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Swim Lane Model Of Quasi-Automated Enterprise Mail Management System For University Of UYO

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***Abstract*— Swim lane model of quasi-automated enterprise mail management system for University of Uyo is presented. The mail management system combines some manual documentation of physical hardcopy mails with computerised online documentation of the same physical hardcopy mails. The functional decomposition of the quasi-automated enterprise mail management system is presented. The swim lane model of each of the functional units is also presented. The swim lane model captures the actors and the sequence of actions they actors perform in the course of implementing the functional unit. In all, the system is a quasi-automated system with offline and online components. The essence of the online component of the system is to facilitate speedy tracking of mails and interfacing of the mailing system with the other automated processes in the case study enterprise.**

***Keywords*— Quasi-Automated System, Enterprise Mail Management System, Swim Lane Model, Model Actors, Value-Added Mail Services**

1. Introduction

In recent years, the effort of many enterprises is to improve their service delivery through adoption of modern tools and procedures [1,2,3,4,5,6,7,8,9,10]. This has become necessary because of globalisation and the attendant highly competitive market [11,12,13,14,15,16,17,18,19,20]. Among other processes, mail or document management process is key to the daily operation of many organisations and timely delivery treatment and tracking of documents are essential for acceptable quality of service [21,22,23,24,25,26,27,28]. While off-the-shelf solution may suffice for some organisations, some others may need customized solutions due to their peculiar mail management procedure.

In many cases, organisations that use manual approach to mail management usually transition to automated version in phases, starting with a quasi-automated system whereby the old manual method runs concurrently with the automated system. In this paper, a quasi-automated enterprise mail management system for University of Uyo is studied [29,30,31,32]. Specifically, functional decomposition of the entire case study mail and document management system is presented along with the description of each of the functional units or modules. In addition, some value-added mail management services are also included such as mail tracking, mail reference management and mail citation management.

Importantly, the swim lane model for each of the modules was developed. The swim lane model is a pictorial presentation of the sequence of activities by the different actors in the given module [33,34,35,36]. Notably, the swim lane model provides sufficient details for the development of a web application that will implement the mail management processes as captured in the functional decomposition.

2. Description of the quasi-automated Enterprise Mail Management System (EMMS)

The mail management system combines some manual documentation of physical hardcopy mails with computerised online documentation of the same physical hardcopy mails. As such, it is a quasi-automated mail management system. The essence of the online system is to facilitate speedy tracking of mails and interfacing of the mailing system with the other automated processes in the case study enterprise. The key functionalities of quasi automated mail management system consist of the following (as shown in the functional decomposition diagram of the system in Figure 1):

i. File indexing function
ii. Generate mail, submit/dispatch mail and receive mail function
iii. Incoming mail file and outgoing mail file processing function
iv. Filing mail, retrieving mail and refiling mail function
v. Value-added mail handling services such as automated mail tracking, file reference listing, file citation listing functions and file copy referencing function

