New Approaches to Targeted Poverty Alleviation in the Age of Big Data

—On Improving the Results of Targeted Poverty Alleviation Programs (10)

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Abstract: Since the State Council issued the Action Plan on Promoting the Development of the Big Data Industry, big data-enabled information integration and processing applications have increasingly become the basic strategic resources for the building of a modern governance system in China. When it comes to poverty reduction, given that we are currently at a critical stage in the battle to eradicate poverty, it's important that we apply the big data way of thinking and big data technology to the development and integration of poverty alleviation resources. This paper examines the need to apply big data technology in targeted poverty alleviation and discusses how big data technology can be integrated into targeted poverty alleviation programs and how the big data way of thinking meshes with the idea of targeted poverty alleviation. It is believed that the application of big data technology can significantly improve the results of targeted poverty alleviation programs and that the building of big data-powered poverty alleviation platforms is a new approach to implementing the targeted poverty alleviation strategy. This paper calls for changing our way of thinking regarding targeted poverty alleviation and points out the directions for targeted poverty alleviation in the age of big data, with a view to promoting the extensive application of big data technology in the field of poverty reduction and improving the results of poverty alleviation and eradication programs.

Keywords: targeted poverty alleviation; big data; targeted poverty eradication; innovative approaches

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1. The need to apply big data technology in targeted poverty alleviation

The application of information technology in our economy and society has led to an exponential growth of data and big data-enabled information integration and processing applications have increasingly become the basic strategic resources for the building of a modern governance system. As the internet booms and becomes widely used, promoting innovation-driven development, accelerating big data deployments, and developing big data applications have become an essential and inevitable part of the drive to modernize the government's governance capacity. Informatization and digitalization are also important means for the promotion of standard social governance and scientific development. When it comes to poverty reduction, since we are currently at a critical stage in the battle to eradicate poverty, it's important that we round up poverty alleviation resources in an efficient manner, which in turn makes it necessary to apply the big data way of thinking and big data technology to our work throughout the poverty eradication battle, from the development of overall targeted poverty alleviation policies to the realization of poverty eradication targets. In retrospect, the Chinese government has attached great importance to eradicating poverty and constantly adjusted the poverty line and its poverty reduction policies since 1949. The manpower, funds and resources invested in poverty alleviation programs over time have significantly improved the conditions facing regions and people in China below the absolute poverty line and altered China's image as a backward, poverty-stricken country. China has been making its contribution to the global drive to reduce poverty. Nevertheless, despite the advances of the poverty reduction projects, as of 2015, China still had over 60 million people living below the poverty line of RMB 2,300 a year. Most of these people live in special regions such as places that were old revolutionary bases primarily inhabited by ethnic minorities and remote mountain villages. This means that the poverty crisis they face is more entrenched; they lack the ability to seek development on their own, and the task of lifting them out of poverty is more challenging. Given this, China is still faced with serious challenges on its path to eradicating poverty. The goal is to ensure that all rural residents living below the current poverty line are out of poverty and poverty is eliminated in all counties and regions by 2020. This is a task to be completed and a challenge to be tackled by China during the 13th Five-Year Plan period. The idea of targeted poverty alleviation was put forth by General Secretary Xi Jinping during an inspection tour of Tujia-Miao autonomous prefecture of Xiangxi, Hunan Province in November 2013. The idea has since become a fundamental part of the country's poverty alleviation work. Looking at the incubation process of the targeted poverty alleviation strategy, some scholars have pointed to a shift of focus from poverty-stricken counties and villages to specific individuals living in poverty. "The poverty alleviation project with Chinese characteristics is the product of continuous strategic planning in the process of building a socialist system with Chinese characteristics and the targeted poverty alleviation strategy is a furthering of the original poverty alleviation policies and a guarantee of victory in the battle to eradicate poverty" (Mo, 2016). More specific requirements have been raised as the strategy is further analyzed and expanded. Big data technology meshes well with the targeted poverty alleviation programs for the fact that it's dynamic and data-powered and enables unit-based management. The Action Plan on Promoting the Development of the Big Data Industry by the State Council in September 2015 listed the application

