The Adoption of IBM’s Spoken Web in Information Poor Communities: A Pilot Study with Farmers in Gujarat, India

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Abstract
IBM’s Spoken Web Service enables illiterate and disadvantaged communities in the developing world to create and access VoiceSites over the phone. A pilot study was used to examine the adoption of this service by a community of farmers in rural Gujarat, India. Data analysis carried out using the principles of grounded theory helped us identify the factors responsible for the adoption of the service by a community of information poor farmers. The over-arching themes that emerged were: community of practice among farmers, gatekeeping, and characteristics of the service. In particular, we find that endorsements and word of mouth are important disseminating mechanisms and that community and individual interests, norms of reciprocity and trust motivate participation in the service. In addition, gatekeeping mechanisms and gatekeepers play an important role in the adoption of this service.

Keywords: Spoken Web, Grounded Theory, Communities of Practice, Gatekeeping mechanisms, IT Adoption, Information Poor, Farmers, Gujarat, India.

1. Introduction

Mobile phone is the most widely adopted information and communication technology (ICT) in the world. However, a majority of the disadvantaged communities in the developing world do not have access to the mobile Internet. Illiteracy and inability to communicate in English, one of the major languages of communication on the Internet, severely limit their access. As a result, they are deprived of a number of socioeconomic opportunities despite having access to the mobile phone.

To address this digital divide, IBM introduced “Spoken Web”, also known as World Wide Telecom Web, in 2006 [1]. The Spoken Web is a voice-based equivalent of the World Wide Web. Instead of websites, the system relies on “VoiceSites”, voice-based applications that are created by the users and hosted by the telecommunication network. Phone numbers play the role of web addresses and information is listened to rather than being read or seen. This “spoken network” of information connects VoiceSites using Hyper Speech Transfer Protocol and can be accessed through any phone. The phone does not require any extra features or software. Thus it is a voice-based mechanism for local content creation that can be used by anyone, even if they are illiterate. Spoken Web enables disadvantaged communities to create and access VoiceSites in their local language over their phones.

Spoken instead of written communication is used for sharing information without investing in the Internet, computers, or any other related infrastructure. Importantly, disadvantaged communities living in rural remote areas in the developing nations do not need to travel to seek, search, retrieve, process, or use information. The interactive voice response feature of VoiceSites instructs the phone caller to create, update, access, and retrieve information. This spoken communication in their native language and local accent is stored on IBM servers and accessible via a phone call. Any villager can dial the Spoken Web number and retrieve the information they need in one phone call.

1.1 Research goal

One application of IBM's Spoken Web is an interactive information service called “Anubhav Khedut ni Vani” (literally translated to mean an experienced rural dweller’s speech) that is customized for farmers in rural India in their local language. By calling a toll-free number farmers can learn about market prices, weather forecasts, disease prevention etc. In addition, Anubhav Khedut ni Vani (henceforth referred to as the AKV service) provides information interactively as specific questions can be recorded and later answered by other farmers or experts. Farmers who register for this free service can use voice navigation to record their questions or hear questions posed by others (as well as answers recorded) or simply share their experiences.

This pilot study aims to explore the adoption of this service within information poor communities in India. In particular, we focus on the dissemination and adoption of the AKV service by farmers in rural Gujarat.
2. Literature review

Digital skills related to finding and assessing information are crucial for information literacy and those who do not possess such skills are informationally disadvantaged [2] or information poor. Information poor people are those who lack (1) the financial ability to pay for the ICT, (2) the technical skills to use the ICT, (3) the capacity to filter and evaluate digital and non-digital information resources or (4) the motivation to look for information online or offline and the capacity to use this information [2]. Digital inequality can be attributed to a variety of demographic and socio-economic factors [3]. However, there has been less focus on the adoption of ICT by communities who do not have access to the Internet or to English-medium education. People belonging to such communities may not be economically disadvantaged but may yet be information poor. The antecedents of adoption and use in such communities may be different and therefore merit investigation.

