TPMAP: a Data Analytics and Visualization Platform
to Support Thailand Target Poverty Alleviation Programs

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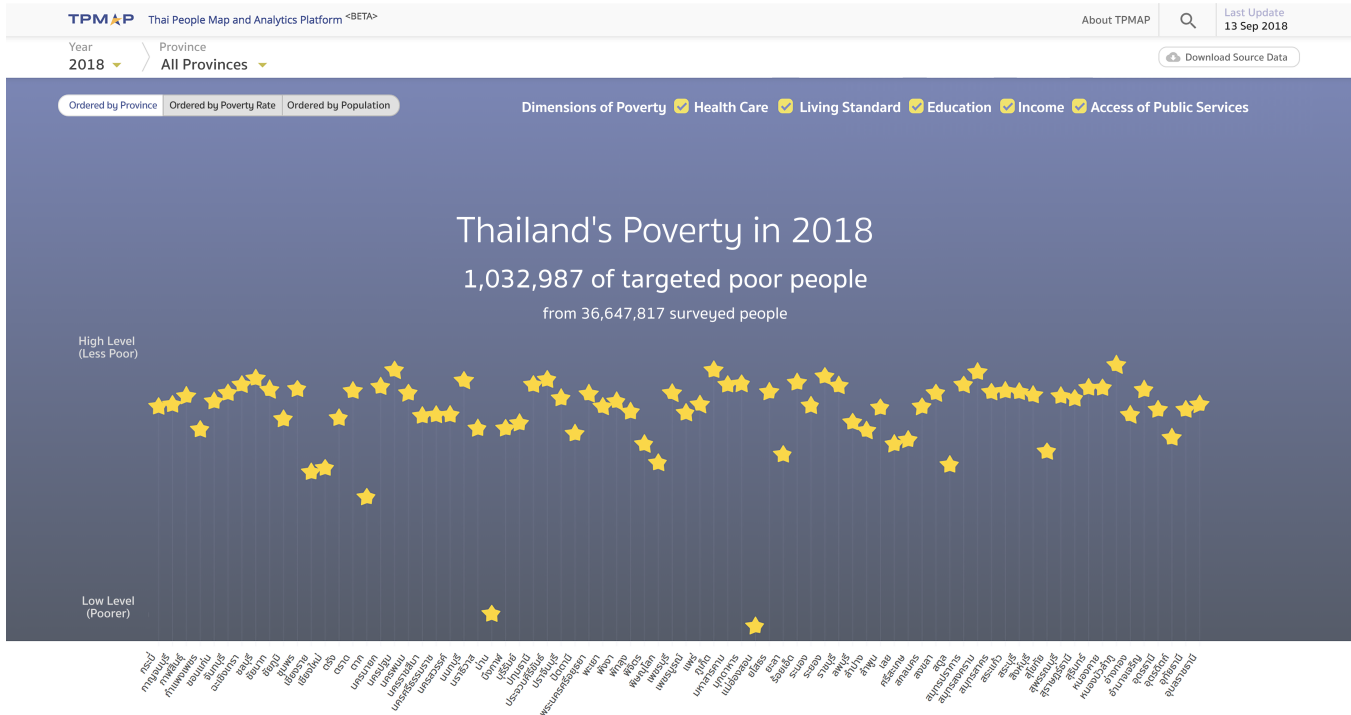
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Figure 1: An English translated screenshot of Thai People Map and Analytics Platform (TPMAP).

ABSTRACT

This paper presents Thai People Map and Analytics Platform (TPMAP: https://www.tpmap.in.th), a data analytics and visualization platform to support target poverty alleviation programs in Thailand. TPMAP aims at enabling Thailand policy-makers to identify the poor, locate them, and understand their basic needs. We use a star as a multidimensional data glyph throughout various charts navigated through a geographical hierarchy. The online platform is being used by a few local government officials to tackle the poverty problem.

Index Terms: Human-centered computing—Visualization; Information systems—Information systems applications—Decision support systems—Data analytics; Information systems—Data management systems—Information integration

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1 INTRODUCTION

Where are the poor? What are their basic needs? How to alleviate their poverty? These are the three main questions that TPMAP aims at answering. Initiated by the Thai government with the ultimate goal of precision poverty alleviation, TPMAP intends to integrate, analyze data sources from different government agencies, and visualize the analysis results on a public website.

2 DATA INTEGRATION AND ANALYSIS

TPMAP integrates different data sources from different government agencies to compare them for verification purpose. Currently, TPMAP uses data from two agencies: 1) a survey-based Basic Minimum Needs (BMN) data of approximately 36 million individuals from the Community Development Department, the Ministry of Interior and 2) a register-based data of approximately 11.4 million individuals who are entitled to welfare program from the Ministry of Finance.

One important figure presented in TPMAP is the number of *target poor*, i.e., a group of poor at whom the government poverty alleviation programs should target first. In TPMAP, a person is considered *target poor* if he or she satisfies two conditions: 1) a person is *MPI*
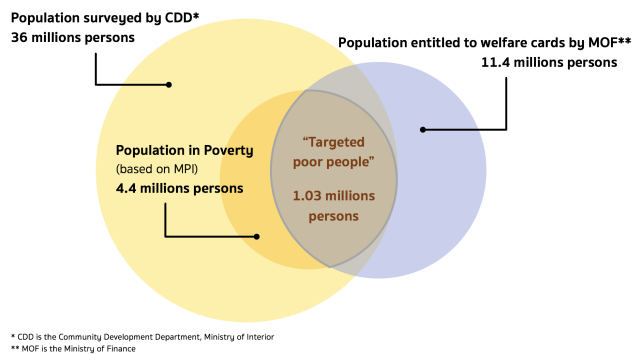
Figure 2: A *target poor* in TPMAP is a person who is *MPI Poor* and entitled to a welfare program of the Ministry of Finance.

Figure 3: TPMAP visualizes a poverty profile of an area with a five-pointed star in which each point represents each MPI dimension.

poor according to the Multidimensional Poverty Index (MPI) and 2) a person is entitled to a welfare program of the Ministry of Finance.

The MPI is an international measure of poverty which complements traditional income-based poverty measures as it captures the deprivations of a person in several dimensions simultaneously. The MPI approach has been adapted by many countries based on country-specific contexts and data to create custom national poverty measures [1,2]. The MPI methodology identifies a set of deprivation indicators and summarizes their poverty profile in a weighted deprivation score. A person is identified as *MPI poor* if their deprivation score exceeds a pre-specified poverty cutoff.

To calculate MPI in TPMAP, we use 17 indicators from five dimensions of the BMN survey data: healthcare, education, income, living standard, and access to public services. We compute the weighted deprivation score with an equal weight of 0.2 in each dimension and use a poverty cutoff of 0.05. As shown in Figure 2, the person identified as *MPI poor* is then cross validated with the register-based data from the Ministry of Finance. If the person is *MPI poor* and appears in the register-based data, they are classified as *target poor*.

3 DATA VISUALIZATION

TPMAP uses a five-pointed star to show the five MPI dimensions as depicted in Figure 3. The shorter each point looks, the more severe the corresponding dimension is. Akin to a radar chart, the shape of a star characterizes the poverty profile of the people in a specific area. Some stars look more complete than the others and we intend to create a symbol of pride to local administrations with complete stars.

As people who live in different areas may have different problems, policy-makers can use TPMAP to derive precision poverty alleviation programs that are suitable for individuals in any Thai administrative level. TPMAP has a hierarchical drill-down navigation, which enables the user to access poverty information (e.g., the number of the poor, poverty rate, basic needs of the poor) from country, province, district (*amphoe*) to sub-district level (*tambon*).

To visualize and compare subareas under the same level, TPMAP provides an overview chart as shown in Figure 1. The vertical position reflects the poverty rate of each subarea; the higher stars have less poor people. The star as a data glyph is used in various contexts throughout each page.

4 APPLICATIONS AND CASE STUDIES

In early 2018, the Prime Minister Delivery Unit (PMDU) submitted a memorandum to the Prime Minister to inform the progress of TPMAP development. The Prime Minister then agreed to assign a committee to report the progress and demonstrate how TPMAP
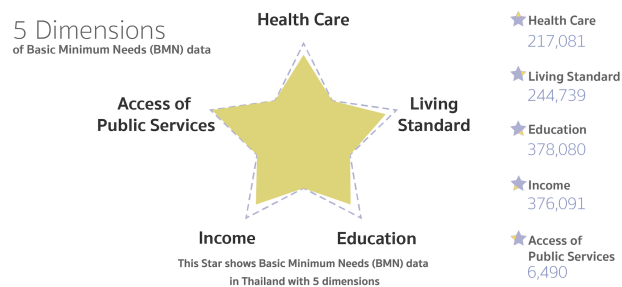
might reduce poverty and improve quality of live to the joint committee on regional development policies.

At present, TPMAP has been presented to local government agencies in several provinces where local government officials are also trained to use the platform. *Samut Songkhram*, the smallest province located just southwest of Bangkok with the forth least poverty rate, is among those provinces that actively use TPMAP. In early November 2018, the governor team used TPMAP to locate and verify the problems of individual households in poor areas. Among 96 households surveyed, the team discovered that 44 households had already received adequate supports while the rest still needed additional supports including home repairs, grants for starting local businesses, and travel allowances for medical appointments. To promptly respond to the problem, instead of waiting for the next fiscal year budget, the governor team will run a fund-raising event for the home repair requests in the early months of 2019 and the repair program will start immediately afterwards. In this regard, we visualize the *Samut Songkhram* star in TPMAP as a blinking star to incentivize other provinces to implement their own poverty reduction solutions.

We also make the data and MPI scores publicly available in Comma Separated Value (CSV) format to promote data usage for other strategic plannings. The user can obtain the data by clicking the "download data" button at the top-right corner of each page.

5 CONCLUSION AND FUTURE WORK

This paper presents TPMAP, a data analytics and visualization platform to support precision poverty reduction policies in Thailand. Currently, the system has been used by local government officials of several provinces. More data sources and details are being integrated. We also plan to broaden the open data via an open API. In the future, feedbacks from the government agencies, such as the outcome of the home repair program in *Samut Songkram*, will be collected and utilized to adjust and enhance the capabilities of TPMAP.

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