INNOVATIONS FOR
SUCCESSFUL SOCIETIES

DISSEMINATING THE POWER OF INFORMATION
KENYA OPEN DATA INITIATIVE, 2011 – 2012

SYNOPSIS

When Bitange Ndemo became permanent secretary of Kenya's Ministry of Information and Communications in 2005, he was well aware of the difficulty Kenyans faced when they tried to get information from the government. He knew that easier access to government data on topics ranging from demographics to education could help spur innovation in business and technology and help drive the country's economic growth. The Official Secrets Act under former President Daniel arap Moi had long prevented civil servants from sharing government data, and for the most part, the trend had continued since the 2002 election of President Mwai Kibaki. But in 2011, Ndemo won Kibaki's approval to create an Internet portal that would serve as a one-stop shop for government census, economic, health and education data. With Kibaki's support, Ndemo persuaded other ministries to allow access to the data, and he assembled a volunteer task force of computer programmers, data experts and ministry and World Bank officials to build the website and upload information. After the site—opendata.go.ke—went online in July 2011, the ministry started taking crucial steps to ensure the system's effectiveness by training journalists in how to use the data in their reporting, by encouraging software developers to build applications that manipulated the data to explore trends, and by working to streamline the continuing flow of information to the site from government institutions. The case highlights Ndemo's efforts to open Kenya's government to the country's citizens and the world.

INTRODUCTION

On 8 July 2011, President Mwai Kibaki officially launched the Kenya Open Data Initiative at a public event attended by more than 3,000 people. An important milestone for the country, the new Internet portal compiled government information and made it available to the public for free. Kibaki stressed the importance of providing easy access to information ranging from the recent census to government budgets and spending, to school and health facilities. "Millions of Kenyans and interested persons around the world will now be able to access data that will facilitate informed decision making in a wide variety of areas," Kibaki told the gathering.[1]

Kenya launched the Open Data Initiative at a time when a number of countries were putting government information online. The United States had led the global open data movement, launching its data.gov site in 2009. The United Kingdom's official data went online a year later through data.gov.uk. Within three years, 31 diverse countries—including Australia, Canada, Chile, Denmark, Estonia, Italy, Moldova, Morocco, the United Arab Emirates and Uruguay—had created similar portals. Multilateral organizations embraced the concept as well; the World Bank inaugurated its open data website, data.worldbank.org, in 2010.

Advocates of open public data contended that "data generated or collected by organizations in the public sector should belong to the taxpayers," as long as the release was cost-effective and did not violate any laws or citizens' or government staff's rights to privacy.[2] Making information available was also an important step in helping citizens monitor government effectiveness.

In 2008, Kibaki had unveiled Vision 2030, a blueprint for transforming Kenya into a middle-income country. The plan emphasized information and communications technology (ICT) as an important element for a knowledge-based economy.[3] The portal was consistent with that goal and with a clause in the country's new constitution, adopted in 2010, which said: "Every citizen has the right of access to information held by the State. … The State shall publish and publicize any important information affecting the nation." The constitution had come about in the wake of violence following the 2007–2008 elections and a new coalition government, which agreed to speed constitutional reforms that had been in the works since 1990s.

Kenya's open data advocates found a champion in Bitange Ndemo, who had joined Kibaki's Cabinet as permanent secretary of the Ministry of Information and Communications in 2005. At the time, Ndemo was a senior lecturer and head of research and consultancy at the University of Nairobi's faculty of commerce, and senior government advisers had tapped Ndemo's expertise regularly since Kibaki's 2002 election. Before joining the university in 1993, Ndemo had been a financial systems analyst at Medtronic Inc., a medical-device company in the United States. He held a doctorate in industrial economics from the University of Sheffield in the United Kingdom and management and finance degrees from universities in the United States.

THE CHALLENGE

In his position in charge of research at the University of Nairobi, Ndemo had firsthand knowledge about the difficulties of getting reliable information from the government. His requests for data often were refused outright. "Getting information from the government was a big problem when you did research from the outside," he said. "For example, one area that I really wanted to study was the reasons for the collapse of firms in Kenya. But I couldn't get the information. And I certainly couldn't get several years' worth of information."

Under former President Daniel arap Moi (1978–2002), the government restricted the free flow of information and clamped tight restrictions on Kenya's few private radio and television networks. In addition to stifling the media, the Moi government also barred civil servants from sharing data outside the government. Davis Adieno, former national coordinator at the National Taxpayers Association, an organization that focuses on government accountability, said, "Under the Moi regime, the government was clearly on one side and the citizen on the other. Citizens had no business to access [government] information."

The Official Secrets Act, a holdover from Kenya's colonial era, gave the government the ostensible authority to withhold data. Ndemo

said, "We have the Official Secrets Act [with] several levels of classification: secret, confidential, restricted and sharable information. *Secret information* means that you handle the document and file it yourself. But sometimes secretaries or others just take the stamp that is nearest and stamp the document even if it is something that is supposed to be shared. So, if by accident someone puts *secret* on a file, no one is ever going to look at it."

Activists had pushed for a Freedom of Information Act for years with little success. Michael Murungi, editor and chief executive officer of the National Council for Law Reporting, a public agency responsible for publishing the judiciary's law reports, said, "We have not had a very open culture of sharing information, and public access to information has been a challenge. We have been trying to break that challenge." With more than 300 members, the Kenyan chapter of the International Commission of Jurists had campaigned for a Freedom of Information Act since 2000 and had circulated drafts in 2005, 2007 and 2011, but the act remained stuck in Parliament in 2012.

Tight restrictions on information sharing permeated the government. Civil servants in ministries and departments had a silo mentality and closely guarded all kinds of information. Adieno said, "Even parliamentary committees have most times had trouble accessing detailed ministry expenditure information. … It is a problem because there are established corruption networks. These networks benefit from the lack of the information to the public." Citizens had to buy official reports from the government printing office, a costly and inconvenient process; and other information was available only through appeal to ministries' permanent secretaries. The system created ample opportunities for mismanagement, misappropriation of funds, bribery and other forms of rent seeking.