2.1. Communities of practice

A community of practice is a collection of people who engage, on an ongoing basis, in some common endeavor [4]. The community emerges in response to a common interest and the shared experiences of the members allow for mutual sense-making and shared understanding. Thus they are a group of active practitioners who exchange information and provide support to each other. The interactions in these communities build relationships and trust among their members, allowing them to create a shared repertoire of communal resources over time [5]. Such communities have the potential to share information beyond traditional, hierarchical boundaries. Thus the mechanisms through which technologies get adopted in such communities may be distinct from individual adoption and are worth exploring.

2.2. Gatekeeping

Social networks can be created by technology and form virtual communities or may be information networks of physically connected people. Most networked communities have gatekeeping mechanisms to select, add, withhold, channel, repeat, delete, integrate or shape information [6]. The mechanism is often a technology (e.g., authentication controls, navigation tools, or network access) and the particular information control activities performed dictate the interactions between the gated and the gatekeepers [6]. Network gatekeeping theory is relevant for communities of practice and we apply it in the context of communities of practice who may be information poor. Gatekeepers in our pilot study helped study participants form a favorable opinion about the AKV.

2.3 Characteristics of the IT artifact

Past studies show that perceived characteristics of technology artifacts (e.g., trialability, compatibility, etc.) and the strength of interpersonal networks in communities play a key role in influencing the intention of communities to adopt such technologies [7, 8]. For instance, trialability, which refers to the effort or risk involved in experimenting with an innovation and the ability to recover from errors, emerges as an important attribute of technology artifacts, especially when communities have little or no experience accessing and/or using new technology [9].

Compatibility, which indicates the extent to which a specific innovation matches with the value and belief system of a community of potential users, is one of the key facilitating conditions for the adoption of technology artifacts. For instance, Al-Ghaith et al. find compatibility to be a key determinant of the intention of a community of small businesses to adopt online services in Saudi Arabia [10]. Compatibility emerges as a significant predictor of attitude, in a community of 200 nurses, toward using a smartphone [7].

Perceived benefits represent a person’s opinion of the value or usefulness of a new technology, which help individuals conclude whether the new technology is better than what they are already using. It is an individual-level factor influencing the adoption of technology artifacts by communities. For instance, a study aiming to close the rural broadband gap in the US concludes that perceived benefits play a significant role in shaping the decision and efforts of rural communities in adopting the Internet [11].

Ease of using IT tools and the user’s perceived ease of using the tools, which are related to the nature of the task the user plans to perform using the tools, often times influence the intention of user community to adopt those IT tools [12]. Koch et al. find that the acceptance of e-Commerce websites by a student community in Turkey depends on the ease of use, the perceived community size, perceived community structure, and the presence of users with leadership qualities [13].

3. Methods

One of the authors identified a community of information poor farmers in Gujarat, who were using the AKV service. As of the 2011 census, almost 55% of the state of Gujarat was under cultivation [14]. Of the 5.4 million farmers in Gujarat in 2011, about a third of them owned up to 2.5 acres of farmland, with another third owning between 2.5 and 5 acres and a final third owning

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between 5 and 25 acres. Only 1% of farmers owned over 25 acres [15]. The farmers using the AKV service, although large landowners in some cases, were disadvantaged for two reasons: (1) they are located in rural areas, thus geographically remote from technology transfer institutions, and (2) they did not have access to the Internet and were not literate in English, even though a majority of them had high school education. They had neither the financial ability to pay for Internet access nor the technical skills to use it. For these reasons we consider this population to be information poor.

With the help of a gatekeeper, 31 AKV users living in 5 different villages from Banaskantha, Rajkot, and Surendranagar districts in Gujarat were identified as potential participants in the study. Most of the farmers in our sample harvested their crops twice a year with some of them harvesting up to three or four times annually. They were between 31 and 55 years of age and their educational levels varied considerably with one of our respondents having no formal schooling and another having a college degree.

Two graduate students proficient in Gujarati (the native language of the farmers) were recruited to assist the researchers. Two teams of a researcher and a student separately conducted phone interviews with 18 farmers lasting about 45 minutes each. We created a brief, open-ended questionnaire to serve as an interview guide and provide more systematic data collection. The corpus of interview transcripts was coded to identify the factors influencing the adoption of the AKV service by farmers.

