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2nd INTERNATIONAL CONFERENCE ON APPLIED INFORMATION TECHNOLOGY AND INNOVATION

September 21-22, 2019
in Bali, Indonesia

Organized by
Department of Information Technology
Politeknik Negeri Padang

Theme :
Exploring the Future Technology of Applied Information Technology and Innovation

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Welcome Message
by the General Chair

Assalamu'alaykum wrwb,

On behalf of the technical program committee (TPC), we warmly welcome you to the 2nd International Conference on Applied Information Technology and Innovation (ICAITI 2019) in Padang, Indonesia. The committee has organized exciting technical program for 2nd ICAITI with conference theme "Exploring the future technology of Applied Information Technology and Innovation ". 2nd ICAITI is the international conference organized by Politeknik Negeri Padang. As an International conference , ICAITI provides excellent platform in sharing the idea and experiences, exchange information and explore collaboration among researchers, engineers, practitioners and scholars in the field of information technology, communications, and electrical engineering.

All 120 submitted papers throughout the world went through a rigorous review process and each paper was evaluated by independent reviewers in accordance with standard blind review process. Based on the result of process, 54 papers have been selected, which constitute the acceptance rate of 45.00%. 2nd ICAITI also features world-class keynote/plenary speeches and distinguish-invited speakers that reflect the current research and development trends in the aforementioned fields.

We are deeply indebted to all of our TPC members as well as our reviewers, who volunteered a considerable amount of their time and expertise to ensure a fair, rigorous, and timely review process. We are very much appreciate our keynote and invited speakers who will share their expertise in this conference. Last but not least, our sincere gratitude should be given to all authors for submitting their work to 2nd ICAITI 2019, which has allowed us to assemble a high quality technical program.

Welcome to Bali and enjoy a wonderful experience in paradise island!

With best regards

Rahmat Hidayat, ST., M.Sc. IT

General Chair

Welcome Speech from The Director of Politeknik Negeri Padang

Assalamu'alaikum wr. wb,

Good morning ladies and gentlemen, our dear honorary guests and speakers.

On behalf of Politeknik Negeri Padang, I am pleased to welcome all participants to the 2nd Conference on Applied Information Technology and Innovation (ICAITI) in Bali. We have successfully conducted the 1st ICAITI in our hometown in Padang last year, and this year event brings ICAITI to a new horizon in Bali.

As the host, Politeknik Negeri Padang is pleased to conduct the 2nd International Conference on Applied Information Technology and Innovation (ICAITI) 2019. As a leading higher vocational educational institution in Indonesia, Politeknik Negeri Padang strengthens its international reputation to achieve long term vision as a higher vocational education in South East Asia. This international event is part of our strategic plans toward that vision which also to strengthen our cooperation with national and international universities. We are now in the era of Industrial Revolution 4.0 where the use of information technology has penetrated every sector. Hence, by conducting this conference, we would like to gather best researchers in this field to share their knowledge and invention to the world, and to gain new perspective and plans for future research and international collaboration. This conference will be an annual event, so I would like to encourage participants to inform our fellow researchers and scholars to mark this event in their calendar. Last but not least, I also encourage our guests to enjoy the beauty of our nation and its hospitality as shown in Bali.

Warm Regards,

Surfa Yondri
Director of Politeknik Negeri Padang

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e-Vent: Support System for Event Registration

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***Abstract*— Registration, ticketing, and valid certificates are a series of work that must be done by event organizer. The registration, ticketing, and certificate issuance stages are often carried out using conventional or manual methods using stationery, print, and paper media. The conventional method is often an obstacle that causes the program to run less smoothly. This problem can be overcome by applying e-registration technology and QR Code as a substitute for tickets and e-certificates. Cellular technology such as smartphone can be the right solution for event organizers to overcome these obstacles. The application of an event registration system (e-Vent) that combines e-registration technology and QR Code as validation of registration and certificates is an effective and easy solution in implementing the stages of procuring an event. With E-Registration, data on participants who have registered will be stored in the database and will be displayed using the QR Code as the entry ticket sent to the participant's email. With this, QR Code readers can access data quickly to validate event participant data. The process of filling out the registration form can be done anywhere and anytime and the registration verification process can be done more quickly and accurately through this e-Vent system. The e-Vent system is designed using the FAST method and uses CodeIgniter as a development framework for web admins and Android Studio as a tool for developing QR Code reader validator applications.**

Keywords*— *registration; event; QR Code; ticketing; certificates; validation

I. INTRODUCTION

The development of increasingly advanced and rapid information technology has now spread in almost all fields such as education, event organizer, business, health, and government. Information technology has enhanced the ability to exchange knowledge, and accelerate the flow of information and communication [1]. in addition, its use can also have a positive impact on business productivity and performance [2]. This technology plays a very important role to ensure the organization runs more effectively and efficiently, one of which is when an event is held. One series of activities in organizing an event is the registration of participants. Registration is done to collect prospective participant data regarding the event to be held. An organization that organizes an event or event requires a registration process for participants to take part in the event. Therefore, a registration process that is fast, precise, and easy is needed so that the event is held as expected.

Registration is one of the important aspects that are needed by the organization when conducting an activity or event such as a seminar, show, conference, etc. Registration will always be required for prospective participants to participate in an activity by entering their data. Meanwhile for the organizers, registration is needed to monitor participants' personal data and the number of participants who attend certain events. With this registration process, event organizers can also confirm to participants who have filled in their personal data regarding the certainty of attendance.

The registration process that is done manually requires more costs for the purchase of stationery and registration paper so that it tends to be inefficient and there may be problems when registering. The use of paper is also very risky for possibilities such as being torn, burned, destroyed by water, or may be lost due to misplacement. Meanwhile, the process of validating participants with signatures when re-registration using paper media can take a long time especially if the number of participants reaches hundreds. The need for places for registration and registration staff can also incur additional costs. With the adoption of e-registration, it is expected that event organizers will benefit in terms of ease of error correction, more accurate and consistent data recording, easy data retrieval, storage, access, confirmation, avoiding unauthorized data access, reducing paper usage, increasing portability / mobility in data recording and backup, and shorter processing time. From the user side, it is expected that users will be more facilitated in the registration process [3].