Progress remained slow during the early years of the Kibaki government. A significant step came in 2006, when Parliament passed the Statistics Act to create the Kenya National Bureau of Statistics (KNBS), a semiautonomous agency under the planning ministry, to replace the Central Bureau of Statistics, which had collected and analyzed very little data since the mid-1980s and had discontinued many publications.[4] The KNBS assumed responsibility for gathering, storing and analyzing government information, as well as publishing and disseminating the data for public use.

For Kenya's citizens, however, complete government data remained elusive. Although the KNBS regularly updated on its website with the monthly consumer price index, quarterly gross domestic product aggregates, and basic economic indicators such as coffee or tea prices, other statistics were limited to summaries in PDF files, with few relevant details.[5] Through the government printer, the KNBS published paper copies of some of the information in the forms of books and reports, selling them for small fees. Copies of census data and economic surveys were in high demand.

The government's cautious moves to improve the availability of information contrasted with a technological explosion that took place at about the same time. Information and communications technology became Kenya's fastest-growing sector because of deregulation and privatization following years of government monopoly. After 2000, the sector grew at an average rate of 20% annually[6] and contributed an average of one percentage point to Kenya's gross domestic product.[7] New software applications had helped fuel the growth. In 2007, for instance, cellular company Safaricom launched M-PESA, a service that enabled subscribers to pay bills and transfer money for other reasons by using their cell phones. In 2011–2012, the company earned 16.9

billion Kenyan shillings (US$200 million) in revenues from M-PESA alone, with 14.9 million users in a country of 43 million.[8] Other cell phone providers quickly began offering similar services.[9]

Developers also created platforms that engaged citizens and focused on the public good. In 2007–2008, the Ushahidi project helped monitor incidents of violence following Kenya's 2007 elections. It used crowd sourcing, an online tool that rapidly collected and disseminated data from contributors. The Ushahidi platform expanded internationally and helped direct emergency aid in the aftermath of the 2010 Haiti earthquake.

But even as Kenya's citizenry embraced technology and the sharing of information, the government lagged behind. Denis Gikunda, program manager at Google Africa, said, "There would be a clamor from developers to get the data at every engagement Ndemo would go to. The KNBS printed annual booklets, and the information was public, but not frequent or useful enough."

Erik Hersman, a blogger based in Kenya and one of the founders of iHub, a community of more than 8,000 software developers, said, "If someone is [working] for education in the country and cannot access data on scores and testing, then that's a disservice. The data-hugging disorder stifles innovation."

Nairobi's technology community argued that easy access to government data could help reduce waste, spur development of mobile or Web applications, and promote technology start-ups. Athman Mohamed, director at Trademark East Africa, an agency that promoted regional trade, offered transportation as an example. "Up to 40% of the cost of anything in a landlocked country is due to transportation," he said. "You can have a direct impact on the lives [of people] if you can use data to save a day here and there [on goods being transported]." More government data also could benefit education, health, agriculture and other sectors. Al Kags, an entrepreneur and founder of the Open Institute, an organization dedicated to open data and open governments, said, "A lot of young people are driven by innovation. They will develop applications if you provide them with data. And they will provide important service to others."

In early 2011, advocates for greater government transparency joined in the clamor for open data. Supporters of Mzalendo, a project that called for citizen participation in politics, became central in calling for public financial data.

During his early years as permanent secretary of the Ministry of Information and Communications, Ndemo had tried, usually with little success, to loosen the government's tacit policy of restricting the distribution of information. For instance, with technical expertise from the World Bank, Ndemo had started mapping poverty and the distribution of cash from the Constituencies Development Fund, which allocated 2.5% of the country's tax revenue to Kenya's 210 political constituencies. But the effort ran afoul of political interests, because the mapping revealed that wealthier constituencies received more money than poorer ones did. "Because some members of Parliament came from richer areas, the spending was skewed to where they came from so that they could get votes," Ndemo said. "We actually put out the maps. The members of Parliament [MPs] were up in arms, saying that we could not do it. I said, 'Why not? We are just looking at the distribution of resources.' But they managed to push the then minister to bring down the website. We pulled it down because of the number of threats we received from some of the MPs owing to the fact that it was going to hurt them in the elections."

In 2010, another open data attempt failed for a different reason. In response to demands from programmers and businesspeople at the annual Connected Kenya Summit in Nairobi, the ICT Board, a state agency that implemented many of

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the ministry's projects, launched a website for government data but then found that it had little information to put on it. Kaburo Kobia, project manager at the board, said, "We got the domain name and started a website but had no data. It was a response to the pressure. It was a way to let people know that we are committed to open data. But we didn't have access to the data ourselves, and we hadn't developed relationships with the line ministries" to supply data. The site went off-line by the end of the year.

Paul Kukubo, chief executive officer of the board, said the failure illuminated the complex challenge confronting reformers. "The site was premature," he said. "What you learn is that [putting data out] is not as straightforward as it seems. People own data and are custodians of data. And many people who sell data are threatened" by open data.

In March 2011, Ndemo attended an iHub session at which programmers complained about the lack of digital government data. This time he publicly vowed to facilitate an open data portal. "There is data within the government that nobody touches, with which the youth wanted to do applications," he recalled. "They said they needed data from government. So I said, 'Allow me time, and I will go do it. I promise that.'"

FRAMING A RESPONSE

Soon after taking the job of permanent secretary of the Ministry of Information and Communications in December 2005, Ndemo set five priority areas for improvement in the ICT sector: infrastructure through fiber cables, content and application development, public-private partnerships, capacity building and employment. The need for open data cut through the last four.

During his early years, Ndemo laid the groundwork needed to create a political environment that would be conducive to his goals. He knew he had to build support both within the government and in the private sector. An

important backer was then minister of information and communications Mutahi Kagwe. In Kenya, the relationship between a permanent secretary and a minister was similar to that between the chief executive officer of a company and the company's chairman. The permanent secretary was responsible for the day-to-day operations of a ministry. Ndemo said, "My minister at the time came from the neighboring constituency of the president, so I leveraged on that. If we were stuck, I could go to him and say, 'Let us see the president.' He trusted me, and that was critical. This is how we managed to have the necessary political will."

Ndemo developed professional relationships and coalitions by reaching out to ICT people in the private sector. "I started calling several people, mostly from academia and industry to simply understand the problems they had at the time," he said. And he spoke regularly with members of Nairobi's technology community to bolster those ties.