The qualitative responses of the respondents were analyzed using grounded theory principles. Grounded theory is an interpretive data analysis technique that helps researchers identify themes, patterns, or trends useful for theory development. [16]. Each response was analyzed on an individual level and then compared across subjects to identify patterns and common categories. We initiated data analysis by using open coding and progressed to axial and selective coding. For instance, a line-by-line coding of interview transcripts, also known as open coding, yielded us the following axial codes: endorsements, information dissemination, knowledge as a public good, norms of reciprocity, and trust, which then helped us identify “communities of practice” as the first umbrella theme or selective code. Similarly, our second selective code “gatekeeping” is based on the following three axial codes: gatekeepers as educators, gatekeepers as censors, and localization and customization mechanisms. Finally, “Characteristics of the IT artifact” emerged as our third selective code with trialability, perceived compatibility, perceived benefits, and ease of use as axial codes. Based on our data analysis, we propose 12 preliminary hypotheses. Thus we use an inductive approach to theory development.

4. Findings & discussion

The ability of information poor communities to derive benefits from the AKV service depends heavily on the extent to which their community creates and accesses VoiceSites using IBM’s Spoken Web. A majority of the farmers who were invited to join the AKV service did so but farmers who were willing to improve their existing farming practices were more likely to join the service and farmers who owned land were reported to benefit the most from the service.

4.1. Communities of practice

Communities of Practice are tied together by their common interests and they are collective owners of the knowledge they create and maintain [4, 17]. The AKV service clearly created a community of people with common interests. For instance, R3 (abbreviations are used to preserve the confidentiality of respondents and the people they refer to) said: “We got closer to our farmer friends living in different regions. My farmer friend from Banaskantha shared the ways of farming in his region and the problems faced by farmers there. I also share farming matters related to my region with him. So I got more knowledge of different regions, like what type of land and weather conditions they have, what type of crops they grow, what type of problems they normally face and how they find the solution for that.” He added that when they were using the service “we all farmer friends were connected with each other, and the distance between us was reduced.”

4.1.1 Endorsements. Before the introduction of the AKV service, respondents relied on local government institutes and non-government organizations (NGOs) to address their farming-related queries and issues. IBM’s radio advertisements, magazines published exclusively for farmers (e.g., Krushi Jeevan Samayik), local government institutes and NGOs dedicated to serve farmers (e.g., Khedut Talim Kendra and Kisan Call Center, a government-run radio channel, and community gatekeepers) introduced the AKV service to a majority of the respondents as an easy to use, free service capable of answering all farmer queries.

Rural farmers in Gujarat formed a Community of Practice as subscribers to agricultural magazines, listeners to radio shows about farming, members of farming-related NGOs and interested participants in various farming-related educational activities. It is important to note that pre-existing services that had similar goals of serving farmers with relevant and timely agricultural information over the phone, also advertised the launch of the AKV service. Hence, we propose the following hypothesis.
4.1.2 Information dissemination – word-of-mouth. 
An individual is more likely to adopt an innovation if a number of individuals in their personal network have already done so [18]. As the critical mass of adopters in the individual’s personal network increases, so will the likelihood that the individual will adopt the innovation [19] and this is particularly true in information poor communities [3]. 

Word-of-mouth publicity for the AKV service served as an effective communication channel to spread the news about the new service. As a result, a majority of the respondents did not actively seek information about the AKV service; they heard radio advertisements or knew gatekeepers like MVbhai personally, two major communication channels for spreading the news about the newly introduced AKV service. R5, a 32-year old respondent with over 15 years of farming experience, learned about the AKV service through his friends who also signed him up for the service. MVbhai helped a couple of respondents register for the AKV service over their phones. In some instances, rich farmers with a lot of acreage received multiple invitations to join the AKV service. R6, a 40-year old farmer with over 9 acres of land was invited to join the AKV service by a local NGO and even by unknown farmers in adjacent villages. 

