Chapter 16
A Strategic Analysis of Actor Competencies and e-Governance Performance

P.K. Suri

Abstract The potential of e-Governance for serving the citizens at large is well recognized by the Government of India. A number of initiatives have been undertaken in this direction under various projects identified under the erstwhile National e-Governance Plan (NeGP). Some of these initiatives have been successfully implemented whereas many others are yet to deliver as per expectations. The vision of effectively serving the citizens at grassroots through digital pathways is, therefore, still far away from its realization. The unfinished NeGP has now been subsumed in NeGP 2.0 or e-kranti as part of a highly ambitious 'Digital India' programme. The realization of this vision expects active involvement of government officials and the target beneficiaries. Lack of operational competencies has been identified, by the twelfth five-year plan document, as a major hurdle in the effective implementation of several such mega government initiatives in India. This study, based on a survey of government officials and beneficiaries of government services, aims at analyzing competence level of key actors and e-Governance performance. Suitable constructs are proposed, statistically validated and applied for conducting the analysis. Competence level of actors has been measured in terms of 'Ability to use project service', 'Ability to use computing facilities' and 'Ability to maintain contact' with implementers and beneficiaries. E-Governance performance is measured as the common expected benefits.

Keywords Actor competence · e-Governance · e-Governance in agriculture · e-Governance assessment · e-Governance performance · e-Government · ICT in agriculture

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16.1 Introduction

Agriculture continues to play a predominant role in terms of employment and livelihood in India despite its declining contribution to the overall growth of economy. Successive governments have been attempting to enhance competitiveness of Indian farmers in the world market through a series of measures (Planning Commission 2002, 2007, 2013). However, Indian agriculture is characterized by the challenge that a large number of farmers own small land holdings. These marginalized farmers are unable to draw benefits from various government schemes aiming at agricultural development. In the globalized economy, it has become essential to enable the farming community with best farming practices for keeping their production and marketing related activities aligned with the changing market conditions. Farmers need information on aspects such as quality inputs for nurturing and protecting crops besides globally acceptable farm operations, storage and marketing related transactions, etc. (Reddy and Ankaiah 2005; Moni 2006; Rao 2007; Aker 2011; Nonso 2012; Magesa et al. 2014).

According to recent national sample survey reports, local knowledge system accessible to farmers is primarily based on accumulated knowledge of input dealers, credit organizations, traditional extension workers and non-government organizations apart from audio and visual broadcasts from subject experts (NSSO 2003, p. 7, 2014, p. 38). The existing system is inadequate due to limited access to information for decision making. Many of these limitations can be overcome through appropriate intervention of Information and Communication Technology (ICT) (Rao 2007; World Bank 2012). The required agriculture-related information is, however, available in pockets with multiple organizations. The information relevant to farmers needs to be integrated and provided to farmers as per their needs. ICT can facilitate integration of relevant data repositories and promote adoption of best practices in farming sector as being followed in many developing countries (Rao 2007; Glendenning and Ficarelli 2012; NAIP 2014).

The National Agricultural Policy (NAP) of India, which was announced in 2007, reflects upon government's intent to develop ICT-based support system for improving capabilities of farmers. Substantial resources have been allocated for e-Governance in agriculture as part of the e-Governance plan of India (www.mit.gov.in). Concerted efforts are being made, particularly by the central government, to improve service delivery at the grassroots through large-scale e-Governance projects. A major initiative under NeGP is Agricultural Mission Mode Project (AMMP), which is aiming at implementing a cluster of ICT enabled farmer centric services in different states of India. The project has to overcome several challenges before it is effectively implemented (Suri 2014).

