Application Export of Goods Cross-Platform Based Mobile Application Case Study Directorate General of Customs and Excise Bandung

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ABSTRACT

Goods export-based mobile can help the community, especially among exporters to facilitate export activities. However, the various types of platforms that are currently widely used as iOS, Android, Windows Phone to be a problem for developers. Development of cross-platform mobile-based applications into solutions that enable the development of applications to be run on multiple platforms without the need to think about the iOS platform that uses language Objective C, Android platform using the Java language, and the Windows Phone platform using C # language. With the application to the platform iOS, Android and Windows Phone do quality testing to obtain test results of performance of the most good, and it can be deduced application of technology cross-platform mobile app on the app exports of goods, which is applied to the iOS platform have top quality improved compared with the Android platform and Windows Phone.

Keywords: *Export, Mobile, Cross Platform, Cross Platform Mobile Application, Quality*

1. PRELIMINARY

Based mobile application is cross platform technology of programming language that allows software / application to be run on multiple platforms on a smartphone. Based on cross-platform mobile application can create applications for multiple platforms using the same source code, one with Phonegap [1]. By leveraging the cross-platform mobile application, a solution in software development across platforms can save costs and time, and entrepreneurs can access the application of export goods only with a smartphone of its expected to address the lack of human resources in the Customs office, as well as for exporters to receive notification legality of the document export of goods to be exported so that the process of export goods trade business can run faster.

1.1 *Cross Platform*

Cross Platform is a term in information technology on a software that can be used in several different operating systems. The advantage of the use of technology cross platform ie the cost-effectiveness to build solutions cross platform rather than building custom applications for multiple platforms, access to the plugin easy that provides a common link to the same API, speed in developing applications where only one base code to be made to the application The mobile platform.

1.2 PhoneGap

Framework PhoneGap allows one to develop native mobile applications using the expertise of HTML, CSS and Javascript. PhoneGap be an ideal solution for a web developer who is interested in making an application on the smartphone. An application created using the PhoneGap framework can be deployed to multiple platforms at once.

PhoneGap support features, such as accelorometer, Camera, Compass, Contacts, File, Geolocation, Media, Network, Notification and Storage. PhoneGap Storage is one of the features that can be used to store and access data into a local database. PhoneGap is a library used for porting of web apps to native apps. PhoneGap native produce web apps so that the PhoneGap development could be incorporated into the Store, for example, iOS Apps Store, Android Market, and so forth.

1.3 Apache Cordova

Apache Cordova is a platform for building native mobile applications using HTML, CSS and JavaScript. Native mobile application that supported include Android, iOS, Windows Phone and Blackberry. Apache Cordova contains a set of APIs (Application Programming Interface) to access the device from a mobile device. Devices that include cameras, GPS (Global Positioning System), storage and others. With menunggunakan UI (User Interface) framework like jQuery Mobile, Dojo Mobile or

Sencha Touch, then you can access this API. In other words, builders can build applications using only HTML, CSS and Javascript.

By using the API of Cordova, do not need to build applications using native code such as Java, Objective-C and others. Developers only use web technology with web programming languages and is installed on the mobile device concerned. Because using Javascript, applications are built on a mobile platform can be used on other platforms with little or no change. Applications resulting from Cordova is packaged in applications using the SDK each platform and can be applied to other platforms using the platform SDK.

1.4 JSON (*JavaScript Object Notation*)

JavaScript Object Notation (JSON) is a lightweight data interchange format, readable and writable by humans, as well as easily translated and made (generated) by the computer. JSON is a text format that is independent of any programming language because it uses a style that is commonly used by programmers family of C including C, C ++, C #, Java, JavaScript, Perl, Python etc. Because of these properties, making it ideal as a language exchange JSON-data.

1.5 JqueryMobile

Jquery Mobile is a web framework that is optimized for touch screen devices (touch -optimized). As a library, Jquery known as javascript and jquery mobile framework was developed by a team jquery Project. Objectives The development is focused on creating a framework that is compatible with a wide range of smartphones and tablet devices.

JqueryMobile a system interface based on HTML5 and development of jquery and jquery UI library that is currently popular. Jquery Mobile is very possible to create mobile web applications that look and interaktifitasnya consistent across all devices that have the capability User Interface (UI) is advanced.