Two years into his term, Ndemo set up some of the machinery needed to move forward. In 2007, he established the ICT Board, a state corporation responsible for implementing policies and projects developed by the Ministry of Information and Communications. "In government, you don't get a choice of people you work with," he said. "So, we actually created a small, semiautonomous agency called the ICT Board to quickly implement some of the programs we had started." Ndemo soon developed a track record for carrying out successful reforms on several levels by helping bring high-speed fiber-optic cables to Kenya, liberalizing the telecommunications sector, and supporting M-PESA.

Tackling the thorny issue of open data was a logical next step, and the March 2011 iHub meeting helped stoke efforts that already were under way. Reliable advice and sage counsel were needed to answer questions regarding what Kenya

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needed and how those needs might be filled. Six months earlier, Ndemo had started seeking ideas and observations from the World Bank. Christopher Finch, senior social development specialist at the World Bank's Nairobi office, said, "Kenya was a place where a lot of things were happening because of the new constitution. It was one of those times when the country was making a big shift. When I came in, we began a series of 7 a.m. unstructured meetings with the permanent secretary, [in] which [we] almost always ended [up] talking about the underlying development stories in Kenya's data and the most recent census and how the data could inform Kenya's policy and development."

Finch recalled that Ndemo cited particular situations to stress the need for open data by saying, "The permanent secretary would pull out four volumes on census and say, 'Look at the school data and see how girls drop out when they reach ages 11 to 13.' Or 'Look at sanitation facilities in schools. There is a story to be told here. A lack of investment and cultural norms are forcing girls to leave school, and we are losing capacity.' Or 'We are wasting thousands of tons of tomatoes and you can pull the information out of electronic data, but it is hard to pull it out of records or files.'"

Finch brought in other World Bank data analysts to advise Ndemo. "He said we should reignite the government data portal that had been started a couple of years before but had not gained much traction. I came along at the right time and was there to listen and bring in colleagues who were good with data." Kags, an entrepreneur who had worked with the ICT Board in the past, and Jay Bhalla, another technology entrepreneur and a World Bank consultant at the time, joined in the early discussions.

In turning to other models, Ndemo looked at the U.S., U.K. and World Bank open data portals. Finch recalled that planners also looked at the Philippines' Check My School website as an example of a portal that promoted good governance by enabling parents, educators and students to monitor school funding and report issues. "We were bringing back cases or examples of how data applications had been created elsewhere that might be of interest to Kenya," Finch said. "For example, 'How has making government data open made it possible for companies to use the data for employment?' We were looking at the U.S. and the U.K. and were talking about the bank's own experience. We did not have to do very much convincing. The permanent secretary was doing it. He was always way ahead of us."

The World Bank's Kenyan office had a large amount of government information on public spending, finance, the Constituencies Development Fund, and school and health facilities. Tracey Lane, senior economist at the bank, had worked with planning and finance ministries on public expenditure and financial analysis. She said, "In March 2011, when a dialogue started with the permanent secretary around having an open data site, I had a lot of data on my laptop that had been collected through working with the government."

The World Bank Institute and the Kenya Country Office's Poverty Reduction and Economic Management Network had used the public expenditure data and countrywide school performance data to create an interactive map of 12,000 schools. Users could track socioeconomic indicators and World Bank–funded education projects. Ndemo recalled, "Around April or May, we discussed with the World Bank that they had this data on spending. I said we could do the same thing we did in 2007 but on a much larger scale. 'You can supply the data and we can do this.'"

Ndemo knew that the success of his open data reforms would hinge largely on winning approval from ministries in order to use the same data on a government website that was open to the public and the world and that getting such

approvals would be costly in terms of time and energy.

In an early strategic decision, Ndemo opted to launch the site with data that was already in the public domain but not published in any broad way or usable form. In doing so, he sidestepped the need to confront government agencies about their release of nonpublic information—a move that likely would produce hostility and could prompt a powerful political backlash. Kags said, "We were going for data that was already published in reports, etc. The key thing is that the open data movement is not about top-secret information but about information that is already there. We did not want to publish anything that was detrimental to security."

Based on past experience, Ndemo knew he would have to both move quickly and secure high-level political support. He knew that if he did not push the project through in a short time, bureaucratic complications and political machinations might doom the reforms. "The projects I have been held back [in are the ones] where people say, 'Why can't we organize this?' or 'We need to have a concept paper on this,'" he said. "These projects have never taken off."

Ndemo decided to lobby the president for the political leverage to prod ministries for data. He said, "The World Bank people had the data, but they needed the concurrence of the Ministry of Planning. I said, 'I will get it.' But I would have to first ensure the president's blessings and have him launch an open data portal."

GETTING DOWN TO WORK

Instead of waiting for the passage of the Freedom of Information Act, which had languished in Parliament for more than a decade, Ndemo decided to anchor his open data initiative to the 2010 constitution, which called for the government to "publish and publicize any important information affecting the nation."

"The [Freedom of Information] law could take years," Ndemo said. "It has been in Parliament, and when it goes to the Parliament, you have no guarantee that it will go through. You have no guarantee that you will be there to implement the open data portal. So I said, 'Let's move with this and take advantage of the new constitution.'"

Enlisting the president

Loosening ministries' tight grip on government information required high-level intervention. Ndemo went to the top. At the beginning of June 2011, Ndemo made his case during a personal visit with Kibaki. "I went to the president and told him we have a lot of data in government, which we can use and convert into businesses for the youth and for more employment," Ndemo said. "He is an economist, and he understood all this very quickly.'

Ndemo said he described his problem: "We have this silo mentality in government, and no one gives the data: Ministry of Education keeps its data. Planning [ministry] keeps its data. Everybody keeps the data. But we want to create a portal. It would be a place to put the data, and the youth would use it and give credit to the government. They would create applications with the data."

Kibaki gave his blessing to the open data project and accepted Ndemo's invitation to preside at a launch event. He instructed his staff to work out his availability to attend the launch ceremony. Based on the president's schedule, the ministry set the official launch date as 28 June 2011, just a few weeks away. (The president's office later requested that the date be moved to 8 July 2011.)

Securing data for the launch

In discussions with the bank, Ndemo targeted sets of data he deemed critical for

application development, including information from the census, audited public financial accounts, public schools and health facilities, and surveys of household income and spending.

