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# BUSINESS PROCESS MODELLING USING RIVA AND ARIS – PART 1, PROCESS ARCHITECTURE DEVELOPMENT: COMPARATIVE STUDY (7)

Dina Tbaishat

*University of Jordan*, [d.tbishat@ju.edu.jo](mailto:d.tbishat@ju.edu.jo)

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# **Business Process Modelling Using Riva and ARIS – part 1**

## **Process Architecture Development: comparative study**

**D. Tbaishat (University of Jordan)**

### **Abstract**

Business process modelling has been given great attention due to its crucial role in developing computer-based systems that support (and automate) organizational processes. In information systems; building the right process architecture is vital, since a poor division of organizational processes can lead to complex designs or incoherent structure. Moreover, process architecture acts as a "big picture" of what the organization does, and represents dynamic relationships between the existing processes, which in turn helps understand how the organization works (Ould, 2005). A number of process architecture methods are available, however, few studies focused on assessing these methods, and comparing some of them to find out how easy they are to be used in particular contexts, and whether they can be standardized. In a previous work for the author, ARIS was used to generate a process architecture diagram for academic libraries (Tbaishat, 2015). This paper discusses the derivation of a Process Architecture Diagram (PAD) using Riva method in detail; in contrast to the process architecture diagram developed using ARIS. The information system selected as an example for this comparative study is in the context of academic libraries, embedding various –generic - library processes. ARIS is more professional tool that can be used to support large organizational systems with clear division of processes, many users and less complicated architecture. The translation from ARIS process architecture to Riva's PAD is not likely to be straightforward, since there are major differences between the two methods, and it will rely on the analyst's ability of interpretation.

**Key words:** ARIS, Riva, process architecture, process improvement, and business process modelling

## 1. Introduction

Many organizations adopt the idea of developing process architecture in order to identify, analyze and model their business processes effectively. Process architecture development is part of business process modelling. It embraces organizational processes and their relationships. It also helps understand processes and support their improvement. Cauvet and Guzelian (2008) suggest that business process modelling is used to automate business processes to increase productivity, and to evaluate, hence, improve existing processes. Harmon (2003) recommends building process architecture before individual processes are selected, modelled and supported by any computer-assisted software. The process architecture is then expected to guide process development to ensure appropriate interrelation. A number of process architecture methods are available in the literature, but few studies focused on assessing these methods, and comparing some of them to find out how easy they are to be used in particular contexts, and whether they can be standardized.

Although modelling processes using flow-charts has been part of software development since 1946, the current generation of analysts replaced this term (flow-charting) with process modelling (Rosemann, 2006). Business process re-engineering or improvement however is quite new, and there has been a change in terminology since the early 1990s. The original perspective on business processes was to use information technology to achieve efficiency, or to use methods to improve operative manufacturing processes (Tinnilä, 1995). Many articles have emerged in the literature since then, supporting the concept of process management and improvement using different terms such as: business process redesign, business restructuring and business process re-engineering (Zairi and Sinclair, 1995).

Green and Ould (2004) believed that there is "absence of a critical comparative analysis of different kinds of process architecture (and their associated development methods)". Since then, only a few studies emerged in the literature assessing different process architecture methods, and comparing some of them to find out how easy they are to be used in particular contexts, leaving the literature in that area still poor. Example of such comparison studies is Dijkman, Vanderfeeston and Reijers (2011) research that explores different process architecture approaches and provides a comparison of the usefulness of these design approaches. The authors classified

possible business process architecture approaches into five categories, these are: goal-based, action-based, object-based, reference model-based and function based. Such classifications helped researchers look at how processes are selected and how their relationships are identified, which indeed varies from one approach to another, for instance; Kavakli and Loucopoulos (1999) consider organization's goals to be the centre of process architecture. Lunn, Sixsmith, Linsay and Vaarama (2003) introduced a process architecture based on a logical grouping of events that is considered to be a vital element of a business.

To enrich the literature in this area, and to add value in terms of addressing the problem of selecting the appropriate process architecture approach, in a given situation, amongst a number of proposed methods, this paper investigates the use of two process architecture methods in the context of academic libraries, the first method is Riva; proposed by Martyn Ould (Ould, 2005), and it is explained and generated in detail in section 2. The second method is ARIS; developed by Professor A. W. Scheer (Rippl, 2005). The architecture using ARIS however is derived from previous work by the author (Tbaishat, 2015). Therefore; the purpose of this paper is to introduce and generate the PAD using Riva, and then compare it with the process architecture using ARIS; that has been applied before. The two architecture diagrams were compared in terms of notations, semantics and many other aspects. The paper reflects on the experience of using the two methods, and explores the possibility of translation from one method to another.