The current trend in the use of information technology, especially smartphones, has touched almost all people. This telecommunications technology is developing very rapidly following the needs of the community for practical and flexible media to support their daily activities. With the widespread use of smartphones, this can be an opportunity that the smartphone can be used for the registration system at an event. One of the features of a smartphone that is interesting to use is the camera features. The camera feature that has been installed in almost all smartphones can be used for the application of a validation system by using it as a QR (Quick Response) Code reader. QR Code is one of the popular technologies because it is cheap, easy to produce, and easy to use when compared to other technologies [4].

The transformation from the manual registration process that was changed to mobile technology through the e-Registration system and validation using the QR Code will

make it more effective and efficient. This transformation can be the right solution by developing an e-Vent mobile application that utilizes website technology as e-Registration and QR Code simultaneously. e-Vent is a registration system that uses QR Code technology as proof of validation of event registration and website technology as a place of registration.

This e-Vent system will be used as a registration form that can store participant data so it is more efficient because it does not require paper and saves on site costs because registration is done through the website. Invitations or event entry tickets as proof of registration will be in the form of a QR Code image that will be sent via e-mail after participants register. For participant validation, the organizer only needs to scan the participants' QR Code using the QR Code Scanner through the smartphone camera.

The advantage of implementing e-Vent for participants is that participants have the flexibility to register. Participants can register anywhere and anytime as long as they have a smartphone. The convenience and time savings in re-registering are also obtained by participants because proof of registration in the form of a QR Code can be shown via a smartphone. Therefore, participants do not need to wait long to re-register because they only need to display the QR Code into the scanner camera or QR Code Scanner so that participants can directly enter the event.

For the committee, the advantage of implementing e-Vent is saving in terms of costs, time and human resources needed. The committee will save costs from using paper for registration and credit fees for attendance confirmation needs because it is done through the system. The committee also does not need a location to open registration stands and registration staff so that costs can be reduced. Deletion of invitations, tickets, or ID cards can be done because they have used the QR Code sent via e-mail to each participant. The participant's certificate will be in the form of a softcopy that is sent to the participant's e-mail, reducing the cost for printing the certificate. The re-registration process will take less time, thereby reducing the buildup of participants at the registration desk.

Based on the description above, it can be concluded that the event registration system developed aims to help organizations manage registration of participants more easily, quickly, precisely, and efficiently than manual methods. Losses and problems that arise when using manual methods can be avoided by using this registration system in terms of cost, time, and resource as well as the security of participant data which is certainly more secure.

II. LITERATURE REVIEW

Event is an activity that collects a set of target people in a certain space and time, then a meeting takes place whose message is communicated to those people. The event describes different activities for different purposes [5].

Registration is a process, method, act of registering, recording names, addresses, etc. on the list. Registration is the process of recording the identity of the registrant into a storage media used in the registration process.

Adoption can be defined as the decision to make full use of innovation as the best available action. Whereas adoption of innovation is a process in which an individual switches from first knowledge about innovation to a decision to adopt or reject and to confirm this decision [6]. E-registration is also known as electronic registration or web-based registration or even online registration. This online registration system replaces manual processes such as registering via telephone, mail, or directly at the event using paper forms [7]. In addition, depending on the underlying model, documents can be digitally signed [8].

Event Organizer are parties responsible for managing events such as festivals, social events such as gatherings, meetings, conferences, etc [9].

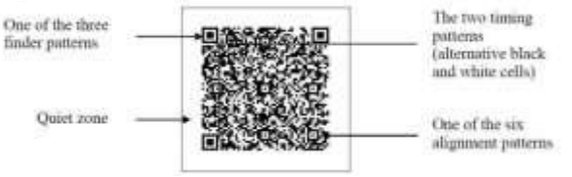

Fig. 1. Example of QR Code [10]

The QR Code (Quick Response Code) is a trademark for machine-readable optical labels that contain information about the items attached [11]. The code in the QR Code is a two-dimensional barcode. The QR Code was developed by Denso Wave, a Denso Corporation division which was a Japanese company and was published in 1994. QR codes are read with cameras or QR scanners. Figure 1 shows an example of a QR Code.

III. METHODOLOGY

The stages of research used in this study shown in Figure 2.

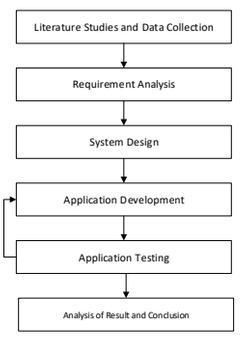

Fig. 2. Research Methodology

1) Literature Studies and Data Collection

At this stage a study of the Framework Development will be used and data collection. There are two types of data used in this study, namely primary data and secondary data.

a. Primary data

Primary data is obtained from observation, interviews, or questionnaires [12]. In this study the primary data is data relating to the need for registration in an event. To obtain these data, researchers will conduct interviews with event organizers or event organizers and committees on campus.

b. Secondary Data

Secondary data is data that already exists, or can be said as data that has been collected and analyzed by other parties.

Secondary data can be obtained from various sources such as publications, books, magazines, newspapers, reports, recordings and reports on general statistics, etc [12]. To obtain these data the researcher took several books, brochures, websites, and examples of previous research related to this research, namely regarding the flow of registration of participants in an event.

The data collection method used in this study is the Interview method. Interviews are appropriate for cases or questions that require investigation to obtain sufficient information. There are three types of interviews, including: structured, unstructured and semi-structured interviews [13]. The researcher will interview several event organizers and Student Association committees to obtain certain data, especially if the data obtained through the documentation method is unclear.