The tight timeline put pressure on Ndemo to move quickly but also worked in his favor. Before approaching the president, he had met with planning, finance, health and education officials to get data or secure permission for using data already with the World Bank, such as public expenditure, school and health facility data. Ndemo said, "The Ministry of Planning has almost the entire data for government. I went and camped there. I talked to the director of the KNBS. He said they could not do it because we might get wrong data out there."

The president's support and his commitment to attend a launch event in the near future armed Ndemo with the political clout he needed to pressure his ministerial counterparts to decide the matter quickly in his favor. "I announced the launch date," he said. "Things work better under crisis in government, and that is what helped me. You have to create a super crisis and say, 'The president is going to launch, and I don't know why you are refusing to [give data].' Eventually, they caved in."

Ndemo said that, if he had to, he would go to a ministry every morning and sit there for hours to secure permission. He often told ministry officials that he would not leave until they agreed. Once they did, he said, "I asked them to put it in writing, because they might turn around and say, 'I did not give permission.' All this worked because of the pressure of the launch."

It helped Ndemo's cause that most of the World Bank–held data was in the public domain. He recalled a meeting with the permanent secretary of the planning ministry: "I said, 'The World Bank has released the data, and it is silly that you cannot release it.'" Ndemo used his iPad to demonstrate to the planning ministry's permanent secretary that the data was openly

available. "He asked the KNBS director, who said that they had released it. So the permanent secretary gave me the go-ahead," Ndemo recalled.

Ndemo also showcased potential uses of the data when trying to persuade ministry officials to support his cause. "I told them there are no districts in this country where more girls go to the university than boys, and I said that this is the analysis we want to generate from the data," he said. "Sometimes I could see that they were not 100% supportive, but it was a start." A few ministries, however, agreed readily. Kags said, "Some ministries were already trying to publish their data—like the Ministry of Education—and saw this as a robust tool."

In addition to the World Bank–held data, Ndemo wanted the open data site to include the huge volume of information in Kenya's 2009 census. Organized and formatted, the electronic data would be invaluable for application development. Kobia, program manager at the ICT Board, said, "Census data was one that could have the biggest impact because it gave the public great insight into the Kenyan population."

As the KNBS's largest data set, the census information was in high demand. The bureau was supposed to sell paper copies of the census books for 4,000 Kenyan shillings (US$47) each, but people could end up paying much more for leaked digital copies.

Ndemo said getting the census information was difficult. "They did not want me to touch it," he said. "I spent whole mornings—every third morning—and my counterpart [at the planning ministry] eventually caved in and told the director [of the KNBS] that he can work with me on this."

On 10 June 2011, the Ministry of State for Planning and National Development handed over electronically formatted census data to Ndemo. By now, Ndemo had paper copies of the budget from the Ministry of Finance; data on diseases and health facilities from the Ministry of Health; student-teacher ratios and other school data from

the Ministry of Education; and the Constituencies Development Fund data showing projects, costs and money spent in each constituency. Some of the health, education and development-fund data carried geographic coding that eased management and analysis. In addition, the National Council for Law Reporting shared digital versions of the *Kenya Gazette*, containing notices of new legislation and policies.

To expedite the process and lessen the workload on ministries, Ndemo accepted data in any format, printed or digital. Kukubo of the ICT Board said, "The idea was that any data is good. We will do the hard work in making that data relevant and cleaning it on our end."

Addressing privacy concerns, Murungi of the National Council for Law Reporting said, "In terms of individual privacy, concerns did not arise. All the content was in the public domain: census data or statistics on distribution of schools in Kenya."

Mustering workers for the launch

Ndemo started work on implementing the portal as soon as the planning ministry released the 2009 census data. He worked with Kags, Bhalla and Kukubo to form a task force of 23 members comprising public officials, developers and World Bank data experts. The group had teams responsible for (1) solving technical and usability issues and getting the website up and running; (2) cleaning and formatting data for presentation on the site; (3) dealing with legal and policy matters, including terms and conditions for data usage and the legal aspects of the publishing of government data; and (4) organizing the launch-day event.

Most task force members were volunteers who had collaborated with Ndemo in the past. Kobia of the ICT Board led the events team; Lane of the World Bank took charge of the data team; Murungi of the law-reporting council led the policy team; and Mohamed of Trademark

East Africa led the technical team. Others included Linet Kwamboka, a software and technology consultant who later became project coordinator of open data at the ICT Board; Gikunda and Ory Okollah of Google Africa; Finch of the World Bank; and Hersman of iHub. Kags and Bhalla were chairman and vice chairman, respectively, of the task force. The task force, especially the data team, received technical support from data experts at World Bank headquarters in Washington, D.C.

Ndemo chose not to include civil servants, who he said might have slowed down implementation because of their other duties. But he did invite representatives from the KNBS to attend meetings. Officials such as the deputy chief economist of the Ministry of Education and representatives from the Ministry of Health, Ministry of Lands and the Directorate of e-Government, responsible for managing information technology applications within the civil service, were also present at the first task force meeting on 17 June 2011. Thereafter, the team decided to meet at the ICT Board every Friday.

The task force settled a number of strategic questions at its first meeting. Learning from the World Bank's experience, the team decided on data visualization—or visual representation of information through graphs, maps, applications and easily downloadable files—instead of just putting up PDF files or tables on the website. Ndemo explained the rationale: "People don't understand the data—and part of it is that those in charge of data don't *want* people to understand it—so, to change this, we needed to better visualize it so that people could understand the data."

The team decided to upload data by both county and district. Based on the 2010 constitution, Kenya was in the process of transitioning from eight provinces, subdivided into 46 legal districts, to 47 counties. The data

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team would therefore have to remap district-level data into county-level data. The group also decided to make the site interactive so that users could submit requests for data that would be most useful to them.

For building the actual portal, Ndemo, Mohamed and other team members decided to contract with Socrata, Inc., a U.S.-based firm that had provided software for the U.S. site (data.gov). The technical team could easily customize Socrata's Open Data Platform for Kenya's needs, thereby speeding creation of the site. Similar software was not available in Kenya at the time, and Socrata could host the completed portal on its computer servers based in the U.S. Lane, who had discussed the platform with Socrata, showcased it at a task force meeting.