## **2. Development of the Process Architecture Diagram (PAD) using Riva**

Ould (2005) argues that a process is about people doing business, how they do it, how they think they do it and how they can make it better. A process is basically a set of activities that interact together to achieve a certain goal. Ould (2005) stresses the importance of constructing process architecture by stating that it is a concept of central importance for any work with processes. Ould (2005) developed the Riva method, which received attention in the UK. Fady and Beeson (2009) used the PAD to reveal the structure of business processes in a port. Beeson, Green and Kamm (2013) used the PAD to build process architecture for higher education. Ould asserts

that the PAD is invariant for an organization that stays in the same business. This particular kind of process architecture proposed within the Riva approach is based upon key entities in an organization. An Essential Business Entity (EBE) can be physical or concrete, such as a customer or a clinical trial. Those entities are part of the essence of the business and they are things one cannot get away from.

Before going ahead with identifying the business entities as a preparation for building the diagram, it is worth emphasizing that the list of EBEs developed here are going to be generic, applicable as far as possible to the “typical academic library and information service”. The process architecture should be at a high enough level of abstraction to allow for some variation in the priorities that individual services might wish to emphasize – the aim was to provide a PAD that could represent “what academic libraries are about”. The final PAD developed in this research is an attempt to understand how the organization (library) sees itself in relation to its environment, and for others to judge how its ‘nervous system’ operates.

The information used to derive the PAD was provided by two UK university library academic staff interviewed in 2008 as part of the researcher's doctoral thesis (Tbaishat, 2012). The PAD developed at that time was published by Urquhart and Tbaishat (2016), but without any details of the steps undertaken. For this paper, a new version of the PAD is developed; new entities, hence processes were added, as the researcher passed it on again to library staff in a UK academic library in 2015. Moreover, the details of steps undertaken are provided.

The first step in developing a PAD is to identify essential business entities. The procedure followed Ould’s list of questions (Ould, 2005, p.174):

What do we make?

Classified catalogues of holdings, subject guides to electronic resources, repositories, access tools, alerting tools.

What do we sell?

Access to media/document management services (printing, binding, photocopying services), software/hardware.

What product lines do we have?

Digital library, digital repository, digital repository branding and marketing, publications, resource sharing and re-use (Web 2.0), learning resources, VLE (Virtual Learning Environment).

What services do we offer?

User assistance (tutorials, online guides), teaching programmes, lending services, reading facilities and learning spaces, digitization of resources for learning collections, conservation, acquisitions of resources, access to licensed / purchased resources and serving multiple constituencies, help desk and reference and enquiry services, accessibility support for students and staff with disabilities, information literacy support for students and staff, supporting knowledge transfer to external clients, research support.

What service lines do we have?

Type of assistance offered, types of library management system used, collection management policy, levels of access to resources (guest, student, staff, alumni), types of support for students and staff with disabilities, types of programmes for information skills training, types of programmes for VLE support (for staff), types of policies on digitization, types of policies on access to and use of purchased licensed resources.

What things can we simply not get away from?

Data protection, copyright and intellectual property, equality / diversity legislation, health and safety issues on work spaces, licensing agreements with publishers / aggregators, budgeting and financial issues such as currency value, publishers, suppliers, donations, quality standards and league tables, lifecycle of documents, and requirements for storage, standards for interoperability, cataloguing standards.

Who are our external customers?

Users of repository items (wider research community), users of library catalogue (including other libraries), users in local community, visitors to the library (visiting scholars, visiting students, etc.)

Who are our internal customers?

Students and staff within the university, university researchers.

Are there things that our customers have, or want, or do, that might be EBEs for us?

User accounts, loans of resources, complaints, library cards, list of requests, computer or equipment purchase, thesis, publication.

What things do we think differentiate our organization from others in the same business?

Some universities may focus on international research, or specialize in e-learning, and academic libraries may offer services that support such functions. Some university act as the lead in collaborative projects, and thus have particular expertise and services.

What sorts of things do we deal with day in, day out?

Lists of requests, purchases, loans, overdue notices, enquiries, journal access problems, computer network problems, invoices, maintenance and organisation of physical building space (including re-shelving, rooms booking), maintenance of virtual library space, cataloguing and classification.

What events in the 'outside world', the world outside our organisation, do we need to respond to?