of big data technology as one of the approaches to targeted poverty eradication. At a meeting convened by the Political Bureau of the CPC Central Committee in 2015, General Secretary Xi Jinping, when explaining the targeted poverty alleviation strategy, proposed setting statistical targets for targeted poverty alleviation programs and making full use of data to target poverty, promote the opening and sharing of resources and ensure the well-being of the people. Then in September 2015, Gansu was selected as the region to pilot a national big data platform for poverty alleviation by the State Council Leading Group Office of Poverty Alleviation and Development and thus became the first in the country to explore the possibility of building a big data management platform for targeted poverty alleviation (Mo, 2016). Since then, different pilot projects that involve using big data to facilitate the implementation of the targeted poverty alleviation strategy have been launched. Regions including Guizhou, Sichuan, Guangdong and Guangxi began to apply big data technology in poverty alleviation, upgrading their technology and introducing necessary equipment and systems based on local conditions, exploring poverty alleviation methods that are in line with their regional development, and optimizing their dynamic poverty alleviation management systems and evaluation criteria with the help of cloud platforms and data management systems. They have continuously strengthened the comprehensive analyzing and dynamic monitoring capacity of their poverty alleviation information platforms, promoted the linking, sharing and integration of information with relevant industry organizations, and built their own big data platforms for targeted poverty alleviation. Scholars have already pointed out the huge role big data can play in advancing public administration reform. "The reason that big data can promote reform in public administration is not that it provides data services, but that it brings changes in management thinking and structure, clarifies the scope of management and entities to be managed, and improves the efficiency of management. Big data applications and relevant big data services will revolutionize public administration" (Hu, 2016). Internet technology has seen some applications in poverty alleviation, but a national or regional data sharing platform for targeted poverty alleviation has yet to be established. It's high time that we explore the potential of big data technology in targeted poverty alleviation. Therefore, against a background where the poverty issues have become more complicated, the causes of poverty are manifold, the task of eradicating poverty is more challenging, and the means of poverty alleviation need upgrading, to mitigate the poverty crisis and effectively address China's poverty problem. We must create favorable conditions and build an institutional environment helpful for the extensive application of big data technology in poverty alleviation, with the aim of maximizing the role of big data technology in targeted poverty alleviation, popularizing big data technology and applications for targeted poverty alleviation, improving the efficiency of poverty alleviation programs, and providing the basic technological support for China to win the battle to eradicate poverty. This is not only an urgent task in the implementation of the targeted poverty alleviation strategy, but also a major topic for scholars studying the theories of poverty.

2. How big data meshes with the targeted poverty alleviation strategy

2.1 Big data technology

Big data technology facilitates the building of internet-connected regional poverty databases. The Implementation Plan for Building a Targeted Poverty Alleviation Mechanism, introduced in

2014, brought targeted poverty alleviation-oriented informatization to a new level. "The State Council Leading Group Office of Poverty Alleviation and Development shall formulate and guide the implementation of a plan for promoting poverty alleviation-oriented informatization nationwide, setting standards, integrating the Office's existing information systems and putting in place a universal application system." Universal, well-coordinated and internet-connected information platforms will provide important information support for the implementation of targeted poverty alleviation programs. Take Guangxi for instance. The local government made full use of e-government data as well as other basic information resources such as the population information database, natural resources and the geospatial information database, and the economic information database, collected poverty-related information on taxes, finance, civil affairs, social security, urban and rural construction, etc., digitalized poverty-related information with the help of modern information processing technologies including cloud computing, cloud storage and cloud management, and built for its region a universal poverty alleviation database. In the meantime, Guangxi clarified the scope of data sharing among different poverty alleviation departments and set standards for the exchange of poverty data to enable the sharing of poverty information across the region and provide data necessary for decision making and advancing of poverty alleviation programs.

