, units, or organizations. For example, large organizational size and structure may influence units’ and actors’ ability to work independently. As a result, coordination of all agents within and between organizations, through vertical and horizontal channels, will promote a strategic way to work harmoniously and integrate organizational activities so organizational goals can be efficiently achieved.

3.2 Cooperation
Cooperation can be practiced within and between organizations. Inter-organizational cooperation, defined as “the degree to which focal activities of the relationship are carried out jointly” (Bensaou, 1997, p. 4), is practiced by two organizations or more to achieve their collective goal(s). In achieving their collective goals, organizations work together by allocating clear responsibilities and resources amongst themselves. Intra-organizational cooperation is viewed as a collective action of all units to achieve the organization’s common interests through each unit cooperating in learning and knowledge sharing. The reasons for organizational cooperation may relate to environmental uncertainties such as lack of resources or to gain support from other actors (Williams, 1997). In an innovation, a unit or department within an organization may require support from other departments to help them cope with skills or knowledge difficulties. Tsai (2002) also argues that to gain new innovation, organizations have to learn and cooperate with each other.

The benefits of cooperation, which also can be practiced formally and informally (Ring & Van De Ven, 1994), include increased knowledge and service improvement in an organization (Williams, 1997) as well as improving opportunities to share costs and increase access to other resources among actors that are involved in the cooperation (Kumar & Van Dissel, 1996). Cooperation can also increase mutual gain amongst the actors (Williams, 1997) particularly those within the internal organization because they will benefit equally from the sharing of skills or knowledge and the support given to one another. During cooperation, a unit or individual may give something valuable and in turn also receive something of value (Ouchi, 1980), which then increases mutual recognition of each other’s role in an organization. However, cooperation is not limited to resources only but it may involve a large set of activities, including long range planning, development and product design, quality delivery, training and education (Bensaou, 1997).

4. COORDINATION AND COOPERATION IN E-GOVERNMENT IMPLEMENTATION
Cooperation in an e-government setting is important due to the complexity of actors involved in a policy implementation (Ho, 2002; Moon, 2002; Traunmüller & Wimmer, 2003). The involvement of many actors within and between government organizations also requires an ability to coordinate all those actors (Mofleh et al., 2009). These studies highlight that e-government implementation requires coordination and cooperation at all levels of government, and with employees, businesses, and citizens. Cooperation among the actors can
be become a solution to overcoming the constraints imposed by lack of resources in an e-
government implementation by providing opportunities to share across agencies (Scholl &
Klischewski, 2007) and to determine rules that govern their relationship (Neuroni et al.,
2011). Cooperation also allows government employees to gain external input relating to
knowledge and skills that can help them to ease implementation.

Coordination helps clarify the actors’ responsibilities across government organizations
and departments (Mofleh et al., 2009) and can result in harmonious task completion.
Alternatively, lack of coordination might impact the success of a government implementation
because it causes lack of clarity in allocation of tasks among government agents. For example
the implementation of a Government Electronic Administration (GEA) in Iran has not been as
successful as expected because the government organizations are not well-organized and
coordinated, and the structure and organizational bodies are in dispute over their
responsibilities towards the implementation (Sharifi & Zarei, 2004). Lack of coordination
may also lead to conflict of goals and strategies in implementation because each actor may
work with their own strategies and policies. In other words, coordination of actors can ensure
that they collectively act “in a coherent manner” (Nwana et al., 1996, p.79) and encourage
them to cooperate by contributing personal effort to ensure “the completion of interdependent
jobs” (Wagner, 1995, p.152).

Coordination can be exerted within the context of a rigid organizational structure and
bureaucracy with strong hierarchical command and control (Wallach, 1983). Alternatively, it
can be practiced with less bureaucratic rules in which a government organization functions as
a facilitator of the coordination rather than rigid command and control (Ho, 2002). In this
latter setting, centralized coordination is still needed but with flexible management and inter-
departmental teamwork under volunteer leadership facilitation and coordination. Coordination in a rigid command and control environment can raise barriers to e-government
implementation as the lack of autonomy inhibits actors’ ability to feel empowered and
restricts their ability to cooperate with others.