The financial situation, changes in the student funding model, changes in research funding, changes in research assessment exercises, power failures. (And for the cases in the study: theses from other organisations, consortium centre work)

What business entities are listed in our corporate data model?

Student, staff, research activity, modules, programmes / courses.

What things do our information systems keep information on?

Statistics regarding number of items, access to electronic resources, budget division, list of suppliers, borrowers, room bookings, use of VLEs etc.

The second step is developing the units of work (UOWs); the essential business entities that have a lifetime that the academic library has to handle. As Ould (2005, p.175) recommends, the first draft list was tested to put “a” or “the” in front of each item on the draft list. For example, placing “a” or “the” in front of “digitization” does not make sense, whereas the same operation in front of “catalogue record” does make sense. Catalogue record is therefore retained.

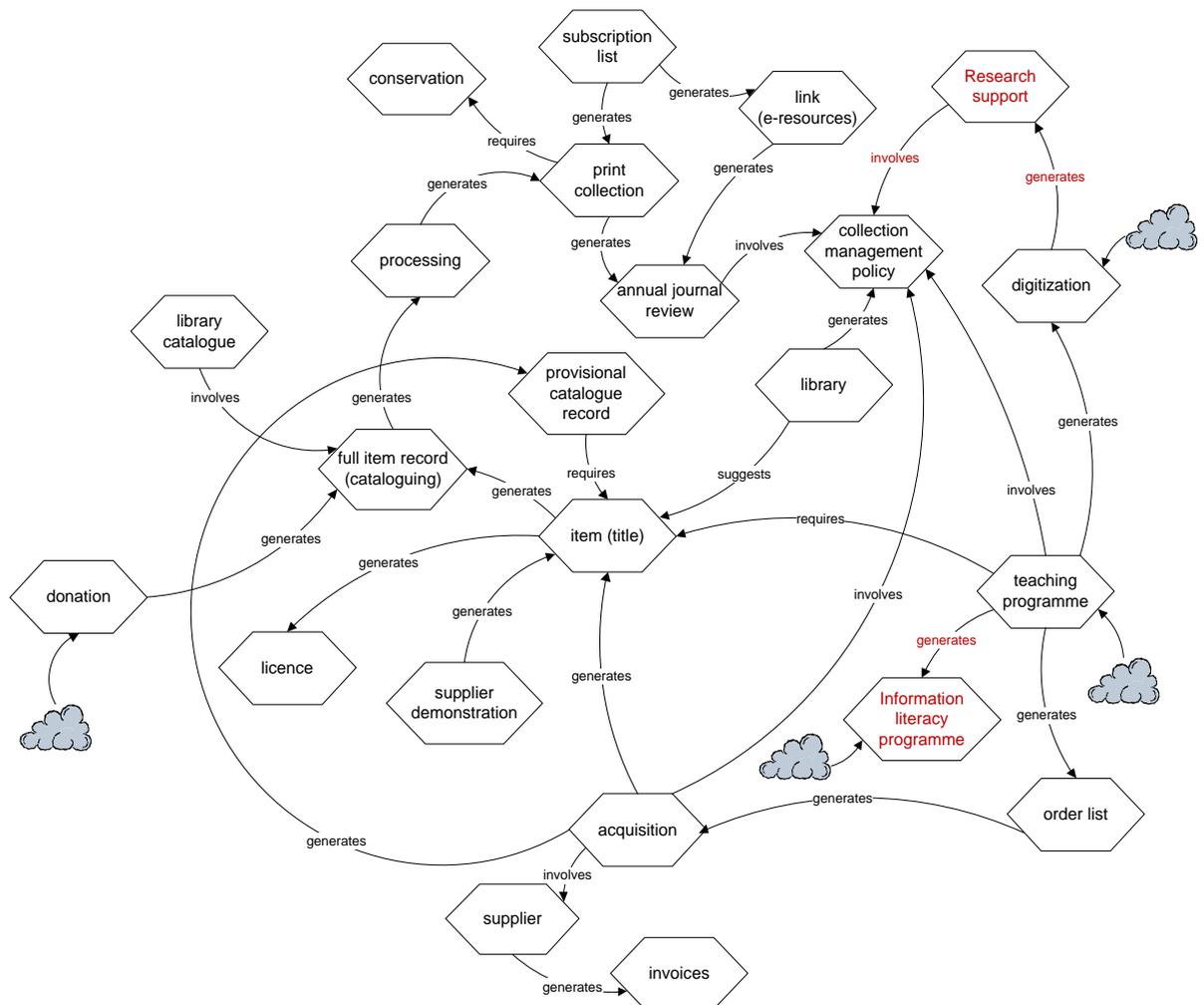
For library staff dealing with acquisitions, *Provisional catalogue record* was a distinct UOW as this needs to be looked after as it is the working record of what has been ordered, or obtained. Until the item is obtained it may not be possible to provide any more details but it is a distinct UOW.

