

Mobile-based land related data collector for land registration activities: usability tests of Smart-PTSL application

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Key words: land information system, land registration, mobile-based data collector

SUMMARY

The availability of an integrated field map are very important in assisting the need for acceleration of The PTSL (Complete Systematic Land Registration). This program is strategic program initiated by The Ministry of ATR/BPN (Agrarian Affair and Spatial Planning/National Land Agency). The increasing number of PTSL targets from year to year become a challenge for technological advancements to contribute the requirement of field map. Before the year of 2025, land parcel in Indonesia must completely registered. The Ministry of ATR/BPN has obligation to complete this task. This situations triggered need of innovation to accopmplished target in an efficient and effective way. Many innovations that utilized the information and communication technologies emerged. Mobile-based (android-based) application meets requirements as a tool for supporting the program to be accomplished. The Smart-PTSL application being developed to do so. The Smart-PTSL application provide a convenience method to collect data directly in the field. Hopefully, this application could satisfied the need. Aim of this paper is to find out the usability issues of the Smart-PTSL application. Usability parameter was extracted to develop a set of questionnaire. Respondents was chosen among users of Smart-PTSL application. The results show that user satisfaction is quite high. Most users (84.87%) is satisfied with the application.

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1. INTRODUCTION

The legal certainty of land parcel right and or tenure are become national strategic program in the agrarian reform scheme. Kementerian ATR/BPN (The Ministry of Agrarian and Spatial Planning/National Land Agency) has obligation to complete this task. In year of 2017, 7 millions of land parcels registered. Then, in the following year, the target become 9 millions parcels registered. This year, 2019, become 11 millions parcels and finally in 2025 all parcel in Indonesia must be registered. The enormous target of The PTSL have to be finished before 2025 (Pemerintah Republik Indonesia, 2015). Obviously this legal certainty could realized if the land parcel map completed. Unfortunately it is not yet completed.

In the land registration process the measurement and mapping work as well as the juridical data collection on the land are carried out by different task forces (Pemerintah Republik Indonesia, 2017a). The problem occurs when the physical and juridical task units work independently so there is a problem when trying to match the fields with juridical data. Even though there was an agreement on the identity of the serial number on the field map and the juridical data, there were still many mistakes because there was no agreement on the numbering system.

Technological advancements in building mobile-based application based on Android application provide a convenience method to collect data directly in the field. This potentially could solve the problem of spatial and textual data integration throughout this program. The concept of collecting data directly in the field will minimize the occurrence of errors in data collection. This paper provide an information regarding usability issues of Smart-PTSL application as a land-related data collected to accelerate land registration activities.

2. METHOD

A brief literature review was done to silver lining related works and basic theories. Set of questionnaires was developed based on ISO data quality as parameter for usability test, as been done by Mustofa, Aditya, & Sutanta (2018). The parameter consists of: effectiveness, efficiency and satisfaction. It was being breakdown into items: accuracy, completeness, time used, human effort, financial resources, materials expended, responses of physical-cognitive-emotional.

User testing is a widely used test technique to gather information on how real users use the application. These users give us feedback from their experience when testing the application, the feedback helps us to improve the usability of the application and also to find bugs and errors. Instrument for giving feedback is made in Google Form, which is user friendly to the most of people.

3. A BRIEF LITERATURE REVIEW

3.1. The PTSL (Complete Systematic Land Registration)

The PTSL is an activity of initial land registration, which includes all objects of land registration that have not been registered in one kelurahan/desa (village) or other applicable territories (Pemerintah Republik Indonesia (Government of Indonesia), 2017b, 2017a). Resources of The PTSL consist of: methods, material resources, human resources dan financial resources (Pemerintah Republik Indonesia (Government of Indonesia), 2018).

Material resources consist of: field map based on administration map, public facilities map, and imagery map. Human resources involved consist of: spatial data collector (Puldasik), legal/attribute data collector (Puldadis) and administrator. Financial resources consist of: state budget (APBN), regional budget (APBD), and Corporate Social Responsibility (CSR)..

3.2. The Smart-PTSL

The Smart-PTSL is a mobile-based application. The system supported by a web-based application to manage storage, conversion and simple data mining. The Smart-PTSL was build to support data collecting for The PTSL (Abdullah et al., 2018). Available features that built was fit to The PTSL requirements: spatial data and legal/attributes collector. The Smart-PTSL will more powerfull with external GPS/GNSS support. Formerly, this application was build to generate a field map (Abdullah, 2018). As user requirements analysis conducted, it grows to be a brand new application. This application, recently, become more features and simultaneously growth better.

3.3. Usability test

There are many definitions of the term “usability” (Folmer & Bosch, 2007), recent sources (e.g.: (International Standart Organization (ISO), 2018; Morville, 2004; Nielsen, 2012b; Quesenbery, 2003) derived from a long journey of former usability studies. The most recent source explain the definition of usability: “extent to which a system, product or service can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use” (International Standart Organization (ISO), 2018)

Measuring usability there are 5 components (Nielsen & Tognazzini, 2015). These 5 components are: learnability (how easily users master the basic commands of an application or product?), efficiency (how fast a task can be accomplished?), memorability (how easy to remember?), errors (how to handle errors?), and satisfaction (how much fun in using the product?).

Effectiveness is Is a noun of effective (adjective), where effective means can bring results or success (Pusat Bahasa Departemen Pendidikan Nasional, 2018). It also proposed as a level of accuracy and completeness with which users achieve specified goals (Bevan, 2000; International Standart Organization (ISO), 2018). In a matter of method, it is about how accurate and close enough to what goals or tasks can be achieved (Quesenbery, 2003).

Efficiency is a noun from efficient (adjective). Efficiency has the meaning of the accuracy of how to do things without wasting time, effort, and cost (Pusat Bahasa Departemen Pendidikan Nasional, 2018). It is about how fast task(s) (Quesenbery, 2003) and how much resources used to the result(s) achieved (International Standart Organization (ISO), 2018).

Satisfaction is physical, cognitive and emotional responses (International Standart Organization (ISO), 2018). It is extent to which the user experience that results from actual use meets the user’s needs and expectations.

The benefits of usability test are: improve software, save customer’s money and minimize engineering costs (Folmer & Bosch, 2007). Usability test commonly encountered issues such as: various technology used, different users, and lack of user knowledge (Shneiderman, 2000). So numbers of user experience test being develop as a guideline. For example, 5E test by Whitney Quesenbery (Quesenbery, 2003), Honeycomb user experience test by Peter Morville (Morville, 2004), and 5 quality components by Jakob Nielsen (Nielsen & Tognazzini, 2015).

Since majority of the user research is qualitative and the return of investment (ROI) consideration, so the optimum number of users test are 5 users. But, this number of users are not applicable for quantitative study (at least 20 users), card sorting (15 users) and eyetracking (39 users) (Nielsen, 2012).

4. RESULTS & DISCUSSIONS

4.1. Respondents Background

Respondents who gave feedback on the questionnaire distributed were 88 people with varying ages of respondents. Age variations of respondents ranged from 18 to 56 years, with different educational background and various occupations (**Fig.1**).

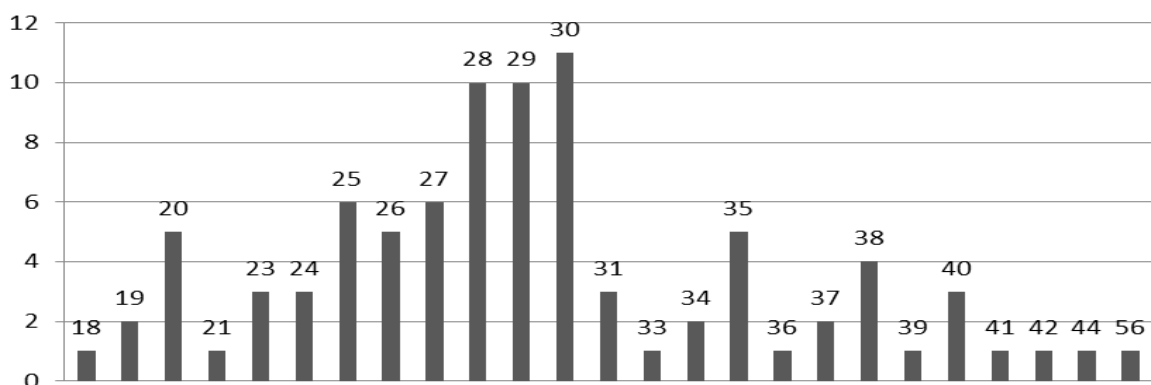


Figure 1. Age variation of respondents

The profession of all respondents is as follows (**Fig. 2**): BPN ASN, Cadastral Assistant Surveyor, Non BPN ASN, Private, Student, and Land Office PPNPN with sufficient cadastral survey expertise and 4 people from ordinary society (non professional land surveyor).

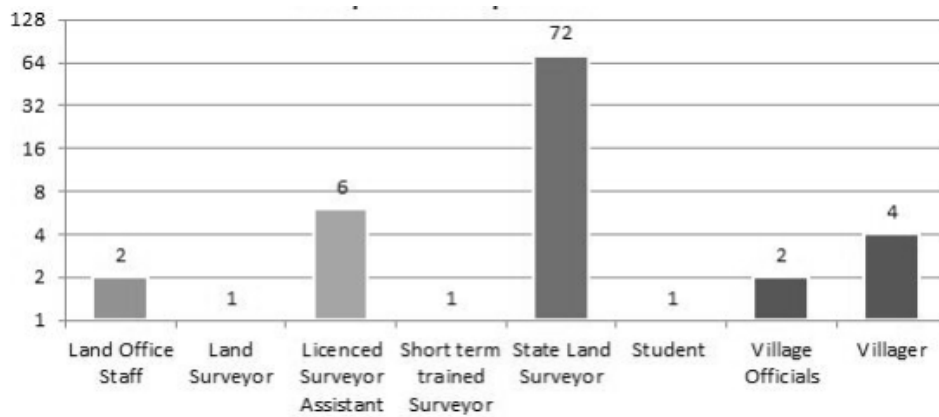


Figure 2. Occupation variation of respondents

4.2. General Mastery (User Experience)

All respondents knew about the Smart-PTSL application and had operated before. More than half of the respondents also know and use other similar android based application. Other applications known to respondents in succession according to popularity include the following: "Sentuh Tanahku", AutoCAD 360, SMART, Next GIS, GeoJot, Locus GIS, Meridia Collect, Mapit GIS, GeoODK, Measure Map Pro, and Avenza Map (**Fig. 3**).

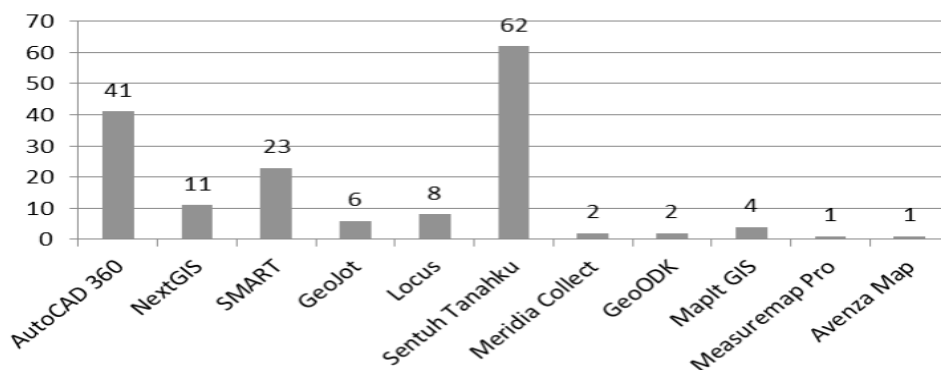


Figure 3. Awareness of other application

"Sentuh Tanahku" is the most popular application, follows by "AutoCAD". Respondents knew quite well "Sentuh Tanahku" because this application was officially launched by the Ministry of Agrarian and Spatial Planning. Its function in the field of mapping, actually this application lacks full features like Mapit GIS, Locus GIS, etc., but for matters of completeness of land information, this application is classified as the most familiar among respondents. This application also, is the easiest and provides many benefits related to land information to respondents.

4.3. Ease of Operation

Of all respondents who had been conducted the study, a score of 353 out of 430 was found (**Fig. 4**). Of the 86 respondents, the majority chose a score of 4 and 5. There were 39 respondents who chose a score of 4 (45.35%) and 30 respondents who chose a score of 5 (34.88%) and the

others chose score 3 (17.44%) and score 1 (2.32%). Looking at the scores obtained, the operation of the PTSL Smart application is considered easy.

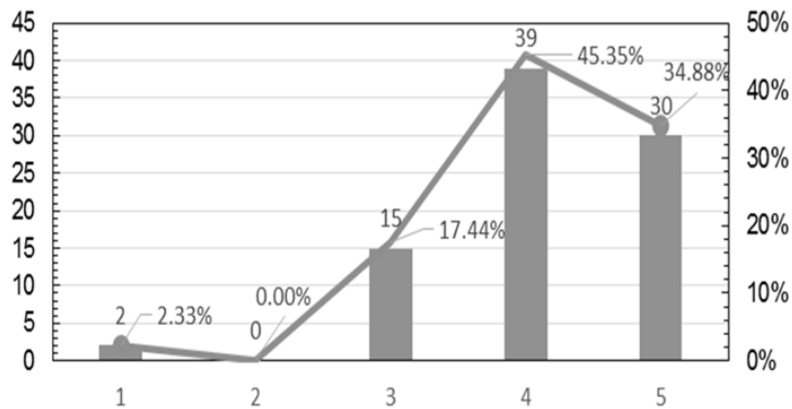


Figure 4. Ease of operation

4.4. Benefits of the PTSL Smart Application

Regarding the benefits of the Smart-PTSL application on PTSL activities itself has a very big positive impact. Most respondents chose a score of 5 (56.98%) from all respondents. The benefits of the PTSL Smart application on PTSL activities get a fairly high score of 378 out of 430 (Fig. 5).

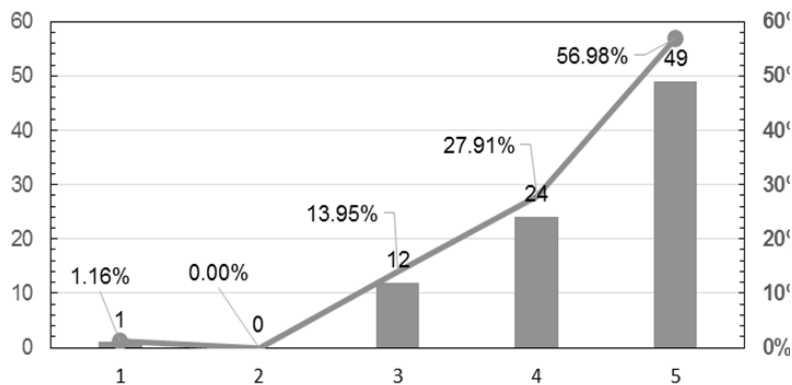


Figure 5. Score of benefit

The benefits of using the PTSL Smart application for PTSL activities include: drawing / mapping boundaries of land parcels for field maps, collecting / filling supporting forms (DI 201, nominative lists, etc.) digitally, measuring land boundaries, drawing GU and SU , administrative boundary mapping, evidence preparation for disbursement, juridical data collection and toponymy, as well as assisting in the overlay of certificates of ownership (K4) and other land parcels, including plots to be measured and not certified (K1 to K3).

4.5. The dependence of Smart-PTSL application on internet services

The operation of Smart-PTSL application in the field is considered quite independent / not too dependent on supporting infrastructure, namely internet services. Half of the total respondents, 43 people (50.00%) thought that the Smart-PTSL application could still be used well even though the existence of internet services in the field was limited. From this data, it can be concluded that internet service is not too disruptive to the operation of the PTSL Smart application in the field because this application can still be used for its features inline mode

4.6. Variation of Smart-PTSL application support tools

There are various PTSL Smart application companion tools used in the field. Each office has different supporting tools depending on the extent of the supporting infrastructure tools at the office. The tools to support the use of the PTSL Smart application include: 3 "and 6" smartphones, 7 "and 10" tablet smartphones, handheld / navigation GPS, measuring tape, total station, compass, geodetic GPS (GNSS and RTK) and theodolite (**Fig. 6**).

