Towards a Cumulative Tradition in E-Government Research: Going Beyond the Gs and Cs

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Abstract. The emerging research area of e-Government is gradually moving towards a level of maturity on the back of increasingly rigorous empirical research. Yet, there has been little theoretical progress and a cumulative tradition is not emerging. We argue that a principle reason for this is a lack of shared understanding about basic concepts and entities amongst scholars in the field. Specifically, the entities that form the bedrock of e-Government research, such as "Government" and "Citizen" are conceptualized at a very general level of abstractions and treated as homogenous groups. We argue that existing models and frameworks fail to see the vast differences that exist between categories of these entities. Without a finer grained conceptualization, comparison of findings across different research studies is not possible and thus transfer of knowledge between different projects is difficult. This is a fundamental obstacle in developing a cumulative tradition. Based on an examination of the literature, we propose categories of "Government" and "Citizen" at a finer grain and discuss implications for both practice and research that stems from our conceptualization.

Keywords: e-Government concepts, government, citizen, cumulative tradition.

1 Introduction

E-Government as an area of research and practice has been around for roughly a decade and a half (and IT in public sector for some 50 years). Recent reflections based on rigorous examinations of the intellectual development of the field has revealed that the field is gradually maturing [1-3]. The knowledge base of the field is growing at a fast rate fuelled by an accelerated increase in the number of papers published in refereed outlets [3]. More importantly, the quality of research is steadily improving. There is more empirical research [1, 2], employing rigorous methods spanning the full spectrum of methods [1, 3], and is becoming multi-disciplinary in nature [3]. Rigorous research has also reduced the incidence of "dubious claims" [1]. These are optimistic trends and it gives the impression of a dynamic maturing field with a dedicated and enthusiastic group of scholars.

Yet, there are ominous signs. e-Government remains under-theorized [3] and there are few attempts at either theory testing or theory building [1]. While the relatively high interaction with practice can be the envy of related fields such as Information

Systems, it may well be a weakness. Gronlund and Anderson [1] found that almost 30% of the papers they reviewed were product descriptions. One reason for this may be the funding policies of the EU that encourages product development and service delivery [4].

The lack of theoretical endeavours reduces our ability to analyze and understand current e-Government developments. No wonder Scholl [3] found a lack of shared vision of the impact of e-Government initiatives. Research has shown limited crossreferencing and hardly any cumulative studies [2].

Thus, e-Government research is in serious danger of becoming a fragmented field populated with a series of one-shot studies, albeit rigorous, but little progress towards a coherent area with its own theories. To do so, it is essential to build a cumulative tradition which is characterised by the following [5]:

- Researchers build on each other's and their own previous work
- Definitions, topics and concepts are shared
- Senior researchers view their main role as shaping the field
- Each journal in the field has a clear focus
- There is some definition of orthodoxy, while unorthodoxy is not discouraged (p. 13).

Reviews cited earlier (e.g., [1, 3]) reveal that the last three characteristics are present in e-Government research. Missing are the first two points which both cause and result in each other.

In this paper, we address the second issue: lack of the shared view about key concepts. The precursor to articulation of theories in any field is a consensus among researchers on concepts and definitions. We examine two key and fundamental entities of e-Government, namely, "Government" and "Citizen" and propose finer grained conceptualization of these entities. Based on an examination of the literature, we propose categories of these entities.

The rest of the paper is organized as follows: Section 2 outlines *Government* and *Citizen* as the fundamental entities of e-Government and argues that these categories of entities are too broad in order to provide a meaningful conceptual basis for understanding e-Government and to develop normative guidelines for the further development of the field. To address these issues, Section 2 re-conceptualizes *Government* and *Citizen* into more fine grained categories that are considered to provide a higher descriptive accuracy than existing conceptualizations. Section 3 illustrates the proposed entities resulting from the literature review in Section 2 and suggests possible interactions between the entities. Further, Section 3 discusses the implications this new conceptualization has for both research and practice. Finally, Section 4 makes some overall conclusions from the paper.