*Full item record*: this is a unit of work since we care about how it is designed or created. Ould suggests (Ould, 2005, p.178) that one method of finding unseen UOWs is to put the word “change” in front of each candidate UOW. Here “change to provisional catalogue record” to “create full record” definitely becomes a new UOW, and this, after all, is part of the function of a library, whether discussing print or electronic items, in providing access to the collection and making retrieval of this, and related items (by topic) easier for users.

For the same reasons, *Classified catalogues of holdings* is also a UOW, as without it we are not in the essence of the library business. These units of work are used constantly to search for items. Note that special collections may have their own catalogues – and archival collections will be processed in a different way to the rest of the book and journal collections. Ould (2005, p.178) also suggests that putting “collection of” in front of candidate UOWs can help to check whether there are other UOWs. In this case, the collection of catalogue items becomes something that has its own existence and something that differentiates one academic library from another.

The main thing of importance for digitization is the *Digitized item*, as to arrive at the final product the digitized item (or item to be digitized) goes through stages, all of which need tending.

Figure 1 below reflects the units of work that are common to most academic libraries with two units of work (shown in red) (research support, and information literacy programme) that may be instantiated in different ways, and to different extents.



**Figure 1:** Units of work diagram using Riva

In this figure, the top of the diagram is concerned with journal subscriptions. A collection management policy (formally or informally) monitors the annual journal review which is applied to both print and electronic journals. The item (title) UOW

represents the new non-periodical purchased title that the acquisitions process generated. License agreements are involved here for electronic items. In the acquisitions process, a book will be requested by academics for a teaching programme, so academics will generate a list, a list will generate acquisitions, then acquisitions will generate purchase, hence, new title. This new item/title needs to be catalogued, and so it generates a cataloguing process. The acquisitions process involves choosing suppliers and producing invoices. Note, as already mentioned that there is a difference between a basic item record (done by acquisitions at the beginning) and a full item record done by the cataloguer.

The cataloguing process generates “*Processing*”, the term is used to refer to the process of adding the spine label, the barcode, the ownership stamps/labels and security triggers to the item. As a term it may look a bit odd on the diagram, particularly when talking about processes, but it is difficult to think of another term to describe this: processing sequence or preparation or stock processing might be a possibility.

When a set of new print books (collection) is ready, it certainly needs to be managed and conserved (*Conservation* UOW). Again, this might need some expansion for some libraries with rare book collections.

Figure 1 illustrates how two parties are considered for initiating items for acquisitions: academic staff and the library itself. Sometimes the library would suggest certain items to buy, and they might ask for some material to help and support library staff in their work.

The *Supplier demonstration* unit of work expresses the phenomenon in which publishers/vendors may come over to universities to advertise their resources. It might also be referred to as supplier marketing. It is a kind of sales pitch and that might be the publisher, or a vendor who bundles different publisher journals together (aggregator service).

Binding books was not illustrated in the diagram as the PAD is meant to be generic rather than detailed. Moreover, the binding itself is often outsourced to an external binder, which implies that binding is not an essential business entity of most academic

libraries. For libraries that deal with rare books and other special collections, and where binding is done, the processes might come under the general UOW of conservation.

Digitization and donations do not necessarily take place in all academic libraries, but they are listed as units of work in the diagram, as they may be important for the immediate future.

Finally, there are three bubbles in the diagram, which represent outsiders to the organization. For instance, a bubble is linked to a *Teaching programme*, as it is expected to have students and academic staff involved. *Digitization* is also linked to a bubble as materials to be digitized could be received from academics outside the organization. A third bubble is linked to *Donation* for those parties who donate materials to the library.

The next step is to hypothesize that each UOW has a case process which deals with a single instance of the UOW, a case management process that deals with the flow of instances, and a case strategy process that determines the future strategy for the case and case management processes (Green and Ould, 2004).

To explain a case process (CP) and a case management process (CMP) more fully, Ould (2005) suggests that one should look at work done within an organization as ‘cases’ or ‘episodes’. In academic libraries for example, it is expected that an ordered item (a case) follows the same standard, in other words, a certain process deals with the case and handles it. This process is called ