Information Network Villages

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Abstract

This study examines South Korea?s Information Network Village (INVIL) project as an exemplary policy of building sustainable communities through a digital divide policy implemented in small rural areas. INVIL project has three objectives: to close the digital gap between urban and rural areas, to create new sources of revenues from existing industries, and to build sustainable local communities. The conception was that rural digital divide can only be resolved by addressing deep rooted rural issues that influence the provision and adoption of ICT. While the INVIL programs may not remedy the gap in the short term, it provides a future vision to the communities. Due to this multi-layered and long term approach, the villages have been successful in narrowing the digital divide, not only in terms of access but also in effectively utilising broadband to enhance the local economy and building sustainable communities. This paper introduces the INVIL project, the plans and outcomes, as well as a qualitative evaluation of the process across a decade. Following a general description of the project, an in-depth case study of three successful INVILs is provided. The uniqueness of the program is that it emphasises investment in human capital rather than on infrastructure and includes a tailored vision of each local community. This motivates local residents to be active participants, which is the key to the success of the policy.

Introduction

South Korea is one of the most connected nations in the world, with 82.3% of households using broadband, with an average connection speed of 14.7 Mbps and with smart phone users reaching over 60% of the population (Korea Communications Commission 2013 [7]; Korea Internet Security Agency 2013 [8]). Nevertheless, the rural digital divide issue has not been resolved and there is still a considerable gap between urban and rural areas in terms of access and usage. The digital divide index reported annually by the Korean Government indicates that rural residents still have less access, and more importantly, the gap in skills and utilisation of the Internet is still persistent (Park & Kim 2014 [9]).

The Information Network Village (INVIL) project, a government funded initiative to bridge the rural digital divide, was launched in 2001. The government acknowledged that laying the infrastructure in rural areas cannot simply remedy the digital gap and that further intervention would be necessary. This paper examines the framework of the INVIL project, analyses the outcomes and provides an in-depth case study of three exemplary villages that have benefited from the project.

Rural areas are disadvantaged in telecommunications infrastructure due to the distance from major cities and the low population density. Without public intervention, it is not usually economically viable to provide quality services to rural areas. Digital divide policies have always been South Korea?s priority with regards to rural and urban areas. This is particularly so because rural areas overlap considerably with agricultural and fishery communities that have been socially excluded groups.

The provision of broadband in rural areas is an initial step towards overcoming the digital divide. However, access itself does not guarantee adoption and usage. In order for broadband connectivity to result in benefits for users, people must use the technology effectively. Effective use captures the notion that beyond connectivity, users must have the capacity to use the services to realise their benefits (Gurstein 2003 [10]). Thus, government subsidised programs alone cannot achieve sustainable adoption. Other intervention policies such as public education campaigns must follow (LaRose et al. 2011 [11]; Strover 2001 [12]).

Empirical research indicates a positive economic impact of infrastructure investment in rural areas (Katz & Suter 2009 [13]). This is enabled not only by

increasing productivity and creating value for businesses but also by enabling sustainable social networks and communities (Atasoy 2013 [14]; Hollifield & Donnermeyer 2003 [15]; Steinfeld et al. 2012 [16]; Stenberg et al. 2009 [17]). However, digital divide policies are difficult to implement in rural areas due to the lack of community participation (Kumar 2012 [18]) or other unintended externalities, such as deprivation of human resources in rural communities (LaRose et al. 2008 [19]) or benefiting non-agricultural sectors rather than the target area (Flor 1993 [20]).

The complexity of enabling sustainable broadband adoption and usage in rural areas is the reason why despite aggressive government policies on the digital divide policies, the rural sector still has the largest gap among digitally excluded groups including the disabled, low income and aged (NIA 2012b [21]). South Korea has been successful in closing the access gap but the second-order effects of skilful use of the technology have not been resolved (Moon et al. 2012 [22]).

Information Network Villages (INVIL)

In 2001, South Korea?s Ministry of Security and Public Administration (MOSPA, former Ministry of Public Administration and Security) launched the Information Network Village (INVIL) program starting with 21 INVILs. The program aimed to narrow the digital gap between urban and rural areas by equipping rural citizens with the necessary skills to thrive in the online environment. The ultimate aim was to enable rural citizens to use those skills to increase income levels and improve everyday lives (INVIL Central Agency 2013a [23]). As of 2013, 361 INVILs were operating in various locations across the country in small rural towns.

For the first few years, the project focused mainly on investing in infrastructure, setting up the INVIL Centres, distributing computers to rural households and designing INVIL websites. Korea Telecom (KT), which was a public company at that time, participated in the consortium, enabling large-scale capital investments in the early days of the project. Since 2006, more focus was placed on identifying sustainable income streams from either e-commerce or by selling rural tourism packages.

As of June 2013, among the 394 INVILs funded by the government, 361 were actively operating. The majority of the villages ? 247 (68%) - were launched in the first five years of the program. This reflects the policy framework of first laying the infrastructure and then finding ways to sustain the uses. INVILs are classified into revenue generating models and non-revenue models. There are three types of revenue generating models: e-commerce, tourism and mixed. Non-revenue INVILs are mainly urban community models. Except for the four non-revenue villages that are located in urban areas, INVILs are designed to generate additional income (Whang 2012 [24]).

The cost of setting up one INVIL is approximately A$300,000. Thus most of the funds are spent on maintaining and managing the centres. In 2013, the central government budget for the INVIL program was A$5 million, of which 30% was allocated to salaries of INVIL managers. The central and provincial governments contribute to the maintenance of the villages. While the proportion varies by area, the provincial governments are increasingly taking up a larger role.

Gangwon Province has the most INVILs with 57 in total, whereas Gyungki Province has 54. Provincial governments of these two provinces contribute approximately 46% and 52%, respectively, to their INVIL programs, which is a higher figure compared to other provinces. Both provinces are relatively close to Seoul metropolitan area, which makes the tourist packages more accessible to urban residents (Table 1).

	2001	2002	2003	2004/2005	2006	2007	2008	2009	2010	2011	2012	2013	Total
Busan	-	1	2	1	-	-	-	-	-	-	-	-	4
Daegu	1	1	-	-	-	-	-	-	-	-	-	-	2
Gwangju	1	1	2	-	-	-	-	-	-	-	-	-	4
Gyungki	3	5	9	19	6	6	6	-	-	-	-	-	54
Gangwon	3	10	9	8	9	6	4	3	2	1	1	1	57
Chungbuk	-	5	3	5	1	4	2	2	1	-	-	-	23
Chungnam	1	10	8	7	2	3	3	-	-	2	1	-	37
Jeonbuk	2	6	8	13	4	2	2	2	-	-	-	-	39
Jeonnam	2	8	13	11	1	4	6	3	-	-	-	-	48
Gyungbuk	5	14	10	10	1	3	1	-	1	1	1	-	47
Gyungnam	2	6	7	5	1	3	3	2	-	-	-	-	29
Jeju	1	3	3	3	1	3	3	-	-	-	-	-	17
Total	21	70	74	82	26	34	30	12	4	4	3	1	361

Table 1- INVIL launch by province and year

Source: INVIL Central Agency (2013a)

Among the 361 active INVILs, 251 were funded initially by the central government?s fund and 110 were funded exclusively by the provincial governments. The central government reviews the performance of INVILs every year and if a village fails to fulfil the requirements for two years in a row, then the government can decide to withdraw the funds. To date, there have been 33 villages that have been revoked. According to the INVIL Central Agency (2013b [25]), there are several reasons why a village might be assessed as unsatisfactory. First, some villages have had conflict between residents and the INVIL manager. New sources of revenue became the source of conflict, thus causing disruption of the community. The second reason is due to the lack of quality control of the new products the village are offering and thus not accumulating enough revenues. Finally, some villages were re-assigned to another administrative area by the government because of the declining population and thus became non-existent.

The vision of INVIL was that, in order to overcome the rural digital divide, the provision of infrastructure and services must be followed by participation in the digital economy by rural residents and eventually sustainable communities enabled by the new technologies. The emphasis on community building is the unique feature of the project. From its inception, the INVIL project had four distinct characteristics: first, it was a joint program between

the central and provincial governments; second, it was built upon the existing strengths of the rural communities; third, it was based on very small communities, often smaller than 100 households, which made it manageable; fourth, it was designed as a long term project that would continue for several years or decades. Unlike many programs where infrastructure costs are provided upfront but facilities are never updated, INVIL emphasised maintenance and sustainability.

The central government oversees the funded villages nationally and provides the initial funding. The provincial governments select, manage, review and provide support in their areas. This systematic approach allows each village to build upon its own strengths and needs. Once the village is set up with the training centre, a full time employee ? the INVIL manager ? takes up a crucial role in developing and maintaining the program. The manager helps the villages set up their websites, run training programs and create user demand by examining the local needs. Often an existing community member, the manager is an essential component of the program.

There have been many tangible outcomes of the INVIL program over the past decade. In particular, INVILs have been largely successful in narrowing the digital divide. Before the INVIL program was launched, in villages selected for the INVIL program the average computer penetration was 37.3% and Internet usage 9.1%. After the launch of the INVIL program, the averages increased to 72.1% and 66.5%, a much higher rate compared to the rural average (see Table 2 below). The increase in usage can be ascribed to the training programs offered by the INVIL managers. In the early stages of INVIL, most of the training programs focus on basic computer use; but once the village is established, setting up e-commerce sites, online marketing, system operation and online finance become more popular among village residents. In 2001, there were about 15,000 trainees in the program, but by 2012 this figure had increased to 400,000.

The central government provides training opportunities to INVIL managers every year, so that they can improve their services to the local community members. In 2012, MOSPA held more than 20 training sessions for INVIL managers in nine locations. The provincial governments also run re-training programs for the managers. Most INVIL managers have at least two professional trainings per year.

	INVILs		Agricultural/fishery areas	National average
	(2000)	(2008)	(2011)	(2011)
Computer penetration	37.3 %	72.1%	60.8 %	81.9 %
Internet usage	9.1 %	66.5%	38.9 %	78.3%

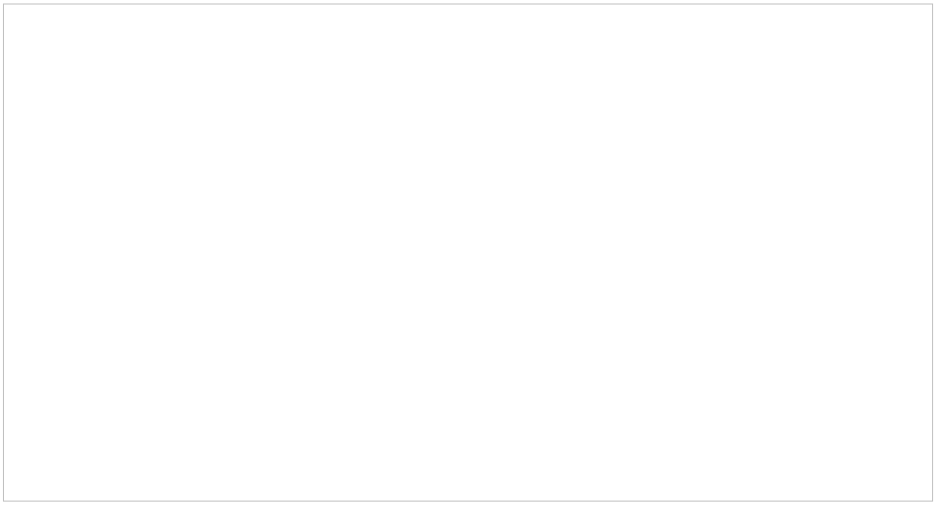
Table 2 - Access and usage gap between INVILs and non-INVILs

Source: National Information Society Agency (NIA) (2012).; National Information Society Agency (NIA) (2012).; INVIL Central Agency (2013b).

The economic outcome of INVIL programs has been confirmed by various statistics and empirical studies. In Gangwon Province, the revenues of INVILs were increased by 827.5 times in 2010 compared to 2001 (Whang 2012 [24]). The main factors contributing to revenue increase were the websites and knowledge sharing among community members (Jeong et al. 2010 [26]). To systematically enhance economic gains, MOSPA set up two central websites: one for selling local produce and the other for selling travel packages. The central agency provides consultation to rural farmers to help them develop new products, services and marketing tools. Revenues from the two online shopping malls in 2006 were $A3 million, which increased to A$40 million in 2012. During the same period, the average revenue per village increased from $A11,000 to $A114,000. In 2012, there were 1.1 million INVIL online shopping mall visitors and 176,181 purchases were made through the site. INVIL travel package visitors reached 310,000 and 38,443 purchased travel packages from the site (see Figure 1).

The INVIL online shopping mall has sold more than 11,000 different types of products to date. Most of them are locally produced agricultural products. The most popular products in 2012 were green apricot jelly (Jeonnam Gwangyang ?Maehwa Village?), wild honey and apples (Miryang ? Ice Valley Apple Village?; Yeongdeok ?Peach Village?). While selling local produces to consumers in other areas can help local farmers in terms of revenue, the flow is outbound. In contrast, various tourist packages can bring travellers from other areas into the local community that has externalities such as boosting local businesses and building a sense of community among the members. There are 348 different INVIL travel packages such as farm-stay, weekend farming and bed-and-breakfast. Popular packages include ?making cheese? at Imshil Cheese Village, ?trout catching? at Jeongseon Baekdu Village and ?clam digging? at Hwaseong Baekmiri Village.

While e-commerce and online tourism packages are the main components of the INVIL program, there are other promotion events such as ?INVIL Festa?, which is held annually to encourage face-to-face interaction (http://festa.invil.org/index.html [27]).



[28]

Figure 1 - Revenues from e-commerce and tourism (Unit: A$1000)

Source: INVIL Central Agency. (2013b).

Case study of three villages

The community has always been at the centre of the INVIL program. The commitment of local residents is a major component for the program to be launched. Participation is crucial to the maintenance of the program. Participation could be in the form of online engagement, training or other economic activities generated by the program (Kang 2009 [29]).

The essential element of the INVIL project is to build sustainable communities. This is an outcome that cannot be quantified but nonetheless crucial to the performance of the program. It is more difficult to ascertain such intangible benefits and a case study approach may be useful in that regards.

We conducted an exploratory case study of three successful villages - Mosan Onion Village, Baekmiri Village, and Gaemideul Village - to evaluate the intangible outcomes as well as the potential for a longer-term policy strategy applicable to all rural areas. In 2012, Mosan was the village with the highest e-commerce revenues while Baekmiri generated the highest tourist package income. Gaemideul adopted a combined approach of having both e-commerce and tourism components in their program, and has been awarded the best village prize for three consecutive years by the Government.

The purpose of this case study is to assess the program by using both qualitative and quantitative measures. We interviewed three INVIL managers of the villages selected as the sites. We also consulted public government documents, Information Village Network websites and interviewed the INVIL program co-ordinator at MOSPA. Multiple sources of data were used to validate the results and minimise any bias of the qualitative data. We used a case study approach due to the complexity and unpredictability of the policy outcome (Liu 2012 [30]). The aim of the case study was to qualitatively assess the program?s effectiveness, not only in terms of tangible outcomes but capturing the externalities.

Name of village	**Mosan Onion**	**Baekmiri**	**Gaemideul**
Business model	E-commerce	Tourism	Combined
INVIL launch year	2003	2008	2009
Number of households(population)	220 (350)	130 (370)	39 (88)
Percentage of households participating	43%	54%	36%
Informatisation			
Computer penetration (%)	50%	More than 90%	90%
Internet usage (%)	50%	More than 90%	70%
Average ICT training frequency per INVIL participant per year	5.5	4.7	68
Economic gains			
Average annual income generated by INVIL per household (2012)	$A4,700	$A54,300	$A39,200
Average increase in income per year since the start of INVIL	66%	176%	103%
Sustaining communities			
Number of website visitors in 2012	34,000	35,000	51,000
Number of tourist program participants in 2012	400	150,000	28,000

Table 3 - Comparison of three villages

Mosan started the INVIL program in 2003 and launched their e-commerce site in 2006. As of 2013, 43% of the households participate in selling their products online. Internet use among INVIL households in Mosan is about 50%, which is higher than the overall village average of 20%. Compared to urban areas or the national average, this is still a low figure but considering its high median age and previous usage statistics, this is a promising outcome. Since 2003, when Mosan was first funded by the INVIL program, there has been very little upgrade in computer facilities in the households mainly due to the aging population.

The main products they sell online are onion extract and peeled garlic, both very popular food products in South Korea. This generated an average of $A4,700 extra revenues a year per household in 2012. Since 2006, the average increase in income was 66% for INVIL households. Each year, approximately 340,000 visit the village website and purchase products online. Around 400~500 online consumers visit the village to participate in harvesting and processing the original produces, which generates additional tourism revenues.

Active participation of the residents was crucial to the success of this INVIL. Participants hold a monthly meeting to discuss INVIL management issues but during those meetings, they naturally talk about ways to improve their community as well. Among INVIL participants 74% are over the age of 60, which is a similar trend in most agricultural regions. Mosan Village was one of the earlier INVILs, launched in 2003. This makes it vulnerable to sustainability issues. Computers at home have not been replaced since then and Internet usage has not improved. Nonetheless, having regular visitors from outside the village has enabled a more vibrant and lively village atmosphere.

Baekmiri focuses more on selling tourist packages to urban residents. It is a fishery village located in Gyungki Province, southwest of Seoul. Program participants have a high computer penetration (over 90%) and internet usage rate (over 90%). Their main products are clam/crab catching packages. The tourist packages are seasonal ? popular during May to November. Nevertheless, it has been a solid source of additional income for the village households. Since 2009, the average annual revenue increase has been 176%. In 2012 alone, 150,000 tourists have visited this village, most of them from Seoul metropolitan area. This has become a source of indirect revenues where tourists purchase local produce while they visit the village, amounting to $A7.8 million per year.

During the non-tourist season ? December to April ? INVIL participants received an average of 5.7 ICT trainings per year. The new business model of drawing tourists to the village where participants are required to take part, as well as the frequent interaction through training sessions, have

heightened the sense of community among INVIL participants.

Gaemideul adopted a mixed model of selling agricultural products and tourist packages online. It is a typical farm village, the main produce being organic chilli peppers and bonnet bellflowers, both popular Korean vegetables. In 2009 they were funded by the INVIL program and 36% of the households currently participate. Computer penetration is 90%, while internet usage is 70%, both relatively high figures compared to other rural areas.

This village is particularly active in getting regular ICT training. On average, INVIL participants attend about 70 training sessions per year. The main products they sell online are organic peppers, wild vegetables and corn. Their tourist packages include trout fishing, making rice cakes and bicycle hiking, which were carefully designed to appeal to urban families.

In 2012, there were 50,000 website visitors and around 28,000 tourists visited the village. While most of them purchase tourist packages online, that was not always the case. Total revenues generated by the INVIL program in 2012 were A$549,000. This was an increase by 103% since the launch of the program in 2009.

The most striking outcomes of the INVIL program are digital engagement and participation in the digital economy. However, there are many other intangible outcomes that make the program sustainable. The INVIL managers of Gaemideul and Baekmiri both suggest the morale of the residents has been boosted by participating in the program, mainly because they now have an extra source of revenue. Another spill-over effect occurs during digital training sessions because these provide opportunities for villagers to meet with other residents. More frequent interaction with members enhanced their sense of community. This was observed in all three villages by the managers.

Participation in the program is purely voluntary, so there were no conflicts between INVIL households and non-INVIL households. However, pollution and noise were suggested as a factor that discourages certain residents to participate in the program. This was especially the case in tourist packages, where urban visitors would create unnecessary noise and increase garbage in the area.

One of the most critical issues in the sustainability of the program is the aging population of the villages. In Baekmiri, 66% of INVIL participants are over the age of 60 and 74% in Mosan Village. This trend cannot be resolved through INVIL programs but, nonetheless, can be a crucial hindrance of the program.

Gaemideul provides some insights into how rural communities can overcome this problem. INVIL participants over the age of 60 comprise only about 33% in this village. Most of the participants are in their 40s. They provide good examples of rural migrants through their tourist packages and useful information about living in rural communities. Some of the INVIL participants are rural migrants who have high levels of digital literacy. They inspire the existing community members, teach them how to use digital devices informally and actively communicate with the senior residents.

The seasonality of agricultural products and tourist packages is another hurdle to overcome; the revenue stream is not consistent throughout the year. Mosan actively addressed this issue and has developed processed agricultural products that can be sold year round. In case of Gaemideul, they have developed a tourist package ? straw art ? that can be experienced in an indoor environment during the winter months.

Conclusion

The INVIL program is a unique digital divide policy that has been largely successful in narrowing the rural digital gap in South Korea. Its unique approach to the adoption of sustainable broadband is the key to the success. First, the INVIL program can be differentiated from any other government intervention programs in South Korea. Unlike previous programs such as the Ministry of Agriculture, Food and Rural Affairs? (MAFRA) Digital Lounge program or Rural Development Administration?s (RDA) e-commerce grant, both of which limited the funding to 1~2 years, systematic support following the initial launch is built into the program. The emphasis on continuity rather than infrastructure is one of the reasons why INVILs are successful and sustainable.

Second, INVIL programs have an inbound strategy that brings people into the villages, if not in person, through their website. Sometimes, it stretches to attracting rural migrants into the area. All INVILs share the ultimate goal of building communities. It is not merely adding a layer of ICT to existing villages but a constant effort to enhance the sense of community by utilising the INVIL centres as a central location within the village where member convene. Typically, INVIL members actively participate in the program management which is facilitated by the INVIL manager. Managers are hired not only to operate the training centre but also to monitor, interact with and educate residents within the community.

Third, INVIL programs are designed to provide seamless switching between offline and online environments for a sustainable digital engagement. The website where participants sell their produce or tourist packages is maintained by the INVIL manager and also overseen by the INVIL Central Agency. This provides standardised, quality access to any consumer who might be interested in purchasing the products and services. It also provides INVIL participants with a sense of a larger online community. More importantly, this space does not exist separately from their offline everyday lives where they convene and learn about the online space in their village centres. The manager serves as the intermediary in both the online and offline spaces, which makes the transition from being non-users of the Internet to active online participants easier.

The digital divide is not simply a binary divide between ICT haves and have-nots. Rather it should be understood as varied degrees of multiple layers of digital disadvantage. The digital exclusion issue is better understood if we adopt a concept of digital continuum that is related to other social exclusion parameters (Servon & Pinkett 2004 [31]). While INVIL is largely a successful policy due to its sustainable nature, there are still issues surrounding rural and urban digital divide that must be addressed. First of all, a second level digital divide may be occurring at various levels. Even in INVIL areas, the urban/rural divide has not completely disappeared. While the recipients have benefited greatly from such governmental support, the development of broadband technologies in urban areas is not static, meaning the urban counterpart would have advanced even further. This is why programs need continuous re-evaluation and re-design, in order to fully embrace the changing technologies.

Second, another possible area of the second level digital divide is that there may be a rift within the community between those who participate in the INVIL program and those who do not. Policies implemented to bridge the digital divide usually have an ultimate goal of benefiting all individuals. INVIL programs are effective in enhancing communities as a whole but there may be individuals who are not fully part of the picture. Currently, there are no statistics to support this argument and needs further attention in future research. The third area where the second level digital divide may occur is that there may be a widening gap among rural areas across the nation, creating a new type of hierarchy. There are some areas with largely successful

INVILs but there are other areas with not-so-successful INVILs. Furthermore, there are non-INVIL areas where there is no support. This, again, is not supported by empirical evidence and needs further investigation.

Among the 394 awarded villages, 361 are still actively operating. This can regarded as a highly successful program in terms of the retention rate. This is in part due to the small size of each INVIL. In Korea, there were more than 3,400 small towns in rural areas as of 2012, which means only about 10% of the rural towns have benefited from the program to date. Such small sized projects made it manageable at the town level which is a crucial element of the policy but this specificity may be a barrier when applying the policy to cities and larger regional areas where the sense of community may be slightly different.

This study examined the overall outcome of the INVIL program with the emphasis on the policy framework of narrowing the digital divide, increasing economic gains and sustaining communities. Three exemplary cases were examined to provide an in-depth account of how INVILs can help sustain rural communities. The analyses show that efforts to bridge the digital gap can be successful by identifying the needs of local communities and providing continuity in support. Further comparative analysis of villages that have been successful and those that have not may shed light on the common elements of sustainable broadband adoption in rural areas. INVIL managers play a crucial role in implementing and maintaining the program in each village. Their role extends beyond teaching digital literacy or technical support for the residents. The varied degree of participation and the outcomes of the 361 INVILs are largely dependent upon the capacity and enthusiasm of the manager. Further research into the multiple roles of INVIL managers will add knowledge to how digital divide intervention policies can be more sustainable.

Endnote

1. An earlier version of this paper was presented at the News and Media Research Centre 2013 Conference, Emerging Issues in Communication Research and Policy (Dec 2013, Canberra). .

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