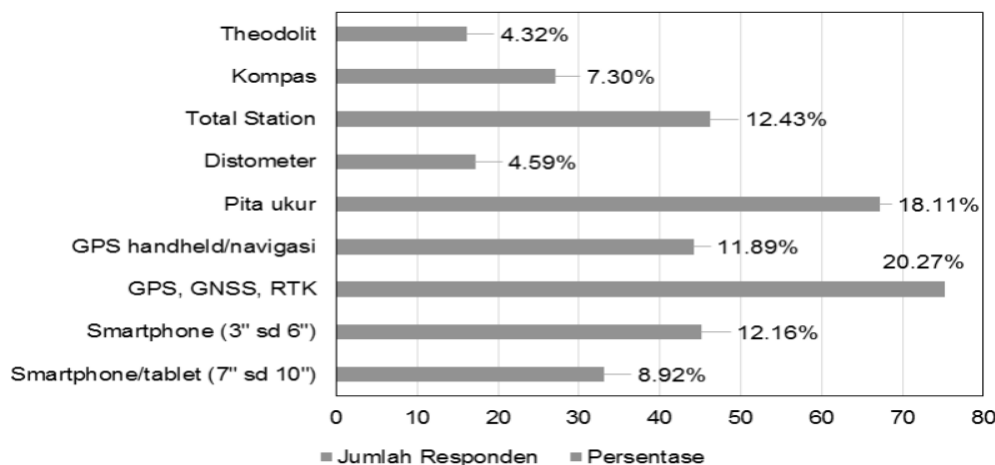


Figure 6. Preference of companion tool

4.7. Accesibiity of Smart-PTSL

Most respondents (97.67%) stated that it was easy to get the Smart-PTSL application (**Fig. 7**). For the free version, you only need to have an internet connection and Google account, this

application can be downloaded through the Google Play Store and Apple Store, and is used offline by installing using the APK version.

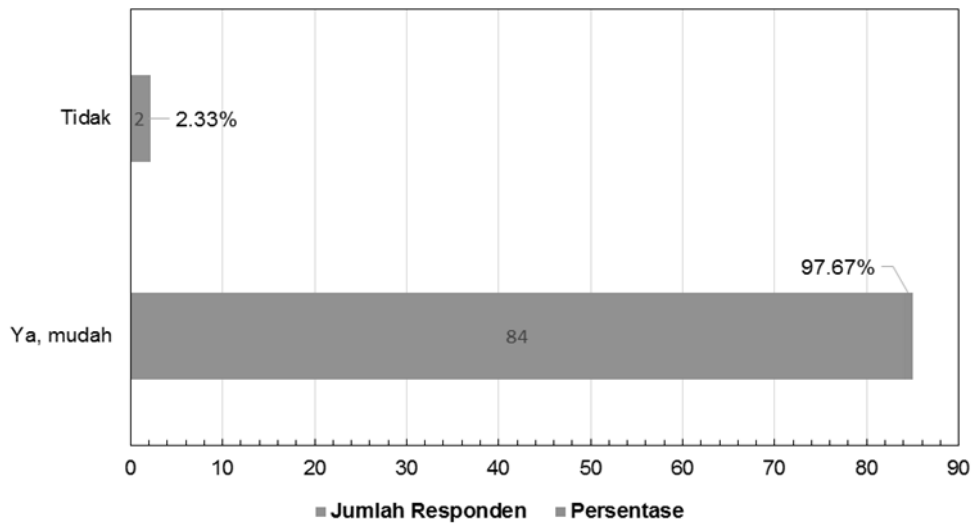


Figure 7. How easy to get The Smart-PTSL

From the available data, the majority of respondents (95.35%) get the PTSL Smart application through the Google Play Store, then (2.33%) through the Apple Store and for (1.33%) get this application via install offline (Fig. 8).

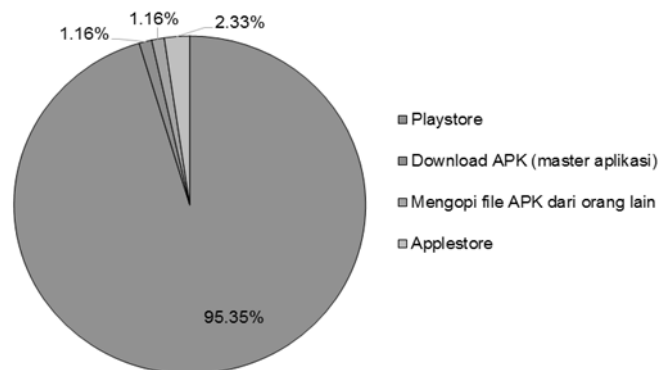


Figure 8. How respondents get The Smart-PTSL

If the parameter is changed to "paid version" then we can see the score obtained decreases (Fig. 9), which is equal to 291 from 430. Furthermore, for the price of this application in the opinion of the respondents it turned out to be diverse. But there are still unique people who choose and assume that this application is free.

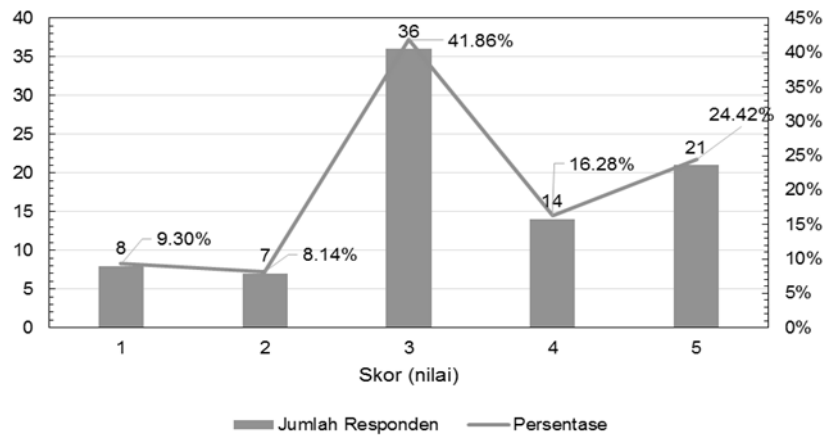


Figure 9. User responds for pricing policy

4.8. User Satisfaction

Scores for user satisfaction parameters reached a score of 350 out of a total of 430 (**Fig. 10**). This is a fairly high score considering that many similar free applications are spread on the Google Play Store and Apple Store. It can be concluded that the Smart-PTSL application received a very good response from respondents with evidence of their satisfaction with the use of this application.

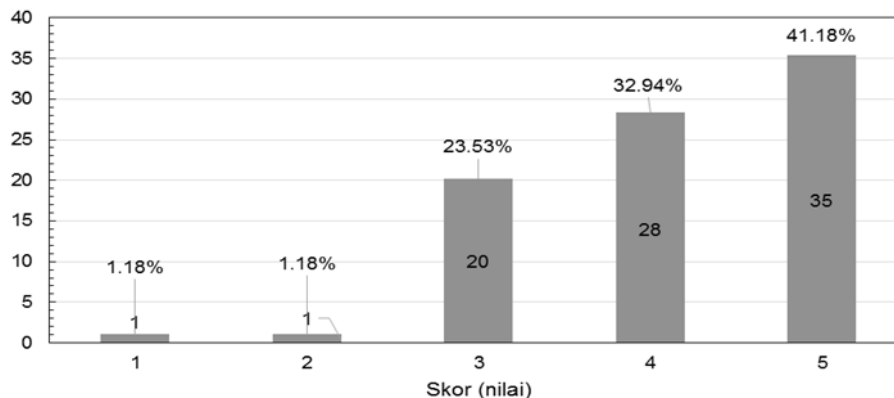


Figure 10. Users satisfaction

Finally, the willingness of respondents to recommend this application to the general public turned out to get a very good response too. There are (94.19%) respondents who want to recommend this application to anyone (relatives, extended family, coworkers, superiors, etc.).

Meanwhile, the amount of (3.49%) has not recommended to be shared with others and (2.33%) stated that they did not know. Apart from all of them, I hope this application will progress and develop along with the suggestions and criticism given.

5. CONCLUSIONS

To be summarized, the results show the evaluate of the users' needs for the designed application is very good in the integration of spatial data and textual data based on the requirement to help accelerate PTSL. They also say that the Smart-PTSL application is user friendly, and fulfilled their need to finish their work.

The Usability testing for Smart-PTSL involves respondents with various professions that are relevant to land registration work, as well as some people from ordinary society, this is intended to find out how easy and effective it is to support physical and juridical data collection in the land registration process. In this case it is indicated by a score of 4 (27.91%) and 5 (56.96%) which means user satisfaction with The Smart-PTSL ability to facilitate integration of physical and juridical data, and ease of working on administrative requirements in the land registration process, quite high with the accumulated numbers of scores 4 and 5 reached 84.87% of the total score.

In terms of user experience when operating The Smart-PTSL there are a number of things to note, that application performance is not too affected by the availability of internet access, and is quite easy in terms of use even in the case of people who have insufficient knowledge about mapping measurements, with debriefing before. This fact is quite an indication that Smart-PTSL is promising enough to be used as a tool to collect physical data and juridical data in a participatory manner by the community.

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BIOGRAPHICAL NOTES

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complete parcel-based map of Indonesia”.

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