1.5 Android

Android is an operating system on mobile phones that is open and based on the Linux operating system. Android can be used by anyone who wants to use it on their devices. Android provides an open platform for developers to create their own applications that will be used for a variety of mobile devices.

1.6 IOS

The operating system was first launched in 2007 for the iPhone and iPod Touch, and has been developed to support other Apple devices such as iPad and Apple TV. The user interface of iOS is based on the concept of direct manipulation using multi-touch movement. Elements of the user interface controls include sliders, switches, and buttons. Interaction with the OS includes gestures such as sliding, touch, pinch, and flip open, each has its own meaning in the context of the IOS operating system and interface multisentuhnya. Internal accelerometer is used by a number of applications that can respond to pengguncangan tools (eg, cancel the action) or rotate in three dimensions (eg, switching from portrait to landscape mode).

1.7 Windows Phone

Windows Phone technology is the latest mobile phone operating system. Windows Phone or Microsoft Windows Phone is an operating system for mobile devices developed by Microsoft. The operating system (OS) have been invested in smartphones (smart phones) manufactured by Nokia. Applications are owned by Windows Phone is almost the same as the Windows OS in general that can operate almost any application that has Windows as Microsoft Office, Windows Live, games plus personalized ringtones. Window of the most recent phone is Windows Phone 10.

1.8 *Software Quality Metrics Model*

In scientific software engineering, there are several models of software quality. In each model, there are several factors which the main points in the assessment of the quality of a software. Here is an explanation of the software quality model to be applied. ISO-9126 Model was first introduced in 1991 as the standardization of the quality of software products. This standardization was made because of the many models offered quality as a factor in the quality of software.



Figure 1.1 Factors ISO 9126

1.9 *Measurement Software*

Measurement software is the main factor to determine how well the software will be assessed based on the method used. Software measurement is done by finding the value criteria such software and also looking for the weight of interest based on the method to be used. The overall assessment can be obtained from the value of the criteria and the weights. The calculation of the weight and value of the criteria could vary depending on what method to use.

Weighting Method of Rank Order Centroid (ROC) based on the relative importance or priority of the

criterion. According to Jeffreys and Cockfield in Afiefah Rahma, ROC technique gives weight to each criterion according to the ranking based on the level of priority. In general weighting ROC formulated as follows:

$$Wk = 1/k \sum_{t=i}^{k} (1/i) \quad (1)$$

1.10 ***Assessment Methods***

The calculation of the value of sub-factors, as well as the overall value is an important factor to determine the outcome of a value. factors determine the value per its criteria and the final value with the calculation formula Weight summation. W value is the value of the metrics obtained from the processing of questionnaires and m is the weight of the sub factor or factors that have been obtained from the calculation using Rank Order Centroid (ROC).

Values Criteria :

$$Criteria(\text{a}) = \sum_{j=1}^{M} W_j . m_{ij} \ldots\ldots = w_1 m_1 + w_2 m_2 + \ldots\ldots \text{wnmn} \quad (2)$$

2. *CONTENTS OF RESEARCH*

2.1 *Analysis of Cross- Platform Based Application Development*

The analysis method is an analysis of the cases that describe how the application development process working with the exports of goods based cross platform. Stages - stages are as follows:

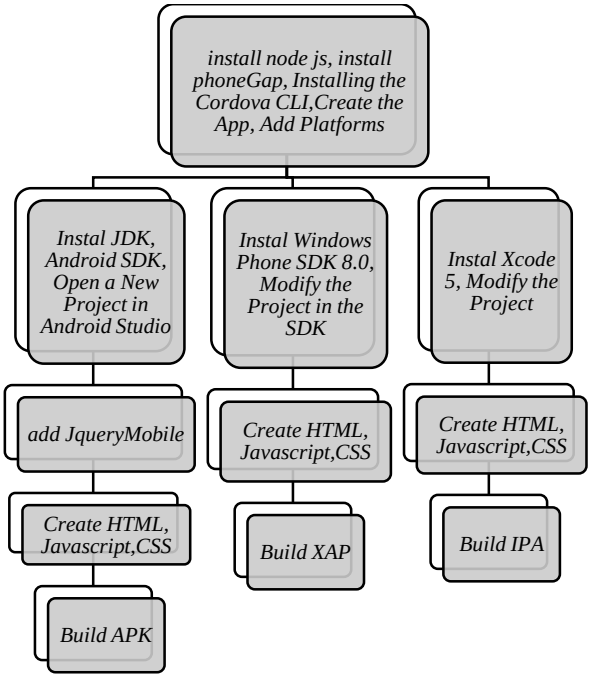


Figure 2.1 The flow chart based Cross Platform Application Development

The first step by installing Node.js which functions so that a server can execute JS script, then it must first be installed Node.js as a runtime environment for JavaScript. Then install phonegap through Node.js Command Prompt. Phonegap which has cross-platform compatibility and architecture are largely based on web service. PhoneGap is a library used for porting of web apps to native apps.

Furthermore, installing cordova via the Command Line Interface which provides a set of APIs (Application Programming Interface) to access the device from a mobile device, then Create App to create cross-platform-based applications and add platform to add on whatever platform the application will be built. Install the steps in the JDK, Android SDK, Android Studio is done so that the tools can run, then Open a New Project in the SDK on Android Studio tolls.

Install the Windows Phone SDK 8.0, do that tools Visual Studio 2012 for Windows Phone can be used due to the Windows Phone SDK 8.0 tools automatically installed Visual Studio 2012 for Windows Phone. Then Modify the Project in the SDK, which on the Android platform and Windows Phone adds Jquerymobile in the folder as a Javascript library to support the concept of cross-platform interface design with user-friendly interface. At this stage of the Create / modify HTML, Javascript, CSS can be accessed directly folders that you created in step Create App and coding is done according to the needs. The final stage by building applications on each - each platform.

2.1.1 Install node js and install phoneGap, Installing the Cordova CLI,Create the App, Add Platforms

Download Node.js can be downloaded on the official web NodeJs.org, and then install the application Node.js. NPM is a package manager node and installed with Node.js.



Figure 2.2 Install Node.js

NPM commands used in CLI PhoneGap to run on the local computer, create a folder node_modules with the necessary code required to run CLI. Function -g specifies that folders are installed in global locations so it can be accessed from anywhere on the computer.

Install Phonegap and Cordova via the Command prompt type the following:

```
npm install -g phonegap@latest_
```

Figure 2.3 Phonegap install command at the Command Prompt

```
npm install -g cordova
```

Figure 2.4 Cordova install command on the Command Prompt

To create a new project (Create App) and open the location address App has been created, type in the command prompt like to see the following:

```
cordova create beacukai.com.example.beacukai Beacukai
```

Figure 2.5 Command Create App on Command Prompt

```
cd Beacukai_
```

Figure 2.6 The order to move to a location app that was created on the Command Prompt

To add a platform that will be built (Add Platform) type at the Command prompt like to see the following:

```
cordova platform add android
cordova platform add ios
cordova platform add wp8_
```

Figure 2.7 The command to add a platform on the Command Prompt

2.1.2 Instal JDK, Android SDK, *Open a New Project* in Android Studio

Download Java JDK Latest Version of Java JDK can be downloaded on the official website www.oracle.com then choose Java Platform (JDK) followed by installing the JDK.



Figure 2.8 Download Java Development Kit

SDK Tools provides something that is used to start developing Android apps, the Android Platform-tools, platform Android, Android's emulator system image, Android Emulator. Download Android SDK on the official web http://developer.android.com/sdk/index.html followed by installing the Android SDK.

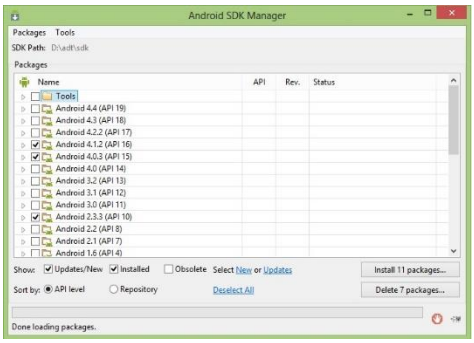


Figure 2.9 Install the Android SDK using the SDK Manager

The next step in the project open Android Studio, with:

1. *Select Import Project (Eclipse ADT, Gradle, etc).*
2. *Select the location where the android platform is stored.*



Figure 2.10 Open Studio Project On Android

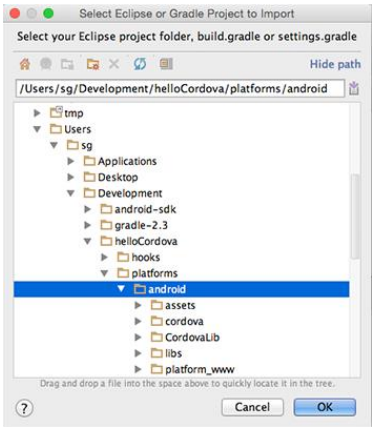


Figure 2.11 Location Android platform

2.1.3 Add JqueryMobile

Download JqueryMobile on the official web https://jquerymobile.com/download/ then jquerymobile who have downloaded extract the folder Javascript.