Gatekeepers like MVbhai persuaded respondents to use the AKV service. R2 said: “MVbhai told me about the service. Every day in the evening we get together and discuss different issues we face on a daily basis. During those discussions he would periodically mention the service and how we could experiment to find solutions to our problems.” R5 said: “MVbhai is my best friend. He told me about the service… Previously we used to get information on farming from the government’s farming book in which all the standards related to farming are mentioned. I have it with me. Almost 50 to 60 customers would visit me to get knowledge from the book. I invited all of them to use the service.” Hence, we hypothesize that: 

H2: Information dissemination in the form of word-of-mouth publicity positively affects the adoption of a new service by disadvantaged communities.

4.1.3. Community and individual interests. 
Motivations for sharing information in communities of practice can be attributed to serving community interest [20] or self-interest [21]. The former is associated with moral obligations for sharing information with others whereas the latter is driven by a search for recognition and respect. In collectivistic cultures, people are more likely to share information to serve the interests of the group, rather than pursuing self-interest [22]. In addition, the anticipation of improved and deeper relationships with other members also drives people to share information with others [23]. 

Several noble intentions motivated respondents to invite other farmers to use the AKV service. R6 said: “I invited many farmer friends to use the service. It is good to share such an important thing [the AKV service] through which our farmer friends can progress in their life.” The AKV service helped respondents form small groups that consulted with each other. R9 invited 20 farmers to join the AKV service. He said: “No one asked me to invite others to join this service. I invited several friends. I told them that with the help of this service they would be able to get all kinds of information regarding farming, animal husbandry, and much more.” 

Several of them used the AKV service to seek knowledge for helping others. R4 said: “Mostly whenever I was free from my work I used the service [for others]. I had given my phone number [of the AKV service] to school teachers and had told them to ask me questions and share their problems related to farming through this service…. Mostly I used the service to give useful information to all other farmers. If you ask any of the farmers here they will tell you how much important information I provided them.” He added: “My house is always open to all of my farmer friends. People came to know that I will definitely help them and I remain ready to help others anytime and anywhere.” 

Similarly, R7, a 35-year old high school educated farmer believed that using the service enhanced his standing in the community. He said: “This service introduced a new technology and an efficient way to solve all the farming related problems. So when I adopted this new technology everyone knew me as an advanced farmer who uses the latest technology to improve farming.” R3 shared this sentiment by saying: “I think using the service affected my social status profoundly, and I made so many friends through this service.” Thus participation in the service appears to blend the two established motives of individual and community interests.

H3: Both community and individual interests are positively associated with increased participation in the service.

4.1.4 Norms of reciprocity. Social exchange theory posits that people in community networks develop a sense of mutual indebtedness such that members who receive a resource reciprocate by repaying the benefits to others in the community [24]. Communities of practice form relationships of give and take in order to develop a set of communal resources [25]. In our sample, respondents provided as well as sought information, either alone over the phone, or in a group

H1: Endorsements by existing Community of Practice resources positively affects the adoption of a new service by disadvantaged communities.
setting with other farmers. R3 reported seeking information from a set of farmers with the help of the AKV service on a regular basis. He said: “Almost 4 to 5 farmers from Banaskantha were actively involved in the network of farmers through this service. They would provide information or answer questions asked by other farmers. Sometimes I also contributed information.” R2 said: “Daily in the evening we all get together. We discuss our daily experiences and try to suggest solutions to each other’s problems based on the information gathered from the service.”

Information sharing was not limited to farmers in the same village. The AKV service acted as a platform for farmers across Gujarat to help each other by sharing their experience and advice. R4 said: “With the help of this service we got connected to the other farmers in different districts. The service provided other farmers’ phone numbers and we shared information. I also visited their place to meet them in person.”

**H4:** Norms of reciprocity are positively associated with increased participation in the service.

**4.1.5. Trust.** Due to the technology used to interact and share knowledge our sample belongs to a mobile community of practice [25]. Trust is an important antecedent to sharing knowledge in mobile and virtual communities [23, 25, 26]. Trust develops over time and the nature of trust in virtual communities evolves accordingly [27]. The initial stage of trust is economy-based as members are attracted to the virtual community due to its potential economic benefits such as cost and time savings and other benefits of knowledge and advantage [28]. The next stage of trust is information or knowledge-based where members grow more confident about relying on other members and are comfortable with the technology used in the virtual community [29]. The final stage is that of identification-based trust where members develop strong relationships with each other and believe in the competence and benevolence of the members of the community [29].