Population is the term collection to describe the total quantity of an object or case under study. Population can consist of several types of objects, organizations, people, or events [13]. The population used is the party that acts as an event organizer and student committee.

2) Requirement Analysis

In the requirement analysis phase there are primary and secondary data analysis activities, determining system indicators, system indicator analysis, extracting system requirements that are in accordance with the indicators' achievements, and documenting system requirements.

3) System Design

At this stage there are design activities, requirements, process flow, database, applications, and interfaces.

4) Application Development

At this stage an application development is carried out consisting of coding, interface creation, and system installation. The system development method used in this research was FAST method with prototyping as an approach method. FAST is an agile methodology that is flexible enough to support a variety of projects and system development strategies [14]. The letters in FAST stands for "Framework for the Application of the System Thinking". FAST can be said as a best practice from previous methodologies to support the development system and support the system life cycle. FAST method with a prototyping approach chosen based on several considerations:

1. The Prototyping approach involves a lot of users, so it can increase system visibility and get more support from users and management.

2. The Prototyping approach is faster, cheaper, and does not require a large development team. These factors lead to the prototyping approach in accordance with a medium-sized system, such as the system to be developed.

3. Prototyping approach can make it easier for users to know their desires. In prototyping, the system consists of several cycles, in which each cycle the team produces a prototype. The results of this evaluation will be analyzed again by the development team and then produce a new prototype. Thus this cycle will continue until the system is obtained in accordance with the wishes of the user. Prototyping cycle shown in Figure 3.

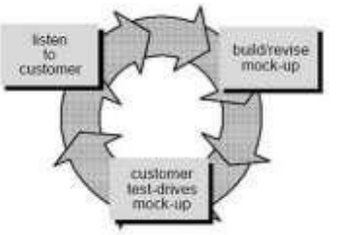

Fig. 3. Prototyping Cycle [15]

5) Application Testing

After implementation, a system evaluation will be held. System evaluation will be carried out at first, second and third year. From this evaluation, results will be obtained which will be used to improve the system every year.

6) Analysis of Results and Conclusions

At this stage, the results of the analysis are carried out and conclusions are drawn.

IV. Result and Discussion

Based on the results of observations and interviews with student committees and several event organizers, there were several problems from the participant registration flow to the granting of participant certificates. Figure 4 shows the registration of participants in an event until the acceptance of event certificates by participants using conventional methods.

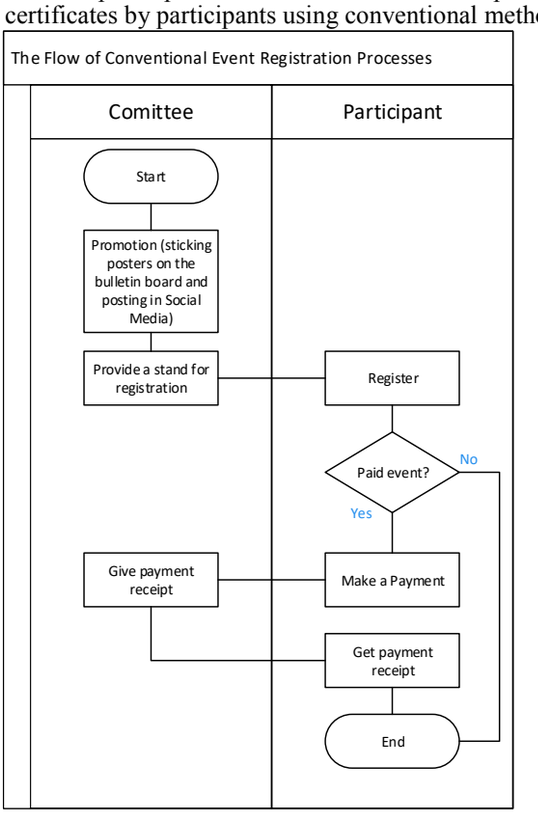

Fig. 4. Conventional Event Registration Flowchart

Figure 5 shows process flow from participant registration to giving certificates to participants.

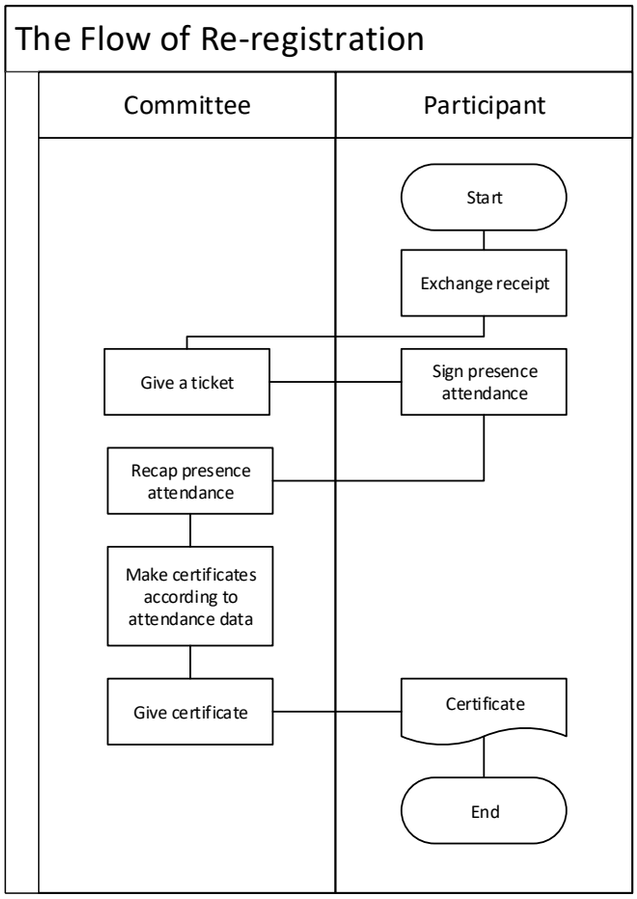

Fig. 5. Conventional Event Re-registration Flowchart

However, conventional registration method has several weaknesses and problems. Analysis of problems that arise from convention method and the solution offered such as:

1. **Problem:** During registration, Event organizers tend to still use paper as a media for participant registration so that potential participants must come or even queue to register for the event. In addition, the use of paper has the potential to be damaged or lost.
   Solution offered: The application of a website-based online event registration system so that prospective participants can register wherever and whenever they are without having to queue. Prospective participants who have registered online through the web will receive e-tickets and QR codes via email. The event committee also does not need to archive registration paper or form again because all participant registration data has been stored in the system database.
2. **Problem:** During Re-registration, Event organizers tend to still use paper as a participant registration media, causing participants to come or even queue to enter the location of the event. Again, the use of paper has the potential to be damaged or lost.
   Solution Offered: The application of the online event registration system also provides a QRCode Reader feature for event organizers to replace conventional verification methods such as participant presence form using paper. QR codes obtained by participants after registering will be shown to the event committee during the registration process to verify their attendance. With the transition of the registration process from the paper media presence method to attendance verification by scanning the QRcode participant using the QR Code Reader, it is expected that the participants' queuing time and the user of presence attendance paper can be reduced.
3. **Problem:** For ticketing, events held still tend to use physical tickets which require the committee to issue ticket printing costs. Physical tickets purchased by participants after registration must be taken when attending the event as proof of registration. Such physical tickets have the potential to be lost or damaged so that they can harm participants in terms of material.
   Solution offered: The application of an online event registration system provides an e-ticket in which there is also a participant's QR code to replace the physical ticket. The e-ticket was sent to the participant's e-mail according to the e-mail registered. When participants attend the location during the event, Participants only need to show the e-ticket to the event committee. The QR code listed in the e-ticket will be scanned using the mobile app to verify participants' attendance. By utilizing QRCode and its Reader tools, it is expected to reduce physical ticket loss or damage.
4. **Problem:** In terms of certificate given, current events tend to provide physical certificates for participants as proof of participation. These physical certificates require the committee to spend printing cost. In addition to printing costs, the committee needs to distribute certificates to all attendees after the event ends. This creates a process that is not efficient in terms of time and cost. The committee must look for participant certificates when distributing them, at the same time participants must provide time to queue again after the event ends in order to get a certificate.
   Solution Offered: The application of an online event registration system provides participant e-certificate features. When the participant's QRcode has been scanned by the committee using a QR Code Reader and its presence has been verified, the participant can download the e-certificate from the website by entering the full name that has been registered and the registrant's ID listed on the e-ticket. With the presence of the e-certificate feature, the committee does not need to share certificates one by one with participants and does not need to pay the cost of printing certificates and participants do not need to queue again to the committee table to obtain certificates.

After analysing problems and offering solution, conventional registration process can be simplified using the help of event

registration system. The flow of the event registration process that uses QRCode on e-Vent shown in Figure 6.

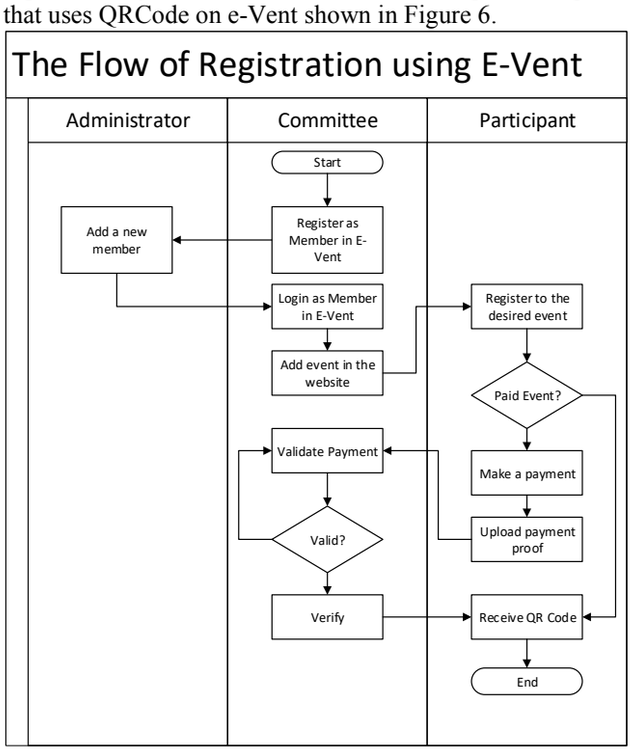

Fig. 6. Event Re-registration using E-Vent Flowchart

Network Architecture of E-vent Registration System shown in Figure 7.

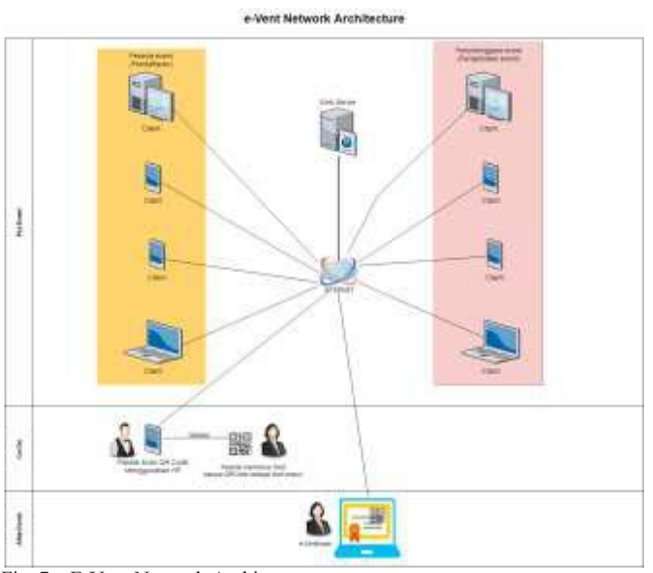

Fig. 7. E-Vent Network Architecture

Based on the solutions mentioned before and e-Vent architecture, the researcher developed a system for managing registration, ticketing, QR code reader & validation and e-certificate using framework codeIgniter as a backend, ciqrcode library as a QR code generator, MySql for storing databases, and Android Studio for the development of a QR code reader and data validation.

Fig. 8. E-Vent Landing Page

At the landing page shown in Figure 8, the systems will be displayed a list of events held by event organizers who have been registered as members. Prospective participants can choose the event to be attended and see detailed information from the event. In this view there are some general information on the event such as time, place, ticket price, participant quota. Furthermore, prospective participants can immediately register themselves through eventkampus.info prospective participants choose the event they want. The registration form shown in Figure 9.

Fig. 9. E-Vent registration form

If the event is a paid event, the participants have to make a payment first and then upload proof of payment in the Upload Payment Proof Form shown in Figure 10.

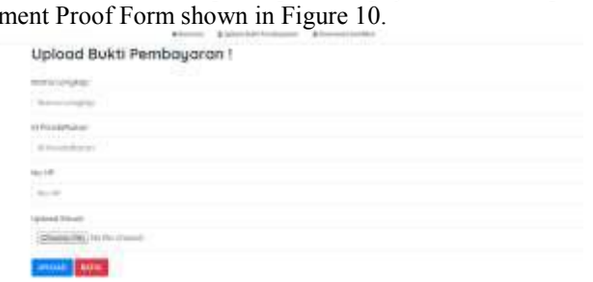

Fig. 10. E-Vent registration form

After the Participant has uploaded proof of payment, proof of payment will be verified by the committee. If verified, the ticket in the form of a QR Code will be sent directly by e-mail to participants. On the ticket there are several information

such as date, time and place, and there is a QR Code that contains participant data. E-ticket shown in Figure 11.

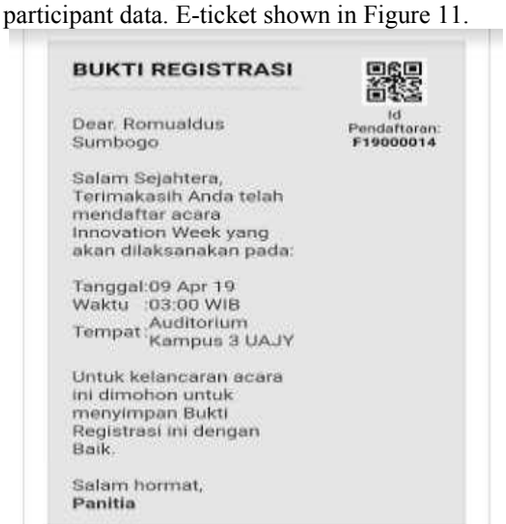

Fig. 11. E-Vent E-ticket

During the day of the event, participants simply show the QR Code shown in E-ticket to be scanned by the committee using mobile apps that function as participant identity validators. The scanning process will change the status of participants in the database from 'not present' to 'attend'. If the event participant's status has been validated, then the event participant will be able to download e-certificate through the "Download Certificate" menu shown in Figure 12.

Fig. 12. Download Certificate Menu

V. CONCLUSION

Events held in Indonesia tend to apply processes that are still using conventional methods. The conventional method causes some processes to be inefficient in terms of time and cost. Processes that run inefficiently such as the process of registering participants, re-registering participants, ticketing, and giving participant certificates. With the presence of E-Vent, it is expected to increase efficiency in these processes, especially in the registration process such as the presence of online registration features, e-tickets, QRCodes, and e-certificates. E-Vent offers convenience in managing participant and event data, participant registration, administration and validation, and certificate distribution because it can be done anywhere and anytime.

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e-Vent: Support System for Event Registration

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***Abstract*— Registration, ticketing, and valid certificates are a series of work that must be done by event organizer. The registration, ticketing, and certificate issuance stages are often carried out using conventional or manual methods using stationery, print, and paper media. The conventional method is often an obstacle that causes the program to run less smoothly. This problem can be overcome by applying e-registration technology and QR Code as a substitute for tickets and e-certificates. Cellular technology such as smartphone can be the right solution for event organizers to overcome these obstacles. The application of an event registration system (e-Vent) that combines e-registration technology and QR Code as validation of registration and certificates is an effective and easy solution in implementing the stages of procuring an event. With E-Registration, data on participants who have registered will be stored in the database and will be displayed using the QR Code as the entry ticket sent to the participant's email. With this, QR Code readers can access data quickly to validate event participant data. The process of filling out the registration form can be done anywhere and anytime and the registration verification process can be done more quickly and accurately through this e-Vent system. The e-Vent system is designed using the FAST method and uses CodeIgniter as a development framework for web admins and Android Studio as a tool for developing QR Code reader validator applications.**

***Keywords*— registration; event; QR Code; ticketing; certificates; validation**

I. INTRODUCTION

The development of increasingly advanced and rapid information technology has now spread in almost all fields such as education, event organizer, business, health, and government. Information technology has enhanced the ability to exchange knowledge, and accelerate the flow of information and communication [1]. in addition, its use can also have a positive impact on business productivity and performance [2]. This technology plays a very important role to ensure the organization runs more effectively and efficiently, one of which is when an event is held. One series of activities in organizing an event is the registration of participants. Registration is done to collect prospective participant data regarding the event to be held. An organization that organizes an event or event requires a registration process for participants to take part in the event. Therefore, a registration process that is fast, precise, and easy is needed so that the event is held as expected.

Registration is one of the important aspects that are needed by the organization when conducting an activity or event such as a seminar, show, conference, etc. Registration will always be required for prospective participants to participate in an activity by entering their data. Meanwhile for the organizers, registration is needed to monitor participants' personal data and the number of participants who attend certain events. With this registration process, event organizers can also confirm to participants who have filled in their personal data regarding the certainty of attendance.

The registration process that is done manually requires more costs for the purchase of stationery and registration paper so that it tends to be inefficient and there may be problems when registering. The use of paper is also very risky for possibilities such as being torn, burned, destroyed by water, or may be lost due to misplacement. Meanwhile, the process of validating participants with signatures when re-registration using paper media can take a long time especially if the number of participants reaches hundreds. The need for places for registration and registration staff can also incur additional costs. With the adoption of e-registration, it is expected that event organizers will benefit in terms of ease of error correction, more accurate and consistent data recording, easy data retrieval, storage, access, confirmation, avoiding unauthorized data access, reducing paper usage, increasing portability / mobility in data recording and backup, and shorter processing time. From the user side, it is expected that users will be more facilitated in the registration process [3].

The current trend in the use of information technology, especially smartphones, has touched almost all people. This telecommunications technology is developing very rapidly following the needs of the community for practical and flexible media to support their daily activities. With the widespread use of smartphones, this can be an opportunity that the smartphone can be used for the registration system at an event. One of the features of a smartphone that is interesting to use is the camera features. The camera feature that has been installed in almost all smartphones can be used for the application of a validation system by using it as a QR (Quick Response) Code reader. QR Code is one of the popular technologies because it is cheap, easy to produce, and easy to use when compared to other technologies [4].

The transformation from the manual registration process that was changed to mobile technology through the e-Registration system and validation using the QR Code will

make it more effective and efficient. This transformation can be the right solution by developing an e-Vent mobile application that utilizes website technology as e-Registration and QR Code simultaneously. e-Vent is a registration system that uses QR Code technology as proof of validation of event registration and website technology as a place of registration.

This e-Vent system will be used as a registration form that can store participant data so it is more efficient because it does not require paper and saves on site costs because registration is done through the website. Invitations or event entry tickets as proof of registration will be in the form of a QR Code image that will be sent via e-mail after participants register. For participant validation, the organizer only needs to scan the participants' QR Code using the QR Code Scanner through the smartphone camera.

The advantage of implementing e-Vent for participants is that participants have the flexibility to register. Participants can register anywhere and anytime as long as they have a smartphone. The convenience and time savings in re-registering are also obtained by participants because proof of registration in the form of a QR Code can be shown via a smartphone. Therefore, participants do not need to wait long to re-register because they only need to display the QR Code into the scanner camera or QR Code Scanner so that participants can directly enter the event.

For the committee, the advantage of implementing e-Vent is saving in terms of costs, time and human resources needed. The committee will save costs from using paper for registration and credit fees for attendance confirmation needs because it is done through the system. The committee also does not need a location to open registration stands and registration staff so that costs can be reduced. Deletion of invitations, tickets, or ID cards can be done because they have used the QR Code sent via e-mail to each participant. The participant's certificate will be in the form of a softcopy that is sent to the participant's e-mail, reducing the cost for printing the certificate. The re-registration process will take less time, thereby reducing the buildup of participants at the registration desk.

Based on the description above, it can be concluded that the event registration system developed aims to help organizations manage registration of participants more easily, quickly, precisely, and efficiently than manual methods. Losses and problems that arise when using manual methods can be avoided by using this registration system in terms of cost, time, and resource as well as the security of participant data which is certainly more secure.

II. Literature Review

Event is an activity that collects a set of target people in a certain space and time, then a meeting takes place whose message is communicated to those people. The event describes different activities for different purposes [5].

Registration is a process, method, act of registering, recording names, addresses, etc. on the list. Registration is the process of recording the identity of the registrant into a storage media used in the registration process.

Adoption can be defined as the decision to make full use of innovation as the best available action. Whereas adoption of innovation is a process in which an individual switches from first knowledge about innovation to a decision to adopt or reject and to confirm this decision [6]. E-registration is also known as electronic registration or web-based registration or even online registration. This online registration system replaces manual processes such as registering via telephone, mail, or directly at the event using paper forms [7]. In addition, depending on the underlying model, documents can be digitally signed [8].

Event Organizer are parties responsible for managing events such as festivals, social events such as gatherings, meetings, conferences, etc [9].

Fig. 1. Example of QR Code [10]

The QR Code (Quick Response Code) is a trademark for machine-readable optical labels that contain information about the items attached [11]. The code in the QR Code is a two-dimensional barcode. The QR Code was developed by Denso Wave, a Denso Corporation division which was a Japanese company and was published in 1994. QR codes are read with cameras or QR scanners. Figure 1 shows an example of a QR Code.

III. Methodology

The stages of research used in this study shown in Figure 2.

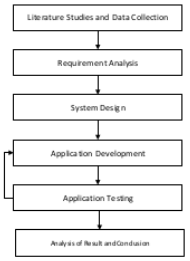

Fig. 2. Research Methodology

1) Literature Studies and Data Collection

At this stage a study of the Framework Development will be used and data collection. There are two types of data used in this study, namely primary data and secondary data.

a. Primary data

Primary data is obtained from observation, interviews, or questionnaires [12]. In this study the primary data is data relating to the need for registration in an event. To obtain these data, researchers will conduct interviews with event organizers or event organizers and committees on campus.

b. Secondary Data

Secondary data is data that already exists, or can be said as data that has been collected and analyzed by other parties.

Secondary data can be obtained from various sources such as publications, books, magazines, newspapers, reports, recordings and reports on general statistics, etc [12]. To obtain these data the researcher took several books, brochures, websites, and examples of previous research related to this research, namely regarding the flow of registration of participants in an event.

The data collection method used in this study is the Interview method. Interviews are appropriate for cases or questions that require investigation to obtain sufficient information. There are three types of interviews, including: structured, unstructured and semi-structured interviews [13]. The researcher will interview several event organizers and Student Association committees to obtain certain data, especially if the data obtained through the documentation method is unclear.

Population is the term collection to describe the total quantity of an object or case under study. Population can consist of several types of objects, organizations, people, or events [13]. The population used is the party that acts as an event organizer and student committee.

2) Requirement Analysis

In the requirement analysis phase there are primary and secondary data analysis activities, determining system indicators, system indicator analysis, extracting system requirements that are in accordance with the indicators' achievements, and documenting system requirements.

3) System Design

At this stage there are design activities, requirements, process flow, database, applications, and interfaces.

4) Application Development

At this stage an application development is carried out consisting of coding, interface creation, and system installation. The system development method used in this research was FAST method with prototyping as an approach method. FAST is an agile methodology that is flexible enough to support a variety of projects and system development strategies [14]. The letters in FAST stands for "Framework for the Application of the System Thinking". FAST can be said as a best practice from previous methodologies to support the development system and support the system life cycle. FAST method with a prototyping approach chosen based on several considerations:

1. The Prototyping approach involves a lot of users, so it can increase system visibility and get more support from users and management.

2. The Prototyping approach is faster, cheaper, and does not require a large development team. These factors lead to the prototyping approach in accordance with a medium-sized system, such as the system to be developed.

3. Prototyping approach can make it easier for users to know their desires. In prototyping, the system consists of several cycles, in which each cycle the team produces a prototype. The results of this evaluation will be analyzed again by the development team and then produce a new prototype. Thus this cycle will continue until the system is obtained in accordance with the wishes of the user. Prototyping cycle shown in Figure 3.

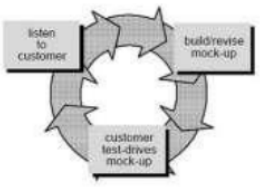

Fig. 3. Prototyping Cycle [15]

5) Application Testing

After implementation, a system evaluation will be held. System evaluation will be carried out at first, second and third year. From this evaluation, results will be obtained which will be used to improve the system every year.

6) Analysis of Results and Conclusions

At this stage, the results of the analysis are carried out and conclusions are drawn.

IV. Result and Discussion

Based on the results of observations and interviews with student committees and several event organizers, there were several problems from the participant registration flow to the granting of participant certificates. Figure 4 shows the registration of participants in an event until the acceptance of event certificates by participants using conventional methods.

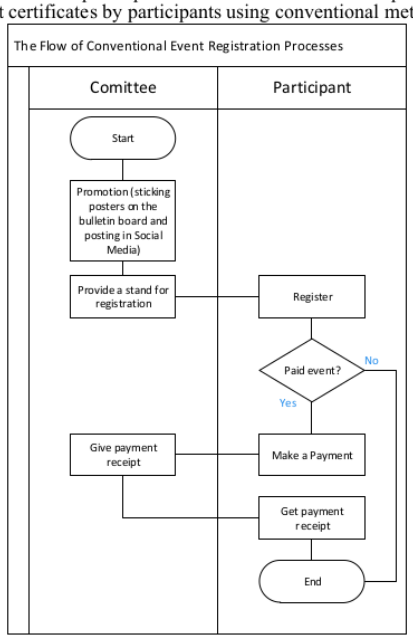

Fig. 4. Conventional Event Registration Flowchart

Figure 5 shows process flow from participant registration to giving certificates to participants.

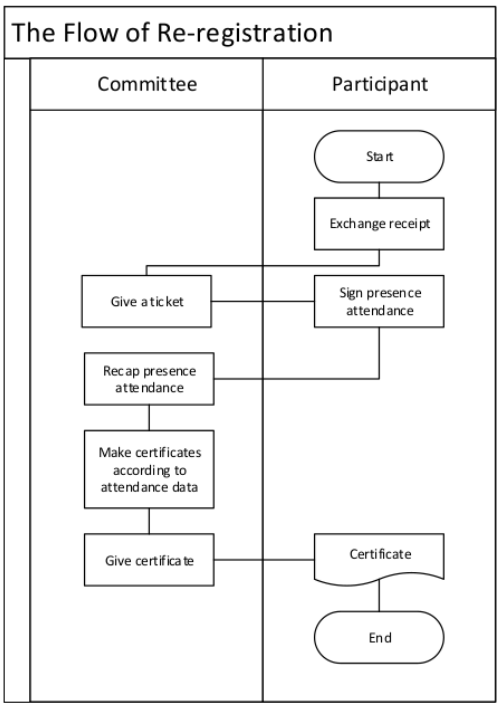

Fig. 5. Conventional Event Re-registration Flowchart

However, conventional registration method has several weaknesses and problems. Analysis of problems that arise from convention method and the solution offered such as:

1. **Problem:** During registration, Event organizers tend to still use paper as a media for participant registration so that potential participants must come or even queue to register for the event. In addition, the use of paper has the potential to be damaged or lost.
   Solution offered: The application of a website-based online event registration system so that prospective participants can register wherever and whenever they are without having to queue. Prospective participants who have registered online through the web will receive e-tickets and QR codes via email. The event committee also does not need to archive registration paper or form again because all participant registration data has been stored in the system database.
2. **Problem:** During Re-registration, Event organizers tend to still use paper as a participant registration media, causing participants to come or even queue to enter the location of the event. Again, the use of paper has the potential to be damaged or lost.
   Solution Offered: The application of the online event registration system also provides a QRCode Reader feature for event organizers to replace conventional verification methods such as participant presence form using paper. QR codes obtained by participants after registering will be shown to the event committee during the registration process to verify their attendance. With the transition of the registration process from the paper media presence method to attendance verification by scanning the QRcode participant using the QR Code Reader, it is expected that the participants' queuing time and the user of presence attendance paper can be reduced.
3. **Problem:** For ticketing, events held still tend to use physical tickets which require the committee to issue ticket printing costs. Physical tickets purchased by participants after registration must be taken when attending the event as proof of registration. Such physical tickets have the potential to be lost or damaged so that they can harm participants in terms of material.
   Solution offered: The application of an online event registration system provides an e-ticket in which there is also a participant's QR code to replace the physical ticket. The e-ticket was sent to the participant's e-mail according to the e-mail registered. When participants attend the location during the event, Participants only need to show the e-ticket to the event committee. The QR code listed in the e-ticket will be scanned using the mobile app to verify participants' attendance. By utilizing QRCode and its Reader tools, it is expected to reduce physical ticket loss or damage.
4. **Problem:** In terms of certificate given, current events tend to provide physical certificates for participants as proof of participation. These physical certificates require the committee to spend printing cost. In addition to printing costs, the committee needs to distribute certificates to all attendees after the event ends. This creates a process that is not efficient in terms of time and cost. The committee must look for participant certificates when distributing them, at the same time participants must provide time to queue again after the event ends in order to get a certificate.
   Solution Offered: The application of an online event registration system provides participant e-certificate features. When the participant's QRcode has been scanned by the committee using a QR Code Reader and its presence has been verified, the participant can download the e-certificate from the website by entering the full name that has been registered and the registrant's ID listed on the e-ticket. With the presence of the e-certificate feature, the committee does not need to share certificates one by one with participants and does not need to pay the cost of printing certificates and participants do not need to queue again to the committee table to obtain certificates.

