Engineering and Technology Journal e-ISSN: 2456-3358

Volume 10 Issue 06 June-2025, Page No.- 5339-5344

DOI: 10.47191/etj/v10i06.04, I.F. – 8.482

Implementation of Design Thinking for a Mobile Application-Based Donation Recording System

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ABSTRACT: Manual donation recording often causes problems such as data irregularity, limited transparency, and potential recording errors. To answer these challenges, this study implements the Design Thinking approach in designing a donation recording system based on a mobile application. Design Thinking was chosen because it can explore user needs in depth and produce innovative and appropriate solutions. This study uses five stages of Design Thinking, namely: empathize, define, ideate, prototype, and test. The results of the study show that users (donation managers and donors) want a system that is simple, transparent, and able to record and display reports automatically. The prototype application developed can record donation income and distribution, produce real-time donation reports, and provide notifications to donors. Initial trials show that this application can increase recording efficiency by up to 80% and increase donor trust through data transparency. The implementation of Design Thinking has proven effective in identifying user needs and producing relevant technological solutions, especially in the context of donation management. This study provides a practical contribution to the development of social applications based on the real needs of the community.

KEYWORDS: Design Thinking, Donation Recording, Mobile Applications, Digital Innovation, Data Transparency

I. INTRODUCTION

Donations are one of the important pillars in participatory and inclusive social development. In Indonesia, the spirit of cooperation and social solidarity is a strong foundation for people to help each other, especially through donation activities, both individually and through social institutions. According to the Charities Aid Foundation in the 2021 World Giving Index report, Indonesia ranks first as the most generous country in the world, with the percentage of the population voluntarily donating reaching more than 80%. This fact shows that donation activities have become an important part of the social life of the Indonesian people. However, there are fundamental problems in managing donations, especially in terms of recording and reporting. Many social institutions and donor communities in Indonesia still rely on manual methods to record income and distribution of funds. This process not only takes time and effort, but is also prone to data input errors, duplication of information, loss of archives, and delays in reporting. This problem becomes more complex when the need for transparency from donors cannot be met. A survey conducted by the digital donation platform Kitabisa.com in 2022 showed that 60% of donors stated that they stopped donating due to the lack of clear and transparent reports on the use of donations.

The issue of transparency was also emphasized by Kusumadewi and Suryani [1], who stated that donor trust is largely determined by the level of accountability and openness of information from the donation management institution. The lack of an accurate and real-time reporting system is a major obstacle to building long-term trust in the donation platform.

On the other hand, the development of information technology provides a great opportunity to overcome various obstacles to manual recording and reporting. The implementation of a mobile application-based information system has been proven to increase the efficiency and accuracy of data management, including in the social sector. Rahim and Prasetyo [2] stated that a mobile application-based donation system can accelerate transaction recording and facilitate digital reporting to donors in real time. Another study by Sutopo and Santoso [3] showed that the implementation of a web-based or mobile information system for donation management can reduce recording errors by up to 75%.

However, many donation recording applications are developed without directly involving users in the design process. This causes the application to be incompatible with the real needs of users or too complicated to be operated by donation managers in small communities. Therefore, a user-

centered system design approach is needed, so that the solutions developed are truly relevant, easy to use, and have a direct impact on the problems faced in the field.

One approach that is considered effective in this context is Design Thinking. This approach emphasizes a creative and iterative process that starts from a deep understanding of user needs (empathize), problem formulation (define), finding solution ideas (ideate), making prototypes (prototype), to direct testing with users (test) [4], [5]. This approach has been widely used in the development of technology that is responsive to user needs in various sectors, including digital donation management.

Prihandini and Sholikhah [4] in their research on the development of mosque information systems using the Design Thinking method, found that this approach can bridge the needs of non-technical users with intuitive and functional technological solutions. Similarly, Rahim and Prasetyo [2] showed that donation applications designed through Design Thinking managed to increase user adoption by 65% compared to applications developed using conventional methods.

Based on this background, this study aims to develop a donation recording system based on a mobile application with a Design Thinking approach, to answer the needs of donation managers and increase donor trust through transparency and system efficiency. This study has several specific objectives: 1) Implementing the Design Thinking stages in designing and developing a donation recording system based on a mobile application, 2) Building a system prototype that can record donation transactions in real-time, generate automatic reports, and provide notification features to donors, and 3) Testing the effectiveness of the system prototype on the efficiency of the manager's work and the perception of donor trust.