Although trust was a major factor among farmers for signing up for the service, respondents showed varying levels of trust in the service. An example of economy-based trust was R6, who said: “A farmer always thinks that if a fellow farmer gets more production by following a certain method or using some product, then why should I not give it a try?” He explained: “The farmer always has more trust in the advice of a fellow farmer rather than trusting advertisements of different brands in media since companies use advertisements to promote their products for more profits. A farmer can always trust another farmer.”

When in doubt farmers double checked with their fellow farmer friends who would confirm or disconfirm the information provided by the AKV service. Discussing the information received from the AKV service with friends in person was a common practice of making decisions. R8 explained: “I used to discuss information received from the service with friends in my group. I think it’s necessary to ask my friends individually. But I also trusted the people who gave information over the service.” A majority of the farmers reported following the advice received using the AKV service based on information or knowledge-based trust.

Some farmers blindly trusted the advice received through the AKV service since they believed that whoever advised them using the service was an expert, which was not always the case. R1 said: “I have full faith in the information given by others and I always note down all important information given by others.” Similarly, R14 reported: “People who provided answers over this service had technical knowledge.” Due to the prior practice of relying on external sources of information for making decisions, it was easy for some respondents to trust the external sources of information including the AKV service. R11 said: “I am farming since 1998. Even then I would read magazines on farming. I would make decisions based on the guidance offered by those magazines. Similarly I trust the advice suggested by this service.”

R3 said: “I fully trusted the advice of fellow farmer friends received through the service. Some of them I knew personally because I talked with them on the phone many times.” To clarify certain doubts, in some cases, respondents called the original person who answered their query over the AKV service. R17 reported: “Normally I received answers from the service. Whenever I was unable to get appropriate and clear answers I would call the person who gave me the answer.” These are examples of identification-based trust where members of the community have developed strong relationships with each other and believe in other members’ competence and benevolence.

**H5:** Trust is positively associated with increased participation in the service.

**4.2 Gatekeeping**

The “gatekeepers” in our study were those individuals who facilitated linkages in the farming community by subscribing other farmers to the AKV service. They are considered gatekeepers since they provided access to the AKV service to certain individuals that they considered would be suitable members. Although this kernel of members could then solicit more members without requiring permission from the original gatekeepers, (akin to snowball sampling procedures), the process of creating the kernel served to control participation in the network. Although individual participants can be considered as moving from “gated” to “gatekeepers”, consistent with the
dynamic interpretation of gatekeeping [6], all the individuals who subscribed to the AKV service are essentially “gated”. This is because even though they provided information and created content for the system, without the AKV service they could not disseminate the content they created. Thus their autonomy was contingent on the technology infrastructure. Although some alternatives did exist for these farmers, the AKV service was considered far superior to previous technologies available to them as it enabled users to pose questions as well as to listen to answers anytime, anywhere and as often as needed.

Gatekeepers can themselves be gated, and in this context, all subscribers to the AKV service are gated by the technology, to different extents [30]. The gated in this study represent a rare type: the “lost voice”, as their access to others is totally dependent on the gatekeepers, and in this case, the gatekeeping mechanism.

4.2.1 Gatekeepers as educators. Gatekeepers had some measure of control over who had access to the AKV service and like the gatekeepers in Schulzke and Boland [31], they also acted as facilitators by educating the newly gated about the AKV service. According to social-cognitive theory [32], low self-efficacy is a major barrier to the exchange of knowledge. The desire to share knowledge has to be coupled with the perceived capability to communicate that knowledge. Lack of self-efficacy is a significant deterrent for disadvantaged populations [3]. Gatekeepers and friends of farmers played a key role in convincing and assuring the newly gated about the AKV service. For instance, R9, a 29-year-old farmer with 5 acres of farmland noted that when someone recorded Bollywood songs on the AKV service “MVbhai deletes all such kinds of recording from the service.”

H7: The gatekeeper’s role as a censor increases the perceived value of the service.