Although the task force had ample reasons—especially the impending launch deadline—for hiring a foreign software company, the decision raised complaints that local programmers should have been chosen and that the servers should be based in Kenya. Kwamboka described the situation: "The software community said we should have developed the platform ourselves locally. Ideally, that would have been the way to go. We could build it ourselves, looking at the needs and demands of the Kenyan people and government. But we had a short time frame, and we needed something that would work from day one."

Mohamed added, "We had to either build the open data platform or outsource it. Since the project was a direct response to the technical community to expose data so that they [could] use it, it would be logical to start from local talent. If we had had time, we would have done it ourselves because we would have liked to host Kenyan data on a Kenyan platform. But Socrata met 80% of our demands in the box."

The task force operated with little money. Kobia said, "Everyone put in a lot of time and

sleepless nights. It was mostly volunteers. We didn't have a budget. It wasn't a project, and it wasn't allocated." Socrata offered discounts in exchange for Kenya's becoming its design partner on a platform feature under development at the time. The ministry provided the money for the hosting and the launch.

Counting down to opendata.go.ke

Starting on 17 June 2011, the four teams began work in earnest. The technical team included Mohamed, Kwamboka, Bhalla, Hersman, Gikunda, and Okollah, Google Africa's head of strategy and a founder of Ushahidi. The group had to work closely with the Socrata team to customize the platform, make it user friendly and create data visualization. It also had to brand the site with a Kenyan flavor and create Web applications. To give the site a Kenyan look and feel, the group worked with University of Nairobi researchers to assign Swahili names to census and household budget data indicators. The variable names were in both English and Swahili, but the rest of the site was in English. Mohamed said the team turned down requests for a parallel Swahili-language site because of time constraints.

The group worked under extreme pressure. Mohamed said, "The project management was minute to minute. There was no detailed plan apart from the overall plan, which was [that] we needed to do this by this day. Everything had to happen in that time." The team did not have time to write out technical documents or specifications.

Coordination was important, especially between the technical team and the data team. Lane said, "Mohamed and I discussed how we would navigate the site. He and I sat down to design the front page and [talk about] where we would go next, how we would group data sets around categories, what those categories would look in terms of basic functionality, and what would get highlighted or promoted on the front page."

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Mohamed's team did not format the data but instead relied on Lane's team to supply the data in a form ready for the website. With Socrata's technical support, Mohamed showed the data team how to organize data to achieve certain kinds of visualization. A team member who found missing or faulty data would contact the data group for fixing that, no matter how small the mistake. That simple step ensured quality and accountability.

Hersman coordinated application development to showcase how the information could be used. For instance, one application enabled cell phone users to send a text message with a constituency name and receive in return both census data and the name of the elected representative of the constituency. Another application mapped health clinics in a district and contrasted the map with other districts', and, later, counties' maps.

To ensure the quality of applications, the team set up a peer review procedure. When Hersman submitted an application, the technical team had two days to respond with comments. Mohamed said, "We had to enforce quality control [and] didn't want delays, because the president [was coming to launch]."

Mohamed's team worked closely with the World Bank and Socrata teams in the United States to improve the site's usability and quality. He said, "We would be here [in Nairobi] and have a Skype session with the U.S.—Socrata and the World Bank—early morning to take over from the U.S. team in the morning. We were working 24-7 in this way. It was an advantage of having part of the team in the U.S."

Apart from Lane, the data team included five other World Bank Nairobi staffers who worked around the clock to clean up and digitize 200 data sets, with each data set being a collection of one type of data. Because county boundaries had not yet been drawn, the team recalibrated district-level data into county-level data with KNBS's support.

Murungi's policy team worked on the terms and conditions of using data from the portal and licensing it. The team compared open data licenses in other countries, such as Brazil and the United Kingdom, and came up with guidelines. At the time of the launch, the terms of use stipulated that the public was free to use and reuse the data as long as it was not for commercial use, but Murungi regretted attaching the restriction on commercial usage. "The best thing would have been to provide that users are free to access, copy and use the information as long as they accurately represent the information, acknowledge its source and avoid giving the impression that they are affiliated with or in partnership with the source of the information where no such affiliation or partnership exists," Murungi said. "The proper advice would have been to not attach any conditions or restrictions."

Meanwhile, the events team scrambled to arrange a launch event that would be appropriate for presidential attendance. The events team dispatched online invitations to the ICT Board's mailing list, and on 8 July 2011, 3,000 people were present as Kibaki officially launched the site, opendata.go.ke. At the event, Ndemo showcased 200 data sets organized into six categories: education, energy, health, population, poverty, and water and sanitation. The data included the 2009 census; seven years of detailed government expenditure data, including national and county public expenditure; national budgets; the 2005 household income survey; and information on health care and education.

Honing the site and getting the word out
After the launch, Ndemo reconfigured the task force into four teams that concentrated on data, site functionality, policy and outreach. Most of the volunteers from the launch phase remained on board, and Kags and Bhalla led the team once again. With Socrata's ongoing support, the teams worked to improve the site further. Bhalla said,

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"What the site was before and what it is now are different. You couldn't search for data sets earlier. The data had not been tagged. My work was to tag it and search it." The team renamed data sets, included the most popular data sets on the front page, and added new ones. The ministry launched the improved site in November 2011. Soon after, the task force stopped meeting and the volunteers went back to their regular jobs. The ICT Board took over the day-to-day management of the portal.

After the second launch, Ndemo, the ICT Board, developers and media groups started putting strategies in place to sustain interest and build demand for data. Media and researchers would play crucial roles. Kukubo said, "We have a strategy to build awareness programs around open data. Media is going to be very important because media is how you reach people. We need to teach people how to use the data so that they can analyze and add value. We are also building partnerships with schools and universities, businesses, government and software developers."

Ndemo elaborated on the publicity strategy, "We must have one-liners from academics who can understand and analyze the data for the media to use it. I called the media here when a fungal disease affected our crops. I said, 'Please let us write about it in a more detailed way.' They were not interested until somebody said we are losing 40% of our crops and this is going to undermine our food security in the coming years. Then they started writing about it. So, someone needs to synthesize the data, and someone needs to speak about it."