2 Theoretical Conceptualizations

Arguably, "Government" and "Citizen" are the most fundamental entities in e-Government research. Yet, these terms are taken almost for granted and there is hardly any scholarly examination of what they mean. In the absence of theories, this is not surprising. However, existing theoretical expositions offer some possible avenues. One such direction is provided by the framework proposed by Grönlund [6] which distinguishes three "spheres of governance" (p: 7), namely formal politics, administration and civil society. Although not explicitly stated, it can be reasonably argued that the term "Government" as used in the literature includes formal politics and administration. The term "Citizen" is exhumed in the remaining sphere, i.e., civil society.

This model is useful in distinguishing the types of interaction between key entities. However, it depicts a very high level conceptualization that stands the risk of oversimplifying the complexity of governance. Each sphere, or stakeholder group, contains a variety of stakeholder interests and different modes of operation, and it is clearly impossible to view any of the basic stakeholder groups as unified entities promoting just one or a few common interests. For example, politicians set policy on, among other things, providing services to citizens while civil servants such as administrators execute them. A large part of the citizenry simply consumes these services but a significant minority actively attempts to influence policy. This leads to different objectives of communicating within and between these groups. It is on this premise that we propose categories of these entities.

2.1 Reconceptualizing "Government"

Government entities are often classified according to hierarchical position in a multitier structure. Typically, such structures involves a national central governing organ (the central government), a regional level (e.g. the County) and a local level (city or municipality) [7, 8]. The tier-distinction can be a purposeful one as the different tiers perform different and separate tasks that in total represent the spectre of services available to society. However, practical government service production often requires interaction between tiers and also within tiers (but across different entities). This internal interaction, where data needs to flow between entities, is often referred to as horizontal or vertical integration in the e-Government literature [9]. The tierdistinction can be useful to visualize this interaction, but is insufficient as a means of understanding the complex challenges associated with actually making such integration happen. To sharpen our understanding of governments, we propose a further classification of the internal aspects of e-Government.

Although slightly dependent on hierarchical position, government entities can easily be further separated in three distinct groups, namely administrations, service providers and politicians. With such a categorization, administrations represent management and coordination functions of government agencies. The public administration literature often refers to government agencies as typical bureaucratic structures entailing a fascination for management and control [10]. While a bureaucratic tradition certainly exists in government agencies, we argue that such entities are more faceted than this rather stereotype description allows us to understand and that the preoccupation with management and control only reflects the description of what we refer to as *Administrators*. A typical example of this category would be Chief Administration Officer of a municipality and this person's staff. The primary concern of this group is to govern it's agency according to directions provided by other agencies such as county and central governments and to ensure that the operations of the agency is maintained within budget and according to rules and regulations. Much of the e-Government literature has focused on the interests of the Administrators by discussing the potential of e-Government to provide better control and coordination and increased cost efficiency [10-12]. While the administrative element of government entities certainly constitutes an important aspect of e-Government, this aspect fails to encompass other, equally important aspects like facilitating citizen centric modes of governance and increased democratic participation [13]. Therefore, we propose to distinguish between *Administrators* and *Service providers*, allowing a more nuanced conceptualization of government entities.

Service providers represent a different entity with a somewhat different purpose from the Administrators. This group represents an agency's interface toward civil society with the purpose to ensure that public services are supplied as specified by administrations and politicians. However, the close and constant interaction with the service consumers places this group in a somewhat different position from administrators. The service providers are thus more likely to be concerned with the quality of the service they offer than being overly engaged in budgets and overall strategy of an agency. While there are several mentions of government employees as a distinct group within governments [7, 14, 15], viewing government entities in light of whether they have primarily administrative or service perspectives have not been extensively explored in the e-Government literature. However, the proposition that there does exist a segment within governments that differs from the mainstream understanding of governments as *administrators* has been suggested in a recent Norwegian study of benefits management practice [16]. Also, Griffin et. al. [17] and Peristeras et al [18] stress that (local) governments performs various roles, one of them being a service provider. This study does indicate that government employees occupied with service production and provision differ in their interests versus government employees that are predominantly occupied with more administrative duties. We therefore argue that the concept of service provider is more meaningful than government employees as employees as a category inevitably would represent both our proposed categories of *administrators* and *service providers*.

Both administrators and service providers execute policies that are set by *politicians*. The central tenet in politics is the ability to shape society based on a particular notion of an ideal (and just) society [19]. The shaping of society is largely done by controlling government spending, i.e. allocating budgets to promote particular directions on societal development. Public spending can be given further directions through the development of policy and guidelines that administrations are instructed, or inspired, to carry out. Additionally, politicians may shape society through laws and regulations [19].

2.2 Reconceptualizing "Citizen"

Citizens comprise a major stakeholder group in the e-Government literature including work related to eDemocracy and eParticipation (e.g. [20-22]). Citizens are often discussed in relation to other stakeholder groups. For example, the relationship between citizens and politicians focus on the interaction between the two groups ([13, 23]), on how participation varies between these stakeholder groups [24] and on their specific roles [23].

In these discussions citizens are often seen as a homogenous group. An exception is Wimmer's model [25]. We agree and argue that citizens are a heterogeneous group with different interests and views on how they can utilize government services and influence and take part in public decision making processes. Their different relationships and roles influence on how these should be addressed when new e-Government services are to be implemented. We suggest that citizens can be divided into the three distinct groups; *consumers, activists* and *direct decision makers*.

Consumers are more interested in the product and the services offered by the government than the political process leading to these offerings [26]. Their concern is the quality of such services, and may not be influencing the decision making [27-29]. The role of such consumers in the decision making process is often limited to choosing between candidates in elections [26], thus supporting or rejecting the current political regime.

A large proportion of current e-Government projects reflects a consumer perspective on citizen participation.. Even where citizens ostensibly have the opportunity to influence the decision-making process and policy, such as discussion forums for political debate, the authorities define the purpose for the communication beforehand and control the debate [29]. The use of such discussion forums are often connected to elections and used to inform and be informed by electors. The power balance between different stakeholders in the decision making processes are not challenged [29].

This "traditional" view of citizens as consumers differs markedly from the citizen as activist view. *Activist* citizens seek to be more explicitly and directly connected to decision making processes [19, 30] and emphasize the role of open discussions in a well functioning public sphere [31]. Politicians and citizens share an interest in dialogue and discourse leading to the formation of political opinion. Activists not only try to influence through traditional channels or solely through elected representatives, but they also seek to obtain visibility for alternative political expressions and criticism without interference from the political elite [32-34]. They seek to influence the political process [35-38] by using technological means to promote their interests such as public discussion forums [29]. Activists seek a much more interactive and interwoven role between themselves and other stakeholder groups taking part in the decision making processes (e.g., politicians and administration). They even contribute to setting the political agenda.

While activists attempt to influence the decision making, they do not actually make decisions, in contrast to a direct democracy system where citizens actually make the decisions [29, 39]. We refer to this group as *decision makers*.

Direct (cyber) democracy has been suggested as an ideal form of e-Democracy by some scholars [28, 40, 41]. Despite optimistic theorizing, the actual implementations of direct e-Democracy has remained rare [42-45]. Thus, the idea of citizens as direct decision makers has currently more academic than practical interests. Citizens are now seen to have both interests and wisdom to rule, and representatives are "generally regarded as a necessary evil that could and should be avoided in different ways" [26].

There are some examples of discussion forums that support citizens as direct decision makers [29]. These forums represent a direct channel to raise issues and affect decisions. The citizens are online affecting the decisions to be made (mostly at the local level). Citizens set the agenda both for public discussion and decisionmaking [29].

e-Government services based on a direct decision maker-view of citizens would be radically different than those e-Government services directed towards other categories of citizenry. ICT plays a critical role in implementations where the Internet no longer represents a supplement to traditional communication channels, but instead a crucial precondition for democracy [28]. A direct E-Democracy initiative requires communication technology to support coordination among a great number of decision-makers, i.e. citizens, possibly geographically scattered, with diverse interests and backgrounds.

3 Discussion

The primary contribution of our paper is a finer grained conceptualization of two fundamental entities of e-Government: *Government* and *Citizen*. Table 1 summarizes our conceptualization.

Basic entity	Sub-categories	Description	Source
Government (G)	Politician (GP)	Publicly elected decision and policy maker (e.g. mayor, councillor, parliament member)	[46]
	Administrator (GA)	Middle and higher level salaried career employees executing politicians' policies (city manager, health department head)	[14]
	Service provider (GS)	Lower level salaried career employees carrying out day to day government jobs directly or indirectly interacting with citizens (e.g., case officers in school department, advisors and information providers in taxation office)	[16, 17]
Citizen (C) Consumer (CCon)		Uses services offered by the government	[26, 28, 47]
	Activitist (CAct)	Citizens involved in efforts to effect specific government policies and decisions through civil action often individually or in groups (e.g., Amnesty International)	[19, 26, 29]
	Direct Decision makers (CDD)	Citzens are directly responsible for the decisions being made in a direct democracy system.	[28, 29]

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The subcategories allow us to look at more specific interactions between the entities. Table 2 summarizes these interactions.

Table 2.	Interactions	between	the entities	of e-Government	

Туре	Interaction	Example
Within entities	Politician – Administrator GP2GA	Politicians discuss policy issues and convey decisions to city employees
	Administrator – Service provider GA2GS	Strategic, tactical and operational decision making and task accomplishment

	Politician - Service	Only informal
	provider GP2GS	
	Service provider – service	Handing cases from citizens that cross
	provider GS2GS	departmental boundaries (e.g., placing a child
		through school)
	Administrator –	Deliberations and decision making on issues that
	Administrator GA2GA	require involvement of more than one
		department
	All C2C interactions	Discussions on projects. Discussions on social
	All C2C Interactions	issues
	All B2B interactions	Discussions on implications and consequences of
		government decisions
Between	Politician – all Citizen	Deliberations on social and governing issues and
entities	categories	projects (such as a new road)
	Administrator –	Information on forthcoming initiatives or
	Consumers GA2Ccon	explanations of decisions already made
	And Administrator –	
	Advocacy groups (CAg)	
	Service provider –	Use of government services
	Consumer GS2Ccon	

Table 2. (continued)

This conceptualization has important implications for both research and practice.

3.1 Implications for Practice

By clarifying further the key concepts of Government and Citizen, our framework can eventually contribute to the practice of E-Government, especially in developing e-Government systems. Determining requirements for specific systems is not easy [29]. One approach that has been used successfully is genre-based where the communicative genres between entities are analyzed to determine requirements. We propose that subcategories of an entity have different genres of communication with another entity. Our framework can help designers to me more specific about these genres. The subcategories are also different categories of stakeholders with different powers, urgency and legitimacy.

3.2 Implications for Research

In our conceptualization of e-Government, we limited our analysis to two high level entities, namely Government and Citizen. A third stakeholder group that is important in e-Government, Businesses, is left out of our analysis, largely because this entity only has received marginal attention so far and we consider it therefore somewhat premature to theorize around it. Still, when reflecting on the Businesses at least two possible categories spring to mind: "individual businesses" and "business associations" (such as chamber of commerce and industry associations. We do, however, leave conceptualization of Businesses to future research.

Even the three categories of Citizen we propose leave out other important stakeholders. For example, we conceptualize "activists" as individual citizens.

However, an important part of civil society is groups of such individuals collectively known as "advocacy groups". These groups have longer life span and often centred around causes that are more sustained. Examples are Amnesty International and Human Rights Watch. These groups are often subsumed under "NGO". However, they are different from NGOs that focus on providing specific services – such as BRAC the Bangladesh-based NGO that aims at rural development. This is a fruitful avenue for future research.

4 Conclusion

We argued that despite advances in both quantity and quality of research in e-Government, there is little evidence of building a cumulative tradition. We believe that the main reason is a lack of shared meaning and understanding on primary and basic concepts in the field, specifically entities such as Government and Citizen. We delved into these entities and proposed categories of these entities. Like any new conceptual framework, our proposed re-conceptualization seeks to provide a clearer understanding of a phenomenon based on logically integrating prior work in the area. The academic community will find our concepts useful to compare findings across studies and re-interpret prior findings. For a field to mature, possibly to become a discipline, theory building is essential. (for a good discussion on the "disciplinarity" of e-Government see Scholl [3]). The first step to articulating theory, as Eom [48] points out is consensus building among the scholars of the field about concepts and definitions. Our paper is a step towards such consensus building.

Obviously there is a need to validate our concepts. Our conceptualizations are by no means complete or even comprehensive. It is a work in progress, and its usefulness lies in serving as a springboard for further work towards achieving conceptual clarity and developing a cumulative tradition in e-Government research.

References

- Grönlund, Å., Anderson, A.: e-Gov Research Quality Improvements Since 2003: More Rigor, but Research (Perhaps) Redefined in EGOV 2006. Krakow, Poland (2006)
- Sannarnes, M., Henriksen, H., Andersen, K.: The E-Government Melting Pot: Lacking New Public Management and Innovation Flavor? In: Wimmer, M.A., Scholl, H.J., Grönlund, Å., Andersen, K.V. (eds.) EGOV 2006. LNCS, vol. 4084, Springer, Heidelberg (2006)
- Scholl, H.: Is E-Government Research a Flash in the Pan or Here for the Long Shot. In: Wimmer, M.A., Scholl, H.J., Grönlund, Å., Andersen, K.V. (eds.) EGOV 2006. LNCS, vol. 4084, Springer, Heidelberg (2006)
- 4. Bicking, M., Wimmer, M.: eGovernment Research in Europe: Disciplinary Understanding and State of Play from eGovRTD2020. In: Electronic Government Communication, Krakow, Poland (2006)
- 5. Keen, P.: MIS research: Reference disciplines and a Cumulative tradition. In: First International Conference on Information Systems, Philadelphia, USA (1980)
- 6. Grönlund, A.: What's In a Field Exploring the eGovernment Domain. In: 38th Hawaii International Conference on System Sciences, Big Island, Hawaii, USA (2005)

- Edmiston, K.D.: State and local e-government Prospects and challenges. American Review of Public Administration 33(1), 20–45 (2003)
- Flak, L.S., Olsen, D.H., Wolcott, P.: Local e-Government in Norway: Current status and emerging issues. Scandinavian Journal of Information Systems - Special Issues on e-Government 17(2), 41–84 (2005)
- Layne, K., Lee, J.W.: Developing fully functional E-government: A four stage model. Government Information Quarterly 18(2), 122–136 (2001)
- Chadwick, A.: Bringing e-democracy back in Why it matters for future research on egovernance. Social Science Computer Review 21(4), 443–455 (2003)
- 11. Flak, L.S.: The state of G2G development: Maturity levels and current challenges. In: 12th Americas Conference on Information Systems (AMCIS-12), Acapulco, Mexico (2006)
- 12. Flak, L.S., Nordheim, S.: Stakeholders, Contradictions and Salience: An Empirical study of a Norwegian G2G effort. In: HICSS 2006. Hawaiian International Conference on System Sciences, Kauai, Hawaii, US, IEEE Computer Society, Los Alamitos (2006)
- Chadwick, A., May, C.: Interaction between states and citizens in the age of the internet: "e-government" in the United States, Britain, and the European Union. Governance-an International Journal of Policy and Administration 16(2), 271–300 (2003)
- Tan, C.W., Pan, S.L.: Managing e-transformation in the public sector: an e-government study of the Inland Revenue Authority of Singapore (IRAS). European Journal Of Information Systems 12(4), 269–281 (2003)
- Siau, K., Long, Y.: Synthesizing e-government stage models a metasynthesis based on meta-ethnography approach. Industrial Management & Data Systems 105(3-4), 443–458 (2005)
- Päivärinta, T., Dertz, W., Flak, L.: Issues of Adopting Benefits Management Practices of IT Investments in Municipalities: A Delphi Study in Norway. In: HICSS 2007. 40th Annual Hawaii International Conference on System Sciences, Hawaii, USA, IEEE Press, Los Alamitos (2007)
- Griffin, D., Foster, A., Halpin, E.: Joined-up e-government: An exploratory study of UK local government progress. Canadian Journal of Information and Library Science-Revue Canadienne Des Sciences De L Information Et De Bibliotheconomie 27(3), 132–133 (2003)
- Peristeras, V., et al.: Towards semantic web services for public administration based on the web service modelling ontology (WSMO) and the governance enterprise architecture (GEA). In: Electronic Government Communication, Krakow, Poland (2006)
- 19. Held, D.: Models of Democracy. Blackwell, Oxford (1996)
- Rose, J., Sæbø, Ø.: Democracy Squared: designing on-line political communities to accommodate conflicting interests. Scandinavian Journal of Information Systems, Egovernment special issue 17(2), 133–168 (2005)
- Miles, M.B., Huberman, A.M.: Qualitative data analysis: a sourcebook of new methods. Sage, 263 s. Beverly Hills, Calif. (1984)
- 22. Hacker, K.L.: The potential of computer-mediated communication (CMC) for political structuration. Javnost-The Public 11(1), 5–25 (2004)
- 23. Hudson-Smith, A., Evans, S., Batty, M.: Building the Virtual City: Public Participation through e-Democracy. Knowledge, Technology & Policy 18(1), 62–85 (2005)
- 24. Clift, S.: An Internet of Democracy. Communications of the ACM 43(11), 31-32 (2000)
- Wimmer, M., Holler, U.: Applying a holistic approach to develop userfriendly, customeroriented e-Government portal interfaces. In: Universal Access: Theoretical Perspectives, Practice, and Experience, pp. 167–178 (2003)