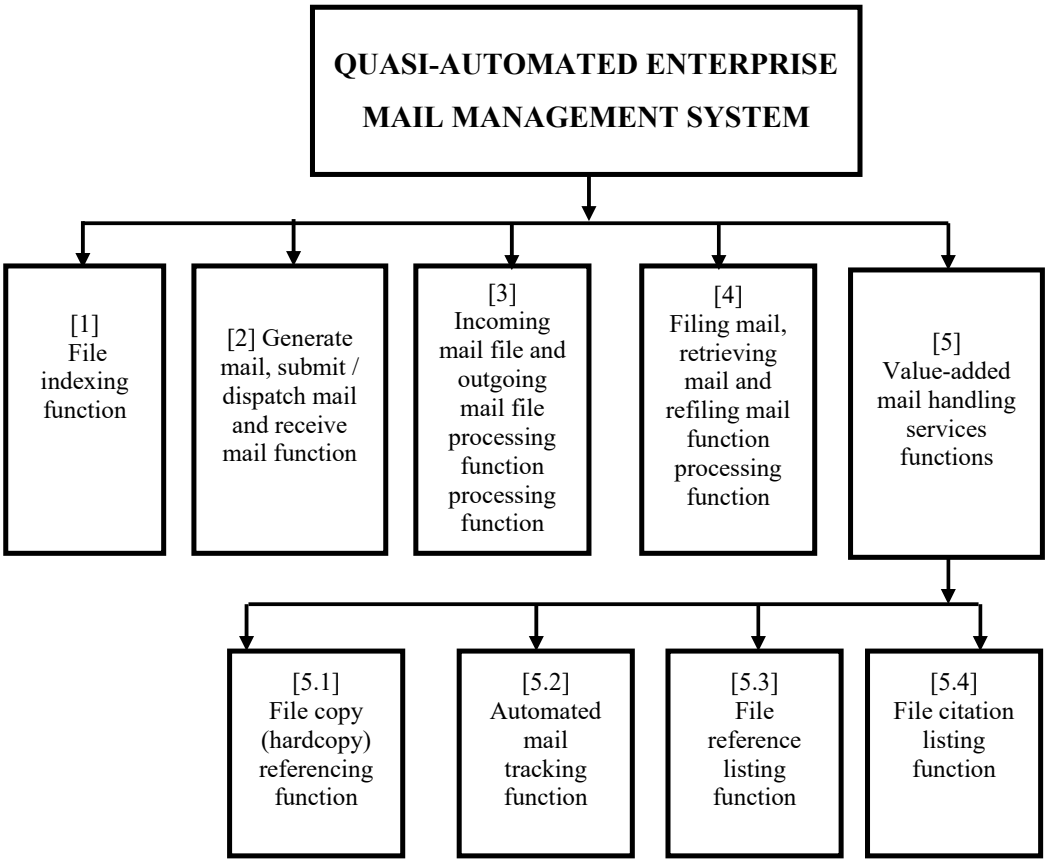

Figure 1 The functional decomposition diagram of the Quasi-automated Enterprise Mail Management System

3. Development of the Swim Lane Model

The quasi-automated Enterprise Mail Management System (EMMS) functions modelled using the swim lane are derived from the functional decomposition of the EMMS (shown in Figure 1) and they consist of the following:

i. The swim lane model for the setup file index function
ii. The swim lane model for the generate, dispatch, submit and receive mail functions
iii. The swim lane model for the incoming mail file and outgoing mail file process functions
iv. The swim lane model for filing mail in a file index folder, retrieving mail from file index folder and refiling mail in a file index folder functions
v. The swim lane model for implementing the selected value-added mail services using the EMMS

In reality, most of the swim lane models capture a group of related functionalities of the mail management system. The details of each of the swim lane model and the functionalities they captured are presented in the preceding section.

3.1 The Swim Lane Model for the Setup File Index Function

As noted in the title, the Quasi-automated Enterprise Mail Management System combines some offline manual hardcopy documentation with the automated online EMMS web application. As such, the items needed for the hardcopy manual operation are prepared at this stage. Accordingly, the setup file index function is where the mail management staff (denoted as M_DDR_STF) is required to identify all the different file folders that need to be created for keeping the file copy of any mail that need to be filed. The list of file folders is referred here as the file index. It require that physical hardcopy file folders are created and documented on a physical hardcopy logbook for file index. The key parameters for documenting the file index and the listed file folders are captured in the file index logbook.

Furthermore, the other hardcopy books required for received mails and dispatched mails are prepared at this stage. The detailed information contained in the offline logbooks and extra information for automated management of the mails are keyed into the web application for the EMMS. The swim lane model for the setup file index function is presented in Figure 2 while the information needed for the implementation of the file index setup in Figure 2 are presented in Table 1.

According to swim lane model in Figure 2, there are two main actors, one, the mail management staff (denoted as M_DDR_STF) and two, the Enterprise Mail Management

System web application (denoted as EMMS). The M_DDR_STF logs into the EMMS web application to perform the online components of the task while the EMMS verifies the login details of the M_DDR_STF and then grants access based on the use privileges of the M_DDR_STF. The M_DDR_STF performs the offline tasks, updates the information on the EMMS web application while the EMMS generates the printer ready version of the updated information for the M_DDR_STF to use to update the offline logbooks. In this way, the online and the offline documentation parameter values are synchronized.

At the end of the implementation of the swim land function modelled in Figure 2, there will be read logbooks for the file index, log book for the received mails, logbook for the dispatched mails and also file folder for each of the file categories listed in the file index.

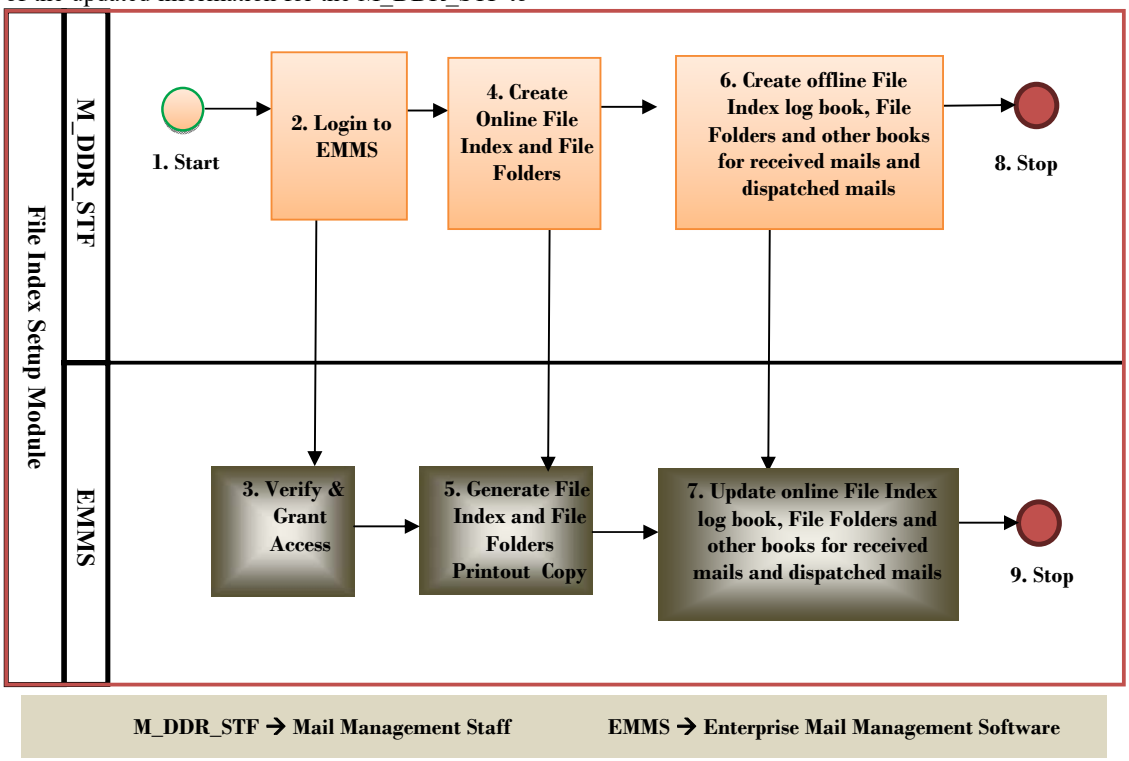

Figure 2. The swim lane model for the Setup file index

Table 1 The information needed for the implementation of the file index setup in Figure 2

S/N	File index list group parameters	Individual file folders parameters
1	The file index list group name	File folder name
2	File index version number	File folder index number
3	File index list creation date	File folder creation date
4	File index list creation time	File folder creation time
5	Name of Person that created the file index version	Name of Person that created the File folder

3.2 The swim lane model for the generate, dispatch, submit and receive mail functions

This swim lane (in Figure 3) captures three different functionalities, namely, generate or originate mail, dispatch mail and receive mail. Each of these functionalities may involve any or all of the following three actors; one, the mail source (denoted in the swim lane as M_SOURCE), two, the mail management staff (denoted as M_DDR_STF) and three, the Enterprise Mail Management System web application (denoted as EMMS).

Notably, the mail source (M_SOURCE) can be the head of unit/department, student, staff, parent/guardian, applicants, general public or mail on transit and mail received from other units. The mail source (M_SOURCE) must ensure that the required key information listed in column 1 of Table 2 are provided in the mail. The mail management staff (M_DDR_STF) receives or dispatches mails. Upon reception of a mail, the M_DDR_STF must check that the required information listed in column 1 of Table 2 are included in the mail. After the check, the M_DDR_STF receives the mail, stamps it received, assigns mail tracking number (if there is none on the mail) and carry on with the online and offline documentation of the mail, as specified in the swim lane model of Figure 3. The required key information listed in column 2 of Table 2 must be used by the M_DDR_STF in the documentation of the received mail.

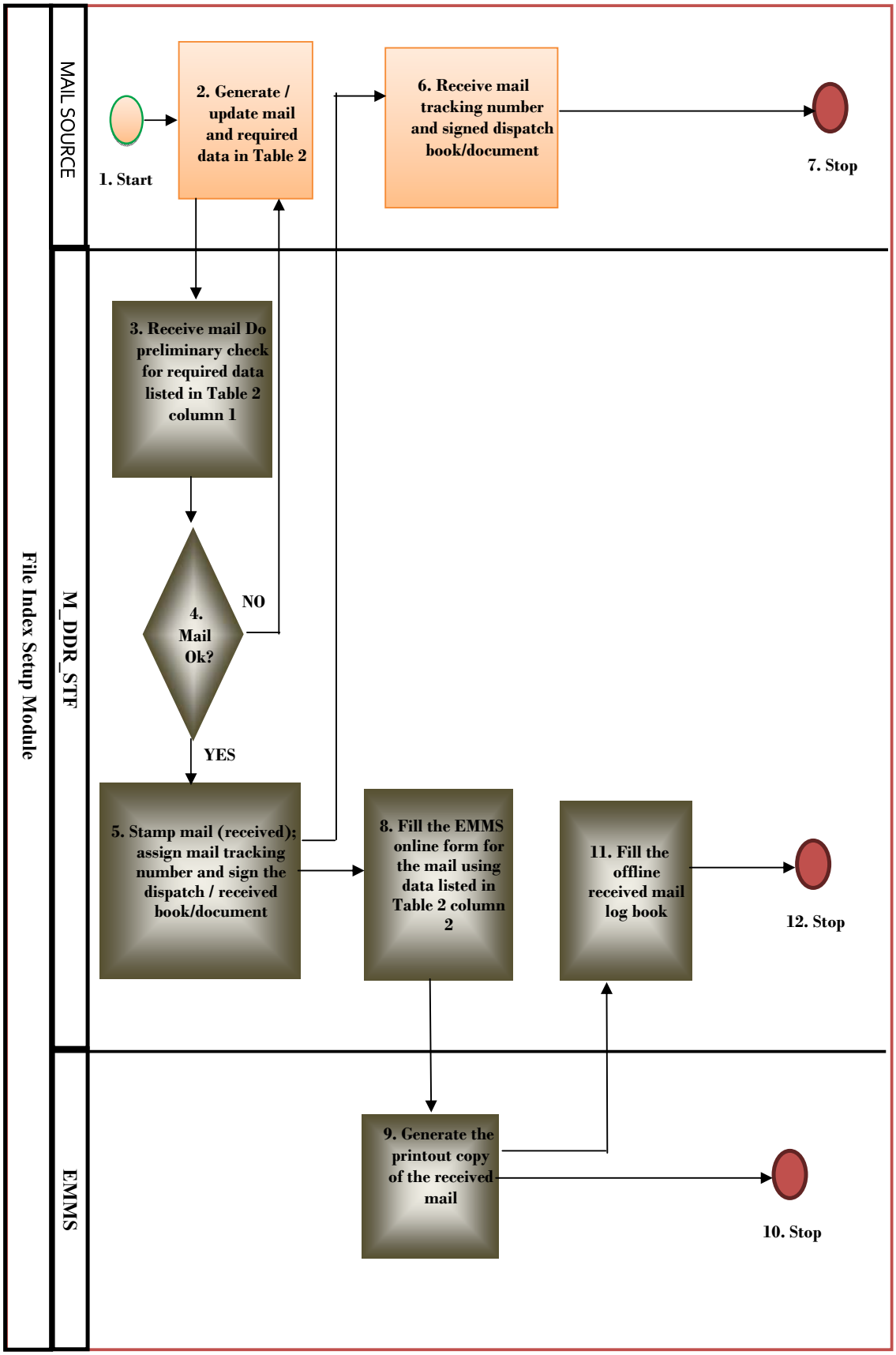

Figure 3. The swim lane model for the generate, dispatch, submit and receive mail module

Table 2 The data required for the generate, dispatch, submit and receive mail module

Description of Parameters required in the Generate Mail Module	**Description of Parameters required in the Submit/Receive Mail Module**	**Variable name for the parameter**
Mail title	Mail title	M_Title
Final destination address	Final destination address	M_DestAddrTo
Intermediate destination addresses	Intermediate destination addresses	M_DestAddrThro[k] for k =0,1,2,…kmax
Mail distribution information	Mail distribution information	M_DestAddrCc[j] for j =0,1,2,…jmax
Mail tracking number	Mail tracking number	M_TNum
Mail source name	Mail source name	M_SName
Registration number for students	Registration number for students	M_SRegNum
Mail source Phone Number	Mail source Phone Number	M_SPhone
Mail source email	Mail source email	M_SEmail
Mail source contact address	Mail source contact address	M_SAddr
	Mail received date	M_RDate
	Mail received time	M_RTime

3.3 The swim lane model for the incoming mail file and outgoing mail file process functions

When the received mails must be passed to the head of unit/department (denoted as H_UNIT/DEPT) the mail management staff (denoted as M_DDR_STF) must send put the mails in an incoming file and then pass the file to the H_UNIT/DEPT. Conversely, after treating the incoming mails, the H_UNIT/DEPT must use an outgoing mail file to pass the mails back to the M_DDR_STF for further actions, as specified by the H_UNIT/DEPT or as required by the mail. The list of possible action that mail be specified are as listed in Table 3. The list of required parameters that are required for documenting and managing the incoming mail file and the outgoing mail file are as listed in Table 4. The swim lane model for the incoming mail file and outgoing mail file process is shown in Figure 4.

Table 3 Some actions that can emanate from treating a file by the head of unit/department

S/N	**Description of Possible Actions**
1	Include in the 1ncoming file for the unit/departmental head
2	Dispatch mail
3	Photo copy mail
4	File/retrieve mail
5	Paste on notice board
6	Drop in the pigeonhole
7	Include in the keep in view (KIV) file
8	Treated for dispatch (Comment or specify next action and ready for dispatch)
9	Pending (mail is being processed)
10	Mail not seen
11	Destroy/discard
12	Trash or put the mail in trash can
13	Other action (specify)

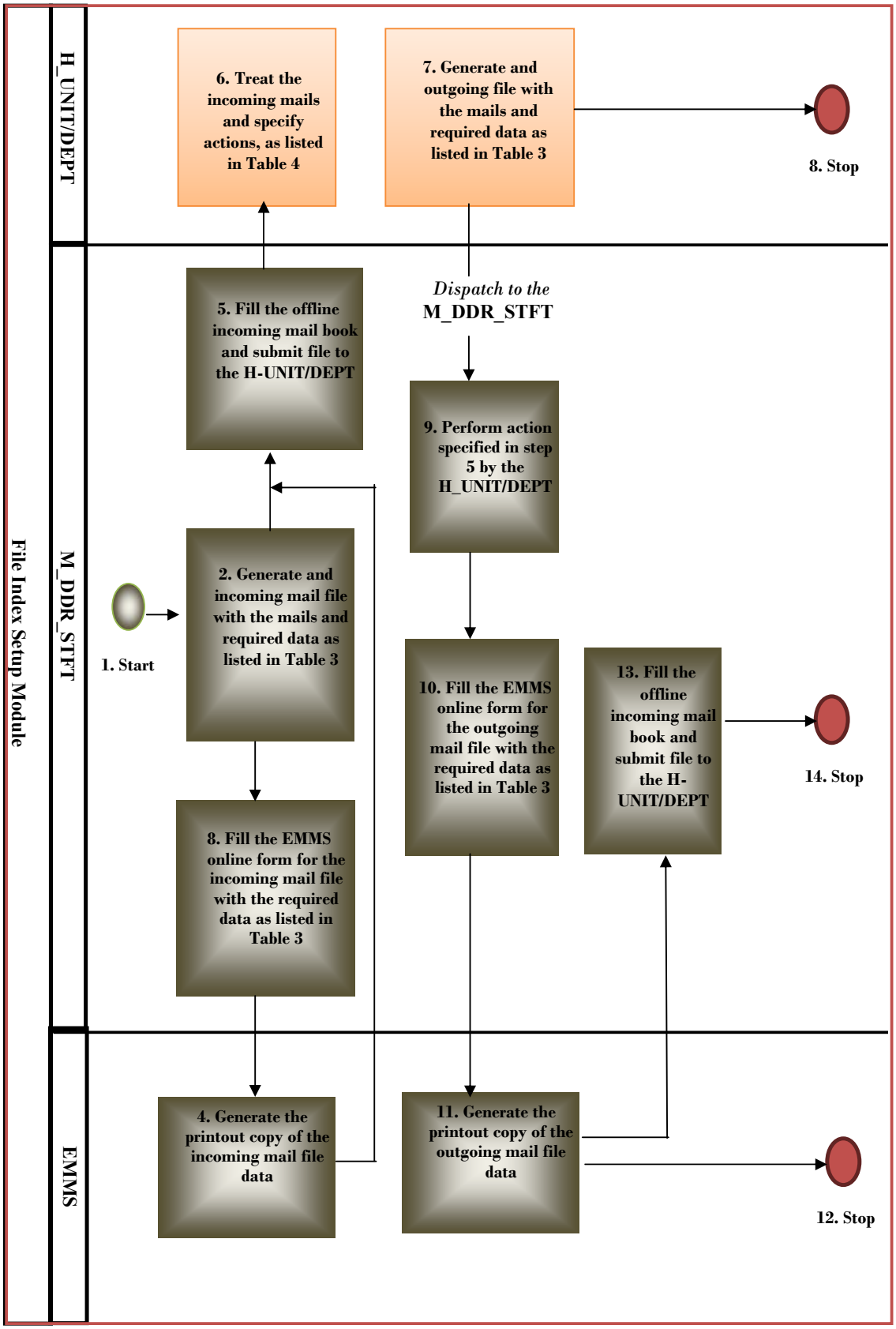

Figure 4. **The swim lane model for the incoming mail file and outgoing mail file process**

Table 4 Required Incoming and Outgoing File Parameters

Required Incoming File Parameters	**Variable name for the parameter**
Incoming file batch number File	InComingBNum
Incoming file batch date File	InComingBDate
Incoming file batch time File	InComingBTime
Number of mails in Incoming file batch File	InComingMN
Mail title	MailTitle [k] for k = 1,2,3,… InComingMN
Mail tracking number	MailTN[k] for k = 1,2,3,… InComingMN
Required Outgoing File Parameters	**Variable name for the parameter**
Outgoing file batch number File	InComingBNum
Outgoing file batch date File	InComingBDate
Outgoing file batch time File	InComingBTime
Number of mails in Outgoing file batch File	InComingMN
Mail title	MailTitle [k] for k = 1,2,3,… InComingMN
Mail tracking number	MailTN[k] for k = 1,2,3,… InComingMN

3.4 The swim lane model for filing mail in a file index folder, retrieving mail from file index folder and refiling mail in a file index folder functions

The swim lane model for filing mail in a file index folder, retrieving mail from file index folder and refiling mail in a file index folder is presented in Figure 5. The swim lane model in Figure 5 captures three functionalities, one is for managing filing a mail in the file folder listed in the file index, two is for retrieving of file from the file folder listed in the file index and the third function if for refiling mail that was retrieved at some point from the file folder listed in the file index. The actions in the swim land model of Figure 5 are performed by the mail management staff (denoted as M_DDR_STF) and then documented on the EMMS web application. Required parameters for filing mail in a file index folder, retrieving mail from file index folder and refiling mail in a file index folder are presented in Table 5.

Table 5 Required parameters for filing mail in a file index folder, retrieving mail from file index folder and refiling mail in a file index folder

S/N	Required parameters	**Variable name for the parameter**
1	File action preformed option denoted as FIL_ACT: i. filing mail in a file index folder ii. retrieving mail from file index folder iii. refiling mail in a file index folder	i. Filingact ii. Retrivact iii. Refilact
2	File Folder Index Name	Findex_Foldname
3	File Folder Index Number	Findex_Foldnum
4	Mail Tracking Number	M_TN
5	File action Date	Findex_Filedate
6	File action Time	Findex_Filetime
7	File action Staff Name	M_DDR_STF_Phone
8	File action Staff Phone Number	