In January 2012, the African Media Initiative, a Pan-African program to support private and independent media, and the World Bank together hosted a four-day media roundtable and training session. Journalists, civil society representatives and developers gathered to learn about global media and digital data. Amadou Mahtar Ba, chief executive officer of the

African Media Initiative, said, "We organized the first-ever data boot camp on the continent to give the media tools to efficiently make use of the data publicly available. We got reporters, journalists and coders to use the data sets released by the government. Good things came out of it that all revolved around transparency and accountability and how to improve people's lives. We have embraced this initiative and are encouraging the government to release more data."

With US$100,000 in support from the World Bank and a matching grant from the African Media Initiative, the ICT Board and other partners collaborated to start the Open Data Pre-Incubator Initiative. The project included workshops and a fellows program. The workshops were designed to familiarize government and media personnel, programmers, development practitioners, civil society representatives and scholars with the open data portal and to showcase applications that had already been developed. The workshops also served as venues for discussion of problems that data and technology could solve. For instance, in June 2012, the board, Strathmore University in Nairobi and a number of other organizations held a three-day Open Data for Development Camp for civil society organizations, researchers and software developers.[10]

As part of the incubator project, Bhalla, executive director of the Open Institute, became project manager of a five-month (July to November 2012) Code 4 Kenya pilot program[11] that embedded four fellows in four media and civil society organizations.[12] The fellows had the tasks of convincing their host organizations to share data and of facilitating the flow of information to four external developers. The developers would use the data to create applications in the areas of education, health and water, with an eye to including county-level and public financial data. Kobia said, "With the incubator, we are testing the process of bringing people together in one

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room to answer questions: How can the open data be used? What applications that we can modify are being built in Kenya or other parts of the world? Then coming up with a problem statement and having the fellows address these problems."

Bhalla added, "With Code 4 Kenya, we will have four fellows who will be embedded in host organizations and will be responsible for convincing the organizations to open up data and share it. At the end of the five months, there will be usable applications that will convince organizations that going down the open data route is good."

In 2011–2012, the ICT Board scaled up its Tandaa Digital Content Grant—a three-year US$4-million grant program that started in 2010—to provide US$50,000 grants for 30 companies and individuals to develop Web and mobile applications.

Building sustainability

Ndemo had to secure additional funding to keep the open data initiative running long term. He worked with the World Bank to secure a four-and-a-half-year (July 2012 to December 2016) US$6.61 million allocation from the bank's US$169.5-million Kenya Transparency and Communications Infrastructure Project. The money would pay for three full-time positions, cover other costs of running the portal, support capacity building within the KNBS, and provide for training and workshops. The bank approved the loan in March 2012.

Ndemo also sought support outside the country for his efforts to open up Kenya's government. A few days after the July 2011 launch of the open data site, Ndemo attended a meeting of the Open Government Partnership, a global effort by eight founding members—Brazil, Indonesia, Mexico, Norway, the Philippines, South Africa, the U.K. and the U.S.—to promote transparency and accountability in government. Access to information was one

criterion for joining the partnership, requiring member countries to create laws that guaranteed citizens' right to information and government data.[13] Ndemo had seen the partnership as an opportunity to promote the idea of a firmer legal and policy framework around open data, and he persuaded the president to allow Kenya to join the group.

Having secured the president's go-ahead, Ndemo sought and gained the Cabinet's approval as well. In December 2011, Kenya sent a letter of intent to the partnership's steering committee, and the country became an official member in April 2012. Ndemo said the international commitment would nudge the Kenyan government toward creation of policies and laws that facilitated open government.

Engaging other government partners

Ndemo and the ICT Board worked with KNBS officials to keep the open data portal updated. The bureau was Kenya's largest repository of government data. It coordinated a National Statistical System through which bureau officials collected statistics from ministries, private organizations and other data-gathering institutions. Crucially, the KNBS had staff in key ministries to gather data or monitor data collection. The ministry's open data initiative fit well with the KNBS's data collection and dissemination mandate. While the ICT Board would still project-manage the portal, the KNBS would gather information from ministries and update the portal.

The World Bank's US$6.61-million funding would go toward five positions, including the salaries of two data analysts at the KNBS as well as those of a project manager, a champion and an analyst at the ICT Board. Lane of the World Bank worked with the KNBS to design a data supply system so that as many as six core government institutions would be able to provide information regularly for the bureau to release on

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the portal. The institutions included the education, health, finance and planning ministries and the National Audit Office. "We agreed in principle that we should start with what we have," Lane said. "The site will get old, and people will lose trust if you don't update annual information annually or monthly information monthly. So, the first principle was keeping what was there up-to-date. The second principle was that we needed to respond to what people wanted. So, we captured all of the data requests for the first six months and grouped them around themes. We agreed with the KNBS that they would release the statistical annex and the economic survey data—their two large annual publications on trade, finance and gross domestic product. They are supposed to release all the data to the site at the time they release it in print."

The World Bank had worked to enhance the KNBS's capacity in the past through a project to build its staff's statistical capacity. For the open data initiative, staff in the local Nairobi office also worked alongside up to five KNBS staff members to clean, format, upload and maintain data on the site. In June 2012, much of the new data on the portal was coming from the KNBS, which uploaded the data with support from the ICT Board.[14]

OVERCOMING OBSTACLES

Not surprisingly, agencies with national security concerns were wary of the open data concept. Ndemo said, "When you implement sensitive matters like open data, people don't understand what you mean. They think you are going to destroy the Official Secrets Act, and everything will be out there. [Normally,] you get very stiff resistance."

Less than two days before the launch, President Kibaki summoned Ndemo to his office. Several ministers, including the minister for internal security, had expressed concerns about the Kenya Open Data Initiative, comparing it to

WikiLeaks, a website that had made classified U.S. government information public in 2010. Kags recalled, "Ndemo said some government people had concerns they shared with the president: that the portal is not a good thing to do. They thought it is like WikiLeaks, which is a bad word in government because it is about leakage. He asked us to think about what else to do if the launch of the open data portal was not approved. It was not easy to hear."

Ndemo said the president's office wanted to cancel the portal. "I was called to see the president two days before the launch," he said. "I was told that the portal had been canceled. Someone had put up spirited resistance."