Government efforts to improve their e-government systems to an advanced level, such
as the integration stage of e-government development (Layne & Lee, 2001), can be supported
by cooperation between different levels of government (Moon, 2002). At the integration
stage, e-government needs to be integrated both vertically and horizontally (Layne & Lee,
2001), which involves multi-actors such as individuals, departments and organizations. This
requires a government organization to cooperate both internally, such as inter-departmentally,
and externally (Allen, 2001; Ho, 2002) such as other government institutions and private
companies. Coordination and a degree of autonomy for actors within government
organizations can promote innovation (Ciborra & Navarra, 2005) because coordination
improves capabilities to solve problem between agencies (Evans & Yen, 2006).

Developing a higher level of e-government maturity also requires that governments
practice cooperation through partnerships with different stakeholders, such as public, private
and citizens (Ferro & Sorrentino, 2010; Sethi & Sethi, 2006). Cooperation creates a value
partnership that helps governments to cope with weaknesses in achieving their goals. Lee &
Kim (1999) argue that this value partnership concerns the relationship of individuals and
government organizations in fulfilling participants’ shared goals, which positively effects
people’s willingness to participate, communicate, to share information, and support the
management of organizations in moving to a higher level of goals. Government employees’
participation in building cooperation can also enhance adoption because it will increase the
level of acceptance, the quality of adoption, and prevent conflict (Scott, Golden, & Hughes,
2004).
5. **Methodology**

This research uses a single case study of local e-government adoption and implementation in Jembrana Regency in the province of Bali, Indonesia. Case study methodology can be applied to understand phenomenon when the boundary between the phenomenon and context are not clearly defined and requires an in-depth study of a case or cases (Yin, 2003). For example, e-government adoption and implementation involves the complexity of government institutions’ relationships (Heeks & Bailur, 2007) that requires close examination. This complexity emerges as the result of institutions’ interaction, such as social, political, and cultural, during adoption and implementation of e-government, and this complexity can be understood through interpretive case study research (Stockdale & Standing, 2006; Walsham, 1995, 2006).

The primary data for this study were gathered through semi-structured interviews, which involved 12 participants from management level to technical employees in Jembrana (Table 1). Data collection from different levels contributes to drawing more informed conclusion of a study (Scheepers & Scheepers, 2003). In addition, notes were made during field visits and written materials that support the main data were also collected.

The interviews were carried out in Indonesian and the interviews were transcribed and translated into English. This allowed for the other two researchers, who do not understand Indonesian, to assist in the coding process as well as to establish research transparency. The interviews along with field data (field notes and other written material related to the case) were also subsequently coded in the Indonesian language to check for original meaning and sense.

<table>
<thead>
<tr>
<th>Role</th>
<th>Participants’</th>
<th>Number of participants</th>
<th>Participant codes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management level</td>
<td>Management</td>
<td>4</td>
<td>A, B, C, and D</td>
</tr>
<tr>
<td>IT/IS Team Members</td>
<td></td>
<td>5</td>
<td>E, F, G, H, and I</td>
</tr>
<tr>
<td>Operational IT/IS staff</td>
<td></td>
<td>3</td>
<td>J, K, and L</td>
</tr>
</tbody>
</table>

Coding of the data broadly followed Strauss and Corbin’s (1998) approach to open coding. The data analysis was carried out with three iterations; open coding, axial coding and selective coding. In the first iteration, we coded into a broad range of categories based on the research question that allowed for a range of categories and constructs to be identified. In the next iteration, axial coding was carried out by making connection between categories and codes (Corbin and Strauss, 1990). In this stage, categories from the open coding were refined to a smaller number to identify the existence of coordination and cooperation in the data and also to review the categories arising from the open coding.

In the third iteration, selective coding (Corbin & Strauss, 1990) assisted with in-depth examination of the second stage categories by “refining their meanings, and articulating relationships among them” (Jin & Robey, 2008, p. 183) to enable theoretical categories that informed the findings of the research and contributed to outcomes which resulted in establishing our theoretical perspectives. The final stage of coding informs the structure of the findings and discussion section and are reflected in the final model (Figure 1).
6. CASE DESCRIPTION
Indonesia has a unique local government structure where the greatest autonomy is transferred to the second level of local government (regencies and cities) and not to provincial levels (Depdagri, 2004). According to Regional Autonomy Law No. 32/2004, central government has granted full autonomy to the regencies and cities to manage their development (except law, monetary, defence, and foreign affairs). Based on this regulation, governments at provincial level do not have the power to impose or mandate regencies or cities to adopt certain policies and regulations. Even though regencies and cities have a direct relationship to central government and can adopt new policies from central government directly without involving the provincial level, the regulation still requires regencies to cooperate and coordinate with the provincial level in certain policy implementations.