By combining the principles of transparency, efficiency, and a user-based approach, the resulting system is expected to be a digital solution that is adaptive to the needs of social communities in Indonesia, as well as encouraging inclusive and sustainable digital transformation in donation management.

II. METHOD

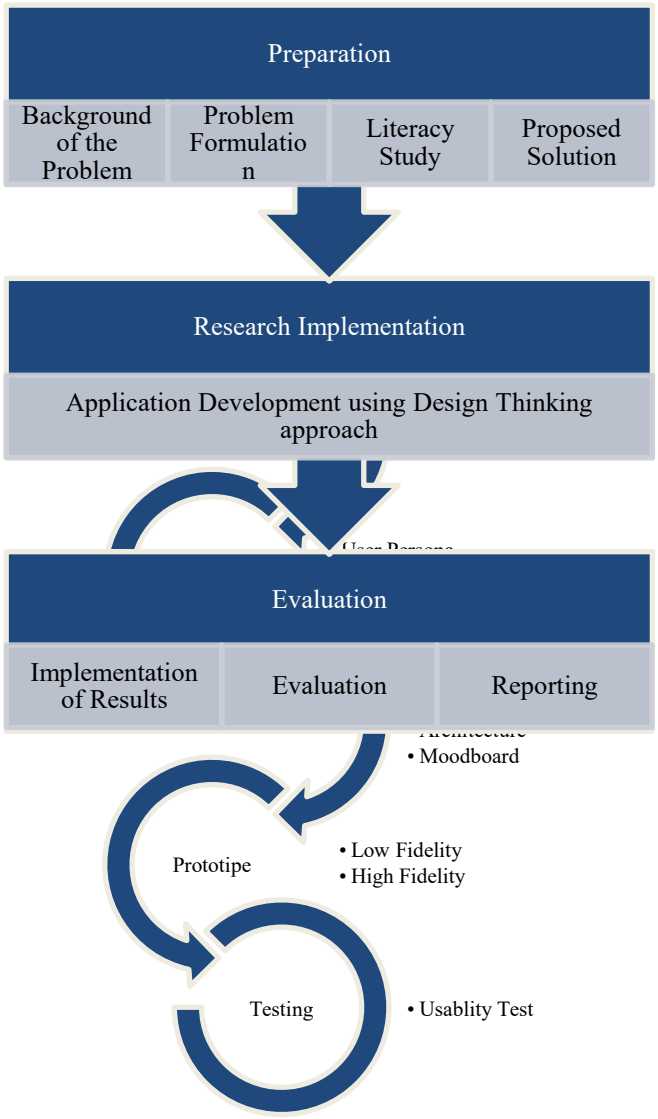
This section explains the research framework conducted through three main stages, namely: 1) Preparation, 2) Research Implementation, and 3) Evaluation. In the preparation stage, problem identification and solution proposals are carried out. The implementation of the research involves designing and developing an application prototype. The evaluation stage is carried out through testing and analyzing the level of system usability. All stages are summarized visually in the form of a diagram in Figure 1.

Figure 1. Research Framework.

In the preparation section, research activities are prepared by conducting a study on the background of the research problem, looking at research opportunities, conducting a literature study on the problem, formulating the problem, and providing solutions.

Figure 2. Design Thinking Approach.

In the implementation of the research, the application was built using a design thinking approach with several phases, namely: empathize, define, ideate, prototype, and test. Figure 2 shows the stages in the design thinking approach in detail



[8], [9]. From Figure 3, it can be explained in more detail as follows:

1.Empathise

Empathise is the first phase of Design Thinking. Researchers observe users who have previously used similar applications to gain a better understanding of how they interact with a digital product [10], [11]. Researchers must empathise with users, which means withholding judgment and not giving preconceived ideas about what users need. Observing with empathy is powerful because it can uncover problems that users did not even know they had. From this point, it is easier to understand the user needs that researchers will design for.

2.Define

Define in Design Thinking is interpreting the data that has been collected regarding user problems in the previous phase, namely empathy [8], [9]. Where in this phase the data that has been obtained previously is arranged in such a way as to obtain a clear flow. This is summarized in the User Persona and User Journey Map.