After analysing problems and offering solution, conventional registration process can be simplified using the help of event

registration system. The flow of the event registration process that uses QRCode on e-Vent shown in Figure 6.

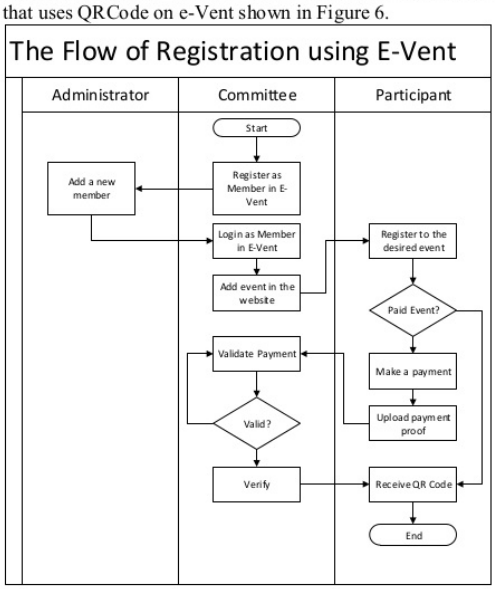

Fig. 6. Event Re-registration using E-Vent Flowchart

Network Architecture of E-vent Registration System shown in Figure 7.

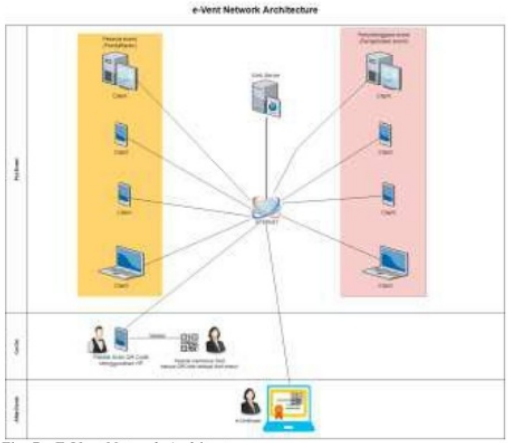

Fig. 7. E-Vent Network Architecture

Based on the solutions mentioned before and e-Vent architecture, the researcher developed a system for managing registration, ticketing, QR code reader & validation and e-certificate using framework codeIgniter as a backend, ciqrcode library as a QR code generator, MySql for storing databases, and Android Studio for the development of a QR code reader and data validation.

Fig. 8. E-Vent Landing Page

At the landing page shown in Figure 8, the systems will be displayed a list of events held by event organizers who have been registered as members. Prospective participants can choose the event to be attended and see detailed information from the event. In this view there are some general information on the event such as time, place, ticket price, participant quota. Furthermore, prospective participants can immediately register themselves through eventkampus.info prospective participants choose the event they want. The registration form shown in Figure 9.

Fig. 9. E-Vent registration form

If the event is a paid event, the participants have to make a payment first and then upload proof of payment in the Upload Payment Proof Form shown in Figure 10.

Fig. 10. E-Vent registration form

After the Participant has uploaded proof of payment, proof of payment will be verified by the committee. If verified, the ticket in the form of a QR Code will be sent directly by e-mail to participants. On the ticket there are several information

such as date, time and place, and there is a QR Code that contains participant data. E-ticket shown in Figure 11.

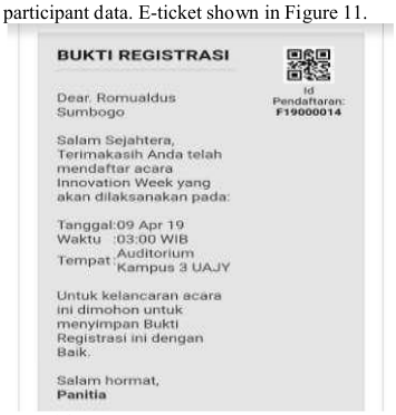

Fig. 11. E-Vent E-ticket

During the day of the event, participants simply show the QR Code shown in E-ticket to be scanned by the committee using mobile apps that function as participant identity validators. The scanning process will change the status of participants in the database from 'not present' to 'attend'. If the event participant's status has been validated, then the event participant will be able to download e-certificate through the "Download Certificate" menu shown in Figure 12.

Fig. 12. Download Certificate Menu

V. CONCLUSION

Events held in Indonesia tend to apply processes that are still using conventional methods. The conventional method causes some processes to be inefficient in terms of time and cost. Processes that run inefficiently such as the process of registering participants, re-registering participants, ticketing, and giving participant certificates. With the presence of E-Vent, it is expected to increase efficiency in these processes, especially in the registration process such as the presence of online registration features, e-tickets, QRCodes, and e-certificates. E-Vent offers convenience in managing participant and event data, participant registration, administration and validation, and certificate distribution because it can be done anywhere and anytime.

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