Key Features of Effective Database Management System Guidelines for Assisting *Asnaf* - Individuals in Need (GAIN)

Ahmad Munawar Ismail[*,1] Mohd Izhar Ariff Mohd Kashim[2] & Ahmad Sani Araby Abdul Alim Araby[3]

[1]Research Centre for Theology and Philosophy, Faculty of Islamic Studies, Universiti Kebangsaan Malaysia (UKM), 43600 UKM Bangi, Selangor, Malaysia.

[2]Research Centre for Contemporary Fiqh and Islamic Compliance, Faculty of Islamic Studies, Universiti Kebangsaan Malaysia (UKM), 43600 UKM Bangi, Selangor, Malaysia.

[3]Consultative Council of Islamic Organizations of Malaysia (MAPIM) Wisma MAPIM Malaysia, 43700 Bandar Bukit Mahkota, Selangor, Malaysia.

*Corresponding Author; email: munawar@ukm.edu.my

ABSTRACT

The use of mobile smartphone applications has been proven to enhance management efficiency and holds significant potential for widespread adoption in the administration of data related to individuals in need within this country which known as asnaf. The implementation of a systematic and effective database management system enables better organization of asnaf data, helping NGOs efficiently identify and support those in need through mobile smartphone technology. Therefore, this study identifies the factors involved in determining the features of a database management system application specifically designed for the storage of data on individuals in need and develops a guideline for the effective features of such applications. This study employs a qualitative research design. A total of 12 participants from 8 NGOs/agencies were interviewed using semi-structured interviews. The analysis of the study's findings using ATLAS.ti software had identified six factors that influence the determination of database management system application features that can drive the effectiveness of NGO and government agency management in systematically handling data for individuals in need. These factors include the application's objectives and requirements, system functionality, data security assurance, application or system costs, system maintenance, and user manuals and instructions. The implications of this study have resulted in the development of an effective data management system application guideline, the Database Management System Guidelines for Asnaf - Individuals in Need (GAIN), as a reference for NGOs/agencies involved in providing support to those in need.

Keywords: Data management; guidelines; asnaf; smartphone applications; social works

ABSTRAK

Penggunaan teknologi telefon pintar dalam pengurusan data telah terbukti berupaya meningkatkan kecekapan pentadbiran serta berpotensi untuk diterapkan secara meluas dalam sistem pengurusan maklumat berkaitan individu yang memerlukan bantuan iaitu asnaf di negara ini. Pelaksanaan sistem pengurusan pangkalan data yang sistematik dan effektif membolehkan penyusunan data asnaf dilakukan dengan lebih teratur serta membantu NGO mengenal pasti dan menyokong golongan yang memerlukan dengan lebih efisien melalui teknologi telefon pintar. Sehubungan itu, kajian ini bertujuan mengenal pasti faktor-faktor utama yang menentukan ciri-ciri kritikal sistem pengurusan pangkalan data yang dikhususkan untuk penyimpanan maklumat individu dalam kategori ini serta merangka garis panduan bagi pembangunan aplikasi yang efektif dalam konteks tersebut. Kajian ini menggunakan reka bentuk penyelidikan kualitatif dengan kaedah temu bual separa berstruktur yang melibatkan 12 informan daripada lapan badan bukan kerajaan (NGO) dan agensi berkaitan. Dapatan kajian yang dianalisis menggunakan perisian ATLAS.ti telah mengenal pasti enam faktor utama yang mempengaruhi penentuan ciri-ciri sistem pengurusan pangkalan data, yang berupaya meningkatkan keberkesanan pengurusan maklumat secara sistematik dalam kalangan NGO dan agensi kerajaan. Faktor-faktor tersebut merangkumi objektif dan keperluan aplikasi, fungsi sistem, jaminan keselamatan data, kos pembangunan dan

operasi sistem, keperluan penyelenggaraan berkala, serta dokumentasi manual dan arahan penggunaan. Implikasi kajian ini telah membawa kepada pembangunan garis panduan komprehensif bagi aplikasi sistem pengurusan data yang berkesan, dikenali sebagai Database Management System Guidelines for Asnaf - Individuals in Need (GAIN), yang dapat dijadikan rujukan utama bagi NGO dan agensi berkaitan dalam usaha mereka menyampaikan bantuan secara lebih tersusun dan sistematik.

Kata kunci: Pengurusan data; garis panduan; asnaf; aplikasi telefon pintar; kerja sosial

INTRODUCTION

Mobile smartphones have been widely used worldwide and have become an essential necessity in various daily activities, enabling users to access information regardless of time and place (Md Jamil et al. 2019). Data from Statista (Statista Research Department 2025) 2024 revealed that there were 4.2 million smartphone users globally, with the percentage increase in smartphone users from 2016 to 2024 exceeding threefold. It is forecast that the numbers are continuously increase from 2024 to 2029 by the total of 1.8 billion users. Among the countries with the highest number of smartphone users are China, India, and the United States, which together account for 1.46 billion users. In Malaysia, the estimated number of smartphone users will continuously increasing between 2024 and 2029 by the total of 1.9 million users (Statista Research Department 2025). The statistics on the growth of smartphone users indicate that these devices not only serve as communication tools but also act as a sixth sense, constantly accompanying individuals as tools that can be utilised to facilitate various tasks and jobs.

In addition, smartphones are also known to operate within the concept of computer functionality due to their capacity to function like computer operating systems, thereby hosting a wide variety of applications based on user categories (Md Jamil et al. 2019; Sarwar & Soomro 2013; Wilmer et al. 2017). Shravanthi and Guruprasad (2014) state that the recorded use of applications on Android mobile smartphones has increased by 40%, with an average of 200 billion hours spent by users worldwide each month. The development of mobile smartphone applications differs from that of conventional applications, that shows the advancement of nowadays technology (Ismail et al. 2018). Various key features must be evaluated to create applications that are effective, useful, and user-friendly. In this regard, a high level of understanding of this technology is essential. Through this understanding, application developers can delve into each element of the technological functions and build applications that facilitate and assist individuals or organisations in performing tasks more efficiently while also reducing costs in work management and company operations (Wahid et al. 2017). Without a clear understanding, the features of any mobile smartphone application may fail to meet the desired objectives (Al-Shamaileh & Sutcliffe 2023).

The benefits of this technology can also be applied in the data management of *asnaf* - individuals in need by non-governmental organisations (NGOs) in Malaysia that receive donations, aids, and supports from government bodies, NGOs, or the public. One manifestation of this technology is the Database Management System (DBMS). The DBMS is a software that enables users to store, modify and retrieve information from a database. This software facilitates the efficient and centralised management of data and provides data access for application programmes. Furthermore, the DBMS acts as an interface between application programmes and physical data files. For instance, if an application programme is to be implemented to access a company's gross income data, the DBMS will locate this data within the database and transfer it to the application programme (Shende & Chapke 2015; Susanto & Meiryani 2019). This system also has a centralised location for all data and data descriptions, allowing the DBMS to facilitate general inquiries about the data. This function is referred to as query language. The use of query language can mitigate issues related to systems that previously required users to employ a fixed set of queries, particularly as the database application expands, which could pose significant problems for software management (Eze et al. 2014).

Although the DBMS has excellent functionality, it is also quite complex and can be challenging for users, as they can view all data simultaneously rather than just the specific data they need. This issue has been identified, and the DBMS provides an additional facility or new function known as the view mechanism. Through this mechanism, each user can customise their view of the database to represent a subset of the overall data, and this mechanism supports various external schemas of

the DBMS (Date 2005; Gunjal 2003). There are five main components within the DBMS, which are: hardware, software, data, procedures, and users or operators (Eze et al. 2014). The meanings and characteristics of these components are as follows:

1. Hardware

It is an electronic device within the computer that can be connected to a mobile phone. The database system operates through this hardware (Muslihudin et al. 2018).

2. Software

The DBMS software, along with database applications and operating systems, includes software for internet networks if the DBMS operates using an internet network.

3. Data

Data serves as the connection between hardware and software to the user or operator. Data consists of operational data (data obtained on a day-to-day basis) as well as metadata.

4. Procedures

Procedures consist of the instructions and rules involved in the design and use of the database. This also includes methods for logging into the system, creating backups, and managing hardware and software failures.

5. Users or Operators

Business analysts, database designers, data administrators, database administrators, application developers, and general users.

Database management systems have evolved in various ways over time to meet changing needs and advancements. These developments have led to continuous improvements in system functionality, making them increasingly sophisticated. Technological progress has played a key role in driving these enhancements (Praveen et al. 2017). There are six types of Database Management Systems (DBMS), each defined by its own function and management structure: Hierarchical DBMS, Network DBMS, Relational DBMS, Object-oriented DBMS, General-purpose DBMS and Distributed DBMS (Eze et al. 2014).

Among the six types of systems, Distributed DBMS (Distributed Database Management System) is a type of database that stores various data distributed across computer networks. This type is managed by a centralized system, where not all storage devices are connected to a central processing unit (CPU). It offers strong security features and centralized access (Eze et al. 2014). A widely used example of Distributed DBMS today is cloud-based systems (Shende & Chapke 2015). Cloud computing refers to the delivery of computing resources over the internet, enabling data storage in multiple locations without relying on personal hardware or software. Data stored can be retrieved via laptop, computer, tablet and even smartphone (Tiyagaraja & Yusof 2022). Cloud-based systems help reduce costs and simplify network operations, as third parties handle maintenance and offer database management services (Al Shehri 2013; Chen et al. 2016; Januzaj et al. 2015; Shende & Chapke 2015). Many well-known global companies now offer cloud services, such as Microsoft Azure, Google, Amazon EC2, GoGrid, Garantia Data, Mongo Lab, Odoo, Salesforce, and Rackspace (Januzaj et al. 2015; "Odoo Website" n.d.; Shende & Chapke 2015). These companies often provide two types of cloud service models: the first involves using a database on a virtual machine, and the second allows users to purchase an existing database service. The latter is easier to manage and provides a range of budget-friendly options (Januzaj et al. 2015).

Additional features of this system include security and privacy rights. This type of system provides unique data encryption keys specifically for authorized users. Additionally, any unauthorized access is immediately blocked. Remote handling via internet access also allows users the convenience of access regardless of time and location (Januzaj et al. 2015; Shende & Chapke 2015). The availability of mobile smartphone applications has proven to enhance work management efficiency and holds great potential for widespread use in data management systems for those in need within the country. Data management through mobile smartphones has led to the development of a system known as mobile cloud computing (Shravanthi & Guruprasad 2014). Currently, several mobile applications offer online services for managing data for those requiring assistance. These functions include tracking locations, providing information about these groups, recording data on aid recipients and documenting the assistance they have received.

These applications are available on the Google Play Store and Apple App Store.

While such applications have shown effectiveness, they are not without weaknesses and limitations, whether within the system or on the device itself. For example, the online system and e-Bantuan JKM application developed by the Department of Social Welfare (JKM) has reported technical weaknesses related to the application, website, and data management. Specifically, technical shortcomings in this application include inefficiency in handling the overall financial aid process and a focus limited mainly to data recording. Although it records data on aid recipients, the existing database is not updated and lacks integration. However, JKM has reviewed this issue and proposed several solutions to strengthen the current system (Syed Abd Rashid et al. 2017). Problems related to the information or data of those in need could be better managed with a systematic, effective database management system and cross-agency coordination in Malaysia (Wahid et al. 2009). Nevertheless, the effectiveness of a database management application depends on specific, accurate factors. Thus, this study aims to identify factors that determine the features of a database management application in smartphone apps specifically for storing *asnaf* data. Additionally, the study will produce a checklist of features for database management applications in smartphone as a guide for those involved in social work.

METHODOLOGY

The research design used is qualitative. Semi-structured interviews were conducted to collect data addressing the research objectives (Abdul Khalil et al. 2020). Each interview with study participants lasted between one and two hours per session. Purposeful random sampling was applied, taking into account specific factors such as knowledge, understanding, function, role and experience. The interviews conducted were digitally recorded (video) and then converted into written form through document transcription (Ismail & Stapa 2019). Each interview finding was thoroughly reviewed, and the researcher identified key themes and supporting themes based on the research questions using ATLAS.ti software, version 9.0.15.0. The recordings were transcribed word-for-word and translated into English by a bilingual researcher with expertise in qualitative research methods. The main themes focused on the factors determining effective Database Management System (DBMS) features to support management tasks for non-governmental organizations (NGOs) or government agencies and the supporting themes involved about sub factors under every main factors. Participants were selected based on initial criteria identified by the researcher to ensure the acquisition of relevant and sufficient information (Flick 2009). A total of 12 informants from eight NGOs were chosen as interview participants for this study. Participants were selected based on their roles and experience in social work in Malaysia, as well as their understanding of database management systems. Recommendations from NGOs management regarding participant selection were also considered. Table 1 below shows the details of the 12 informants, including their NGOs affiliation and gender.

TABLE 1. Study Participant Demographics

Participant Code	Gender	NGO/Agency
YAS	Male	Yayasan Afdlin Shauki
YM	Male	Yayasan Maghfirah
MV	1 Male, 1 Female	Malaysian Outreach Volunteer Experience (MOVE)
IC	Male	Pertubuhan Kebajikan Masyarakat Cakna Terengganu Darul Iman (Iman Care)
YIM	Male	Yayasan Ikram Malaysia
ZOT	2 Males, 1 Female	Lembaga Zakat Negeri Kedah
HH	Female	Sukarelawan Kemanusiaan MAPIM
MW	1 Male, 1 Female	Baitulmal MAIWP

RESULTS AND DISCUSSIONS

Based on the interview findings with 12 study participants, the analysis identified six main themes which are the key factors that determine the features of Database Management System (DBMS) applications in smartphone that can drive the effectiveness of non-governmental organizations (NGOs) and government agencies in systematically managing *asnaf* data. This study prioritizes a smartphone-based DBMS over other internet-connected devices due to its mobility, accessibility, and real-time data synchronization, which are essential for field operations. The integration of DBMS with a mobile application enables NGOs staffs and volunteers to efficiently search, update and manage *asnaf* data while conducting fieldwork in various locations. These factors were derived from the experiences and insights shared by each interview participant. The identified factors are application objectives and requirements, system functionality, data security assurance, application or system costs, system maintenance and user manual and documentation. The meaning and description of these six main factors are as follows.

OBJECTIVES AND REQUIREMENTS

Developing an application with a clear objective and usability features is a primary factor in ensuring the effectiveness of a mobile application. With well-defined objectives set by the app developers, users can utilize the downloaded application consistently and in alignment with their purposes (ISO 9241-11 2018). Developers should also conduct detailed research on the essential features of an application to avoid producing poorly designed apps. A poorly designed application not only risks being uninstalled by users but also receives negative reviews (Inukollu et al. 2014). For example, interviews with several NGOs and government agencies that use specialized applications and systems for managing aid and *asnaf* data revealed that these applications and systems possess distinct and clear objectives. This is illustrated in the following interview excerpt:

"…This system is for internal use only. It's used for processing funding applications for assistance. However, if you look at the information in the system, it shows the number of aid recipients reported. So, this data will be recorded so we know who we've provided assistance to—such as their name, address, and phone number. This makes it easier for us to follow up." (YIM).

This is also similar to the subject (MW), who mentioned that the objective of their existing application and system development is to receive reports on *asnaf*, organize data systematically and assist those requiring support. The interview excerpt is as follows:

"…Usually, one of the approaches used by the public is to report via social media platforms. Because of this, the management of related data can be disorganized, leading to issues like duplicate data, invalid data, and so on. There was no specific application used previously at MAIWP; they only used existing platforms (social media) to send reports about those in need." (MW)

"…We spread the word about this application to the public who need assistance." (MW)

Smartphone apps enable efficient data collection, real-time updates and streamlined communication, ensuring timely interventions. A smartphone-based Database Management System (DBMS) is ideal for first-line data gathering, allowing NGO volunteers to easily collect and input *asnaf* data (Dahunsi et al. 2021).

Additionally, another objective and requirement identified through this study is to enhance data transparency in areas such as aid distribution, collections and more. This objective was highlighted in an interview excerpt with a study participant (ZOT):

"…It's very helpful because top management decisions are now more data-driven. Previously, we couldn't support decisions with fast data. Now, every management and CEO decision is backed by quick and accurate data, facts, and information. That's what I see. All of this is achievable with a comprehensive DBMS." (ZOT)

Furthermore, this objective aligns with the recommendations and requirements of the management team (ZOT), as confirmed in the following excerpt:

"…Yes, indeed, the CEO's objective is to maintain transparency so that the data can be shown to everyone." (ZOT).

The ZOT app features allow users to access data on total zakat received and given over the years, with real-time updates available. The effectiveness of an application depends on its ability to meet system requirements (Browne 2014). Application usability can also be determined by its primary functions, which are essential for facilitating daily tasks. According to the Technology Acceptance Model (TAM), one of the elements evaluated is

perceived usefulness. This element was defined by Davis (1989), who wrote, "the degree to which a person believes that using a particular system would enhance his or her job performance." Therefore, an application that meets user needs will establish a positive relationship between the functionality and performance of the application or system.

An apps called, mHealth in China have a very clear objectives done for social works that provide guidelines, mental health support and access to professional resources for those in need (Chow et al. 2021). This is a good example of using technology (Samsudin et al. 2021) specifically the smartphone apps for social works related field. This will enhance the efficiency and equity of social work interventions, empowering vulnerable populations and promoting social development (International Federation of Social Workers 2014).

<center>SYSTEM FUNCTIONALITY</center>

Based on the interview findings, system functionality is one of the primary criteria used by NGOs to evaluate the effectiveness of database management applications for assisting *asnaf* under their care. The identified system functions can be categorized into several features: (1) the ability to track missing data, (2) real-time updates, (3) open access to the application, (4) transparency in showing NGO/agency performance, and (5) integrated data storage. Below is an interview excerpt related to the real-time update function, which helps demonstrate the performance and transparency of the NGO/agency:

"…Yes, it's in real-time. For example, if the CEO wants to go to Kg. Pisang Mosque, they can just open the ZOT system, zoom in on the mosque area, and see how much zakat aid has been distributed there. Let's say the mosque is collecting zakat fitrah—they can see the collection amount up to today or yesterday. Indirectly, they can show any mosque in the Baling district how Baling is one of the poorest districts. If anyone doubts, they can check the statistics showing that the aid distribution in Baling is higher than the zakat collection. These facts and data will support the CEO's presentation. So, with a structured DBMS, decisions can be made quickly, accurately, and supported with statistical data." (ZOT)

Additionally, the interview findings also revealed a system function within the application that helps record missing data. According to the subject (MW), Baitulmal receives reports from the public through the 'Mobile Jejak Asnaf' application known as MOJA, and they proceed with investigation and other processes before approving any application, as described below in Figure 1:
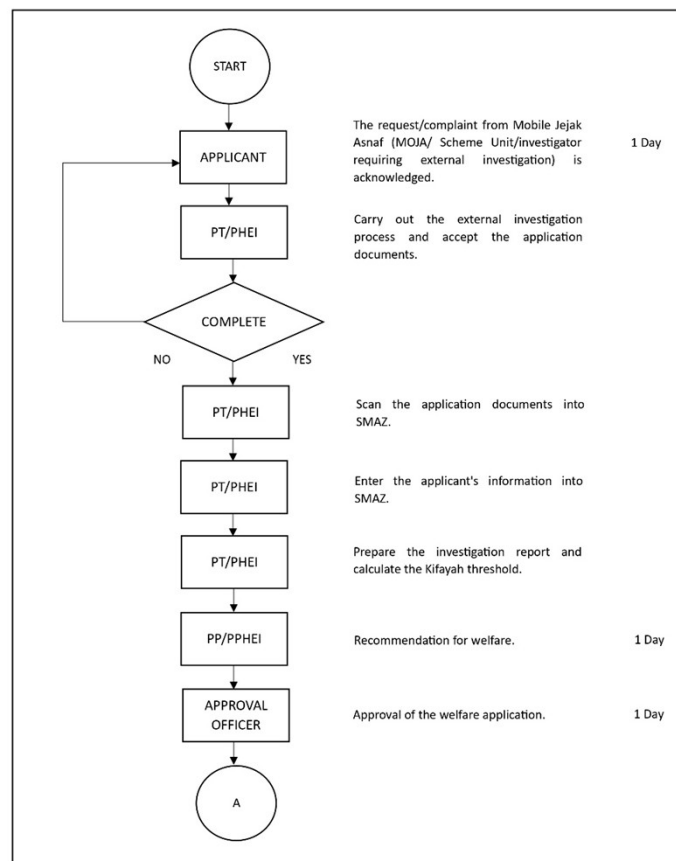

FIGURE 1. Flowchart of the Welfare Application Process Involving External Investigation
Source: Baitulmal MAIWP

In terms of application accessibility, application developers need to ensure that the level of accessibility is at a good standard. Failure by developers to make their applications accessible to the public and in demand will result in an increase in the number of applications that become neglected (Karanam et al. 2018). Therefore, it is the responsibility of the developers to take steps that will enhance the accessibility and marketability of the applications they develop. Furthermore, with millions of applications already developed, competition in this industry is something that cannot be taken lightly (Baktha 2017). This factor also plays a role in demonstrating the performance and transparency of NGOs or government agencies. This point was agreed upon by the study participants (ZOT), who stated in the excerpt:

"...Yes, indeed, the CEO's objective is to be transparent, so that the data can be shown to everyone." (ZOT).

In addition, setting the application to public settings greatly helps in increasing its visibility. Using the correct keywords in the search function has successfully found several applications developed to assist *asnaf*. This is closely related to the strategy of using precise keywords in search, known as App Store Optimization (ASO) (Baktha 2017). Meanwhile, the feature of integrated data storage across agencies or NGOs presents both advantages and challenges in its implementation. This statement was briefly commented on by a study participant (YM) in the following excerpt:

"...In my view, it can align or even overlap the data. Aligning it takes time, but overlapping, that can definitely happen." (3-YM).

At the same time, integrated data storage is also linked to the confidentiality of personal data to prevent data leakage to unauthorized parties, as stated by a study participant (MV):

"...But what I know is that when it comes to data, it is still personal and confidential. So it's quite difficult to collect data without having authority over it, especially data involving the public. For now, it's okay to do it manually. But if a hub is to be created, authority is needed to ensure that the data doesn't leak." (MV).

Another perspective was expressed by the subject (YIM), who briefly stated that integrated data collection can help prevent the duplication of welfare given by referring to the data collection center. Additionally, the subject urged that no

NGO should operate in isolation, as social welfare efforts must involve data sharing to obtain accurate information, avoid wasteful aid distribution and prevent the neglect of those *asnaf*. This explanation can be verified through the interview findings below:

"...If we have Big Data, it would be great for all of Malaysia, where all NGOs can use it to avoid duplicating giving welfare or aid. All NGOs can check and refer to this Big Data for information about recipients and the supports they've already received. This way, other NGOs can provide help to those who haven't received it yet. I'm in the NADMA group (National Disaster Agency) under the Prime Minister's Department (JPM). I suggested that NADMA establish a reference point for all NGOs so that aid distribution doesn't overlap. Right now, each organization keeps its own data, so there is no central reference. Everyone is afraid that their data will be used by others. Sometimes, we're a bit stingy. We have had collaborative experiences where they ask for our data, and we provide it, but they don't share theirs. In the end, we can't do the analysis. This is one attitude NGOs need to overcome. We need to change this mindset. We can't work individually. In social welfare work, data needs to be shared so the efforts don't get repeated, and we don't focus on just one area. We can't ignore the needs of other groups. For example, everyone wants to feed the homeless... This leads to waste. During Ramadan in Chow Kit, there's too much food, and those distributing aid have no data. So they just give out food randomly. We don't want it to be like that." (YIM).

DATA SECURITY ASSURANCE

The next factor identified as a key determinant of effective Database Management Systems (DBMS) characteristics is the assurance of data security (Flora et al. 2014). Several steps and methods were found in this study to ensure the data stored in applications or DBMS is secure. These include: (1) setting passwords, (2) creating backup files, (3) installing antivirus systems, (4) enforcing laws and (5) documenting system vulnerabilities. Most NGOs/government agencies using applications or DBMS have their own methods for ensuring the security of the data stored in their databases. The majority of the interview subjects mentioned that they create backup files, either in the form of document copies that are later printed or by making copies in their database management systems. Below is an excerpt from the interview with a participant who uses this method:

"...In addition, we also create backups using Excel. We just store it in documents. Every month, for the recipients of the welfare, we print it out and keep it as a hard copy." (YM)

The issue of data security and damage is something that the Information Technology Department in MAIWP are prepared for, in

anticipation of any possible events. "We store important data such as reports or personals known as Sahabat MAIWP, along with their details like Identification Card numbers, phone numbers, etc. We store all of this important data at the Public Sector Data Center (PDSA) located at the Prime Minister's Department (JPM) in Putrajaya. A little background on the PDSA: it houses 1,000 servers for 120 agencies, providing centralized services. Therefore, monitoring is handled by PDSA, as well as the management from MAIWP itself. We also have a Disaster Recovery Center (DRC) as a backup plan to ensure that operations run smoothly." (MW)

Additionally, a good system must also be equipped with antivirus software to ensure the safety of the data and the system, preventing disruptions that could lead to the loss of important data. The interview participant (ZOT) mentioned that the antivirus system they currently use is based on advice and guidance from the Ministry of Science, Technology, and Innovation (MOSTI) and the Malaysian Administrative Modernisation and Management Planning Unit (MAMPU), and through their research, they found that the type of antivirus used is easy to maintain:

"...So, from there, we took action to upgrade our antivirus software. Now we're using Malwarebytes. We got advice from MOSTI and MAMPU. After studying it, we found that this type is really easy to maintain. So, we decided to use it." (ZOT).

Some agencies have standard requirements regarding data security that must be adhered to, as acknowledged in the interview:

"...In the Information Technology Department, we have ISO standards or procedures we need to follow. We use the ICT Security Policy Circular. This policy includes clauses that must be followed, such as the act related to personal data protection, and many others." (ZOT).

Limiting or restricting access to view or manipulate data through the use of passwords is also an essential feature of data security in applications or database management systems, ensuring the confidentiality and safety of the data (Yuneline 2022). This feature can be applied regardless of the type of DBMS used by NGOs or government agencies. It can be considered a basic feature that must exist in any DBMS, whether the system is developed in-house or using an existing platform. The study participant (YM), who uses a DBMS provided by Google, mentioned that they use a special password to protect the security of their data and limit access

to certain staff only. By requiring credentials to view or manipulate data, organizations can uphold the confidentiality and integrity of their information. This was confirmed through the interview excerpt:

"...For example, when I was an operations staff member, I stored data of individuals in need using Google Sheets and set a password for it. Only staff could access it." (3-YM).

Additionally, there are DBMS systems used internally only, such as the one developed by the study participant (YIM), known as SPiB (i-Bantu Management System). However, they also use passwords and restrict certain functions within their DBMS. These restrictions are based on the roles assigned within their NGO. For instance, in the case of participant (YIM), only staff with managerial positions are allowed with full access to their system, as explained in this interview excerpt:

"...The person responsible for each zone manages the welfare. Each of them is authorized to use our system, but their levels of access are different. When they log into the system (showing the system interface), right now, as an administrator, my name appears. The same applies to them; when they log in, they'll be administrators but with different status. For example, I can view everything, make year selections and review past records." (YIM).

Password protection is often considered a basic, non-negotiable feature for any DBMS, as it forms the first line of defence against cyber threats. By employing this security measure, organizations not only comply with best practices in data management but also demonstrate their commitment to protecting the privacy and safety of their data. Therefore, ensuring the security of data, applications, and systems is crucial before launching any application to the public. It is recommended that developers conduct performance and security testing for the applications or systems they create to determine their effectiveness or functionality failures (Inukollu et al. 2014).

SYSTEM OR APPLICATION COSTS

The cost factor is closely related to all the other factors when considering the development or implementation of Database Management Systems (DBMS) (Florescu & Kossmann 2009). If an NGO or government agency desires the best functionality for their database management system, cost will undoubtedly be a key factor in determining this. This was acknowledged by the study participant (ZOT), as seen in the interview excerpt below:

"...When it comes to costs related to the IT department, there are two aspects: one is the system and the other is the infrastructure. We focus on the infrastructure, not the system part. In fact, other agencies don't emphasize IT because they're under pressure from these two costs: the system development cost and the infrastructure cost. So, when the cost is divided 50% for the system and 50% for infrastructure, the IT capabilities end up being quite limited. It can't be very advanced." (ZOT).

Furthermore, some subjects, particularly smaller NGOs, acknowledge that they do not need advanced database management systems. This is because they manage data for the *asnaf* on a small scale, and sometimes they do not even store data for recipients of donations under their management. This was shared by the study participant (IC) in the following excerpt:

"...That's actually necessary for NGOs or parties managing aid recipients who are involved in long-term monitoring, meaning they continuously track the same individuals. For example, a drug rehabilitation centre needs to monitor its participants until they are free from substance abuse and reintegrate into society. That's important. But for regular aid, the data can be collected, but there's no urgent need for the NGO to manage it. It can just be stored. That's my view on the necessity of that data." (IC).

The same point was raised by study participant (MV), who stated that they do not yet require an advanced DBMS because they only store data in a simple format:

"...So far, storage is still manageable, and there's no need to build a premium system. At MOVE, we only need something simple because we don't store huge data. Our NGO isn't like MAPIM, MAIWP, or Zakat, which store thousands of records and names. We don't have that. For example, for the Anakku program, we have 8 series, so there are 8 lists of names stored. That's it. It's that simple." (MV).

Additionally, the high cost of applications or database management systems (DBMS) has led some NGOs to delay their desire to use the best DBMS, as these NGOs are still small and do not have the necessary finances.

"...I really want to improve things, but if possible, we want to make it something simpler, a simpler process to collect the data we need from the country. But, at this point, since our organization is small and, as an NGO, we must remember that we don't have a lot of money, and based on what we have, we try to run the foundation as best as we can. If the DBMS is expensive, it's a burden for an NGO to afford a good one. So, we use what's available." (YAS).

Therefore, it is clear that the cost factor of applications or database management systems is indeed one of the key features in determining the sophistication of a DBMS for use. However, this factor also poses a challenge for smaller NGOs in acquiring the best DBMS. This decision is also determined by the specific needs of the NGO. Thus, it can also be related to the fact that the features of a DBMS required by any NGO or government agency vary depending on their needs, along with the budget available for upgrading applications or systems within a reasonable cost.

SYSTEM OR APPLICATION MAINTENANCE

The maintenance of applications or Database Management Systems (DBMS) can be defined through two objectives: the purpose of the maintenance and the frequency of the maintenance (Baktha 2017; Georgiou 2020; Inukollu et al. 2014; Roy et al. 2016). The purpose of maintenance and updating an application or system includes several factors: (1) security purposes, (2) compatibility with device operating systems and (3) regular and comprehensive maintenance based on received reports. The first purpose of maintenance is for the security of the application, system and related data. This is done to prevent their application or system from being hacked. Some NGOs or government agencies perform regular and periodic maintenance, based on damage reports received. For example, the study participant (ZOT) has a scheduled plan for updating their applications or systems. This was confirmed in the following interview excerpt:

"...We maintain internally. We have to comply with two ISOs, which include maintenance on a scale of twice a year for all ICT equipment and hardware, as well as maintenance based on reported damages. So, both of these covers comprehensive maintenance for the system and ICT hardware." (ZOT).

The frequency of application or system maintenance depends on the purpose and requirements. Most NGOs update their systems twice a year:

"...Yes, twice a year. According to the ICT security policy, it's only once. But we intentionally set it for twice a year." (ZOT).

"...The application update will be carried out at least twice within a year. This will be done on the main server at MAIWP, on Google Play and the App Store." (MW).

USER MANUALS AND EXPLANATIONS

Applications or systems are incomplete without having a user manual and further explanations. This is an essential feature for any application or Database Management Systems (DBMS). An effective user manual is one that helps users to understand clearly and in-depth the functions of the application and system, especially for those who are less familiar with information technology. Some NGOs also provide user manuals to facilitate both the users and the staff who manage the application or system.

"...Everything is provided with a manual and procedure so they won't be confused." (6-YIM).

"...There are explanations. We do it together... the staff shows us. Many people... They definitely give explanations." (8-HH).

With the effective use of user manuals, the objectives of using online applications or systems can be achieved. This is because the main purpose of creating online systems is to reduce human intervention, simplify the application or complaint processes and save time for those involved. The study participant (ZOT) shared that all of their systems have been digitized, and there is only one remaining, which is the welfare application system, still using a manual process where forms need to be filled out on paper. This is due to challenges related to the technology literacy of mosque community members and device issues among the disadvantaged.

However, the study participant (ZOT) mentioned that a solution will be implemented by making mosques a one-stop center for collecting forms electronically. The system that will be created is a collaboration with the Kedah State Religious Council. This initiative aims to facilitate data management and storage in a systematic way. From this, the management can make decisions and analyses quickly and accurately. However, the challenges that exist are not only related to technology literacy skills, but also infrastructure issues such as internet connectivity and the availability of smartphones. These challenges were explained by the participant in the following interview excerpt:

"...We can't blame those parties. Sometimes the facilities are just not enough. For example, many of the mosques in rural areas in Kedah, even if they buy smartphones, they have no use for them, they don't need WhatsApp and they're not streaming. The internet is another issue. But this is beyond our control because it's at the national level. If the internet coverage were as widespread as in Korea, this wouldn't be a constraint. It should have been solved already. I hope that not just IT skills but the facilities should also be reviewed."

From this, a guideline was developed as a reference for relevant parties to build or improve existing DBMS tailored to the needs of managing assistance and data for *asnaf* in Malaysia. This guideline is known as the Database Management System Guidelines for Assisting *Asnaf* - Individuals in Need (GAIN), which provides the framework for ensuring that the system is aligned with the unique needs of those managing aid and *asnaf* data. The guideline can be seen in the Figure 2 below, which illustrates the GAIN, outlining key features for effective data organization and support provision by NGOs.

```
┌─────────────────────────────────────────────────────────────────────┐
│  ╭─────────────────────────────╮                                       │
│  │ Factors Influencing the      │                                      │
│  │ Features of Data             │                                      │
│  │ Management System Application│                                      │
│  │ for the Individuals in Need  │                                      │
│  ╰─────────────────────────────╯                                       │
│           │                                                            │
│  ┌──────────────┐      • Tracking or reporting overlooked individuals  │
│  │ Objectives & │────► • Application for financial assistance.         │
│  │ Need         │      • Ensuring data transparency.                   │
│  └──────────────┘                                                      │
│                                                                        │
│  ┌──────────────┐      • Ability to track overlooked individuals in    │
│  │ System       │        need.                                         │
│  │ Function     │────► • real-time updates available.                  │
│  │              │      • Open access to the application.               │
│  │              │      • Able to display performance and transparency  │
│  │              │        of NGOs/agencies.                             │
│  │              │      • Integrated data storage.                      │
│  └──────────────┘                                                      │
│                                                                        │
│  ┌──────────────┐      • Setting up password.                         │
│  │ Data Security│      • Creating backup files.                       │
│  │ Assurance    │────► • Installing antivirus software.               │
│  │              │      • Law enforcement compliance.                  │
│  │              │      • Documenting system vulnerabilities.          │
│  └──────────────┘                                                      │
│                                                                        │
│  ┌──────────────┐      • Adhering to the needs of NGOs/agencies.      │
│  │ Application  │────► • Developing cost-saving strategies while       │
│  │ or System    │        prioritizing the functionality of the        │
│  │ Cost         │        application or system.                        │
│  └──────────────┘                                                      │
│                                                                        │
│  ┌──────────────┐      • Safety purposes.                            │
│  │ Application  │      • Compatibility of device operating systems.   │
│  │ or system    │────► • Scheduled and comprehensive maintenance      │
│  │ maintenance  │        based on received reports.                   │
│  └──────────────┘                                                      │
│                                                                        │
│  ┌──────────────┐      • Essential features of an application or      │
│  │ User Manual  │        system.                                      │
│  │ and          │────► • Assists individuals with limited digital     │
│  │ Description  │        literacy.                                    │
│  │              │      • Met the objectives of using online services. │
│  │              │      • Reducing time spent by parties involved.     │
│  └──────────────┘                                                      │
└─────────────────────────────────────────────────────────────────────┘
```
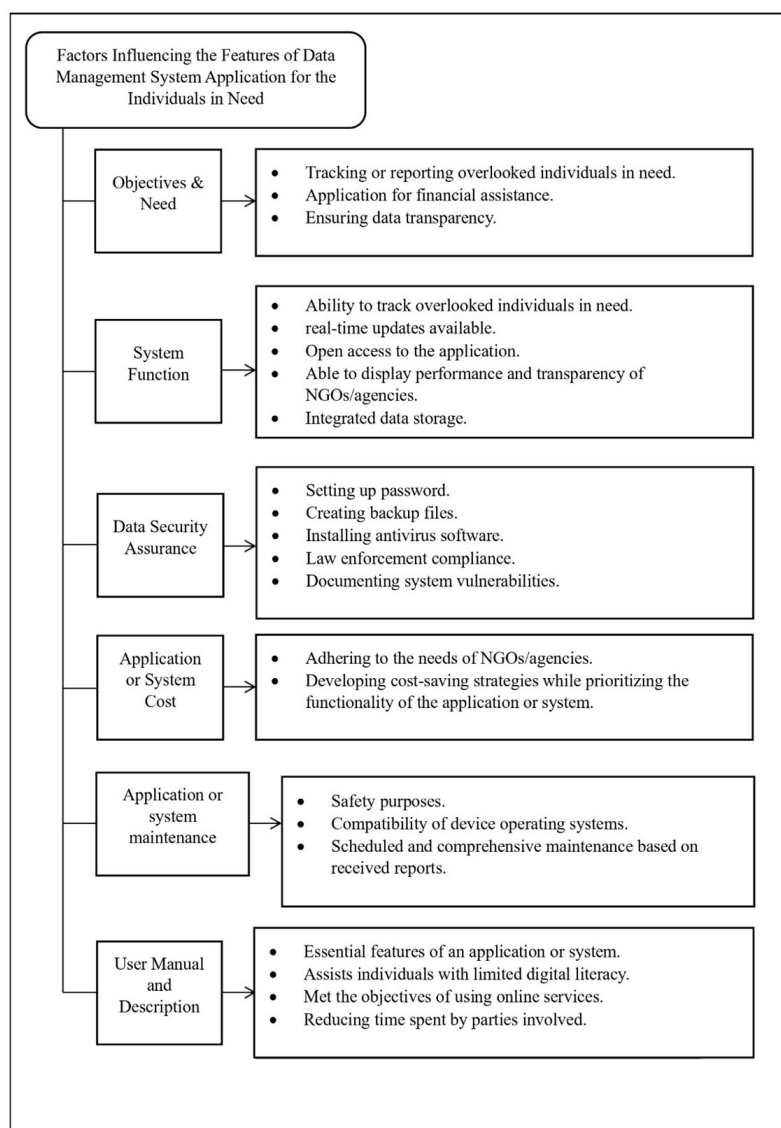
FIGURE 2. Database Management System Guidelines for Assisting Individuals in Need (GAIN)

CONCLUSION

The advancement of technology today has greatly benefited various industries worldwide. This is undeniable, as people now prefer things that are fast, simple, easy, and lightweight. Technology today adapts to the needs and desires of humans in performing daily tasks. Well-organized database management can also be implemented through the use of technology systems. Mobile smartphone applications are seen as a technological system capable of simplifying the management of data for the needy in Malaysia. However, application developers or NGOs/agencies must first ensure that the effectiveness of the application produced is at an excellent level, so that the objectives of the application can be achieved. The Database Management System Guidelines for Assisting *Asnaf* - Individuals in Need (GAIN), which outlines six determining factors for the necessary features in data management applications, will serve as a checklist for all data management applications for the *asnaf* in Malaysia. For future research, integrating artificial intelligence (AI) can enhance the database system, data security and transparency and ensuring trustworthy welfare management. The study of usability such as user feedback is also essential to improve the mobile application for fulfilling the purposes.

ACKNOWLEDGEMENT

AUTHORS' CONTRIBUTIONS

The author's contributions for the provided information are as follows: Conceptualization, Ahmad Munawar Ismail and Mohd Izhar Ariff Mohd Kashim.; Analysis and interpretation of research data, Ahmad Munawar Ismail.; writing—original draft preparation, Ahmad Munawar Ismail.; writing—review and editing, Ahmad Munawar Ismail and Mohd Izhar Ariff Mohd Kashim. All authors have read and agreed to the published version of the manuscript.

REFERENCE

Abdul Khalil, A., Hj. Othman, M. K., & Saidon, M. K. 2020. Memacu pendidikan di era revolusi Industri 4.0: Penerapan nilai-nilai Islam dan inovasi dalam pengajaran di institusi pengajian tinggi. *Islamiyyat* 42(Isu Khas): 13-20.

Al Shehri, W. 2013. Cloud database database as a service. *International Journal of Database Management Systems* 5(2): 1–12. https://doi.org/10.5121/ijdms.2013.5201

Baktha, K. 2017. Mobile application development: All the steps and guidelines for successful creation of mobile app: Case study. *International Journal of Computer Science and Mobile Computing* 6(9): 15–20.

Chen, H. Q., Xin, H. W., Teng, G. H., Meng, C. Y., Du, X. D., Mao, T. T., & Wang, C. 2016. Cloud-based data management system for automatic real-time data acquisition from large-scale laying-hen farms. *International Journal of Agricultural and Biological Engineering*. https://doi.org/10.3965/j.ijabe.20160904.2488

Chow, J. C. C., Elizabeth Pathak, L., & Yeh, S. T. 2021. Using mobile apps in social work behavioral health care service: The case for China. *International Social Work* 64(5): 689-701.

Dahunsi, F. M., Joseph, A. J., Sarumi, O. A., & Obe, O. O. 2021. Database management system for mobile crowdsourcing applications. *Nigerian Journal of Technology* 40(4): 713-727.

Date, C. J. 2005. Database in depth: Relational theory for practitioners. In J. Gennick (ed.). *O'Reilly Media, Inc.* https://doi.org/10.5860/choice.43-2248

Davis, F. D. 1989. Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly* 13(3): 319–340. https://doi.org/10.5962/bhl.title.33621

Eze, U. F., Etus, C., & Uzukwu, J. E. 2014. Database system concepts, implementations and organizations-A detailed survey. *International Journal of Scientific Engineering and Research (IJSER)* 2(2): 22–34.

Flick, U. 2009. *An Introduction to Qualitative (4th Ed.)*. London: Sage Publications Ltd.

Flora, H. K., Wang, X., & Chande, S. V. 2014. An investigation on the characteristics of mobile applications: A survey study. *International Journal of Information Technology and Computer Science* 6(11): 21–27. https://doi.org/10.5815/ijitcs.2014.11.03

Florescu, D., & Kossmann, D. 2009. Rethinking cost and performance of database systems. *SIGMOD Record* 38(1): 43-48.

Georgiou, M. 2020. Cost of Mobile App Maintenance in 2020 and Why It's Needed. Imaginovation.Net. https://www.imaginovation.net/blog/importance-mobile-app-maintenance-cost/ [12 June 2024].

Gunjal, B. 2003. Database System: Concepts and Design. *24th Indian Association of Special Libraries & Information Centres- Special Interest Group*. 1–20.

International Federation of Social Workers. 2014. Global definition of social work. Retrieved from https://www.ifsw.org/what-is-social-work/global-definition-of-social-work/ [8 June 2024].

Inukollu, V. N., Keshamon, D. D., Kang, T., & Inukollu, M. 2014. Factors influencing quality of mobile apps: Role of mobile app development life cycle. *International Journal of Software Engineering & Applications* 5(5): 15–34. https://doi.org/10.5121/ijsea.2014.5502

Ismail, A. M. & Stapa, Z. 2019. Liberalisme dan pemikiran pemimpin Muslim di Malaysia. *Islamiyyat* 41(2): 39-49.

Ismail, A. M., Mujani, W. K., & Zuhaily, A. A. 2018. Methods of da'wah and social networks in dealing with liberalism and extremism. *Islamiyyat* 40(2): 131-139.

ISO 9241-11. 2018. ISO 9241-11:2018 (en) Ergonomics of human-system interaction — Part 11: Usability: Definitions and concepts. ISO.ORG. https://www.iso.org/obp/ui/#iso:std:iso:9241:-11:ed-2:v1:en [14 June 2024].

Januzaj, Y., Ajdari, J., & Selimi, B. 2015. DBMS as a Cloud service: Advantages and disadvantages. *Procedia - Social and Behavioral Sciences* 195: 1851–1859. https://doi.org/10.1016/j.sbspro.2015.06.412

Karanam, A., Agarwal, A., & Barua, A. 2018. Designing for visibility and sharing: The case of mobile apps. *International Conference on Information Systems 2018 (ICIS 2018)*, pp. 1–40.

Md Jamil, M. S., Rajikan, R., Abdul Wahab, N. A., Sannusi, S. N., & Saat, M. H. 2019. Kebolehgunaan dan kesan aplikasi mudah alih (mobile apps) dalam Minggu Mesra Mahasiswa UKM. *Jurnal Personalia Pelajar* 22(1): 93–101.

Muslihudin, M., Yusfika, D., Pribadi, M. R., Susanto, F., Effendi, Maseleno, A., Mukodimah, S., & Vellyana, D. 2018. Computer hardware learning media application. *Journal of Advanced Research in Dynamical and Control Systems* 10(2 Special Issue): 2421–2427.

Odoo Website. n.d. *Odoo*. https://www.odoo.com/ [9 April 2021].

Praveen, S., Chandra, U., & Ali Wani, A. 2017. A literature review on evolving database. *International Journal of Computer Applications* 162(9): 35–41. https://doi.org/10.5120/ijca2017913365

Roy, R., Stark, R., Tracht, K., Takata, S., & Mori, M. 2016. Continuous maintenance and the future – Foundations and technological challenges. *CIRP Annals - Manufacturing Technology* 65(2): 667–688. https://doi.org/10.1016/j.cirp.2016.06.006

Samsudin, N. M. I., Ab. Halim, A. H., & Md. Khalid, R. 2021. Adakah kecerdasan buatan boleh berfungsi sebagai Penasihat Syariah? Analisis peranannya dalam sektor pasaran modal Islam. *Islamiyyat* 43(Isu Khas): 3-15.

Sarwar, M., & Soomro, T. R. 2013. Impact of smartphone's on society. *European Journal of Scientific Research* 98(2): 216–226.

Al-Shamaileh, O., & Sutcliffe, A. 2023. Why people choose Apps: An evaluation of the ecology and user experience of mobile applications. *International Journal of Human-Computer Studies* 170: 102965.

Shende, S. B., & Chapke, P. P. 2015. Cloud Database Management System (CDBMS). *An International Journal of Advanced Computer Technology* 4(1): 1462–1466.

Shravanthi, C., & Guruprasad, H. S. 2014. Mobile cloud computing as future for mobile applications. *International Journal of Research in Engineering and Technology* 3(5): 253–256. https://doi.org/10.15623/ijret.2014.0305048

Statista Research Department. 2025. Number of Smartphone Users Worldwide 2014-2029 (in millions). *Statista.* https://www.statista.com/forecasts/1143723/smartphone-users-in-the-world [11 March 2025].

Statista Research Department. 2025. Number of smartphone users in Malaysia from 2014 to 2029 (in millions). *Statista.* https://www.statista.com/forecasts/1146025/smartphone-users-in-malaysia [11 March 2025].

Susanto, A., & Meiryani, B. 2019. Database management system. *International Journal of Scientific and Technology Research* 8(6): 309–312. https://doi.org/10.5120/179-310

Syed Abd Rashid, S. N., Hamid, T. A., Haron, S. A., Md Noor, A., Mas'ud, F., Koh, T. W., Abdul Ghani, J., Ng, K. Y., Chai, S. T., Hussain, M. R., & Bagat, M. F. 2017. Laporan Akhir Kajian Keberkesanan Bantuan Kewangan Jabatan Kebajikan Masyarakat, Kementerian Pembangunan Wanita, Keluarga dan Masyarakat.

Tiyagaraja, L., & Yusof, I. 2022. Future of Cloud Computing: Mobile Cloud Apps. *International Journal of Business and Technology Management* 4(3): 256-262.

Wahid, H., Ahmad, S., & Abdul Kader, R. 2009. Pengagihan Zakat oleh Institusi Zakat kepada Lapan asnaf: Kajian di Malaysia. *Seminar Kebangsaan Ekonomi Islam 2008/09*, pp. 1–17.

Wahid, Hairunnizam, Mohd Fairuz Md Salleh, Norida Basnan, Azlina Ahmad, A. H. & A. B. A. W. 2017. Pendedahan Maklumat Zakat Bagi Pelaporan Institusi Islam: Kajian Terhadap Majlis Agama Islam Negeri di Malaysia. *Memperkasa Kutipan dan Agihan Zakat Di Malaysia*, *March 2019*, pp. 287–300.

Wilmer, H. H., Sherman, L. E., & Chein, J. M. 2017. Smartphones and cognition: A review of research exploring the links between mobile technology habits and cognitive functioning. *Frontiers in Psychology* 8(605): 1–16. https://doi.org/10.3389/fpsyg.2017.00605

Yuneline, M. H. 2022. Implications of Shariah financial technology in increasing financial inclusion to micro, small, and medium enterprises. *Islamiyyat* 44(1): 89-99.