The NeGP of India has been viewed as highly risky initiative by the Gartner Industry Research (Harris 2007). In Indian context, there are additional challenges which include a considerable number of poor and illiterate farmers,

agriculture-related government organizations operating in silos, lack of coherence among such organizations in a federal government system where agriculture is a state subject, lack of required user level basic IT skills with the government functionaries and beneficiaries, etc. apart from the general technical challenges associated with e-Governance projects. It has been pointed out that the technological challenges in e-Governance projects are of much lesser significance (Suri 2014) as compared to non-technological issues. The poor performance of e-Governance initiatives asks for keeping the ground realities into view while planning for such projects. It has been acknowledged by the government that the lack of implementation capacity at the operational level is one of the key reasons for poor implementation of government plans (Suri and Sushil 2012; Planning Commission 2013: pxv; Suri 2016).

In this chapter, competence level of actors and performance of e-Governance are analyzed by studying a few ongoing e-Governance initiatives related to agriculture. The actors are viewed as government officials involved in the planning and implementation of these projects and the associated target beneficiaries. The chapter is based on a detailed cross-case analysis of six major agriculture-related projects in India from the perspective of planning and implementation (Suri 2009).

The chapter is developed with the following limited focused objectives:

- To bring out constructs for measuring competence level of actors in e-Governance context.
- To analyze competence level of actors and e-Governance performance.

The development of performance construct has been discussed in-depth by Suri and Sushil (2011). The same is included here in brief for better understanding of the readers.

The lessons learnt are expected to be useful to the practitioners for effectively implementing AMMP in particular and other MMPs in general as part of the NeGP. It is clarified here that for the purpose of this chapter, the terms e-Governance and e-Government are used without any distinction. However, the popular term in India being e-Governance, the same is preferred for the chapter title.

This research-based chapter is organized into eight sections. These include introduction, literature review, methodology, research variables, opinion survey, analysis, significance of study and concluding remarks.

16.2 Literature Review

In order to develop insights into the likely influence of competency levels of actors on e-Governance project performance, a review of literature has been conducted. The same is summarized as follows:

16.2.1 Competence Level of Actors

The usage level of e-Government has been found to be low particularly among the disadvantaged group who needs to draw more benefits from e-Government (UN 2012). An earlier survey has found that one of the three prerequisites of realizing the potential of e-Government is human capital (UN 2003). OECD (2003) has emphasized on possessing of basic IT literacy as well as an understanding of information management and the information society by the officials. According to Heeks (2003), competencies needed for e-Governance can be divided into four main components, viz. systems development competencies, project/change management competencies, intelligent customer competencies and operational competencies (ability to operate and maintain e-Government systems and basic computer literacy skill). The requirements of new competencies create a gap between the competencies possessed by the staff and those they need (Heeks 2006, p. 101). Das and Chandrashekhar (2006) have emphasized upon the need for building skilled human capacities for meeting the requirements of different phases of e-Governance project life cycle across different tiers of the federal government system being followed in India. The key areas for capacity building have been identified as policy formulation, building institutional linkages, professional expertise, project monitoring and control, etc. Various training programmes have been suggested to build required capacities. These include e-Governance Champions, Chief Information Officers, Chief Technology Officers, users in government departments and external users. It is, however, to be kept into view that the present pool of employees need to be equipped with required basic minimum IT skills for making meaningful contribution to the e-Governance projects. Employees need to be receptive and willing to update their skills regularly (Nandan 2008, pp. 44–50). According to Gartner Industry Research, skills and receptiveness of the government officials will pose a huge hurdle to the intended capacity development for dealing with the massive transformation of government business processes and practices envisaged under NeGP (Harris 2007). NeGP emphasizes on training of existing government employees on general use of computers (e-mail, word processing, spreadsheets, Internet, etc.) as well as capacity building of actual beneficiaries, especially in terms of enhancing their awareness level about the services. While capacity building programme of NeGP is still at a preliminary stage, general IT training of government officials in India is already an ongoing process under different programmes. Officials at various levels have been getting IT training through programmes conducted by the National Informatics Centre (NIC) as well under departmental programmes. This is as per the emphasis laid in the minimum agenda of e-Governance being implemented in various departments (http://darpg.nic.in). Effectiveness of such trainings for making use of the ICT infrastructure created in various departments needs to be explored through independent surveys as it will help in fine-tuning of the NeGP approach for capacity building.

The resource poor farmers in developing countries such as India seem to rely more on personal contacts for farming related information as compared to other

sources. The national survey of farmers/agricultural households in India reflects the challenges involved in making the large farming community in India accustomed to use of ICT (NSSO 2003, p. 7, 2014, p. 38). Inadequately skilled citizens act as barriers to e-Government (Marche and McNiven 2003). Besides connectivity for all, intensive training and sensitization of intended beneficiaries need to be an essential component of an e-Governance initiative, especially in cases where the target beneficiaries belong to illiterate community. There are examples at national as well as international level where such an approach has been adopted. The evaluation of AKSHYA and KAVERI projects illustrates the importance of training of actual beneficiaries on the usage of services. UNDP (2001) cites a successful USAID project in Guatemala where farmers themselves were trained to download market prices information and disseminate further among the peer group. Based on an evaluation of community telecentres in Uganda, Kyabwe and Kibombo (1999) have found that "constant sensitization of the community, as opposed to a one-time sensitization for creating awareness and sense of telecentre ownership among the local communities is crucial for the success and sustainability of such initiatives". There are several similar examples from across the world which emphasize on development of skills and competencies of the farming community to take advantage of the technology enabled innovations in the agriculture sector (World Bank 2011).

The important role played by "e-Champions" in successful e-Governance projects is emphasized in many studies. The citizen centric nature of e-Governance projects implies that lessons have to be learnt from strategies adopted by customer-centred-organizations in the corporate sector. A key strategy of such organizations is to build direct contact with employees and customers unlike the practice of managing from a distance. Leaders who are innovative and adept in change management are far more popular among employees as compared to ones who believe in dictatorial style of management (Loo 2002). This is reflected in flexibility maturity model where flexibility of actors is shown at higher level of maturity than the process flexibility (Sushil 2016). Gouscos et al. (2007) have emphasized on the need for selecting suitable "e-leaders" who are good at sensing the demand of citizens and businesses and work closely with them to serve their needs. Successive UN Global e-Government Surveys have pointedly highlighted the importance of IT enabled citizens for ushering participatory governance and customized service offerings.

16.2.2 e-Governance Assessment

The assessment of e-Governance projects is an emerging research area. The traditional measures for analyzing project performance such as financial measures are found to be unsuitable for this context as the thrust here is not on returns on investment but on service delivery and governance reforms. To develop basic

understanding about governance reforms linked benefits accruing from such projects, published evaluation reports of popular state level projects in India were studied. These projects include: AKSHYA-Networked Multi-purpose Community Information Centres in Kerala, BHOOMI-land records computerization in Karnataka, CARD-registration of property in Andhra Pradesh, e-Procurement Exchange—online tendering in Andhra Pradesh, e-Seva—one stop shop for many services in Andhra Pradesh, FRIENDS-one stop centre for paying taxes and utility bills in Kerala, GYANDOOT-agriculture and other relevant services in rural areas in Dhar district of Madhya Pradesh, KAVERI-Computerization of sub registrar offices in Karnataka, Lokvani-Transparent governance including grievance handling in Uttar Pradesh, and Nagarpalika—General administrative services including grievance redressal in Gujarat. The reports throw light on various benefits accruing to citizens due to IT enablement of government services (DIT 2003, 2004, 2005; Bhatnagar 2004). Interested readers are referred to published articles (Suri and Sushil 2011) and (Suri 2014, 2016) wherein the performance variables, applicable in the context of this study, have been identified and mapped with the literature. The same is not reproduced here due to space constraints.

16.3 Methodology

In order to take-up this study, the literature was reviewed on relevant areas which led to selection of six agriculture related projects having wide geographical spread and which were operational since at least one year when the main study was initiated in 2005. The short-listed projects included: AGMARKNET (Empowering farmers with market information: www.agmarknet.nic.in), Kisan Call Centre (Providing agricultural extension support to farmers: www.agricoop.nic.in/PolicyIncentives/kisanCallfirst.htm), DACNET (Networking several field offices of central agricultural department for effective information exchange: www.dacnet.nic.in), GrapeNet (Online system integrating various stakeholders in the grape export from India: www.apeda.com), CROP (Reforming of processes registration of pesticides in India: www.cibrc.nic.in) and Integrated Fertilizers Management Information System (Meeting farmers' requirements of quality fertilizers: www.fert.nic.in).

An understanding about the basic competencies expected to be possessed by the key actors involved in these projects is developed through a review of documents. Actors are categorized as government officials and the intended beneficiaries. Government officials are further classified as those involved in planning and implementation, respectively. The knowledge developed by studying e-Governance literature and documents pertaining to the identified projects coupled with practical experience of executing such projects have provided the base for conceptualizing constructs to measure competence level of actors and project performance. The research is designed as simple and implementable by considering only those basic competency and performance aspects that were uniformly applicable in

the selected projects. Three questionnaires were developed to capture response of different actor groups about their competence levels and perceptions about performance.

16.4 Research Variables

The variables for the study are based on review presented above, a field study of an ongoing e-Governance project (Suri 2005) and practical experience of executing projects. These are explained as follows:

16.4.1 Macro Variables

The research variables 'Performance of e-Governance' (Suri and Sushil 2011; Suri 2014) and 'Competence level of actors' are defined as follows:

16.4.1.1 Competence Level of Actors

This variable captures ability of actors to use the project specific e-Governance service, their ability to make use of available computing facilities and demonstrating contact leadership, i.e. maintaining constant touch with actors operating at lower layers.

16.4.1.2 Performance of e-Governance

Unlike traditional measures, which consider a project as successful if there is no cost overrun or schedule slippage, the measures proposed here are based on systems viewpoint, i.e. an e-Governance project is considered as performing well if it has successfully achieved the intended outcomes. In the context of this study, the identified projects are expected to bring transparency in government functioning, promote interaction among stakeholders, strengthen decision support at different levels and deliver services in an efficient manner. The performance variable is conceptualized accordingly.

16.4.2 Micro Variables

The micro research variables constituting the macro research variables, viz. 'Competence level of actors' and 'Performance of e-Governance' are defined here under respective categories:

16.4.2.1 Competence Level of Actors

Under the macro variable 'Competence level of actors', three micro variables were identified to capture operational competence of planners and implementers, which are explained as follows.

Ability to use project service The variable captures the extent to which an officer is equipped to use the service offered. The related questions are extent of familiarity with various features of the service and ability to use these features.

Ability to use computing facilities The related questions are extent to which the government official is able to use computers for e-mail, Internet browsing, word processing, data analysis, improving one's productivity/efficiency, interacting with government and interacting with industry.

Ability to maintain contact This variable captures how far a government official is able to demonstrate contact-based leadership quality. The planners are asked about the extent to which they are able to remain in direct touch with implementers and beneficiaries. Implementers are asked the extent to which they are able to remain in direct touch with beneficiaries.

All the above three micro variables pertaining to 'Competence level of actors', are used in case of planners' and implementers' analysis. In case of beneficiaries, 'Competence level of actors' is represented by 'Ability to use project service', keeping into view wide variations in the project-wise nature of beneficiaries and their context being different from that of government officials.

16.4.2.2 Performance of e-Governance

The micro variables constituting the macro variable 'Performance of e-Governance' (Suri and Sushil 2011; Suri 2014) include: *efficiency* (fast execution of the core process, simplification of government procedures, reduced paper work and decreased communication cost), *transparency* (easily accessible, reliable, comprehensive and fairly delivered service), *interactivity* (improved interactions with internal and external actors) and *decision support* (improved planning and decision support, better monitoring and control).

16.5 Survey of Planners, Implementers and Beneficiaries

The processes involved in conduct of opinion surveys followed by reliability and validity analysis of constructs are summarized as follows:

16.5.1 Questionnaires Development

The context of the six identified projects in terms of their objectives and expected deliverables was studied by reviewing the system write-ups and interacting with project officials. Commonly applicable standardized questions related to competence level of actors and performances were framed. For ensuring clear interpretation by the respondents, the standard performance-related questions were qualified with project specific contexts. The questionnaires were subjected to face, criteria related and content validity tests (Kerlinger 1983, p. 458) for fine-tuning before launching the survey. The validation of questionnaires was followed by pre-testing of questionnaires. The learning from a pilot study (Suri 2005) and subsequent field studies helped in better wording of the questions and removal of ambiguity in questions. A Likert scale was used which was transformed into five contiguous classes as 0–0.2 (Nil), 0.2–0.4 (to a small extent), 0.4–0.6 (to a medium extent), 0.6–0.8 (to a large extent) and 0.8–1.0 (to a very large extent). Observed data was mapped accordingly for conducting statistical analysis. Most of the prospective respondents in the 'planners' category were generally approached in person. This was feasible as the planners in each project were mostly centrally located and their number in each project was also small. Different methods were adopted to get adequate response from implementers and beneficiaries which included approaching them in workshops, and farmers' training programmes that are regularly conducted in a few related institutes besides seeking response through e-mail wherever feasible. Valid responses were submitted by 36 planners, 107 implementers and 139 beneficiaries from different parts of the country.

16.5.2 Reliability and Validity Analysis

The internal consistency of constructs is measured using Cronbach's Alpha value (Kerlinger 1983, pp. 451–452). The values for 'Competence level of actors' in the case of planners, implementers and beneficiaries are found to be 0.74, 0.85 and 0.89, respectively. Corresponding values for the 'Performance of e-Governance' construct were 0.94, 0.92 and 0.92, respectively (Suri 2014). These values are above the recommended threshold level for such empirical studies (Hair et al. 2006, p. 118). The constructs are validated using factor analysis (Kerlinger 1983, pp. 659–678; Hair et al. 2006, pp. 90–114). Cumulative extracted factor loadings greater than 50 % are considered practically significant (Hair et al. 2006). For the variable 'Competence level of actors', the loadings are found to be 54.1 and 56.4 % for planners and implementers, respectively. In the case of beneficiaries factor analysis was not required as there is only one element in the construct. The respective computed percent values of factor loadings for the performance variable are 80.9, 72.3 and 72.6 % which are acceptable. At the micro level, it has been tested that in general all the constituting items are corresponding to the respective

constructs and filtering through the threshold of 50 % of cumulative percentage of variance (Kerlinger 1983, pp. 659–678; Hair et al. 2006, pp. 90–114). The constructs are, therefore, treated as validated.

16.6 Univariate Analysis and Discussion

Univariate analysis has been carried out for the conceptualized macro and micro variables. The computed values include mean, coefficient of variation, range and quartile percentiles for the planners, implementers and beneficiaries of the six projects. The means and medians for all the variables in the respective three actor segments are found to be of the same magnitude, implying thereby that the respective distributions are near symmetric (Table 16.1).

16.6.1 Univariate Analysis of Competence Level of Actors

As per the observed mean values (Tables 16.1, 16.2, 16.3 and 16.4), the overall competence level of implementers is found to be lower (medium extent) as compared to the planners (large extent). This is found to be on expected lines as planners are located at headquarters where they are in a better position to use computing facilities as well as project service. The observed values reflect medium extent of overall measures of competency levels with respect to the beneficiaries category. The project beneficiaries belong to farming community as well as companies. As such, the variation with respect to their situation and competency levels is expected to be high as is reflected by higher value of respective coefficients of variations. The first quartile values (small extent), the third quartile values (large extent) and the ranges of observed values varying from 0–1 also reflect the two extremes of beneficiaries—those not being able to use service at all and those being able to make use of service to a large extent.

The observed means of first two micro variables, viz. ‘Ability to use project service (ABS)’ and ‘Ability to use computing facilities (ABC)’, belong to the ‘very large extent’ range in the case of planners. The means pertaining to questions related to ABS, viz. familiarity with features of service and ability to use the features are also belonging to the same range. Similar means in respect of questions related to ABC reflect that planners are able to make use of the available computers effectively for using e-mail, Internet, word processing, improving their productivity and interacting with government agencies. Usage of computers for interacting with industry is rated as of medium extent by the planners. The mean of third micro variable, viz. ‘Ability to maintain contact with implementers and beneficiaries (CNTP)’, is found to be of medium extent only. Average values pertaining to constituent questions about their ability to maintain direct touch with field/operational level staff and beneficiaries also belong to the medium range.

Table 16.1 Univariate statistical analysis for macro variables for various actors

Macro variable	N valid	Mean	SE (mean)	SD	CV (%)	Range	Min	Max	Percentiles		
									25	50	75
Planners											
Competence level of actors (CLP)	36	0.76	0.02	0.14	18.42	0.50	0.50	1.00	0.66	0.75	0.88
Performance of e-Governance (PERFP)	36	0.70	0.03	0.17	24.28	0.69	0.31	1.00	0.59	0.70	0.82
Implementers											
Competence level of actors (CLI)	107	0.55	0.02	0.17	30.91	0.72	0.20	0.92	0.42	0.54	0.68
Performance of e-Governance (PERFI)	107	0.60	0.02	0.18	30.00	0.78	0.12	0.90	0.48	0.63	0.74
Beneficiaries											
Competence level of actors (CLB)	139	0.56	0.02	0.27	48.21	1.00	0.00	1.00	0.38	0.63	0.75
Performance of e-Governance (PERFB)	139	0.51	0.02	0.20	39.22	0.93	0.00	0.93	0.36	0.52	0.66

Table 16.2 Univariate statistical analysis for planners related micro variables

Planners											
Variable	N valid	Mean	SE (mean)	SD	CV (%)	Range	Min	Max	Percentiles		
									25	50	75
Competence level of actors (CLP)	36	0.76	0.02	0.14	18.42	0.50	0.50	1.00	0.66	0.75	0.88
Ability to use project service (ABS)	36	0.89	0.02	0.14	16.11	0.50	0.50	1.00	0.75	1.00	1.00
Ability to use computing facilities (ABC)	36	0.80	0.02	0.14	18.10	0.50	0.50	1.00	0.71	0.83	0.90
Ability to maintain contact (CNTP)	36	0.59	0.04	0.27	44.84	1.00	0.00	1.00	0.41	0.63	0.75
Performance of e-Governance (PERFP)	36	0.70	0.03	0.17	24.28	0.69	0.31	1.00	0.59	0.70	0.82
Efficiency (EFFI)	36	0.73	0.03	0.19	26.16	0.69	0.31	1.00	0.63	0.75	0.86
Transparency (TRANSP)	36	0.73	0.03	0.16	22.41	0.69	0.31	1.00	0.69	0.75	0.81
Interactivity (INTER)	36	0.61	0.04	0.22	35.41	0.92	0.08	1.00	0.50	0.63	0.75
Decision support (DECSP)	36	0.63	0.04	0.22	34.08	0.75	0.25	1.00	0.50	0.63	0.75

Table 16.3 Univariate statistical analysis for implementers related micro variables

Implementers											
Variable	N valid	Mean	SE (mean)	SD	CV (%)	Range	Min	Max	Percentiles		
									25	50	75
Competence level of actors (CLI)	107	0.55	0.02	0.17	30.91	0.72	0.20	0.92	0.42	0.54	0.68
Ability to use project service (ABS)	107	0.66	0.02	0.22	33.74	0.75	0.25	1.00	0.50	0.75	0.75
Ability to use computing facilities (ABC)	107	0.57	0.02	0.21	36.13	0.90	0.10	1.00	0.40	0.60	0.70
Ability to maintain contact (CNTI)	107	0.40	0.03	0.27	66.06	1.00	0.00	1.00	0.25	0.50	0.50
Performance of e-Governance (PERFI)	107	0.60	0.02	0.18	30.00	0.78	0.12	0.90	0.48	0.63	0.74
Efficiency (EFFI)	107	0.64	0.02	0.18	29.03	0.81	0.19	1.00	0.50	0.69	0.81
Transparency (TRANSP)	107	0.63	0.02	0.21	33.22	0.94	0.06	1.00	0.50	0.69	0.75
Interactivity (INTER)	106	0.47	0.02	0.19	41.33	0.92	0.08	1.00	0.33	0.50	0.64
Decision support (DECSP)	107	0.56	0.02	0.21	37.07	0.88	0.13	1.00	0.38	0.50	0.75

Table 16.4 Univariate statistical analysis for beneficiaries related micro variables

Beneficiaries											
Variable	N valid	Mean	SE (mean)	SD	CV (%)	Range	Min	Max	Percentiles		
									25	50	75
Competence level of actors (CLB)	139	0.56	0.02	0.27	48.21	1.00	0.00	1.00	0.38	0.63	0.75
Ability to use project service (ABS)	139	0.56	0.02	0.27	48.21	1.00	0.00	1.00	0.38	0.63	0.75
Performance of e-Governance (PERFB)	139	0.51	0.02	0.20	39.22	0.93	0.00	0.93	0.36	0.52	0.66
Efficiency (EFFI)	139	0.56	0.02	0.22	38.47	0.94	0.00	0.94	0.44	0.56	0.75
Transparency (TRANSP)	139	0.51	0.02	0.23	46.04	1.00	0.00	1.00	0.31	0.50	0.69
Interactivity (INTER)	136	0.44	0.03	0.30	68.04	1.00	0.00	1.00	0.25	0.50	0.75
Decision support (DECSP)	139	0.46	0.02	0.23	50.36	1.00	0.00	1.00	0.25	0.50	0.63

This hints at an important gap of prevailing set-up of distant leadership being practiced in such projects. This gap needs to be plugged for achieving higher performance level.

In the case of implementers, the mean of first micro variable belongs to the [0.6, 0.8) (large extent) class whereas average values of other two micro variables belong to the [0.4, 0.6) (medium extent) class. Means of questions related to ABS, viz. familiarity with features of service and ability to use the features are also belonging to the same range. Similar means in respect of questions related to ABC reflect that implementers are able to make use of the available computers for using e-mail, Internet, word processing and improving their productivity to a large extent. Usage of computers by implementers for interacting with government agencies as well as industry is observed as of medium level. The mean values pertaining to questions related to ABS and ABC are lower than the corresponding observed means in case of planners. The differences range from 33 to 35 % in case of ABS. In case of ABC, the maximum and minimum observed means pertain to using computers for e-mail and interacting with industry, respectively both in the categories of planners and implementers. The observed difference is 40 % for both the questions. The observed mean of third micro variable 'Implementers ability to maintain contact with beneficiaries (CNTI)' belongs to the medium range with the value being the lower class limit. This hints at the gaps in interaction between implementers and beneficiaries which need to be addressed for improving the project performance in general. The overall differences in the means of constituting micro variables suggest the difference in competency levels of planners and implementers. Comparing the three groups of actors in terms of 'Ability to use project service (ABS)', the competency level of planners is observed to be higher than that of the implementers, which in turn is observed to be higher than that of the beneficiaries.

16.6.2 Univariate Analysis of Performance of e-Governance

The average performance value, based on the response of implementers, pertains to [0.6, 0.8) (large extent) class which is about 17 % lower than the observed average performance value as per planners. The overall average project performance according to beneficiaries is lower than the corresponding observed values pertaining to planners and implementers.

The observed values, therefore, reflect that among the three actor groups studied, the beneficiaries are experiencing the least value from the e-Governance projects. On the other hand, planners appear to be highly satisfied from the performance of e-Governance projects. These observed values appear to be supporting the prevailing hierarchical organizational structure which is typical of government departments where project conceptualization and arrangement of required project resources is generally done at the top level. Such higher level officials may be inclined to have opined in favour of higher performance to justify the resources

spent. Further, in comparison to implementers and beneficiaries, who usually operate under challenging field conditions, the planners may be actually experiencing relatively better working environment at their level due to the ICT infrastructure created under such projects. At the micro level, the survey reflects that all the three actor types are of the view that achievements have been more in terms of efficiency and transparency as compared to interactivity and decision support.

16.7 Significance of Research and Limitations

Significance of research in terms of research contribution and implications besides research limitations are discussed as follows:

16.7.1 Research Contribution and Implications

This study has attempted to develop measures for 'Competence level of actors' and 'Performance of e-Governance'. Univariate analysis based on three independent surveys has thrown light on the gaps in competence levels of key actor groups (planners, implementers and beneficiaries), and their perception levels about e-Governance performance. The analysis reflects the significance of clearly defining project outcomes—particularly from the perspective of beneficiaries—while formulating project plans. Performance of projects needs to be monitored in terms of achievement of these intended outcomes. Similarly, the construct for measuring 'Competence level of actors' is expected to sensitize the practitioners for giving thrust on focused capacity building programmes to improve the abilities of the key actor groups to use computing facilities and project service features besides improving the ability of planners and implementers to maintain contact with the actors operating at lower layers. Such an approach to re-design capacity building programmes is expected to help in continuous performance improvement through an effective feedback system.

From the viewpoint of researchers, the validated constructs can be further used to explore the relationship between the two by taking 'Competence level of actors' as independent variable and 'Performance of e-Governance' as dependent variable. The following macro and micro level hypotheses of association are formulated for statistically examining the relationship between the conceptualized macro/micro variables related to competence level of actors with the performance of macro/micro variables in the context of the study.

The three macro level alternate hypotheses of association, conceptualized on the basis of this study, are:

H_aA: Competence level of actors predict performance of e-Governance.

The respective null hypotheses are:

H_0A: Competence level of actors does not predict performance of e-Governance.

where actors (A) Є {Planners, Implementers, Beneficiaries}.

Further, the general micro level alternate hypotheses of association in the case of planners, implementers and beneficiaries are of the form:

H_aA*ij*: *i*th micro variable predicts *j*th micro variable of performance; where actors (A) Є {Planners, Implementers, Beneficiaries}; *i* Є {ABS, ABC, CNTP}; *j* Є {EFFI, TRANSP, INTER, DECSP}.

The predictive relationships which emerge from such an analysis may be interpreted in the context of each of the six identified projects using Interpretive Matrix Tools (Sushil 2005) to arrive at the influencing links between competence-related independent variables and performance-related dependent variables.

16.7.2 Limitations

A major constraint faced in conducting the study has been the lack of similar past studies based on cross-case analysis. As such, the proposed constructs can be further enriched by analyzing a few more live e-Governance projects in different sectors.

16.8 Conclusion

In this chapter, two constructs have been discussed to measure competence level of key actors (planners, implementers and beneficiaries) and project performance in case of agriculture related large e-Governance projects. The study results reflect upon the gaps related to actor competencies and e-Governance performance. Lessons from the study can trigger corrective actions in terms of designing effective capacity building programmes for government officials and beneficiaries. Such an intervention in the grassroot level on-going and forthcoming e-Governance projects can help in ensuring meaningful realization of the intended benefits from such projects. The study findings have also provided a base for proposing hypotheses of association for testing predictive relationship between competence and performance related conceptualized variables.

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