- Aaström, J.: Should democracy online be quick, strong, or thin? Communication of the ACM 44(1), 49–51 (2001)
- Brants, K., Huizenga, M., van Meerten, R.: The new canals of Amsterdam: an exercise in local electronic democracy. Media Culture Society 18(2), 233–247 (1996)
- Bellamy, C.: Modelling electronic democracy, Towards democratic discourses for an information age. In: Hoff, J., Horrocks, I., Tops, P. (eds.) Democratic governance and new technology, technologically mediated innovations in political practice in Western Europe, Routledge, London (2000)
- Päiväinta, T., Sæbø, Ø.: Models of E-Democracy. Communications of the Association for Information Systems 17, 818–840 (2006)
- 30. Pateman, C.: Participation and democratic theory, p. 122. Cambridge University Press, Cambridge (1970)
- 31. Gimmler, A.: Deliberative democracy, the public sphere and the internet. Philosophy Social Criticism 27(4), 21–39 (2001)
- Fung, A.: One city, two systems: Democracy in an electronic chat room in Hong Kong. Javnost -the Public 9(2), 77–93 (2002)
- Hurwitz, R.: Who needs politics? Who needs people? The ironies of Democracy in Cyberspace. In: Contemporary Sociology. American Sociological Association, pp. 655– 661 (1999)
- Moon, J.Y., Yang, S.: The Internet as an Agent of Political Change: The case of "Rohsamo" in the South Korean Presidential Campaign of 2002. In: 24th International Conference on Information Systems (2003)
- 35. Siapera, E.: Asylum politics, the Internet, and the public sphere: The case of UK refugee support groups online. Javnost-The Public 11(1), 79–100 (2004)
- Siapera, E.: Minority Activism on the Web: Between Deliberative Democracy and Multiculturalism. Journal of Ethnic & Migration Studies 31(3), 499–519 (2005)
- 37. DeLuca, K.M., Peeples, J.: From public sphere to public screen: Democracy, activism, and the "violence" of Seattle. Critical Studies In Media Communication 19(2), 125–151 (2002)
- Schneider, S.M.: Creating a democratic public sphere through political discussion A case study of abortion conversation on the Internet. Social Science Computer Review 14(4), 373–393 (1996)
- 39. Risinger, C.F.: Democracy gov.? Social Education 64(5), 305 (2000)
- 40. Lynne, E.: Direkte demokrati. Oslo: Pax, 453 (2004)
- Van Dijk, J.: Models of democracy and concepts of communication. In: Hacker, K.L., Van Dijk, J. (eds.) Digital Democracy, Issues of theory and practice, Sage publications, London (2000)
- 42. Aidemark, J.: A knowledge perspective on e-democracy. In: Electronic Government, Proceedings, pp. 319–324 (2003)
- Heidar, K., Saglie, J.: Predestined parties? Organizational change in Norwegian political parties. Party Politics 9(2), 219–239 (2003)
- 44. Myles, J.: Community networks and cultural intermediaries: the politics of community net development in Greater Manchester. Media Culture & Society 26(4) (2004)
- 45. Netchaeva, I.: E-Government and E-Democracy. In: Gazette: International Journal for Communication Studies, p. 467. Sage Publications, Ltd., Thousand Oaks, CA (2002)
- 46. Lively, J.: Democracy. Blackwell, Oxford (1975)
- 47. Barber, B.R.: Strong democracy: participatory politics for a new age, vol. xxiv, p. 320s. University of California Press, Berkeley, Calif (1984)
- 48. Eom, S.: Towards scientific progress of DSS research. Decision Line 24(5) (1993)