Big data technology assists analysis of poverty-related issues. The obtaining of specific data is the premise for conducting scientific analysis on an issue. In poverty alleviation, this means developing mathematical models with statistical analysis methods to collect and aggregate various poverty information so that researchers can find the data's overall relevance and intrinsic patterns. First, statistics produced by the mathematical models can shed light on the living conditions and life skills of impoverished people, which enables researchers to study and predict their behavior and values and identify the causes of their slow growth and aggravated poverty problems. By classifying the identified poverty-stricken populations using big data technology, researchers are able to find the causes of poverty for different classifications, which makes it possible to more effectively address their poverty problems and allow non-government entities to target their assistance at specific people. Then, by tracking the poverty alleviation process in real time, governments can deepen their statistical analysis to meet the changing needs of the impoverished and increase their resource allocation efficiency. Besides errors in the identification of poverty-stricken people, another important reason for the timid results of poverty alleviation programs in the past is lack of a dynamic management system that can exclude people who have been lifted out of poverty from poverty alleviation programs. By integrating big data technology, governments can establish a dynamic poverty alleviation management system that automatically excludes those moved above the poverty line and enroll people who fall back below the poverty line. Such a system can remain effective over a long period of time and prevent cases where those lifted out of poverty continue to receive poverty aid while people who fall back below the poverty line are left unnoticed.

Big data technology expedites the establishment of a dynamic poverty alleviation management system. In January 2014, the General Office of the CPC Central Committee and the General Office of the State Council issued the Opinions on Innovating Mechanisms and Steadily Advancing Rural Poverty Alleviation, calling for the establishment of a targeted poverty alleviation mechanism. The Opinions put forward the principles of "county-based dynamic management, overall control, accurate

poverty identification, and clarifying responsibilities at different levels." It also requires that profiles be created for each poverty-stricken village and household and a national poverty alleviation information system be established. Targeted poverty alleviation in the context of big data means using modern information processing technology to replace the original static management system and shifting from static operation to dynamic prediction. Guangdong Province, for example, took the lead in introducing a poverty identification system that involves creating profiles for the impoverished and publishing the list of people and regions identified as poverty-stricken, a working system that assigns responsibilities to specific personnel and targeting aid at specific regions and people, a subsidy granting system in which capital is managed by a separate account and handled independently and capital flows are monitored, as well as a project supervisory system featuring dynamic monitoring through data platforms and real-time updating of poverty information. Via the poverty alleviation information management system, the local government is now able to view in real time the information of any of the 2,571 villages, 209,000 households and 906,000 people identified as needing poverty aid in the latest round of assessments (Hu, 2015). Dynamic management means, on the one hand, continuously monitoring the progress of poverty alleviation programs and adjusting the poverty alleviation plan accordingly as the programs advance and the living conditions of the impoverished improve to ensure that the targets of the programs remain accurate, and on the other hand, dynamically managing poverty alleviation resources, allocating resources and capital based on the needs of the impoverished and guiding the granting of subsidies.

Big data technology enhances data support for poverty assessment. In 2016, the General Office of the CPC Central Committee and the General Office of the State Council issued the Methods to Assess the Results of the Poverty Alleviation Work of Provincial Party Committees and Governments, in which they pointed out that in addition to a statistics-based assessment system, third parties should assess the results of poverty alleviation. On the one hand, governments should conduct quantitative analysis of the results of poverty alleviation programs, develop a system to assess the performance of big data platforms for targeted poverty alleviation, and examine the effectiveness of their regions' poverty alleviation programs by applying to the data assessment system indicators such as poverty identification accuracy, poverty list updating efficiency, income growth in poverty-stricken areas, and subsidy distribution effectiveness. A scientific and dynamic assessment system should keep officials from faking statistics to earn credit for their work. On the other hand, local authorities should involve third parties in the assessment process, collecting and analyzing the opinions of the public using information interactive technology and assigning a weight to the assessment results produced by third parties to ensure the fairness and transparency of the assessment process and increase the credibility and accuracy of assessment results.

2.2 Big data-based way of thinking

Big data-based quantitative assessment enables accurate poverty identification. Thanks to the advancement of big data technology, analysis based on population data has increasingly taken the place of analysis based on sample data. The Rural Poverty Alleviation and Development Program (2011-2020) introduced by the CPC Central Committee and the State Council, calls for "furthering the idea of targeted poverty alleviation, establishing an all-inclusive poverty identification mechanism, and promoting dynamic management." Guizhou's "Poverty Alleviation Cloud" leverages big data and cloud computing technology to quantify the

information of the impoverished and introduces 48 indicators (in 18 sets) for the calculation of a poverty overcoming score for each poverty-stricken individual. People whose scores fall below 60 are categorized as "impoverished;" those who score between 60 and 80 are classified as "likely impoverished," and individuals whose scores are above 80 are considered lifted out of poverty. The scores are helpful for the identification of poverty-stricken populations. Poverty alleviation work is built on the accurate identification of impoverished people, which entails a comprehensive collection of information on poverty-stricken people and the environment of impoverished regions as well as the generation of poverty indexes with the help of big data platforms.

Big data analytics allows targeting aid at specific people. Traditional information analysis focuses on developing solutions to particular problems, while big data analytics pays more attention to the patterns in the data. In June 2015, the Gansu Provincial Party Committee and Gansu Provincial People's Government issued the Opinions on Steadily Advancing Targeted Poverty Alleviation, which states that Gansu will leverage big data technology to achieve real-name management of the province's 6220 impoverished villages and 4.17 million impoverished people, identify the causes of their poverty and learn about their needs. Poverty alleviation information databases collect massive amounts of poverty-related information. They allow relevant parties to analyze various indicators to determine the cases of poverty and formulate strategies and allocate resources accordingly. They also make it possible for governments to make predictions on poverty issues based on the patterns found and take preventive measures to reduce cases where people removed from the poverty list return to poverty.

Big data's scientific system promotes precise management. Big data technology, which has great social significance, will offer new approaches to poverty alleviation in the information age. Incorporating big data information systems into governments' original management systems ensures that poverty alleviation departments at different levels add new data to their databases and update and maintain their existing data in a timely manner. The integrated data can assist their decision making. Additionally, big data poverty alleviation management platforms facilitate the sharing of data among different departments, breaking information barriers and increasing governments' efficiency in poverty alleviation.

Big data-enabled dynamic tracking guarantees targeted poverty alleviation efforts. In May 2016, the Ministry of Agriculture and Rural Affairs of the People's Republic of China, in conjunction with eight other ministries and departments in China, issued the Guiding Opinions on Promoting the Development of Featured Industries and Targeted Poverty Alleviation in Poverty-stricken Areas, urging timely updates on the information of industrial poverty alleviation efforts for the sake of streamlined management and performance appraisal. And big data, born out of the drive for continuously updated information, becomes a natural fit for guaranteeing the dynamic tracking of poverty alleviation efforts. Guizhou, for one, has already built its "Poverty Alleviation Cloud," a dynamic tracking platform that pools all updated information on the registered poverty families and project funds. The platform is based on GIS and is accessible through mobile terminals. The "Poverty Alleviation Cloud" (Phase I) was designed primarily to follow the status of the 6.23 million people living below the poverty line, including 9,000 poverty-stricken villages, 934 poverty-stricken towns, 66 poverty-stricken counties, the areas covered by the poverty alleviation efforts and the 1.23 million

people who had been lifted out of poverty in 2014 in Guizhou. With this pool of data guiding the targeted poverty alleviation efforts, the "Poverty Alleviation Cloud" has become an integral part of the national poverty alleviation archive. Big data-aided targeted poverty alleviation eliminates the previous issue of delayed feedback on poverty alleviation efforts. With the help of big data, the responsible departments for poverty alleviation can respond in a timely way to the changing requirements of the people living below the poverty line. And with the allocation of poverty alleviation resources being recorded and published on an open platform, proper and efficient allocation of poverty resources is ensured. Furthermore, the implementation of poverty alleviation projects can be tracked so that timely revisions can be made to the poverty alleviation efforts with a view to the changing circumstances and upgraded technological means, ultimately coming up with a new approach for poverty alleviation that agrees with local realities.

3. Results generated from the application of big data in targeted poverty alleviation

3.1 More accurate information for targeted poverty alleviation

On October 29, 2015, the CPC Central Committee's Proposal on Formulating the Thirteenth Five-year Plan (2016-2020) on National Economic and Social Development (the Proposal) was adopted at the Fifth Plenary Session of the 18th CPC Central Committee. The Proposal called for efforts to "expand the number of infrastructures in poverty-stricken areas and deliver access to roads, water, electricity and internet for residents in line with local realities." Admittedly, an open online data pool for poverty alleviation could not be built without sound poverty reduction platforms. Guangxi, for example, has been striving to build portals to the poverty alleviation platforms of the villages, towns, counties, cities and the provinces, with an aim to facilitate the sharing of information on poverty relief. To identify more precisely the people in poverty, the Poverty Alleviation Office of Guangxi Zhuang Autonomous Region harnessed the power of big data technology. A solid foundation was thus laid for future targeted poverty relief efforts. Starting in October 2015, Guangxi has dispatched in total 250,000 officers to embark on a new round of precise identification campaign, which has collectively gathered an immense amount of data on poverty. Whereas, the efforts required to identify poverty families are monumental as poverty is an issue that is multifaceted, complex and dynamic, with the support of big data-powered poverty alleviation platforms, the data that are originally confined to specific areas and different departments can be aggregated for comprehensive comparison and analysis. In this case, people in poverty can be accurately singled out while human error is minimized.

3.2 Driving the development of e-commerce for poverty alleviation

In the Decision of the CPC Central Committee and the State Council on Winning the Tough Battle against Poverty, "intensive efforts were needed for both the use of Internet Plus and E-commerce in poverty reduction." The impoverished areas should, riding on the booming e-commerce in rural areas, seek to boost online consumption, foster internet entrepreneurship and change their ways of production and life by leveraging electronic and information technology. Specifically, they should approach targeted poverty reduction with internet-based solutions. Tongzi County of Guizhou, for instance, driven by the trend of "Internet Plus" had been pushing the development of e-commerce by attracting investment and offering targeted assistance. For this purpose, it invested in the

Embroidery unique to Miao Ethnic Township

following aspects: rebrand special agricultural products to boost the development of featured agricultural segments; redesign the package of special agricultural products to add value; tap into data and internet technologies for sophisticated marketing; and highlight eco-friendly brands to promote sustainable development of local industries. By the end of 2015, 20 specialty products, including the liquor brand Tongzi Jiao and embroidery unique to Mazong Miao Ethnic Township and carrying the label "Made in Tongzi" had been listed on the virtual platform of Taobao.com and sold at the "appointed counter for special products from Tongzi." This helped the villagers in Tongzi County to sell their specialties at a relatively lower cost. Poverty relief through e-commerce, on the one hand, serves to scale up relevant industries. With e-commerce, relevant departments can thus endeavor to foster leading industries, drive the development of relevant industries and application technologies, encourage mass entrepreneurship and build a complete industrial chain for information technology by tapping into the existing resources of the impoverished areas with supportive measures like preferential policies, financial support and social assistance. On the other hand, it helps to intensify the

fusion between "Internet and Agriculture," driving the traditionally fragmented agricultural industry toward intensive management. The integration of the sale of agricultural products into the internet industry ecosystem is also conducive to the brand building of local agricultural products, as online sales channels bridge directly the supply and demand for agricultural products. While e-commerce is generally flourishing in rural areas across China, promoting e-commerce in under-resourced poverty-stricken areas still faces a fair number of challenges. These include: widening the local residents' access to internet for the sake of developing a complete internet industrial chain; arming the rural areas with logistics infrastructures and building scientifically engineered logistics information platforms; bringing in and nurturing talents in e-commerce space to offer continuous instructions for the development of big data-powered e-commerce in impoverished areas.

3.3 Diffusion of gains derived from poverty alleviation efforts among the public

An essential role that big data plays in poverty relief is democratizing the access to information on poverty alleviation and encouraging participation from the public in poverty reduction efforts. As such, the local governments should, by capitalizing on the existing poverty reduction resources, build an open poverty alleviation information service platform, through which relevant administrative departments and individuals can access data on poverty alleviation, voice their complaints and share information. Building an open service platform comes with a number of benefits. It encourages participation from multiple social units in poverty reduction and helps the residents in impoverished areas realize the leading role they play in targeted poverty alleviation. These will in turn increase their willingness to engage in and their approval of poverty alleviation efforts. For another, the targeted poverty alleviation work could be further enhanced based on the gathered feedback on the implementation of poverty alleviation efforts. An exemplary case of the combined use of big data and cloud computing in poverty relief is Guizhou's targeted poverty alleviation model of "1+N+N" which essentially represents "Cloud-enabled Joint Efforts" with the help of "Poverty Alleviation Cloud" targeted measures can be taken to help people reduced to poverty for a variety of reasons. In areas where it is almost impossible to make a living, relocation projects are vigorously carried out to fundamentally remove the root for bread-and-butter issues. As demonstrated above, the application of big data in poverty alleviation helps diffuse the gains derived from poverty alleviation efforts and foster ambition in people living below the poverty line.

3.4 Delivering transparency on targeted poverty alleviation work

A big data-powered targeted poverty alleviation management platform enables dynamic tracking of the progress of poverty reduction projects. This helps the poverty alleviation task forces follow, in real time, the changing needs of people in poverty and, in turn, allocate the poverty relief resources precisely to those who really need them. On the other hand, the platform can function as a system of accountability, in which the performance of poverty alleviation task forces is measured against a set of quantitative indexes. With the appraisal results, the underperformed departments and personnel can thus be held accountable, thus strengthening the sense of responsibility in the personnel in poverty alleviation task forces. That said, while intensifying supervision within the poverty alleviation task forces, it is also equally important to speed the building of social supervision platforms to encourage the engagement of people in impoverished areas. This should serve to ensure that the poverty alleviation work is carried out fairly and transparently and the

poverty alleviation efforts are properly targeted. The Poverty Alleviation Office of Yunnan Province, for instance, had been using a "Big Data" platform to follow the progress of poverty alleviation work and the work performance of poverty alleviation personnel. Relevant personnel would be called in for a meeting with their supervisors as soon as they were found to be behind their work schedule. With the help of this big data-powered targeted poverty alleviation platform, Yunnan has so far carried out over 30 times the historical number of inspections of targeted poverty alleviation work, issued notices of criticism to 5 officers and summoned back 1,117 officers stationed in villages due to dereliction of duty. All these efforts were made to ensure that the poverty alleviation work was advanced efficiently as planned.

4. New approaches to targeted poverty alleviation in the age of big data

At a time when the means to fight poverty has evolved, the poverty alleviation offices across the country must also ramp up their efforts in refining the targeted poverty alleviation platforms with big data while working to establish the data archives that pool all the information on people in poverty. A sound big data-powered poverty alleviation platform enables dynamic management of targeted poverty alleviation funds and, therefore, guarantees that the funds go precisely to whomever needs it most. And apart from its ability to track in real time and manage the progress on targeted poverty alleviation work, the big data-powered poverty alleviation platform also facilitates aggregation and sharing of information between different poverty alleviation task forces, thus enhancing the efficiency of targeted alleviation work.