4.2.2. Gatekeepers as censors. Gatekeepers have the discretion to suppress or delete anything considered objectionable or undesirable [6]. Gatekeepers maintain the quality of knowledge stored by deciding what gets stored in the system. This is analogous to trusted open source developers deciding which pieces of code to store in the repository [33]. Several respondents cited the gatekeepers’ services in deleting incomplete or irrelevant questions from the knowledge base. R1 reported that when “somebody uses foul language, MVbhai and AMbhai who were experts of the system, delete that recording from the system”. Similarly, R3, a 29-year-old farmer with 5 acres of farmland noted that when someone recorded Bollywood songs on the AKV service “MVbhai deletes all such kinds of recording from the service.”

H6: The gatekeeper’s role as an educator and facilitator increases the perceived value of the service.

4.2.3 Localization and customization mechanisms. Gatekeeping activities include various forms of information control such as selecting, withholding, disregarding, shaping, channeling, manipulating, and integrating information in order to regulate its flow [6]. However, activities such as localization or translation serve to modify information and services for target audiences and adapt them to their specific locations, taking their distinct cultures into account [6]. Such localization mechanisms are particularly valuable in networks of disadvantaged communities. Given that they are underserved populations, information that is customized to their culture, needs and local conditions is more beneficial.

The AKV service was provided in the local language and in addition, participants indicated the geographic district that they were from. Thus relevance and applicability were some of the criteria applied by respondents before using information. When asked if they always made use of the information received using the service, R2 responded: “No! Everyone has their own view regarding any theory. They have different types of land and they follow different ways of treating it. So, we just follow the advice relevant to us.” R5 said: “Advice given by this service was very effective and positive. But one could apply only the advice that was applicable to their land, weather conditions, and economy. So I only used the information which applied to me. We mostly sought information and advice from the farmers in our region. Since all of us have same land, weather
conditions, and some problems (e.g., same type of insects, diseases etc.), we can get more appropriate and accurate solutions for our problems.”

**H8:** Localization gatekeeping mechanisms increases the perceived value of the service.

### 4.3. Characteristics of the IT artifact

We found that four characteristics of the AKV Service played a key role in shaping the adoption of the Service by the community of farmers. The four characteristics are: trialability, compatibility, relative advantage (or perceived benefits), and complexity (or ease of use).

#### 4.3.1 Trialability

Gatekeepers asked respondents to invite other farmers to join the AKV service, which helped the social network grow, expanding to a larger pool of knowledge and benefiting all users. However, respondents started inviting their friends and relatives only after experiencing the benefits of the AKV service themselves. For instance, R2 said: “I informed nearly 20 to 25 person to take advantage of this service only after I used the service for a month or so.” R1 reported: “I used the service for 10-15 days, and I felt that the service is really very good and noticed that many experienced farmers have shared their experiences to help others. Hence, I started insisting that others use the service so that they could get proper advice and share their experience with other farmers. I emphasized that the service has solutions to 100% of their problems.”

Sharing personal benefits which illustrate the utility of the service was one of the most common methods used by farmers in advocating for the service. Friends and gatekeepers helped respondents form a positive opinion about the service. R7 invited 35-40 farmers within 5-10 days after trying out the service. R1 shared with his friends the instant benefit he derived from using the service. For instance, as per the advice received from the service, he started using a specific type of pesticide and found it beneficial for farming. He also saved money by not buying any other type of pesticide.

R3, a 29-year old high school graduate, described the process of approaching and convincing others to use the service: “I invited many of my farmer friends by illustrating benefits of the service. ….I invited almost 100 of my farmer friends to join the service. The farmers, who were already using the service, further informed their other friends to become part of the network. … When I started using the service, I found that it was easy to use and very useful to the farmers, so I invited others to join it.” Thus the trialability of AKV provided ample opportunities for study participants to evaluate the effort and skills needed to operate the AKV.

**H9:** Trialability increases the adoption of the service.

#### 4.3.2 Perceived compatibility

Individuals adopt new practices based on how it fits with their previous experiences and current needs [24]. The perceived utility of information emerged as the most frequently applied criterion for using the AKV service. The real-world experience of other farmers was considered more useful than theoretical knowledge provided by scientists. R3 said: “I always made use of the information received from the service, because I believe that the farmers who advised us had real-world experience of doing such things; and they advocate for something only after achieving successful results. So one can trust them more than the advice given by farming scientists, because they [scientists] provide knowledge based on theoretical facts, which may or may not work.”