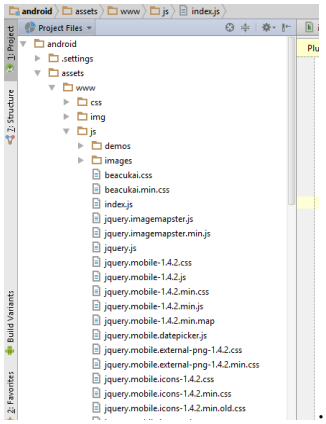


Figure 2.12 JqueryMobile Extract the folder js

2.1.4 *Create* HTML, Javascript,CSS

At the stage of HTML coding is done by adding a script to call jquerymobile file in js folder, then create coding as needed.

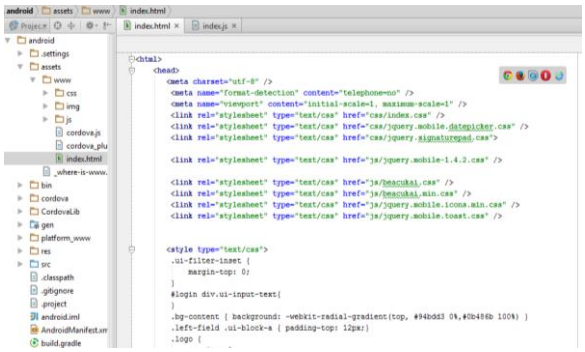
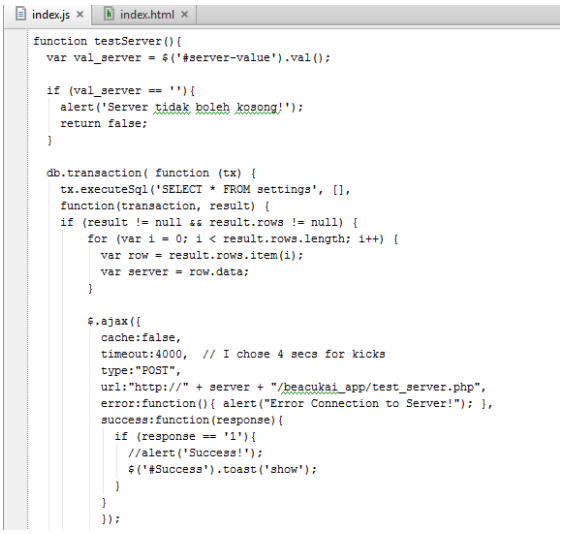


Figure 2.13 Adding a script to call jquerymobile in HTML

At the stage of Javascript coding is done on the file .index.js. The following example to test to the server.



```
function testServer(){
  var val_server = $('#server-value').val();

  if (val_server == ''){
    alert('Server tidak boleh kosong!');
    return false;
  }

  db.transaction( function (tx) {
    tx.executeSql('SELECT * FROM settings', [],
    function(transaction, result) {
    if (result != null && result.rows != null) {
        for (var i = 0; i < result.rows.length; i++) {
          var row = result.rows.item(i);
          var server = row.data;
        }

        $.ajax({
          cache:false,
          timeout:4000,  // I chose 4 secs for kicks
          type:"POST",
          url:"http://" + server + "/beacukai_app/test_server.php",
          error:function(){ alert("Error Connection to Server!"); },
          success:function(response){
            if (response == '1'){
              //alert('Success!');
              $('#Success').toast('show');
            }
          }
          });
```