4.1 Changing the way of thinking towards targeted poverty alleviation

Transformation of decision-making: from pure subjective speculation to scientific analysis. Regarding data analysis, the norm of the past was to rely on manual work, which obviously could not reveal the whole picture. But, this has totally changed with big data. Boasting an ability to centrally process all aggregated data with established statistics evaluation models, quantitative analysis can now be carried out on all the information on people living in impoverished areas, including the seriousness of poverty, causes of poverty and poverty relief measures, enabling the targeted poverty alleviation work to be executed in a scientific manner. Additionally, the implementation of targeted poverty alleviation projects will invariably be impacted by the differences in thoughts of people in different areas, it is thus even more crucial to use scientific statistics analysis to find the real causes of their poverty, say illness, disability, education, natural disaster, land shortage, water shortage, absence of technology, labor shortage, capital shortage, poor traffic conditions and lack of motivation to overcome poverty, and, in turn, apply targeted poverty relief measures. In addition to objective analysis, the responsible units should also work to change the way of thinking of people in poverty, fostering their "motivation to initiatively get out of poverty." Their own motivation, combined with the governments' poverty relief measures, shall serve to ultimately lift them out of poverty and put them on the road to a better life.

Transformation of poverty alleviation approaches: from an indiscriminate approach to targeted poverty alleviation. An indiscriminate approach towards poverty reduction has, to some extent, hindered the advancement of China's poverty alleviation campaign. One of the key priorities of the targeted poverty alleviation campaign is to prevent "the people who have already been relieved of

poverty from slipping back into poverty." The idea of targeted poverty alleviation is mirrored not only in poverty identification but also in the implementation of poverty alleviation measures. With the help of big data technology, poverty alleviation task forces and relevant personnel can take more targeted measures to meet the needs of specific poverty-stricken families, thus eliminating the issues of low efficiency in resource allocations and snail-paced progress on poverty alleviation work. And since big data-powered platforms offer more detailed appraisal indexes and enables scientific data analysis, the poverty relief resources can thus be allocated in a directed manner, eventually improving the efficiency of poverty alleviation work. Big data technologies like cloud computing, cloud positioning and cloud storage have carved out a viable path for targeted poverty alleviation, driving the poverty alleviation efforts to be carried out in a more targeted manner.

4.2 Future development of targeted poverty alleviation in the age of big data

Seeking new breakthroughs in technologies applicable to targeted poverty alleviation. The investment required for developing big data-powered targeted poverty alleviation platforms is so immense that it cannot be borne by the impoverished areas alone. For this reason, the central government must formulate corresponding supportive policies like tax reductions or fiscal subsidies to intensify the application of big data in poverty alleviation and encourage technological innovation. Meanwhile, great efforts must also be devoted to crack the key elements of big data technology, including data visualizations, data mining algorithms, prediction and semantic search to refine the infrastructure of poverty alleviation technologies, like cloud computing platforms. As the value delivered by big data has become increasingly evident, a shortage of big data talents has been experienced in the field of poverty alleviation. Given this, the central government must invest intensively in nurturing big data talents for poverty alleviation, with a commitment to the idea that talent cultivation shall be guided by the notion of sustainable development. Specifically, big data talents for poverty alleviation can be cultivated through the following two ways. First, identify the personnel who are equipped with both the basic knowledge on big data and experience in poverty relief work and provide them with intensive training on big data so that they can be fully readied for the building of big data-powered targeted poverty alleviation platforms; second, identify graduates with potential and organize training to deepen their understanding of big data and its applications in poverty alleviation.

Tracking the flow of the funds for targeted poverty alleviation. One of the main causes for the snail-paced progress in poverty alleviation before was misdirected distribution and embezzlement of poverty alleviation funds. By building a big data-powered targeted poverty alleviation platform, the flow of the funds for targeted poverty alleviation can be tracked during the whole process. With a big data platform, the supervisors of poverty alleviation projects can then easily follow the progress of the poverty alleviation projects through regular updates by poverty alleviation task forces and therefore be aware of the distribution of funds and relief resources, particularly if the poverty alleviation funds are really delivered to the targeted recipients. This should serve to reduce swindling and false claims of poverty, root out misconduct in poverty alleviation work and strengthen the discipline inspection and supervision over targeted poverty reduction work. Ultimately, the proper and efficient use of the special funds for poverty alleviation is guaranteed and the effect of the poverty alleviation fund is maximized.

Establishing a dynamic tracking mechanism for

targeted poverty alleviation work. While seeking to build dynamic information management systems for impoverished villages, households and people, efforts must also be stepped up in building big data-powered poverty alleviation platforms to promote interactions and sharing of information on poverty alleviation across provinces, cities, counties, towns, villages and impoverished people, among different poverty alleviation offices and between poverty alleviation offices with industries, financial institutions and other poverty alleviation departments. In addition, a staggered tracking system should be established for supervision of the poverty relief resources, including personnel, funds and materials, and the evaluation of the effect of poverty alleviation policies so that the responsible units can be updated in a timely way regarding the information on people in poverty, including the general information on impoverished families, their living conditions, causes of their poverty, poverty relief measures and personnel responsible for the poverty relief efforts. Meanwhile, the information on poverty alleviation work should be followed and updated more frequently for the sake of timely analysis and comparison. All these efforts should ultimately serve to enable the dynamic management of poverty alleviation work and ensure that targeted measures are taken for poverty alleviation and the efficiency of targeted poverty alleviation work is enhanced.

Facilitating the sharing of information on targeted poverty alleviation efforts. As the economic growth of China enters the stage of New Normal, adjusting the economic structure and driving growth have become two major objectives in the economic sphere of China. In this context the officers in poverty alleviation offices should make conscious efforts to develop a sense of appreciation for information. This means they should endeavor to proactively organize the information on poverty alleviation and understand the development of the socialist market economy while exploiting the poverty relief resources to the maximum effect. In addition, due importance should be attached to the filtering, processing and evaluating of information on poverty alleviation for integration of information on targeted poverty alleviation and the addition of information capital for the whole society. As big data processing technology develops, the data archive for poverty alleviation and the sharing of information on poverty alleviation have also become more robust. To root out poverty completely, a sound data archive for poverty alleviation is essential. And this necessitates the aggregation of all information needed to relieve impoverished households of poverty. What's more, the big data-powered poverty alleviation platform, specifically designed for poverty reduction, may help deliver economic and social value to other sectors, driving the growth of poverty reduction-related industries.

Widening the diffusion of the gains generated from targeted poverty alleviation efforts. To this end, the dissemination functions of online platforms, including new media platforms, must be fully exploited. Specifically, a website as well as official Weibo and WeChat accounts should be established for timely release of the results on targeted poverty alleviation efforts. And since open platforms are blessed with the capability to invite wider attention to the results on targeted poverty alleviation efforts, a helping atmosphere, in which "everyone is paying close attention to poverty alleviation" and public opinions on the results generated from targeted poverty alleviation efforts are voiced, is thus formed. This should ultimately serve to invite wider engagement in poverty alleviation from the public.

Building a multi-participation system for poverty-stricken title removal. Efforts should be ramped up in building the database and connected query system for targeted poverty alleviation by

taking full advantage of information technologies like the internet, cloud computing and big data. And in a bid to render obsolete the previous norm of "valuing investment in poverty alleviation projects while ignoring its performance appraisal" in poverty alleviation work, detailed, sound and easily executable standards must be formulated for poverty-stricken title removal with the help of big data technologies. Furthermore, an evaluation system, which should see the engagement of multiple social organizations, including impoverished households, supervisors of poverty alleviation projects, villagers, third-party institutions and governmental administrative departments, should be built for poverty-stricken title removal to ensure that the goals of targeted poverty alleviation are fully met. The progress the impoverished areas and impoverished people have made because of the poverty alleviation efforts could be more accurately, scientifically and properly ascertained with comprehensive comparisons against the indexes in the poverty-stricken title removal system.

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