Some respondents cross-checked the information received using the AKV service with other sources of information before using it. R6 said: “I believe that one should first confirm the advice and then follow it up because, the farmers were very nice but their level of education was very low so, unknowingly they misunderstood the question or committed some errors. I used to follow only the advice that I felt was reasonable and logical. Most of the time, information provided by the service was appropriate and relevant, but sometimes due to lack of knowledge or proper understanding of the question, the advice would be irrelevant. So I used information only after confirming it with my other information resources. Due to my agribusiness, I was in touch with several employees of a multi-national company and I was also in touch with scientists at Dativada University. So, I had many sources of information and I only followed the advice which sounded convincing and proper to me.”

**H10:** Perceived compatibility increases the adoption of the service.

#### 4.3.3 Perceived Benefits

The AKV service had a strong relative advantage over existing technologies used by the community. Free, expert advice based on practical experience, the feature allowing farmers to retrieve a specific recorded message multiple times, and the abundance of expert guidance from multiple perspectives are some of the characteristics that made the AKV service stand out among other similar services. R4 said: “Because this service was totally free of cost, farmers whose financial condition was not too good could also benefit from the service.”

R3 informed: “Previously I used to seek information from “Krushi Call Center” and “Krushi University.” One could get information through these services but could not listen to the same information again. In contrast, I could listen to the same information over and
over again using [the AKV service].” R7 said: “I received better information through this service than any other service available at that time. I got multiple solutions and ways to solve my problem. I was able to fix my problems by analyzing different solutions and experiences of others. I got more practical and perfect solutions for my problems through this service.”

R1 explained: “There was nothing like it. There was “Awaz De” but it was not as good as this service because Awaz De made us wait for a long time before we could get any response to our queries. We did not receive as quick a response as we got from [the AKV service].” He said “If I asked a question in the evening at around 8 p.m., then I received the answer by 12 noon on the next day. So the service was very efficient.”

Farming and animal husbandry were the two prime areas in which farmers helped each other through the AKV service R7 said: “I derived many benefits through this service. Firstly, there was an advice to use “Jivamrut” fertilizer which was totally organic and after using it the quality of my crops improved. Secondly, the service insisted that we use certain weed killers; for cumin seed crops it was really very effective.” R13, who used the AKV service for a year, said: “We received accurate weather information related to rain forecasts.” R5 said: “I have enjoyed numerous farming-related benefits via this service. For instance, how to plant, what to do if your crop is having certain diseases, what are the sources of information about particular diseases or insects and insect killers, etc.”

R1 added: “SVbhai, an expert in animal care, advised us on how to look after our animals. We would ask him questions related to the food that needed to be fed to our animals, appropriate medicines to cure our animals, etc. Due to this service, the whole village could benefit from his knowledge and skills.” R4 reported: “Through this service all farmers shared their experiences with each other. For example, once my buffalo was sick and I called in “Anubhavi Khedut ni Vaani” and I got the solution for my problem; my buffalo got all right without spending any more money. Once I also got advice from the service regarding how to get better results for my crops using an alternate method which keeps land fresh and fertile. And because of this advice I got more production in less land area.”

The AKV service made it easy for farmers to learn from other farmers; by building on each other’s experiences, service users could save a lot of resources. An enhanced social network was another key benefit enjoyed by some AKV service users. R10, who lives in northern Gujarat, said: “I made so many new friends from different places in south Gujarat. I didn’t meet all of them but they all are good friends. We shared with each other all kinds of information about Gujarat and what was going on in different parts of the State.”

H11: Perceived benefits increase the adoption of the service.