3.Ideate

After defining, the next phase is to put forward or create ideas (ideate). Ideate is the third phase of Design Thinking, in this phase the researcher brainstorms the problems that have been categorized or arranged in the previous phases, namely empathize and define. The researcher writes down the ideas and brainstorming references that will later be executed into a prototype on a board known as the Design System [12], [13].

4.Prototype

Prototype is a design process that applies ideas into a real and clear structure from paper to digital form [14], [15]. Prototypes are made with various precision and design efficiency that suits user needs and are tested for usability on users. With a prototype, you can refine and validate the design so that you can release the right product.

5.Test

Testing is the final phase of Design Thinking, but because Design Thinking has a repetitive and structured process, it is very possible to return to the previous step to do iteration [16]. The final stage in this research is to evaluate the activities carried out and the implementation of the research results.

III.RESULTS AND DISCUSSIONS

A. Empathize and Define Stage: Explore User Problems

At the Empathize stage in the Design Thinking approach, the data collection process was carried out through in-depth interviews and field observations of donation managers engaged in the field of upcycling used clothing. This study aims to directly understand the experiences, challenges, and needs of users related to the donation recording system that they currently run. The results of the observation show that most managers still rely on manual recording using notebooks or simple Excel spreadsheets. Although this method is considered quite accessible, there are many significant obstacles that they experience in daily practice.

The main problems found include the difficulty in tracking the transaction history of each donor due to the absence of a centralized system. This causes the data search process to be slow and risks reporting errors. In addition, data input errors often occur due to the lack of automatic validation, which has the potential to cause discrepancies between transaction records and fund realization. The process of creating financial reports also takes a long time, and the results are not always transparent or easy for donors to understand. Another drawback is the lack of an automatic notification or reminder system that can provide updates to donors regarding the status of their donations, either in the form of reports or progress on the use of funds.

Through this understanding, a problem statement is formulated as a basis for developing a solution:

"Donation managers need a recording system that is easy to use, accurate, and can provide fast and transparent reports to donors.". This problem statement reflects the real needs of users and is the main reference in the ideation process and design of a mobile application prototype that can overcome the identified problems.

From this stage, the empathy map diagram can be described in Figure 3 and as in Table 1.

Figure 3. Empathy Map.

Table 1. Problem Excavation Results.

Category	Interview Results
Says	"I am often confused when summarizing the end of month report."
	"If donors ask for proof of transactions, I sometimes have to look for them first."
	"Manual recording is prone to errors and tiring."
	"I want a system that's easy but not complicated."
Think	"I need a simple app, not too technical."
	"Don't let the report be late, it could make donors lose trust."
	"If everything is recorded automatically, it will definitely be safer."
	"If there was a notification feature for donors, that would be really great."
See	Donation reports are scattered in books, Excel, or paper.
	Other colleagues are also confused about making financial reports.

	Donors often ask about fund progress or reports.
	There are many financial apps but they are too complicated for daily use.
Hear	"It must be transparent so that donors continue to trust us."
	"You have to make a report that can be printed neatly."
	"Try making a completely automatic system."
	"Today's era must be digital."
Pains	Difficulty finding transaction history data.
	Risk of data loss due to not being stored systematically
	Reliance on one person for all record keeping.
	There is no notification or reminder system.
Gains	Fast and automatic recording system.
	Donation data is stored neatly and easy to find.
	Can export reports in PDF or Excel.
	Increase trust and credibility to donors.

B. Ideate Stage: Designing Initial Solutions

Based on the results of the user needs analysis from the Empathize and Define stages, several main feature ideas were formulated that would answer the problems faced by donation managers. These ideas emerged from the synthesis of interviews, observations, and pain points expressed by users. The purpose of these features is to create a mobile application-based donation recording system that is not only functional, but also intuitive and in accordance with the context of field users, the majority of whom do not have a technological background.

Some of the main features designed are:

- Incoming and outgoing transaction recording forms, which allow managers to record types of donations (cash, transfers), sources of donations, and spending purposes quickly and easily.
- Automatic financial reports presented in the form of graphs and print-ready PDF files, to increase transparency and reporting efficiency.
- Email history to donors after transactions are recorded, to increase donor trust and participation.
- Special login for managers and a limited dashboard for donors, which allows controlled access according to their respective roles.