Ndemo, Kukubo and members of the task force decided they would have to showcase the benefits of the portal to persuade the president and Cabinet ministers to embrace the idea of open data. Ndemo asked Kukubo, Mohamed and Gikunda to accompany him to the meeting. The portal was not yet online because task force members were working day and night to get it up and running. The team therefore decided to showcase the Google Public Data Explorer, figuring that such a demonstration would show the top decision-makers in government the power and usefulness of the planned system. Gikunda of Google said, "We really had to show what the task force was doing, and we carefully selected some visualization that we could show."

On July 7, Kukubo, Mohamed and Gikunda accompanied Ndemo to the meeting with the president. Ndemo met with Kibaki first, and then the rest of the team entered the room. Apart from the president, others present were the vice president, the minister of internal security, the head of the public service, the special adviser to the president, and the minister of information and communications. The ministers expressed concern that open data would expose the government to criticism and undermine national security. The group asked about the kind of data that would go

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on the site, the people who would use the data, and groups behind the portal's launch.

The team assured the group that the initiative was controlled locally and that the data was in the public domain. Ministers present at the meeting were glad to hear that the data on the site was already available—in

electronic or paper format. Mohamed said, "One of the things mentioned in the discussion was that this data was already out there anyway. We were just using it in innovative ways and giving people access. Census data was already there. People could go and get it in a book format."

Gikunda showcased Google applications that used data sets to predict service-delivery gaps. The 20-minute meeting turned into a two-hour session as Gikunda demonstrated charts and graphs by using Google's public data site. He also navigated to Google Maps, historical copies of the *Kenya Gazette* on Google Books, and screen shots of the portal. "The pitch was that the portal can tell a really good story to show how to allocate resources by simply visualizing open data," Gikunda said. "Look at the ratio of students versus teachers, energy sources based on census results. Look at boy-to-girl ratios regionally, by county, and you could see interesting correlations and areas that should be prioritized." Mohamed demonstrated how county-level data would be presented and how the system could allow monitoring of Constituencies Development Fund spending. The team also presented graphs comparing recurrent capital expenditures and population densities.

Mohamed added, "They were all economists, including the president. It was interesting for them to see how the information was being used. They could see statistics tables being brought to life, and they could see [them] as economists."

Ndemo spoke about the economic benefits of open data instead of making a case for greater transparency in government. He argued that data

on the portal would provide employment and offer further knowledge. He said, "I secured political will from the highest office [by] arguing that I can't do anything that would jeopardize [the] legacy of the head of state. The portal will change the lives of Kenyans. I know people are worried about it, but they shouldn't be. I take full responsibility. If anything happens with the data, I will take responsibility.'"

Ndemo said the group present was especially impressed by the argument that the portal would create employment. Kibaki assured Ndemo that he would attend the launch that was to take place the next day.

Ndemo said, "Until the time I saw his vehicle, [I was thinking] somebody is going to tell him not to come. But he actually came and launched the portal and completely changed a lot of things."

ASSESSING RESULTS

Kenya was the first country in sub-Saharan Africa to launch an open data portal, and the second one on the continent, after Morocco. At the time of the launch, the portal had 200 data sets. The number had risen to 434 by June 2012. The ICT Board reported 50,515 site visits as of June 2012. When the board opened a Twitter account in February 2012, 429 followers started following the portal, which had had 634 tweets by June 2012.

Kwamboka reported that users had viewed 29,081 data sets and downloaded 2,600 data sets by June 2012.

As of July 2012, the website had four applications that mobile-phone users could use to track information. For example, through the MedAfrica application, mobile users could track physicians and hospitals in their areas and get information and medical news on their phones. The Msema Kweli application enabled users to select a project in a particular constituency and track its development budget and spending. Users

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could share the information through text messages or other social media tools. Kwamboka of the ICT Board further reported that about 20 applications were using data from the portal.[15] Usage of Kenya's open data site was comparable to similar websites like data.gov, USASpending.gov and Mapping for Results, a World Bank portal for finding data related to World Bank projects.[16]

Other African countries expressed interest in Kenya's experience. During the next 12 months, representatives from Tunisia, Tanzania, Uganda, Ghana, Nigeria and Rwanda came to learn from Kenya, said Kwamboka.

Kenya's portal made international headlines and lit up the blogosphere. Newspapers such as the U.K.'s *Guardian* and *The New York Times* carried articles about the site. *The Star*, a national Kenyan newspaper, rated it number one in a list of "Kenya's biggest ICT stories of 2011."[17]

Although the portal was lauded as a giant step forward for Kenya, even those close to the situation conceded that creation of the website was just the first of the many steps required to allow the country and its citizens to be able to make use of it.

Some newspapers highlighted continued challenges, with headlines such as "Kenya: Open Data Portal Success Hinges on High Speed Internet."[18] Indeed, the lack of Internet availability outside Kenya's major cities sharply curtailed the number of citizens who could use the new website.

Collins Baswony, deputy program officer at Transparency International Africa, said, "Access to the Internet limits the use of open data. People who face the biggest challenges in Kenya—in water, health and education—are not in urban but rural areas. These are the people who are less served and who would really need this kind of information and knowledge. But it is not getting to them. Internet penetration in rural areas is low."

In 2012, only 6.5 million Kenyans (out of a population of 43 million) subscribed to an Internet connection, although 11.8 million had access to the Internet.[19] About 29.2 million people had mobile phones, with 98.8% of total Internet subscriptions through mobile phone.[20] The greater Internet use via mobile phone was one reason the ministry encouraged phone applications that could reach a wider population.

Another problem was the slower rate of application development on the parts of groups that had been expected to make use of the portal. A year after the launch, both Ndemo and Kukubo noted that software developers, the media and the public had not used the open data portal as widely as they had anticipated. The ICT Board reported that as of June 2012, it had no data on commitments from civil society groups or even government ministries to use data from the site.

Task force members said that a lack of institutional structure and defined responsibilities after the launch had slowed momentum. Mohamed said, "We lost a bit of opportunity after the launch, when we had requests, but we had no structure in place to respond."

Kobia of the ICT Board noted, "After the launch, activity slowed down. People went back to their work. There is still activity, but there has been a lag of a year. But we are now getting the structure in place and the budget." In July 2012, the ICT Board was boosting its capacity and strengthening its relationship with the KNBS. It was in the process of hiring five full-time staff members—to be housed at the both the board and the KNBS—who would manage the portal and the flow of information from other government ministries.