4.3.4 Ease of use. Technological complexity is a major barrier to ICT use [3]. Although gatekeepers played a key role in teaching and making new users comfortable with using the AKV service, it appeared that the service was not technically complex. R3, a farmer with a 10th grade education, found the AKV service easy to use. He reported: “I didn’t need help from anyone because at the beginning, the service prompts the user with a menu. For instance, it says press 1 to ask a question, press 2 to listen to your question, and our all radio programs were available on option 3. So the service was very easy to use. I learned to operate the service just by following the instructions given by the service.” R5 was so confident that even after a gap of two years, he thought he would be able to use the AKV service without anybody’s help.

Very few respondents reported committing errors when they first started using the AKV service. R3 said: “In the early days I committed some mistakes once or twice. The service was really very good, easy and simple to use. When we start the service it always shows all the instructions to use it, so there was not a chance to commit any mistake.” R8 reported his friend made a mistake in recording a message but after realizing the mistake, the AKV service allowed him to correct it.

H12: Perceived ease of use increases the adoption of the service.

5. Conclusion and implications

This research studies technology adoption in a context that has not received much attention, that of information poor communities. As is appropriate for an exploratory study, we adopted multiple perspectives: social networks (communities of practice), political (gatekeeping) and cognitive (technology characteristics). Based on our pilot study, it appears that communities of practice forms a dominant cluster of factors influencing the adoption of AKV.

We find preliminary evidence that endorsements and word of mouth are important sources of information about the ICT within these communities. This is consonant with arguments that tacit and asymmetric knowledge flows are best communicated through interactions occurring between geographically proximate actors [34]. This is also consistent with other studies that have found that less-technology intensive sectors such as agriculture are more likely to use hybrid intermediary organizations to fill information network gaps between government and industry [35, 36].

Gatekeepers serve an important role in information poor communities by disseminating information about
the ICT and facilitating its use by educating the community about it. Thus when launching a new ICT-based service in information poor communities, it is important to identify well-connected gatekeepers. Our study findings reveal that trialability, perceived compatibility, perceived benefits, and ease of use typically identified as the antecedents of IT adoption by individuals, were also influential in shaping the adoption of the AKV system by a community of farmers.

On average all of our respondents had used the AKV service for around a year or so, and it also functioned as a crowdsourcing service. It became an ingrained part of their daily routines. R1 started relying on the AKV service so much that he would get tense if the service was down for some reason. He said: “We all became addicted to the service. We would listen to the service at least twice a day. Every day before going to bed, we all listened to the recordings, especially what other farmers have advised us regarding our specific questions. Since the service has been discontinued I feel stressed out.” R3 said: “I used to listen to the service almost daily for an hour or two. I derived benefits from the service from the day it started until it stopped. I did not use the service only when I had some important task at hand. But otherwise I used it every day.”

We also observed that participants found uses for the technology that were not part of its original design but that become valuable to them due to the scarcity of available knowledge resources. The AKV service was designed to help farmers share agriculture-related information however, several respondents reported using it for a number of other reasons. For instance, R1 said: “Based on my knowledge of Ayurveda, I provided some guidance for curing acidity…. I also provided a remedy for flu (e.g., holy basil leaves can heal flu within 3 days).” Importantly, several farmers called R1 back to thank him for his health advice. He shared with excitement: “A person called me from Surat and told me that I spent thousands of rupees on diabetes medicine but didn’t get any result. But your bitter melon remedy did a miracle for me and my diabetes has vanished.”

Sometimes respondents recorded a question on behalf of their friends and passed back the answers received over the service. R4 used the AKV service to help school children. He said: “There is a school in front of my house so sometimes children come and ask questions for their study and I always help them using the service.” Members of disadvantaged communities are likely to exploit opportunities for information gathering available through new ICT and such unintended uses of the ICT could expand the user base as well as encourage continuing use of the ICT.

One of the limitations of this study is that Spoken Web service was discontinued by IBM approximately 18 months before we started conducting interviews for this study; as a result, all of the respondents relied on their long-term memory for answering the questions. Phone interviews limited our ability to capture non-verbal cues by respondents. Moreover, we might have failed to capture local expressions, adages, norms, etc. due to our reliance on the translators.

In the future, we would like to test our hypotheses with a larger sample size.

6. References

[12] Gefen, D. and Straub, D. The Relative Importance of Perceived Ease of Use in IS Adoption: A Study of e-


