

Android-based Marketplace Application for Surakarta Local Products

Nodas Constantine Baronio^{1)*}, Sri Yulianto Joko Prasetyo²⁾

^{1,2)}Informatics Engineering Study, Faculty of Information Technology,
Universitas Kristen Satya Wacana, Indonesia

¹⁾ 672019347@student.uksw.edu, ²⁾ sri.yulianto@uksw.edu

Submitted : Jul 31, 2023 | **Accepted** : Aug 2, 2023 | **Published** : Aug 3, 2023

Abstract: During the Covid-19 pandemic, many companies suffered losses, leading to a reduction in employees and adversely affecting the community's economy. A significant portion of the local economy depends on the sale of locally produced goods. Moreover, the rapid advancement of information technology has intensified business competition, further impacting the development of local products. Unfortunately, the potential of information technology, particularly Marketplace platforms, to boost the economy and facilitate transactions between customers and sellers has been overlooked. To address these issues, this research aims to develop a Marketplace application to assist the community in selling and promoting their locally made products. The research involves several stages, including analysis, design, simulation prototyping, implementation, monitoring, and management. The result of this study is an Android-based Marketplace application designed to support the sale of local products.

Keywords: Android; Helper Application; Local Product; Marketplace; Pandemic.

INTRODUCTION

During the Covid-19 pandemic, many companies experienced losses, leading to a reduction in employees, which had an impact on the community's economy. Numerous members of the community started creating local products that they subsequently sold. Some people sold food, beverages, handicraft products, and even livestock and pets. These local products were marketed through various platforms. However, there is currently no dedicated marketplace specifically selling local products in Surakarta. Many people faced challenges in promoting the items they wanted to sell. The existing buying and selling system using WhatsApp also proved to be less efficient. Additionally, potential buyers often lacked information about the quality of the products they intended to purchase. Furthermore, there was no suitable media to store transaction data.

Several application bases are available, including desktop, web-based, and mobile-based applications. Among these options, the mobile base is the easiest to use. Mobile-based applications are designed for small-sized communication devices that are portable and wireless (Prakarsya, 2019). Mobile applications are typically divided into two platforms: Android and iOS. Android, an open-source operating system, is widely used in mobile devices such as smartphones and tablets (Sari & Ali, 2019), making it easy to develop applications. Mobile applications offer unique user interfaces and interaction mechanisms provided by mobile platforms, allowing interoperability with online sources to access various information that is tailored to the mobile platform's capabilities. Mobile applications also offer

*Nodas Constantine Baronio



the possibility of permanent data storage within the platform (Jainuri et al., 2022). Considering that the majority of people use Android, it is the most compatible choice for this application.

Based on the existing background, this research aims to create an Android-based application that can be used by the Surakarta community for buying and selling transactions. People can easily sell their products, and potential buyers can purchase items conveniently from their respective mobile phones, as the application is based on Android and can be used anytime and anywhere without the need for a desktop. The transaction data will be directly stored in a database, making it easily retrievable when needed.

LITERATURE REVIEW

According to research entitled "Analysis and Design of Batak Souvenir Marketplace Application Based on Android" (Dame Hutauruk et al., 2017) who discusses the design of a marketplace application based on Android, where transactions are directly monitored by the marketplace, making the transactions more organized. With this application, all transactions related to buying and selling Batak souvenirs become easier and more organized, and the transaction data is stored in a database. The marketplace owner can also easily check daily or monthly reports. However, it should be noted that this research only covers the design phase, and the application has not been fully developed.

In the research titled "Build House: Marketplace Application for Building Material Sales Based on Android (Case Study: Building Store in Bali)" (Saleh Nasution, 2019) the design of a marketplace application with features such as ordering and chatting is discussed. The application is intended to improve consumer purchasing power through online channels, and it will also be based on the Android platform. The research highlights the use of Firebase for data storage, eliminating the need for developers to set up their own RESTful API.

According research titled "Android-based Auction Marketplace Application" focuses on developing a marketplace auction application for Android users (Victorian et al., 2019). The application allows users to buy and sell items through the auction system. It can store data on auctions, bids, and transactions conducted within the application. Moreover, the application facilitates the connection between multiple users during the auction and transaction processes.

This research is an extension of previous studies, focused on enhancing an existing application with advanced features. The primary aim is to provide buyers with personalized product recommendations, achieved through the implementation of sophisticated algorithms and data analysis techniques. All transactions are stored in the marketplace database managed by the administrator. The application focuses solely on local products available in Solo, contributing to the regional economy and fostering community-driven growth. By bridging the gap between buyers and sellers, this research seeks to revolutionize local commerce, opening up new possibilities for businesses and consumers alike.

Market Place

Marketplace is a new form of business that is rapidly developing within the context of the fast-evolving information technology infrastructure. The marketplace is designed to minimize business processes to create efficiency and effectiveness (Piranda et al., 2022). With the presence of a marketplace, everyone can transact easily, quickly, and affordably because there are no time and location constraints. Traditionally, the marketplace has played various roles, including facilitating trade and providing infrastructure for buying and selling. The performance metrics of a marketplace are determined by its ability to facilitate the buying and selling process, connect sellers and buyers, and provide the necessary infrastructure for transactions. Efficiency metrics are related to the pricing provided by the marketplace. While traditional markets require physical locations for sellers and buyers to meet, a marketplace relies on virtual facilities as the place for transactions.

A marketplace is an online business transaction platform that uses electronic tools to facilitate online transactions of goods, services, or information between buyers and sellers (Supranto, 1988). It can be understood as a platform that connects sellers and buyers in a more efficient and structured way compared to conventional markets. Through a marketplace, sellers can easily offer their products or services online, while buyers can purchase these items or services more easily and securely. Marketplaces often include features such as online payment systems, rating and review systems, and

*Nodas Constantine Baronio



This is a Creative Commons License This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

customer support, which help enhance security and convenience for users. In the rapidly advancing digital era, the marketplace has become a crucial platform for businesses and consumers (Furrer, 2002). Marketplace can also be understood as a platform for selling products using electronic devices that connect multiple sellers and buyers within an application and facilitate the buying and selling process (Apriadi & Saputra, 2017).

Local Product

Local products are goods produced or manufactured by local communities and sold to consumers. In Indonesia, local products come in various forms, such as handicrafts that can be used in daily activities or as decorations. They also include food and beverages that can be consumed directly or stored for a longer period. Local products are produced by local entrepreneurs, using raw materials sourced from the local area, and taking into account the needs and preferences of the local community (Tjiptono, 2014). Local products are items produced by local manufacturers using local raw materials and considering the needs of the local market, allowing them to compete with products from other regions or countries (Keller & Kotler, 2016). In this study, local products from Surakarta will be highlighted, including handmade crafts, food, and beverages produced by the local community themselves.

Android

The research utilizes Android as its operating system. Android is a Linux-based OS designed for smartphones and mobile devices, comprising a modified Linux kernel, middleware, and core applications. It is open-source, enabling developers to create their own applications (Pasaribu et al., 2019; Darwis, Ferico Octaviansyah, et al. 2020; Darwis et al., 2019). The application development is carried out using Android Studio, an official integrated development environment (IDE) specifically designed for Google Android OS (EMS, 2015). Android Studio serves as the official IDE for Android app development based on IntelliJ IDEA (Utomo et al., 2022). In essence, Android can be seen as software utilized on mobile devices, incorporating both the operating system and key applications released by Google. Android encompasses all aspects of applications, from the operating system to the app development process (A.S & Shalahuddin, 2018). Android Studio primarily employs the Java programming language to execute our created programs, which is an object-oriented language written in classes and methods (Firly, 2018).

METHOD

The method used in this research is divided into 4 stages, namely the first stage is Problem Formulation, the second stage is Literature Study, the third stage is System Design with the SDLC method, the fourth stage is Writing Research Reports.

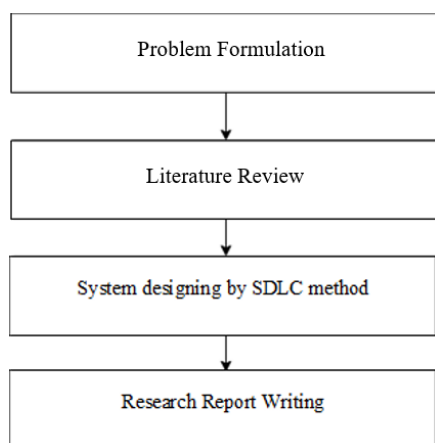


Fig. 1 Research Steps

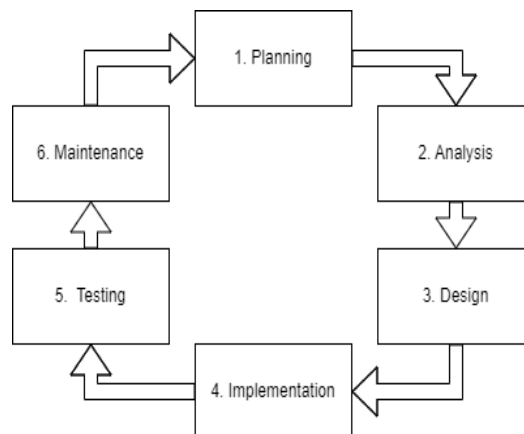


Fig. 2 SDLC (Software Development Life Cycle)

*Nodas Constantine Baronio



The first step is the formulation of the problem, namely the absence of a special place for people to sell the local products they make, which then becomes the basis for this research. The second step is a literature study on the use of information technology that can help solve this problem. The third step is system design based on the results of the needs analysis with the SDLC or Software Development Life Cycle method which consists of: Planning / what kind of system plan will be made, analysis / system analysis, system design will be like what / analyze system requirements by utilizing UML (Unified Modeling Language), namely by making Use Case Diagrams, implementation / application development stage, application testing which is used to check the application whether it is running well or not, maintenance / application maintenance.

The fourth step is writing a report on the results of the research, in this step a written documentation process is carried out from the initial steps of the research to the final stage of this research. In making UML design can be used to describe the work process that will occur in an application. Use Case Diagram can be seen in Figure 3:



Fig. 3 Use Case Diagram

It is evident from the above Figure 3 that the Marketplace application consists of two types of users: Admins and Users. Admins are responsible for managing the data within the application and have access to a special admin account for logging in. On the other hand, Users have the option to register a new account or log in if they already have one. Once logged in, Users can manage their accounts and view their details. Additionally, Users have the capability to purchase goods from other Users and access detailed information about the products available for sale.

*Nodas Constantine Baronio

RESULT

This research produces an Android application that can be accessed by all actors. This application can only be accessed by people who have this application.

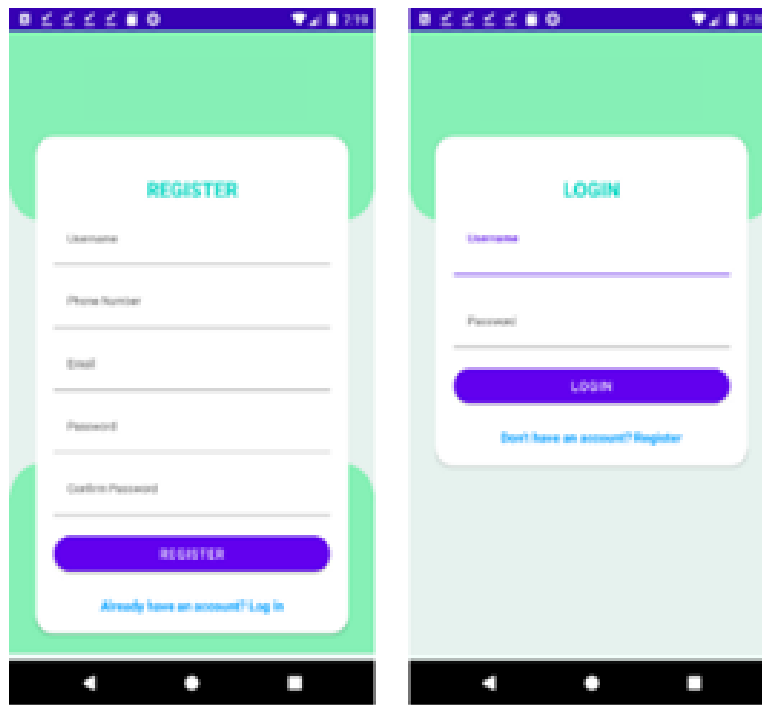


Fig. 4 Display of Register page (left) and Login page (right)

Figure 4 is the initial display of the Marketplace application. Here users can register or login. Here the user is required to enter the appropriate data. The data will be stored in the Realtime Database.

```

        if(!email.isEmpty() && Patterns.EMAIL_ADDRESS.matcher(email).matches() &&
password.length() >= 8 && password.equals(password2)){
            if(!password.isEmpty()){
                if (TextUtils.isEmpty(username)) {
                    username = mFirebaseDatabase.push().getKey();
                }
                User userData = new User( email,password, phone, username,money);
                mFirebaseDatabase.child(username).setValue(userData);
                Toast.makeText(MainActivity.this, R.string.error6,
                Toast.LENGTH_SHORT).show();
                Intent intent = new Intent(MainActivity.this , Login.class);
                startActivity(intent);
            }
        }
    }

```

Fig. 5 Program Code 1 Program Code for Register

*Nodas Constantine Baronio



This is a Creative Commons License This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

Program code 1 is a snippet of program code for Register where this program code will send the data inputted by the user into the database. The data sent concerns username, email, phone, password, and money. After successful submission, there will be a notification that the registration is successful, then it will enter the Login page.

```
Intent intent2 = new Intent(getApplicationContext(), Home.class);  
intent2.putExtra("username", usernameFromDB);  
intent2.putExtra("email", emailFromDB);  
intent2.putExtra("phone", phoneFromDB);  
intent2.putExtra("money", moneystring);  
startActivity(intent2); }
```

Fig. 6 Program Code 2 Program Code for Login

Program code 6 is a snippet of program code for Login where the program code will request the username and password entered by the user into the database. The data in the database will be matched with the data entered by the user if the data entered is the same, it will enter the home page.

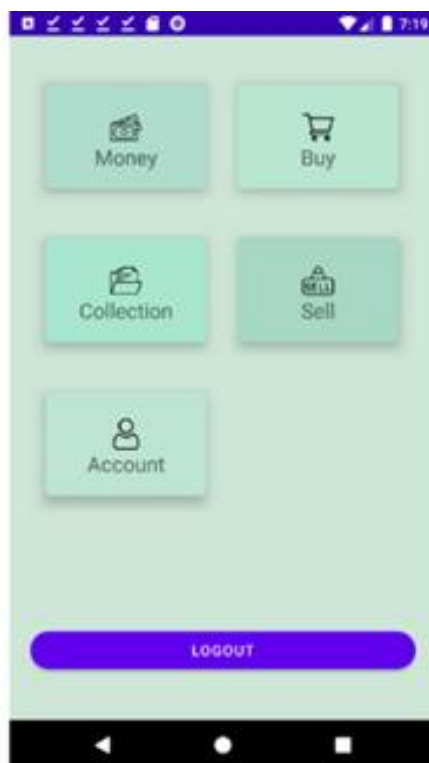


Fig. 7 Home page display

Figure 7 shows the home view of the Marketplace application. Here users can top up money by clicking the money box. Here users can also make purchases and sales. Users can also see what products are owned and sold. Users can also see the details of the account.

*Nodas Constantine Baronio



This is a Creative Commons License This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

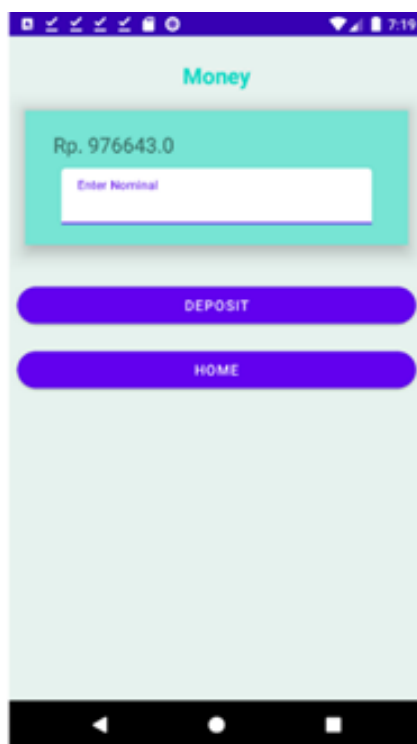


Fig. 8 Add Money Page

Figure 8 shows the Money view of the Marketplace application. Here users can top up money by inputting in the box with nominal numbers. Then the user clicks deposit to add money to the account. In the future, APIs from banks and virtual payments will be added so that they can be used to add money to the marketplace.

```
tombolisi.setOnClickListener(new View.OnClickListener() {  
    @Override  
    public void onClick(View view) {  
        if(!isiuang.getText().toString().isEmpty()){  
            double depositdouble =  
                Double.parseDouble(isiuang.getText().toString());  
            amount = angkakoma + depositdouble;  
            mFirebaseDatabase.child(Username).child("money")  
                .setValue(amount);  
            jumlauang.setText("Rp. "+Double.toString(amount));  
        } else{  
            isiuang.setError(getText(R.string.error4));  
        }  
    }  
}
```

Fig. 9 Program Code 3 Program Code for Adding Money

*Nodas Constantine Baronio



This is a Creative Commons License This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

Program code 3 is a snippet of program code for adding money where the program code will send user input to the database. The money data in the database will change according to the data inputted by the user.

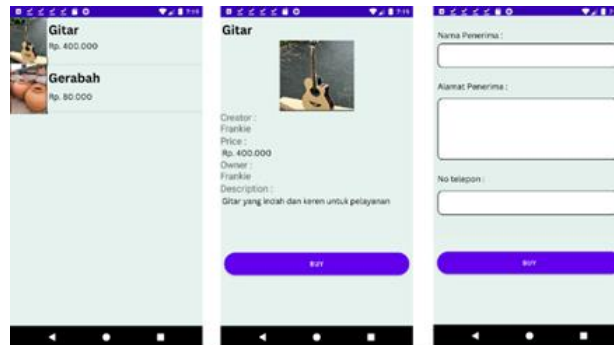


Fig. 10 Market, Product Detail and Purchase Process Page Views

Figure 10 is a Market view of the Marketplace application. Here users can see what items are sold by the community and users can see the details of the items to be sold. Users can also directly make purchases on the page. The data entered will be sent to the seller.

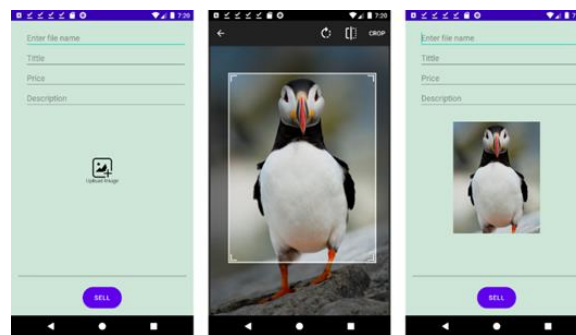


Fig. 11 Sales Page and Image Cropping Process

Figure 11 shows the Sales display and image cropping process of the Marketplace application. Here the community can upload images and determine the price and name of the product to be sold. The picture above is only an example.

```
upload = findViewById(R.id.uploadgambar);
Intent intent = getIntent();
Username = intent.getStringExtra("username");
mStorageRef = FirebaseStorage.getInstance().getReference("uploads");
mDatabaseRef = FirebaseDatabase.getInstance().getReference("Item");
```

Fig. 12 Program Code 4 Program Code for Uploading Images to the Database

Program code 4 is a snippet of program code for uploading images where the program code will send user image input into the database.

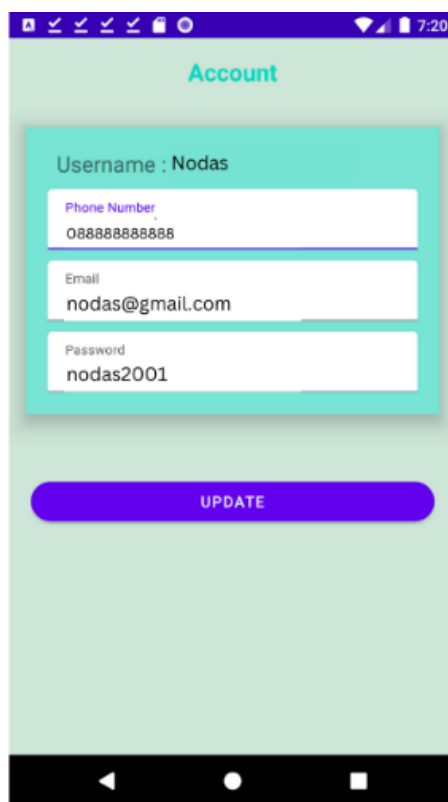


Fig. 13 Account page

Figure 13 shows the account view of the Marketplace application. Here the user can change the phone number, email address and password. Data will be updated directly in the database.

```
btnChange.setOnClickListener(new View.OnClickListener() {
    @Override
    public void onClick(View view) {
        if (Patterns.EMAIL_ADDRESS.matcher(email.getText().toString()).matches() &&
            !email.getText().toString().isEmpty() &&
            !nomor.getText().toString().isEmpty() ){
            mFirebaseDatabase.child(Username).child("phone").setValue(nomor.getText()
                .toString());
            mFirebaseDatabase.child(Username).child("email").setValue(email.getText()
                .toString());
            mFirebaseDatabase.child(Username).child("password")
                .setValue(password.getText().toString());
        }
    }
});
```

Fig. 14 Program code 5 Program code to update user data

Program code 5 is a snippet of program code for updating user data where the program code will send user input to the database. Data in the database will automatically change.

*Nodas Constantine Baronio



DISCUSSION

Application testing is done in 2 ways, namely by black box testing by the author and also Beta tests by users. This black box testing tests software in terms of functional specifications rather than testing design and code to ensure that the functions, inputs, and outputs of the software meet the required specifications (Cholifah et al., 2018). It is the most widely used method for identifying test cases. The main reason is to analyze the features included in the system to determine whether these features have the expected or desired performance (Rahmansyah & Darwis, 2020); (Darwis, Surahman, et al., 2020); (Lestari & Darwis, 2019); (Sulistiani et al., 2020). This method is done so that the author can find out what the application lacks and can be applied in the application when the application will be released. The results of black box testing are as below.

Table 1
Black box testing table

No	Modules tested	Input data/Conditions	Test Result	Status
1	Login	Form Filling: True Form Filling: Wrong	Enter the home page Message appears login failed	Valid Valid
2	Register	Form Filling	Go to the login page and a successful registration message appears	Valid
3	Home	Click money Click buy Click collection Click Sell Click Account Click Logout	Display the money page Display the market page Display the collection page Display the sales page Displays the account page Go to the login page	Valid Valid Valid Valid Valid
4	Money	Click Deposit Click Home	The amount of money increases as inputted Return to the home page	Valid Valid
5	Buy	Click Image Click Buy Form Filling	The amount of money increases as inputted Return to the home page	Valid Valid Valid
6	Collection	Click Image	Display the product details page	Valid
7	Sell	Form Filling + Image Upload	Enter the image upload page and crop the image	Valid
8	Account	Replacement of form content	An updated data message appears	Valid

Based on the tests carried out above, all functions in the marketplace application are valid. Therefore, it can be concluded that the application works as expected.

Beta application testing is carried out by people who have local products by installing the application on their respective android phones and filling out the forms that have been provided. The following are the test results from several people who use it.

*Nodas Constantine Baronio



Table 2
Beta Testing Table

Testing Questions	Number of Respondents				
	Strongly Agree	Agree	Enough	Less Agree	Disagree
Does this app help in selling local products?	15	4	5	2	1
Does it make it easier to sell local products?	16	4	4	3	0
Is this application easy to use?	13	6	6	1	1
Are the inputted results appropriate?	17	5	4	1	0
Is the display of this application easy to understand?	14	4	7	2	1
Can this application be used by ordinary people?	12	6	4	3	2
Can this application support sales?	18	5	4	0	0

Based on the tests that have been carried out and several questions given to the community, it can be concluded that the Marketplace application is easy to use even for lay people, the display is easy to understand, the inputted results are also appropriate. This application is useful for supporting the sale of local products by the community.

CONCLUSION

The research concludes that the Local Product Marketplace Application, developed using Java Android as its base, has successfully utilized various Android application features. The test results demonstrate the application's positive impact on the community, effectively facilitating the sale of locally-made products. Users have found significant assistance through this platform, gaining access to a diverse range of local products available in Surakarta. Furthermore, the application has contributed to fostering a stronger sense of community among the people in Surakarta.

Suggestions for improving the application involve the integration of map functionalities that seamlessly interface with Google Maps, thereby affording users access to location-based information. Furthermore, the inclusion of a chat feature would facilitate direct communication between buyers and sellers, enabling the convenient initiation of product-related inquiries within the confines of the application.

REFERENCES

- A.S, R., & Shalahuddin, M. (2018). *Rekayasa Perangkat Lunak Terstruktur dan Berorientasi Objek*. Bandung : Informatika. In *Pilar Nusa Mandiri*.
- Apriadi, D., & Saputra, A. Y. (2017). E-Commerce Berbasis Marketplace Dalam Upaya Mempersingkat Distribusi Penjualan Hasil Pertanian. *Jurnal RESTI (Rekayasa Sistem Dan Teknologi Informasi)*, 1(2). <https://doi.org/10.29207/resti.v1i2.36>
- Cholifah, W. N., Yulianingsih, Y., & Sagita, S. M. (2018). Pengujian Black Box Testing pada Aplikasi Action & Strategy Berbasis Android dengan Teknologi Phonegap. *STRING (Satuan Tulisan Riset Dan Inovasi Teknologi)*, 3(2). <https://doi.org/10.30998/string.v3i2.3048>
- Dame Hutauruk, B., Febrianus Naibaho, J., & Rumahorbo, B. (2017). Analisis Dan Perancangan

*Nodas Constantine Baronio



This is a Creative Commons License This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

- Aplikasi Marketplace Cinderamata Khas Batak Berbasis Android. In *Jurnal METHODIKA* (Vol. 3, Issue 1).
- Darwis, D., Ferico Octaviansyah, A., Sulistiani, H., & Putra, R. (2020). Aplikasi Sistem Informasi Geografis Pencarian Puskesmas Di Kabupaten Lampung Timur. *Jurnal Komputer Dan Informatika*, 15(1).
- Darwis, D., Pasaribu, A. F., & Surahman, A. (2019). Sistem Pencarian Lokasi Bengkel Mobil Resmi Menggunakan Teknik Pengolahan Suara Dan Pemrosesan Bahasa Alami. *Jurnal Teknoinfo*, 13(2). <https://doi.org/10.33365/jti.v13i2.291>
- Darwis, D., Surahman, A., & Anwar, M. K. (2020). Aplikasi Layanan Pengaduan Siswa di SMA Muhammadiyah 1 Sekampung Udik. *Jurnal Pengabdian Kepada Masyarakat (JPKM) TABIKPUN*, 1(1). <https://doi.org/10.23960/jpkmt.v1i1.10>
- EMS, T. (2015). Pemrograman Android dalam Sehari. In *PT Elex Media Komputindo*.
- Firly, N. (2018). Create Your Own Android Application. In *Create Your Own Android Application*.
- Furrer, O. (2002). Driving Customer Equity: How Customer Lifetime Value Is Reshaping Corporate Strategy. In *International Journal of Service Industry Management* (Vol. 13, Issue 1). <https://doi.org/10.1108/ijsim.2002.13.1.107.1>
- Jainuri, ., Nurasih, ., & Hermilasari, Y. (2022). Perancangan Dan Pembuatan Aplikasi Mobile Point Of Sale Pada Outlet Makaroni Judes Berbasis Android. *Insan Pembangunan Sistem Informasi Dan Komputer (IPSIKOM)*, 9(2). <https://doi.org/10.58217/ipsikom.v9i2.201>
- Keller, K. L., & Kotler, P. (2016). Marketing management. 14th. global edition. K. Keller, *Marketing Management 15th Global Edition*. London: Pearson Education.
- Lestari, P., & Darwis, D. (2019). Komparasi Metode Economic Order Quantity Dan Just in Time Terhadap Efisiensi Biaya Persediaan. *Jurnal Akuntansi* , 7(1)(1).
- Pasaribu, A. F. O., Darwis, D., Irawan, A., & Surahman, A. (2019). Sistem Informasi Geografis Untuk Pencarian Lokasi Bengkel Mobil Di Wilayah Kota Bandar Lampung. *Jurnal Tekno Kompak*, 13(2). <https://doi.org/10.33365/jtk.v13i2.323>
- Piranda, D. R., Sinaga, D. Z., & Putri, E. E. (2022). Online Marketing Strategy In Facebook Marketplace As A Digital Marketing Tool. *Journal of Humanities, Social Sciences and Business (JHSSB)*, 1(3), 1–8. <https://doi.org/10.55047/jhssb.v1i2.123>
- Prakarsya, A. (2019). Perangkat Lunak Permainan Untuk Mendeteksi Dominasi Perkembangan Otak Kanan Dan Otak Kiri Pada Anak Usia 4-5 Tahun Berbasis Android. *Seminar Nasional Hasil Penelitian Dan Pengabdian, IBI DARMAJAYA Bandar Lampung*, 127–134.
- Rahmansyah, A. I., & Darwis, D. (2020). Sistem Informasi Akuntansi Pengendalian Internal Terhadap Penjualan (Studi Kasus : CV. ANUGRAH PS). *Jurnal Teknologi Dan Sistem Informasi*, 1(2). <https://doi.org/10.33365/jtsi.v1i2.388>
- Saleh Nasution, R. (2019). Bangun Rumah: Aplikasi Marketplace untuk Penjualan Bahan Bangunan Berbasis Android (Studi Kasus: Toko Bangunan Bali). *Oktober*, 2(5), 2655–2755.
- Sari, Y. P., & Ali, R. (2019). Implementasi Sistem Pelaporan Sarana Dan Prasarana Kegiatan Belajar Mengajar Berbasis Android (Studi Kasus : Institut Informatika Dan Bisnis Darmajaya). *Jurnal Informatika*, 19(1), 47–53. <https://doi.org/10.30873/ji.v19i1.1500>
- Sulistiani, H., Darwis, D., Silaen, D. S. M., & Marlyna, D. (2020). Pengembangan media pembelajaran akuntansi berbasis multimedia (studi kasus : sma bina mulya gading rejo, Pringsewu). *Jurnal Komputer Dan Informatika*, 15(1).
- Supranto, J. (1988). Riset Operasi : Untuk Pengambilan Keputusan. *Universitas Indonesia Press, Jakarta*.
- Tjiptono, F. (2014). Pemasaran Jasa : Prinsip, Penerapan, Penelitian. In *Penerbit Erlangga*.
- Utomo, Y. T., Rostianingsih, S., & Santoso, L. W. (2022). Aplikasi Marketplace Vendor Lamaran dan Pernikahan berbasis Android. *Jurnal Infra*.
- Victorian, B., Putra, M., Dewi, L. P., & Purbowo, A. N. (2019). Aplikasi Marketplace Lelang Berbasis Android. *Jurnal Infra*, 7(2), 81–87.