Figure 2.14 Example Coding Function testServer

Here's an example for parsing JSON to retrieve data from SQL using parse JSON from Javascript to call into json encode in php.



```
function AddListJenisTPB(){

  $('#jenis_tpb_asal').empty();
  $('#jenis_tpb_tujuan').empty();
  var server = $('#server-value').val();
  console.log(server);

  $.post( "http://" + server + "/beacukai_app/data_TPB.php")
  .done(function( dataResponse ) {

    var response = jQuery.parseJSON(dataResponse);

    $('#jenis_tpb_asal').append('<option value="">Pilih...</option>');
    $('#jenis_tpb_tujuan').append('<option value="">Pilih...</option>');

    var tpb = '';

    $.each( response, function( key, value ) {

      tpb = '<option value="'+ value.id_jenis_tpb +'">'+ value.nama +'</option>';

      $('#jenis_tpb_asal').append(tpb);
      $('#jenis_tpb_tujuan').append(tpb);
    });

  })
  .fail(function() {
    alert( "Server Error!" );
  });
}
```

Figure 2.15 The script parse JSON in Javascript



```
<?php
  include('db_connect.php');

  $sql = "SELECT * FROM `jenis_tpb` ";
  $result = mysql_query($sql);

  $no = 1;

while ($data = mysql_fetch_assoc($result)){

    $TPB[$no] = $data;
    $no++;
}

  echo json_encode($TPB);
?>
```

Figure 2.16 Select query in PHP

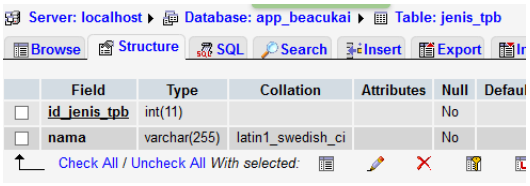


Figure 2.17 Table jenis_tpb in MySql

2.1.5 *Build APK*

At APK build steps - steps click Run, and then edit the configuration, and then configure the Android Test, and the module into Android API emulator into a nexus 5 21 X86.

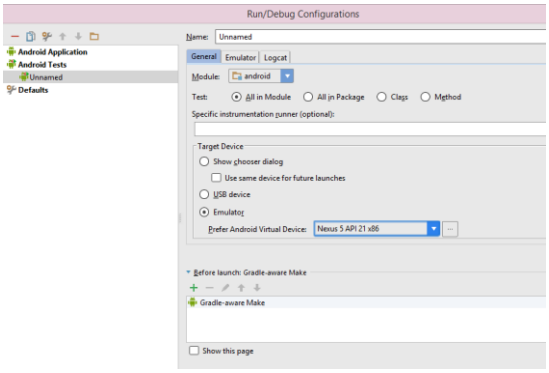


Figure 2.18 Edit Configuration

Next to running an application can be made to the device directly, or use the BlueStacks Android emulator or studio.

2.1.6 Instal Windows Phone SDK 8.0, *Modify the Project in the* SDK

Download Windows Phone SDK 8.0 on the official web https://dev.windows.com/en-us/develop/download-phone-sdk then install the Windows Phone SDK. When the install process is complete open Visual Studio Express 2012 For Windows Phone and select Open Project.



Figure 2.19 Install Windows Phone SDK

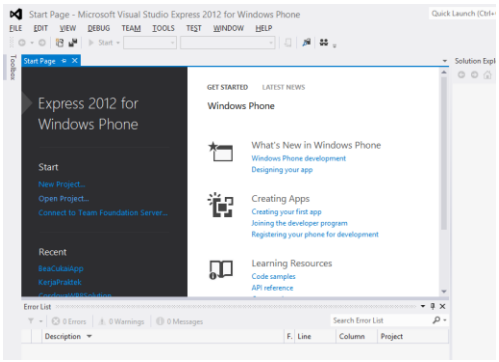


Figure 2.20 Open Project in Visual Studio Express 2012 for Windows Phone

2.1.7 *Modify HTML, Javascript,CSS*

At this stage, copy the www folder on the android platform assets, then paste in Windows Phone 8 platform.

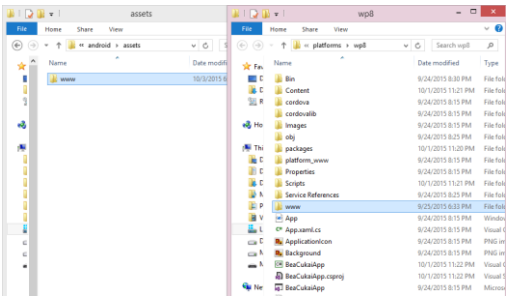


Figure 2.21 Copy the folder www

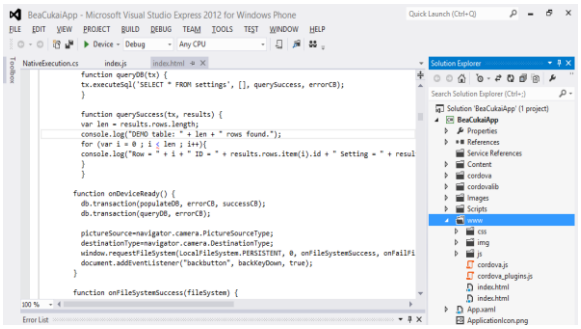


Figure 2:22 www folder

2.1.8 *Build* XAP

In the build XAP as an extension for applications in Windows Phone steps - steps click Run WVGA 512MB emulator or device to direct.

2.1.9 *Install* Xcode 5, *Modify the Project*

Install Xcode 5 with a minimum of OS Maverick or Yosemite. When the install process is complete open Xcode and select Other Project.



Figure 2.23 Install Xcode 5

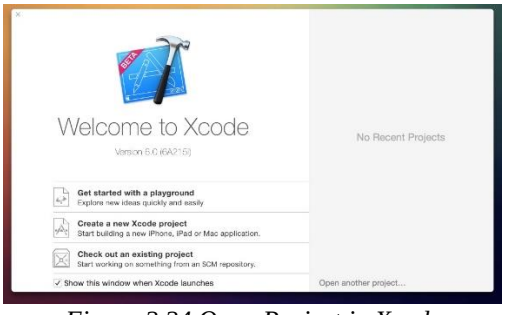


Figure 2.24 Open Project in Xcode

2.1.10 *Modify* HTML, Javascript,CSS

At this stage, copy the www folder on the android platform assets, and then paste it on the iOS platform.

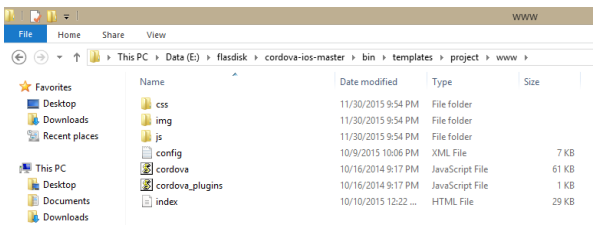


Figure 2:25 Copy the folder www

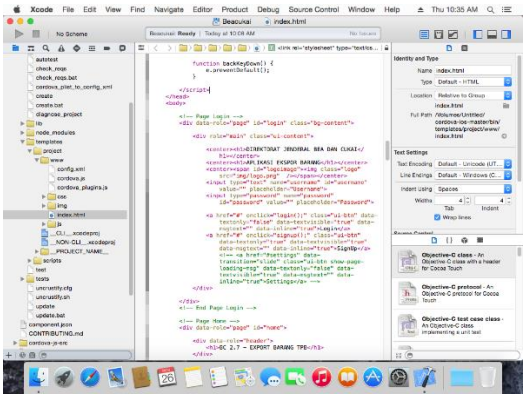


Figure 2:26 www folder

2.1.11 Build IPA

In the IPA as an extension to build applications in IOS, the steps - steps create a certificate, and then enter the apple developer account. The next stage in the account register our device developer based UID IOS devices are used, the last stage did proposioning. We can also try the app on the emulator. Stride click WVGA 512MB emulator run.

2.2 Final Assessment of Quality in Use

Weighting on quality in use using the ROC. Productivity has the greatest interest due to the use of the metrics most are 5 metrics and safety in the next sequence with the three metrics, followed by the two metrics effectiveness and satisfaction as in table below.

Table 2.1 Weighting Quality In Use Android

Sub Factors	*Weight*
Productivity	$W1 = \frac{1+\frac{1}{2}+\frac{1}{3}+\frac{1}{4}}{4} = 0.52$
Safety	$W2 = \frac{0+\frac{1}{2}+\frac{1}{3}+\frac{1}{4}}{4} = 0.27$
Effectiveness	$W3 = \frac{0+0+\frac{1}{3}+\frac{1}{4}}{4} = 0.15$
Satisfaction	$W3 = \frac{0+0+0+\frac{1}{4}}{4} = 0.06$

Quality In Use =
(*w productivity* * *v Productivity*) +
(*w safety* * *v safety*) +
(*w effectiveness* * *v effectiveness*) +
(*w satisfaction* * *v satisfaction*)

Quality In Use =
(0,76 * 0,52) + (0,97 * 0,27) +
(0,53 * 0,15) + (0,44 * 0,06)
= 0,39 + 0,26 + 0,07 + 0,02 = 0,74

Table 2.2 Weighting Quality In Use IOS

Sub Factors	*Weight*
Productivity	$W1 = \frac{1+\frac{1}{2}+\frac{1}{3}+\frac{1}{4}}{4} = 0.52$
Safety	$W2 = \frac{0+\frac{1}{2}+\frac{1}{3}+\frac{1}{4}}{4} = 0.27$
Effectiveness	$W3 = \frac{0+0+\frac{1}{3}+\frac{1}{4}}{4} = 0.15$
Satisfaction	$W3 = \frac{0+0+0+\frac{1}{4}}{4} = 0.06$

Quality In Use =
(*w productivity* * *v Productivity*) +
(*w safety* * *v safety*) +
(*w effectiveness* * *v effectiveness*) +
(*w satisfaction* * *v satisfaction*)
Quality In Use =
(0,8 * 0,52) + (0,9 * 0,27) +
(0,52 * 0,15) + (0,48 * 0,06)
= 0,41 + 0,24 + 0,08 + 0,03 = 0,76

Table 2.3 Weighting Quality In Use Windows Phone

Sub Factors	*Weight*
Productivity	$W1 = \frac{1+\frac{1}{2}+\frac{1}{3}+\frac{1}{4}}{4} = 0.52$
Safety	$W2 = \frac{0+\frac{1}{2}+\frac{1}{3}+\frac{1}{4}}{4} = 0.27$
Effectiveness	$W3 = \frac{0+0+\frac{1}{3}+\frac{1}{4}}{4} = 0.15$
Satisfaction	$W3 = \frac{0+0+0+\frac{1}{4}}{4} = 0.06$

Quality In Use =
(*w productivity* * *v Productivity*) +
(*w safety* * *v safety*) +
(*w effectiveness* * *v effectiveness*) +
(*w satisfaction* * *v satisfaction*)
Quality In Use =
(0,28 * 0,52) + (0,77 * 0,27) +
(0,51 * 0,15) + (0,21 * 0,06)
= 0,15 + 0,21 + 0,07 + 0,01 = 0,44

Table 2.4 Measurement Category Quality In Use for Android

Quality In Use Measurement Category		
Quality In Use	*Caracteristic*	*Weight (High / Medium /Low)*
	Effectiveness	*Medium*
	Productivity	*High*
	Safety	*Medium*
	Satisfaction	*Medium*

It can be concluded that the value of the final Quality In Use is 0.74 against the application of export goods with Android OS included into the category of medium or medium quality, which means the software is pretty good in terms of quality of usage. It is seen and assessed based on four factors that exist at

the Quality In Use namely Effectiveness, Productivy, safety and Satisfacation.

Table 2.5 Measurement Category Quality In Use for IOS

Quality In Use Measurement Category		
Quality In Use	*Caracteristic*	*Weight (High / Medium /Low)*
	Effectiveness	*Medium*
	Productivity	*High*
	Safety	*High*
	Satisfaction	*Medium*

It can be concluded that the value of the final Quality In Use is 0.76 against the application of export goods with OS IOS included into the category of high or very high quality, which means the software is very good in terms of quality of usage. It is seen and assessed based on four factors that exist at the Quality In Use namely Effectiveness, Productivy, safety and Satisfacation.

Table 2.6 Measurement Category Quality In Use for Windows Phone

Quality In Use Measurement Category		
Quality In Use	*Caracteristic*	*Weight (High / Medium /Low)*
	Effectiveness	*Medium*
	Productivity	*Low*
	Safety	*High*
	Satisfaction	*Low*

It can be concluded that the value of the final Quality In Use is 0.44 against the application of export goods with OS Windows Phone included into the category of low or of low quality, which means the software is not good in terms of quality of usage. It is seen and assessed based on four factors that exist at the Quality In Use namely Effectiveness, Productivy, safety = and Satisfacation.

5. CONCLUSION

Application of cross-platform mobile app on the app exports of goods, which is applied to the iOS platform has the most excellent quality (test result values Quality In Use 0.76) compared with the Android platform (test results Quality In Use value 0.74) and Windows Phone (test results quality in use value of 0.44) this result is used as the material for the Customs decision to launch the application of export goods to the exporter on the iOS platform and Android, which have good quality.

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