The portal also needed more data sets and more-frequently-updated information. Hersman said, "The number one challenge is that we need more updated data. How can we get updated data and engage ordinary people to make their lives

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better and talk about services? We have to spur the demand side.

Charles Wanguhu of the African Center for Open Governance noted, "Right now, the portal is not seen as the primary source of data out there. While undertaking research on corruption, a quick search on *corruption* is likely to yield only budgetary allocations to the corruption commission, as opposed to data on incidences, effects of anticorruption efforts or government reports from probes or allegations of corruption. So, it boils down to the higher level of commitment in the government to get the data out."

Ndemo acknowledged the need for current and updated data: "The pressure I have now is the need for real-time data, which is very difficult for me for achieve. Some of the applications would require real-time data. It is one area in which I have failed. But we will create an alternative. One can build a business case for some of the data and have a consortium of different groups, who gather data, release it." Ndemo also remained optimistic about convincing more ministries to release their data.

Others worried that the ministry and the ICT Board had a tough challenge in building awareness of how the portal could be used by diverse groups and organizations. Data and applications on the site had to hold meaning for ordinary citizens, the media and programmers. Ba of the African Media Initiative said, "There has to be public awareness about the usefulness of the data. People have to be educated. How do you go beyond the elite in Nairobi? What relevance and traction does it get in other provinces? Everyone should be able to share in the public good." The board would have to broaden its reach to groups outside Nairobi.

Observers acknowledged the potential of open-government data but argued that more people needed to understand the concept and learn how to use the information in creative and

meaningful ways. Adieno, formerly at the National Taxpayers Association, said, "The government pleasantly surprised us with the launch of the open data platform. It was quite encouraging to see [the] government move so fast. The portal was internationally celebrated. But there is a gap: it is being celebrated internationally, but very few Kenyans know about the portal or what it is about. And for those who know, it is still a challenge to access the data on the portal." After the launch, the ICT Board partnered with other organizations to spread awareness of the resources available on the site. "There have been trainings for some journalists based in Nairobi and a few other selected pockets of the country," Adieno said. "But that is not enough; locally based journalists need to use the data or information. These are the people who need the information the most to inform the public and influence decision-making. Under the new, devolved government system in Kenya, counties will receive a lot of money. Currently, most people at the grassroots level have no idea how public funds are being spent to better their lives. They need information to effectively participate as enshrined in the Kenyan Constitution."

Ndemo recognized the challenges in building broad appreciation of the benefits of open data but emphasized building greater demand for government data. "Right now, we have dealt with just the supply side of data," he said. "The challenge now is to build the demand side of data and try to make the whole venture sustainable by itself. For this, I am doing a strategy for two counties in which I want to emphasize open data. I am building a matrix that will show where they are in terms of per-capita income and the national average and [will include] a comparison with other counties in terms of such indicators as child mortality. We would show where we are now. Then we would say that in two years we want to be here, and this is what we need to do to get

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there. Every county will start doing this eventually, and they will demand data to prove their performance."

Civil society representatives noted that sharing of government data still required a stronger legislative framework. Ndemo agreed: "The next step is to create a legal requirement that data be sent to a central place for processing. We need to ensure the sustainability of this effort after I exit."

REFLECTIONS

Several factors contributed to the successful launch of Kenya's open data portal. Top-level political support was one of them. Athman Mohamed, a team leader in the open data task force, said, "Political goodwill is not to be wasted in this part of the world. Once the president buys into something, everyone buys into it. When it got to that level and he said we could launch by this date, the portal happened. We would still not have gotten the data if that had not happened."

Kaburo Kobia, who led the events team of the task force, agreed. "Approaching it from the technical side can be difficult," she said. "That is why we did not succeed in the earlier attempt. The political goodwill is critical. Ideally, you should get that at first and then build the technical side from there."

The Ministry of Information and Communications and the ICT Board provided the necessary institutional setup to implement the portal, and the constitution and Vision 2030 provided the policy framework. Bitange Ndemo, permanent secretary at the ministry, served as a champion willing to take up the open data cause. His relationship with the developer community also proved to be crucial in implementation of the portal. Kobia said, "We depended on the

relationships we already had, and having that relationship makes it a lot easier. That drew people into the task force, and the network really helped."

The speed with which Ndemo pushed the portal forward was a significant factor in its successful launch. Erik Hersman, who served on the open data task force, said, "I believe in the traction and the speed with which it moved. There were a lot of gaps, but I wouldn't change anything. I think it was done exactly as it should have been done."

Although speed came at the cost of significant coalition building and a sound post launch strategy, task force members stressed that the pros of moving quickly outweighed the cons. "There were missing constituencies," Hersman said. "It would have been good to have media people there. We could have started creating data visualization for television and media reports. But we needed traction over anything else—before people could figure out their interests and mire the project."

Christopher Finch of the World Bank concurred. "It would be nice to have a more systematic approach; have a policy; then create the structures; then the rest," he said. "But my experience is that things often do not work that way. You have to be opportunistic."

Ndemo summed up his approach to the reforms: "In government, you seize the moment and the opportunity when you get it. How do you do it? You do the end first, and then you can put the rest in place later. You simply must deal with the why you need something, then think about [the] how later."

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[11] Along with the World Bank and the African Media Initiative, such partners as iHub Research, the ICT Board, iLabAfrica and 88mph supported Code 4 Kenya. The Open Institute was responsible for implementing the project.

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[15] Huduma (http://huduma.info/) and Eduweb (http://www.eduweb.co.ke/) were the other two applications on the portal. More websites that used data from the portal had sprung up by September 2012. They included County Score Card (www.countyscorecard.on.co.ke), Seeko (https://play.google.com/store/apps/details?id=com.peperusha.kenya.secondaryschools&hl=en), Primo (https://play.google.com/store/apps/details?id=com.peperusha.kenya.primaryschools&feature=more_from_developer%23?t=W251bGwsMSwxLDEwMiwiY29tLnBlcGVydXNoYS5rZW55YS5wcmltYXJ5c2Nob29scyJd) and Hosi (https://play.google.com/store/apps/details?id=com.peperusha.kenya.healthfacilities%20; http://peperusha.com)

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