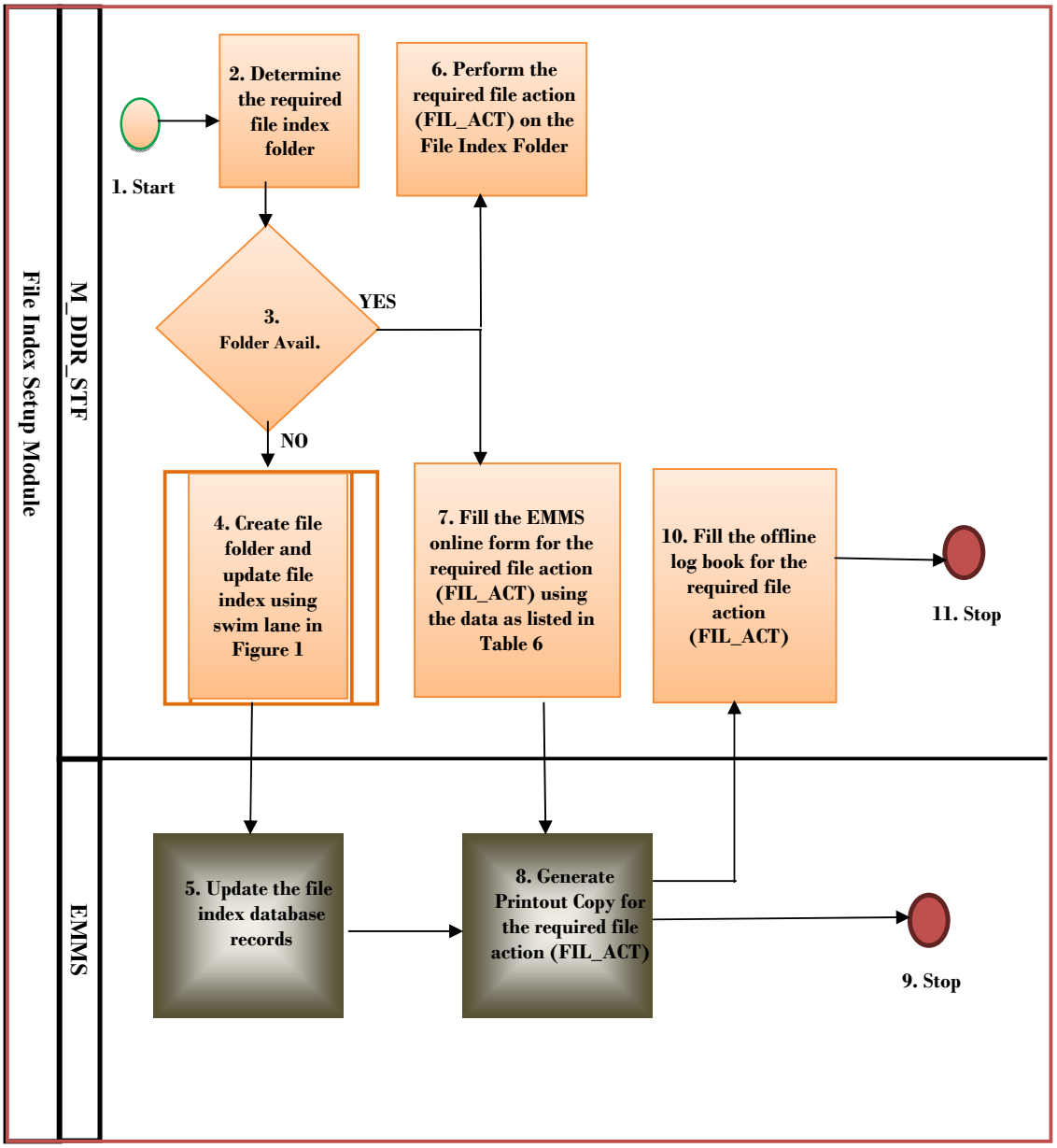

Figure 5. The swim lane model for filing mail in a file index folder, retrieving mail from file index folder and refiling mail in a file index folder

3.5 The swim lane model for implementing the selected value-added mail services using the EMMS

The main essence of automation of the mail management system is to provide some value-added services which makes automation most desirable. The EMMS will facilitated easy tracking of mails and access to mail history and trajectory from inception of the mail till the present moment. This is captured in the swim lane model as mail tracking service. The value added services that are captured in swim lane model are as follows;

i. Mails Tracking Details
ii. Mails File Copy Details
iii. Mails References Details
iv. Mails Citation Details

The file copy service is used to document and report on mails with file copies in the file folders listed on the file index. The mail reference service is used to manage all the mails that a mail cited. It also associate the mail tracking number with the mail reference number included by the mail source. The mail citation service is used to manage all the mails that cited the given mail. It also associate the mail tracking number with the mail reference number included by the mail source. The swim lane model for implementing the selected value-added mail services using the EMMS is presented in Figure 6.

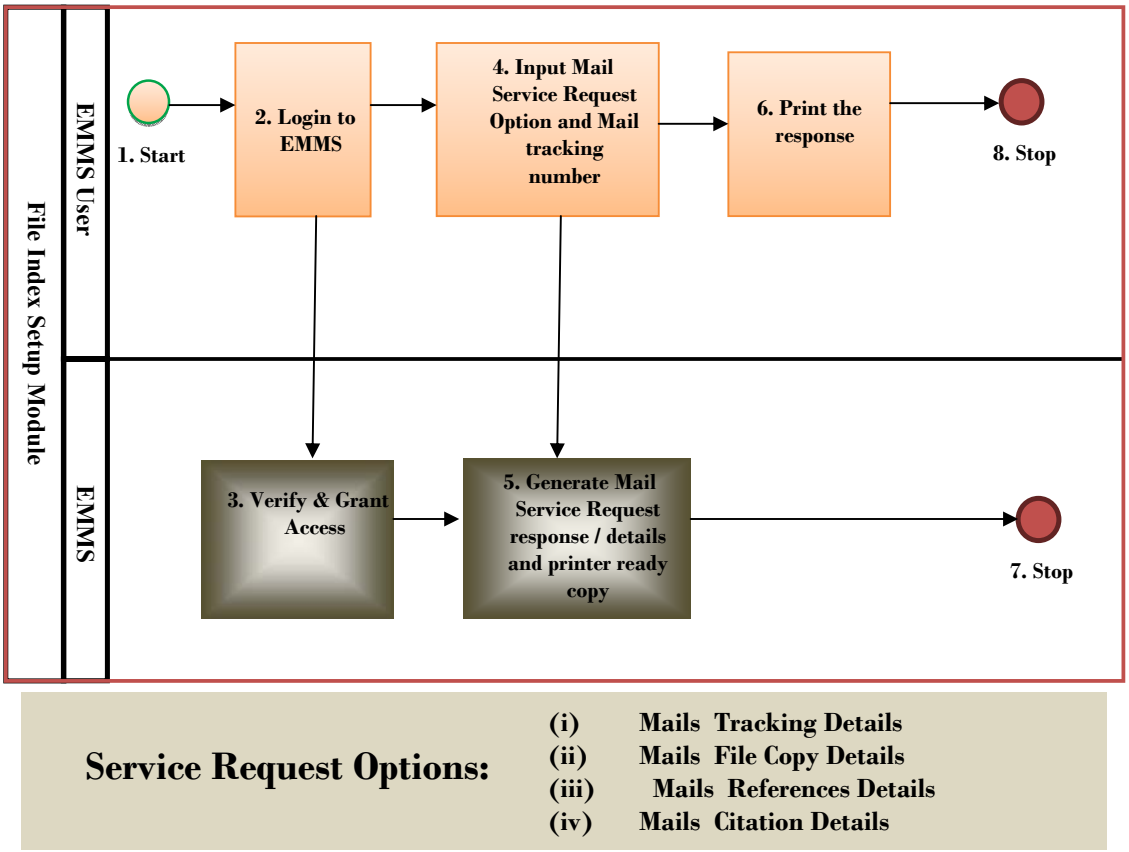

Figure 6 The swim lane model for implementing the selected value-added mail services using the EMMS

4. Conclusion

The swim lane model for a quasi-automated Enterprise Mail Management System (EMMS) is presented, with University of Uyo intra-enterprise mail management process as the case study. The work in this paper used a five major subdivision of the functionalities of the EMMS to present the swim lane model and the required parameters for the implementation of the model. The relevant actors for each swim lane model were identified along with the requisite milestones at the end of each model.

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