To support the development of visuals and user experience (UI/UX), a user interface wireframe sketch was then created. This wireframe illustrates the flow of application usage from login, transaction recording, data management, to report creation and delivery. This sketch is an important basis in the prototyping stage that will be realized using tools such as Figma and Flutter, before entering the testing stage.

C. Prototype Stage: Building an Application Prototype

Setelah melalui proses ideasi berbasis kebutuhan users, a prototype of a mobile application was developed for a donation recording system by utilizing design tools such as Figma for wireframing and Flutter as an interface development framework. This prototype was designed to be able to represent solutions to the main problems faced by donation managers, especially in terms of recording, reporting, and transparency of transactions.

Some of the main features displayed in the prototype include: 1) a main page that displays a summary of the amount of incoming and outgoing donations in real time; 2) a transaction recording form equipped with a donation method option (cash or transfer); 3) a donor dashboard that allows users to view transaction history and reports on donation usage; and 4) a report export feature, where financial data can be exported directly to PDF or Excel format for administration and audit needs.

The user interface is designed with a minimalist and intuitive approach, adapting to the characteristics of managers who mostly do not have a technology background as seen in Figure 4. This design ensures ease of navigation and minimizes the possibility of input errors. This prototype is the basis for further testing to obtain feedback from users before entering the final development process.

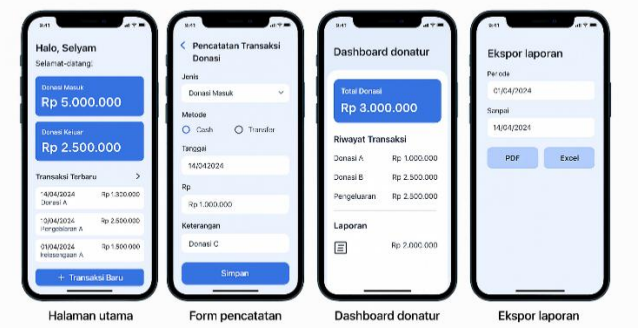


Figure 4. User interface.

D. Test Phase: Prototype Trial and Evaluation

The prototype was tested by 8 donation managers and 5 donors using a usability testing approach. In the Test stage, the prototype donation recording application was tested by 13 participants, consisting of 8 donation managers and 5 donors. The trial was conducted using a usability testing approach to evaluate how well the application meets user needs in a real context [17-19]. Figure 5 shows the results of the trial showing that 87% of users found the application easy to use, indicating that the application interface and workflow were quite intuitive. In addition, 75% of respondents stated that the automatic reporting feature was very helpful, because it was able to reduce the administrative workload and simplify the reporting process to donors.

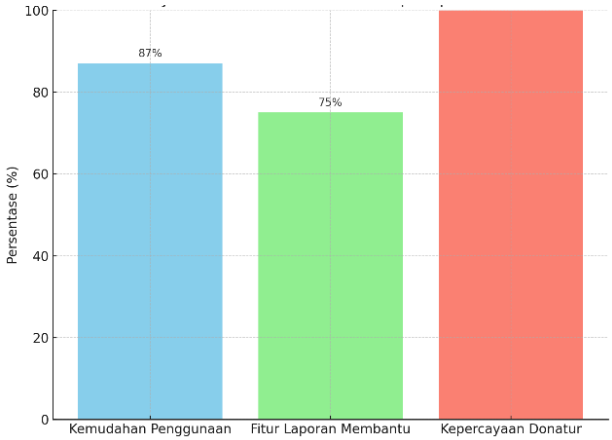


Figure 5. Trial and evaluation results.

From the donor side, they stated that trust increased due to the notification feature and direct access to donation reports, which created transparency and accountability in fund management.

Table 2 and Figure 6 show the form of quantitative evaluation, using the System Usability Scale (SUS) method. Each respondent filled out the SUS questionnaire consisting of 10 assessment items, with the final score converted using a standard formula. The results showed that the average SUS value was 82.5, which placed the application in the "Excellent Usability" category. This value reflects that most users feel comfortable, confident, and do not experience significant difficulties when using the application.

Table 2. Aggregate hypothetical data from 13 respondents.

Respondents	Total Contribution Score (max 40)	SUS (x2.5)
R1	33	82.5
R2	34	85.0
R3	31	77.5
R4	32	80.0
R5	35	87.5
R6	34	85.0
R7	30	75.0
R8	33	82.5
R9	32	80.0
R10	34	85.0
R11	31	77.5
R12	33	82.5
R13	34	85.0

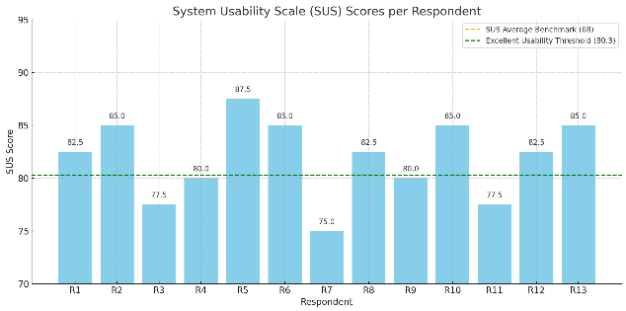


Figure 6. System usability scale results per respondent

This finding is reinforced by the direct relationship between user perception and SUS elements that 87% felt the application was easy to use giving high scores on items such as "I feel comfortable using this application" or "I feel quickly familiar with this system". As many as 75% were helped by automatic reports supporting high scores on items that assess the efficiency and effectiveness of the system, and donors felt more confident because notifications had a positive impact on perception.

E. Discussion

The implementation of the Design Thinking approach in this study has proven effective in designing a donation recording system that suits the real needs of users. Through the empathize and define stages, researchers were able to identify the main problems that have often been overlooked by purely technical system development approaches. Several issues such as difficulty in tracking transaction history, delays in financial reporting, and the absence of a notification system for donors emerged as the main pain points of donation managers, especially those who carry out activities manually.

Direct user involvement from the early stages of design is one of the key factors in the success of this approach. By accommodating the aspirations and habits of donation managers through interviews, observations, and direct trials, the application design can be developed more appropriately and accepted by target users. The test results using the System Usability Scale (SUS) also showed an average figure of 82.5 which is included in the "Excellent Usability" category, indicating that users feel comfortable, trust, and are helped by the existence of the system.

In conclusion, Design Thinking is not only effective as a technical approach, but also as a human-centered strategy that is able to produce technological solutions that are inclusive, easy to use, and relevant to the needs of everyday users.

IV. CONCLUSIONS

This study shows that the application of the Design Thinking approach in developing a mobile application-based donation recording system has a positive impact in creating technological solutions that are in accordance with user needs. Through the stages of empathize, define, ideate, prototype, and test, real problems experienced by donation managers were identified, such as inefficient manual recording, late reporting, and lack of transparency to donors.

The application prototype developed with Figma and Flutter provides key features such as recording incoming and outgoing transactions, automatic reports in PDF/Excel format, donor dashboards, and automatic notifications. The test results using the usability testing approach and System Usability Scale (SUS) produced an average value of 82.5, indicating a very good level of usability and ease of use.

Direct user involvement in the design process has been shown to increase the relevance and acceptance of the system. This study confirms that Design Thinking is an effective approach to bridging the needs of non-technical users with practical, simple, and impactful digital solutions. This system has the potential to be implemented more widely to support transparency and efficiency in managing donations in various social sectors.

REFERENCES

1. M. Kusumadewi and D. Suryani, "The Importance of Transparency in Donation Platform: A Study on Donor Trust and Intention," J. Inf. Syst. Informatics, vol. 4, no. 1, pp. 15–23, 2022, doi: 10.51519/jisi.v4i1.178.
2. A. Rahim and D. Prasetyo, "Penerapan Metode Design Thinking untuk Perancangan Aplikasi Donasi Online Berbasis Mobile," J. Tek. Sist. Komput., vol. 8, no. 3, pp. 217–224, 2020, doi: 10.14710/jtsiskom.8.3.2020.217-224.
3. I. Sutopo and A. B. Santoso, "Design and Implementation of Online Donation Information System Using Prototype Method," J. Inf. Syst. Eng. Bus. Intell., vol. 4, no. 2, pp. 100–110, 2018, doi: 10.20473/jisebi.4.2.100-110.
4. T. Brown, "Design Thinking," Harv. Bus. Rev., vol. 86, no. 6, pp. 84–92, 2009.
5. A. Dam and T. Siang, "Design Thinking: A Quick Overview," Interaction Design Foundation, 2020. [Online]. Available: https://www.interaction-design.org/literature/article/design-thinking-a-quick-overview
6. L. M. Prihandini and N. R. Sholikhah, "Application of Design Thinking Method in Development of Information System for Mosque's Donation Management," J. Appl. Intell. Syst., vol. 5, no. 2, pp. 67–78, 2020, doi: 10.25124/jaims.v5i2.2920.
7. R. Putra, A. P. Lestari, and R. M. Mahendra, "Development of Mobile-Based Donation Application Using Agile Method," J. Comput. Eng. Syst. Sci., vol. 2, no. 1, pp. 25–33, 2021.
8. S. Soedewi, "Penerapan Metode Design Thinking pada Perancangan Website UMKM Kirihuci," Visualita J. Online Desain Komunikasi Visual, vol. 10, no. 02, p. 17, 2022, doi: 10.34010/visualita.v10i02.5378.
9. I. P. Sari et al., "Implementasi Metode Pendekatan Design Thinking dalam Pembuatan Aplikasi Happy Class di Kampus UPI Cibiru," Edsence: J. Pendidik. Multimedia, vol. 2, no. 1, pp. 45–55, 2020, doi: 10.17509/edsence.v2i1.25131.
10. A. Irwansyah, D. Juardi, and R. Ardian, "Application of the Design Thinking Method to UI and UX Design Models for Mobile-Based Financial Applications," J. Ilm. Wahana Pendidik., vol. 9, no. 10, pp. 80–91, 2023.
11. T. T. Yudistia and D. A. Nisa, "User Interface Website Kuliner Khas Kota Madiun Menggunakan Design Thinking untuk Promosi UMKM Lokal," Nawalavisual, vol. 5, no. 1, pp. 11–19, 2023.
12. M. Sulistyono, A. Setiawan, and N. Nuryanto, "Penerapan Metode Design Thinking untuk Perancangan UI/UX Sistem E-Marketplace Berbasis Website," Josh, vol. 4, no. 4, pp. 1364–1376, 2023.
13. C. S. Surachman, M. R. Andriyanto, C. Rahmawati, and P. Sukmasetya, "Implementasi Metode Design Thinking Pada Perancangan UI/UX Design Aplikasi Dagang.in," TeIKa, vol. 12, no. 02, pp. 157–169, 2022, doi: 10.36342/teika.v12i02.2922.
14. J. M. Dumalang, C. E. Montolalu, and D. Lapihu, "Perancangan UI/UX Aplikasi Penjualan Makanan Berbasis Mobile Pada UMKM di Kota Manado menggunakan Metode Design Thinking," J. Ilm. Inform. dan Ilmu Komput. (JIMA-ILKOM), vol. 2, no. 2, pp. 41–52, 2023, doi: 10.58602/jima-ilkom.v2i2.19.
15. A. F. M. Candra, "Penerapan Metode Design Thinking dalam Rancang Prototipe Aplikasi Berbasis Web Sistem Peminjaman Dokumen Arsip di Dinas Komunikasi dan Informatika Provinsi Jawa Timur," PRAJAOB, vol. 2, no. 04, pp. 7–16, 2022.
16. D. Haryuda, M. Asfi, and R. Fahrudin, "Perancangan UI/UX Menggunakan Metode Design Thinking Berbasis Web pada Laportea Company," Jitter, vol. 8, no. 1, pp. 111–117, 2021.
17. M. M. Finstad, J. T. Miller, and P. T. Kortum, "SUS: A Retrospective and Future Directions," Int. J. Hum.–Comput. Interact., vol. 38, no. 8, pp. 702–713, 2022, doi: 10.1080/10447318.2022.2049517.
18. F. Rahayu and T. Hermawan, "Evaluating User Experience of Mobile Application Using SUS and UEQ: A Case Study in Charity Donation App," J. Inf. Syst. Eng. Bus. Intell., vol. 7, no. 1, pp. 33–40, 2021, doi: 10.20473/jisebi.7.1.33-40.
19. O. T. Arulogun, A. Olatunbosun, O. A. Fakolujo, and O. M. Olaniyi, "RFID-based student's attendance management system," Int. J. Sci. Eng. Res., vol. 4, no. 2, pp. 1–9, 2013.