E-government was initiated when the Indonesia government enacted President Instruction No. 6/2001 concerning a five-year National Information and Communications and Technology Action Plan for Indonesia, which states that ICT should be used to empower citizens, increase their welfare, reduce poverty, and eliminate the digital divide. However, e-government in Indonesia was formally adopted when the government enacted Presidential Instruction No.3/2003 concerning National Policy and Strategy of e-government implementation. The legislation is followed by the launching of an e-government implementation blueprint by the Minister of Information and Communication in 2004. The blueprint provides objectives, guidelines, and standardization for local government in implementing e-government. Before this, some local governments had initiated e-government without any guidelines from the central authority. The majority of Indonesia local governments have yet to successfully implemented e-government initiatives and only a few regencies and cities are considered to have achieved successful implementation of e-government.

Jembrana is one of nine regencies in the Bali province of Indonesia. It occupies 84,180 km² or about 15% of Bali province (IANN-NEWS, 2011) and is settled by a population of 307,804. The majority of people are farmers, while the rest are small industrial workers, government employees, traders, and labours. The regency consists of five districts and 51 villages (Jembrana, 2011). Despite Bali’s popularity in the tourism industry, which generates significant income for the province, Jembrana is not a main tourist destination. Consequently, unlike other Balinese regencies, the main source of this regency’s income is not from tourism but from farming. However, farming does not produce sufficient income to support the regency development since farming relies on traditional methods. This regency also does not have mining and big industries that support local government income. Most of the industries are local industries and small-medium industries such as handicraft and religious related arts. Therefore, the local government budget is mostly supported by the annual transfer of funds from the Indonesia central government. Table 2 shows a comparison between the regency’s annual budget and the revenue made by the regency in the last five years.

Table 2: Jembrana Regency Annual Budget and Revenue (in Indonesian Rupiah)

<table>
<thead>
<tr>
<th>Year</th>
<th>Annual budget</th>
<th>Local revenue</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>451 billion</td>
<td>16 billion</td>
</tr>
<tr>
<td>2009</td>
<td>473 billion</td>
<td>34 billion</td>
</tr>
<tr>
<td>2010</td>
<td>551 billion</td>
<td>42 billion</td>
</tr>
<tr>
<td>2011</td>
<td>574 billion</td>
<td>36 billion</td>
</tr>
<tr>
<td>2012</td>
<td>729 billion</td>
<td>52 billion</td>
</tr>
</tbody>
</table>

Source: Jembrana (2012a)
Due to the lack of resources such as finance and employee skills, the local government was required to promote coordination and cooperation with internal and external actors to support the implementation of e-government. Internal coordination and cooperation is practiced among departments within the central regency office and between other institutions within the regency area such as districts, villages, and schools. External coordination and cooperation are practiced with external agencies such as with central government departments, other regencies, and private companies. All coordination and cooperation practices are aimed at gaining resources, developing infrastructure and gathering information to support the regency’s implementation of e-government systems.

Jembrana has successfully implemented e-government systems to enhance local government performance in providing services to their citizens. The adoption and implementation of e-government in Jembrana Regency began in 2001 when the regency leader began coordination and cooperation with the Indonesian Agency for the Assessment and Application of Technology (BPPT). The objective in starting the coordination and cooperation was to initiate the implementation of information technology within the regency. During his ten-year leadership, the regency leader came to be considered a successful proponent of local e-government implementation and use in Indonesia. More than 400 representatives of other local governments and institutions have visited Jembrana to learn and undertake comparative studies (Winasa, 2009).

The regency has adopted and implemented 34 e-government systems and has twice been awarded the Best E-government Implementation Award (2008 and 2009). It was also noted as the best local government in implementing an e-voting system, which was developed by a local IT team in 2010. Some systems have been acquired from central government while others are developed by local IT staff or sourced from private companies. Some of key e-government systems are described in Table 3.

During early coordination and cooperation between the regency and BPPT, the Regent was asked to introduce IT in the central regency office to improve performance of their services. This was followed by the introduction and provision of computers to districts offices. This initiative was followed by the introduction of PABX technology that allowed citizens and government employees to communicate on a free-of-charge basis.

Jembrana Regency’s coordination and cooperation with BPPT was extended to broader aspects, which included systems and human resources development. The BPPT started training regency employees to utilize computers for daily task performance. The training was carried out as a part of human resources preparation for future e-government systems implementation and use. At the same time, BPPT also implemented an intranet system called KANTAYA (a virtual office system). The KANTAYA allows local government employees to share data and documents among departments and employees. Employees can also post their enquiries and opinions through a chat forum in the system.
### Table 3. Key E-government Systems in Jembrana Regency

<table>
<thead>
<tr>
<th>No</th>
<th>E-government Systems</th>
<th>Year</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>KANTAYA (an intranet system which is also called a virtual office system)</td>
<td>2001</td>
<td>Built in collaboration between BPPT and the regency IT team. It allows employees to manage their jobs such as sharing data between departments.</td>
</tr>
<tr>
<td>2.</td>
<td>SIMDA (the regency’s office information system)</td>
<td>2002</td>
<td>Built in collaboration with BPPT, but integrates other systems such as an e-library and SMS centre that were developed by the local IT staff.</td>
</tr>
<tr>
<td>3.</td>
<td>e-JKJ (electronic Jembrana Health Insurance)</td>
<td>2006</td>
<td>Initially the system was used by hospitals and district health centres to make budget claims electronically to the regency office. Since J-ID was implemented in 2009, citizens are also able to access the system by using their J-ID.</td>
</tr>
<tr>
<td>4.</td>
<td>J-NET (Jimbarwana Network)</td>
<td>2007</td>
<td>A network infrastructure that connects all regency institutions. It was built through a financial contribution scheme from central regency department offices, districts, villages, schools, and hospitals.</td>
</tr>
<tr>
<td>5.</td>
<td>SIAK (a demographic information system)</td>
<td>2007</td>
<td>This system was transferred by the Ministry of Internal State Affair (DEPDAGRI) to the regency Department of Civilization and Civil Services (DISDUKCAPIL) based on central government regulation No. 23 in 2006 for regency population management.</td>
</tr>
<tr>
<td>6.</td>
<td>SIADINDA (Departmental Financial Information System)</td>
<td>2008</td>
<td>Mandated by central government regulation No. 58 year 2005 and strengthened by Ministry of Internal State Affairs No. 55 year 2008, and No. 21 year 2011. The regency financial information system is supplied and maintained by a private company.</td>
</tr>
<tr>
<td>7.</td>
<td>J-ID (Jembrana identification)</td>
<td>2009</td>
<td>An electronic identification system developed by the local IT team based on the data from the SIAK system.</td>
</tr>
<tr>
<td>8.</td>
<td>E-ID (Electronic identification) or E-KTP</td>
<td>2009</td>
<td>The national version of an electronic identification system that is also developed based on the SIAK system. Central government issued President Regulation No. 26 year 2009 to mandate local government to adopt e-ID. After almost two years of delay the project was started in early 2011. Jembrana regency needs to adjust their existing J-ID to e-ID to meet national requirements.</td>
</tr>
<tr>
<td>9.</td>
<td>e-Voting</td>
<td>2010</td>
<td>A system that allows citizens to vote for a leader at village level by using their J-ID or E-ID. It was developed by the regency IT team.</td>
</tr>
</tbody>
</table>

7. **Coordination and Cooperation in Jembrana’s E-Government**

Participants viewed coordination as a major Jembrana Regency practice in e-government systems implementation. Coordination within this regency is practiced from the lowest level to the highest level of the local government institutions as well as with external local institutions.
government institutions such as central government department, other regencies, and private companies. The adoption and implementation of e-government is also supported by the ability and the willingness of the regency to practice cooperation among internal departments and with external agents such as central government. The findings from the data analysis are presented within the context of vertical and horizontal relationships to reflect the hierarchy of the government system. In Indonesia, local governments derive a high level of autonomy from the central government, particularly in e-government initiatives, and therefore the provincial layer of government (in this case the province of Bali) is not a focus of the research. Coordination and cooperation are addressed by the participants in terms of central government (vertical) and the regency (local government).

7.1 Vertical Coordination and Cooperation

Vertical coordination is practiced with central government in the implementation of systems sourced from them. These included a demographic administration information system (SIAK) and local government departments’ financial information systems (SIADINDA), and also encompassed additional human resource support. The Jembrana IT team has actively coordinated with BPPT (Central government agency for technological research and implementation) in providing training for local government employees to operate the systems. A participant from a licensing department said:

*We were taught by BBPT in coordination with IT team, which hold a short course to operate the systems* (Participant F)

BPPT has worked with the regency to train the employees and IT people since the early IT implementation started in 2001 through the implementation of KANTAYA (a virtual office system).

The coordination between local government employees and central government is practiced as the result of local government reliance on systems acquired from central government, particularly in relation to sustaining the operation of them. For example, the local government employees within the Department of Civilization and Civil Services coordinate with the people within the Department of State Affairs when the system does not work properly. A participant said:

*It (SIAK) is connected with the central government in Jakarta. I mean the data input by Department of Demographic directly goes to server of State Ministry of Internal Affair in Jakarta. If anything should be done with the systems, we have to coordinate with Jakarta. We cannot repair the systems* (Participant C)

Internal Affairs interacts directly with the Department of Civilization and Civil Services and the coordination is not made by the IT team as stated by an IT staff member:

*They take care of the server and make coordination directly to the central office in Jakarta (Ministry of internal state affairs), not from this division (IT). But if something happens, they do coordinate with us to discuss what exactly happens to the server then make a report to Jakarta* (Participant E)

Managing the systems during the implementation period requires more coordination with variety of actors. For example, another participant admits that they cannot fix the system by themselves when it does not work.

*If the problem occurs, we can’t repair it in one day, there should be coordination with others* (Participant D)

Coordination between divisions within IT department is not difficult to practice as a participant said:

*If our division cannot solve that problem, we bring this matter to IT team and the head of IT team will discuss the matter with the head of department* (participant J)
The coordination of the regency employees with central government organisations has become an accepted process that supports the community of Jembrana Regency employees. The inter-dependence of the actors within the regency and central government can also be identified in levels of cooperation between them.

Cooperation with central government started with the implementation of the early e-government systems, such as KANTAYA. The local government office started cooperating with the Ministry of Research and Technology, through BPPT, in designing the e-government implementation in 2001.

We only cooperated with BBPT, we made a plan to set intranet network when we implemented KANTAYA and SIMDA (regency office data management)…. but after that the planning was mostly done by BBPT. (Participant H)

The local government cooperation with BPPT was expanded to include human resources preparation that supports the implementation.

In addition, cooperation with BPPT also includes training of human resources, program design and application building (Participant A)

The cooperation with central government was not only carried out by IT departments but also by other departments, such as the Civilization and Civil Service department in the SIAK implementation. One of IT staff comment as follows:

SIAK (Demographic information systems) reflects the cooperation between Jakarta and Department of Civilization and Civil service. I don’t know exactly the process. It is the responsibility of population department and they know better about it (Participant E)

Although at the beginning of implementation the cooperation was practiced directly between the Civilization and Civil Services department and central government, it developed to include a wider range of actors and agencies such as the IT department:

The Department of Civilization and Civil Services, then, came to us to discuss how the appearance of the e-ID card should be and then we produce the e-ID card with a chip inside as you see with me (Participant E)

A participant from licensing department also raised a similar issue:

In providing licenses we work based on systems designed by BBPT (agency for technology research and implementation from Jakarta) in cooperation with IT team from here (Participant F)

Similarly, health information systems and licensing information systems have also been implemented in cooperation between the regency departments and the Ministry of Health department and the State Ministry of Internal Affair in Jakarta.

7.2 Horizontal Coordination and Cooperation

In addition to the levels of coordination and cooperation with central government, there are a complex range of other actors and agencies involved with the regency and its implementation of e-government. These agencies operate within a similar environment to that of the regency and are seen as horizontal relationships.

Horizontal coordination is practiced between Jembrana Regency and other regencies within Bali province and between local government departments. For example, the implementation of e-ID within regencies in Bali province required coordination among the regencies. A participant said:

We also did a lot of coordination and consultation in Bali such as with Denpasar city regarding e-ID card implementation (Participant A)

E-ID was first successfully implemented in Denpasar city and then by other regencies in Bali. Jembrana Regency had already implemented e-ID in one district but they required more coordination with Denpasar city to complete the implementation in all districts.
Coordination between local government departments has also played a significant role in the e-government systems implementation process. Coordination is practiced in both formal and informal ways such as through a regular meeting facilitated by the Regent or by using a technology facility. Regarding informal coordination a participant said:

*We can do the coordination through the existing IT network and we also do coordination through interpersonal approach Sir., for example, we often have a chat with friends, just now I just had a chat with one SKPD head related to e-ID card. I asked him how was the activity of implementing e-ID card... You know the weather is not good at the moment, so I try to understand whether there are any problems with the internet network* (Participant A)

Informal coordination is one way the employees share their ideas regarding a particular issue related to e-government systems. They feel comfortable with that way of coordination because they can do it freely. Participant D added:

*In relation to the informal coordination, we usually share our ideas with the others in informal way as long as we find it comfortable with that way* (Participant D)

In term of formal coordination, the IT team has scheduled a monthly meeting with all IT staff within the local government central office. This regular coordination is aimed at finding solutions to problems encountered during e-government implementation.

*Each month we hold a regular meeting where we discuss our problems encountered during tasks completion. We also discuss about what application should be implemented and how to improve current applications* (Participant I)

All IT divisions occupy a big room that allow them to coordinate easily. As they are settled in one room, they do not perceive coordination as a hard thing to do. Participant D said:

*Coordination isn't difficult. We have five divisions here. Every division has four people. For instance, if a head of section is given a task by the Regent (Mayor) to fix the network problem, I can organize IT division to complete the task ... We use either formal or informal coordination. Regarding formal coordination, we do it every Tuesday* (Participant D).

The IT department views coordination as an inevitable process because each task in e-government implementation is related to other tasks in different divisions.

*So, between these divisions there’s a solid coordination. We cannot implement systems by ourselves, because in the implementation process there is a dependency of jobs between these divisions* (Participant E)

Coordination also has been extended to district levels by involving IT men who manage e-government implementation within district offices and villages. The IT team at the main office consider coordination with district levels as an important process for e-government implementation because district IT men are close to villagers.

*We sometimes get input from our friends who work at district level because they are directly confronted with the villagers and they know what should be improved. They usually give input at the coordination meeting* (Participant I)

Coordination with the district IT men is also crucial for systems and hardware maintenance at village level. They can take quick action by contacting the IT team at the regency office if they are not able to handle the problem and then the IT team at regency office will respond to their enquiries.

*If something happens to the internet or towers because of lightning in districts and villages, they directly contact the division of service. Then, the service division will coordinate with maintenance division* (Participant E)

As with the vertical relationships, coordination at the local level is supported and enhanced by high levels of cooperation. The regency office cooperates with the other
agencies where coordination of resources has been found to be of value in implementing e-government. There are also examples where cooperation goes beyond this such as when the local government cooperates with a local private company in maintaining the departmental financial information system (SIADINDA). In 2011, the local government allocated approximately 296 million rupiah to improve the system and private agencies were involved in the implementation. Cooperation with the regency was extended to include providing training for the local government staff.

At that time I made some mistakes in using the system, but after that the boss invited a consultant from the company which implemented the financial information system in the Financial Department to train me (participant G)

Horizontal cooperation between departments is also common, such as in data sharing between other local departments and the IT department. For example, the Department of Industry and Trading provides data to the IT department for the website purpose.

Department of Industry and Trading did not update their data on their website, we requested latest data on trading such as product prices in the market then they gave it to us. After that we helped them update their website (Participant E)

The IT team members do not experience difficulties in gaining cooperation with all departments and within the divisions inside the teams. All five divisions within the IT department have smoothly cooperated in performing their tasks regarding e-government implementation. For example, participant E added:

Usually, if I need data, I just talk to the development division team. They have data because they make frequent contact with all SKPDS to develop a system or update websites.

If one division could not complete their tasks due to certain barriers, they would cooperate with another division to help them.

If we need someone, such as for data gathering, we can involve other staff from other divisions if they were not on the job (Participant K)

Cooperation between IT staff with other staff in developing a system is also commonly practiced. For example cooperation between IT staff with library staff in developing library information system.

Here we have librarians who understand the library system, and we have staff with computer background like me. I think we will combine the librarians’ knowledge and computer staff knowledge to develop the system. It will produce a good system for us (Participant G)

In order to support the e-government implementation at district levels, IT men at district and central regency levels also establish a cooperation mechanism in responding to the complaints within their districts. Respondent J says:

There are men responsible for dealing with the complaints in their districts, if they could not handle the complaints they contact us and we will send our men to the districts to help them.

7.3 Summary

The findings show that coordination and cooperation are practiced with central government and with departments within the regency and other local agencies. Vertical coordination is related to knowledge and skills, and the implementation of systems acquired from central government. Horizontal coordination is practiced to support implementation, skills and task distribution and to gain input regarding system maintenance and improvement. From a cooperation perspective, there is evidence of a willingness to cooperate at several levels from central government to district and village levels. This willingness to engage both formally and informally contributes to training, sharing of information and the planning, acquisition and implementation of e-government systems.
8. DISCUSSION

The case study of Jembrana Regency gives significant insights into the complexity of local e-government implementation and the wide range of actors and agencies involved. The levels of coordination and contribution of all parties involved is complex and intertwined and affects the ability of the local government to achieve an effective level of local e-government. The findings of the study are drawn together in Figure 1 to illustrate the complexities and to enable discussion of how the local government practices in respect of coordination and cooperation support the implementation of e-government innovations.

![Figure 1: Coordination and cooperation practices for the implementation of local e-government innovations](image)

As a relatively autonomous regency, Jembrana can coordinate and cooperate with any relevant agencies and actors in the implementation of e-government systems without being dictated to by central government. As a result, Jembrana Regency has successfully implemented various e-government systems through dynamic coordination and a high level of cooperation with central government bodies and within and between regency departments and with other local agencies. This is consistent with Ciborra and Navarra’s (2005) finding that when a government organization has the autonomy to make its own decisions it can result in the promotion of innovation.

Where vertical coordination and cooperation are practices are found, they relate to the implementation of mandatory e-government systems such as e-ID, demographic information systems and financial information systems. Coordination is practiced in the acquisition of systems transferred from central government and in the planning, implementation and maintenance of these systems. Similarly, cooperation is visible between central government agencies and the regency’s IT team and other relevant departments tasked with implementing
central transferred systems. Such cooperation relates primarily to training and the transfer of skills from central government agencies out to the regency as originally initiated by the regency leader. Coordination and cooperation between the regency departments and central government agencies does not appear to be impeded by strict government bureaucracy at either end. As a result, the implementation of e-government systems in each department is not constrained and a sense of community cohesion and personal effort is apparent.

However, the nature of coordination and cooperation in supporting the mandatory e-government systems differs from that of the locally developed systems in that the realisations of the former activities are primarily controlled by central government. This means relevant local departments that have received mandatory e-government systems need to conform to the central government institutions approval in coordination and cooperation activities. For example, coordination to maintain the SIAK system is highly reliant on central government’s responsive time and staff availability, which may not meet the requirements of the local demand. This conformation is caused by the reliance of the local department staff on central government institutions for resources, such as skills to maintain the systems. This issue has been addressed by DiMaggio & Powell (1991) and Teo, et al., (2003) who argue that parent organizations have the power to dictate to a lower unit of organization due to resource-dependencies. This dependency may constraint the decision-making processes of coordination and cooperation in supporting the systems (Mizruchi & Fein, 1999).

Coordination and cooperation between central and local governments may be affected by the transfer of staff or unexpected changes of leadership (Chen & Gant, 2001). Change of leadership and movement of staff are a common phenomenon in the public sector (Fernandez & Rainey, 2006) and may result in a disruption of e-government implementation. However, where coordination and cooperation are practiced by the IT team, then skills and knowledge may be retained within the IT team or easily transferred across local departments. The role of an individual leader is illustrated in the case study, where Jembrana Regency extended the coordination practices in the implementation of at least one central e-government system to another external, local government area. This example of horizontal coordination was carried out directly by the head of the Department of Transportation Communication and Information with a high level leader in Denpasar city. It was related to the policy determination between both regency and city regarding e-ID synchronization implementation in Bali province (e-ID is a central government mandated system). This coordination has led to the inclusion of Other Regencies in the framework (Figure 1) although no evidence of cooperation has been identified in the findings.

The regency has implemented other e-government systems (e.g. SMS centre and J-Net) that are not mandated by central government. The willingness to extend the e-government services within the local government area may arise from the skills and knowledge acquired through central government although this is not clear, even to the participants. These voluntary implementations have involved agencies at a more regional or local level and involve a complicated network of horizontal coordination and cooperation practices. For example, cooperation with private agencies that were involved with the implementation of financial information systems was evident. The interview participants showed openness in dealing with these agencies, particularly in regard to obtaining knowledge and skills.

The staff of the main regency departments interacted with the districts and villages within Jembrana regency to both coordinate and cooperate with them in the implementation and use of e-government systems at the lowest level of the local government hierarchy. This interaction allowed for problems and complaints to be dealt with effectively, with district workers having the local knowledge of issues while the regency workers were able to support them with system knowledge and troubleshooting.
This study revealed that cooperation and coordination regarding e-government implementation was most prevalent between staff within the regency’s various departments. Coordination between the department of Civilization and Civil Services and the IT team was carried out directly between the department staff and IT staff without involving the head of each department. In this case, the heads of department were aware of the interdepartmental coordination and cooperation due to monthly coordination meetings with the Regent and the IT team. Daily direct coordination and cooperation between the IT team and other local departments’ staff was seen as an advantage for both parties because it reduced red tape. Government organizations often place their IS managers at lower levels of the organizational structure (Bretschneider, 1990) and as e-government implementation activities are primarily related to technical tasks, they sit within middle managers’ responsibilities (e.g. IT team leader). Involving a head of department in coordination and cooperation is seen to be of importance, but can also create a level of bureaucracy across levels of management. In the case study, the bureaucracy was reduced by the direct collaboration of staff, while the heads of department were kept informed via the Regent’s meetings. In the Jembrana case, the role of the leadership can be deemed to be an importance facet of the role of coordination across all levels of management within the regency. The coordination of internal Jembrana departments brought benefits such as effective determining of tasks, inter-department data sharing procedures, planning, and systems maintenance procedures.

Cooperation between departments mostly related to local systems implementation, employee training, the distribution of skills, and systems maintenance. For example, all departmental websites were successfully developed through cooperation between the departments and the IT team. In this context, cooperation between departments is very important because the IT team rely on the departments’ input to supply information and focus as previously noted by Ho (2002). Mecella & Batini (2001) also argue that cooperation in the context of data exchange is also crucial because each department and individual is usually responsible for specific data that can be used for certain services such as websites. Such inter-departmental coordination and cooperation is not only important to support the implementation process but also to avoid possible resistance from other departments during implementation (Chen & Gant, 2001).

9. CONCLUSIONS
Coordination and cooperation factors have significantly influenced Jembrana regency in the successful implementation of e-government. The ability of the regency to practice coordination and cooperation vertically and horizontally has helped the regency to overcome bureaucracy constraints between the central government and internal institutions during e-government systems implementation. At central government, or vertical, level the ability to coordinate and cooperate has led to support for local staff skills, systems transfer, and more efficient maintenance of central government based systems. The availability of human resources and professional skills has supported Jembrana regency in implementing many e-government systems, both those acquired from central government and those developed by local IT staff.

Coordination and cooperation between local government agencies has been found to contribute towards local systems implementation, human resources training, skills distribution and systems maintenance across departments, districts and villages. Other regencies were only involved in coordination with regard to synchronizing central government system implementation across regencies in Bali province. The regency also cooperated with private companies in obtaining e-government systems and human resources training. The regency’s flexibility in practicing vertical and horizontal coordination and cooperation has contributed significantly towards successful implementation of e-government systems within the regency.
Our findings also show high tasks interdependency among government organizations to support e-government implementation. This requires government organizations to employ more coordination mechanism within and across organizations boundaries in IS planning and development (Bretschneider, 1990) and building more intergovernmental and public-private cooperative arrangements (Ho & Ni, 2004).

10. LIMITATIONS AND FUTURE RESEARCH
This study was carried out within a local government in Indonesia and the findings can provide a new perspective on how coordination and cooperation influence e-government systems implementation at local government level. Since this study was carried out within one local government and only focuses on coordination and cooperation aspects, the findings may lack generalizability. However, our in-depth study of the case phenomenon and the results can potentially contribute valuable theoretical and practical knowledge to the public sector community (Myers, 2000). In addition, we do not perceive generalization as a law that is universally applicable (Schofield, 2002) but rather in the context of “naturalistic generalization” (Stake, 1978, p. 6) where this study, as a product of our experience, can usefully inform similar e-government implementation situations and contexts. It should be noted that this study was carried out in the context of developing countries and further research is required to address whether the findings are applicable to more developed countries.

Future research is needed to explore other factors, such as organizational culture, that influence e-government systems implementation to provide a broader perspective of local e-government. Future research into the role of coordination and cooperation across multi-site studies is required to increase the generalizability of the framework presented in this paper.

11. REFERENCES

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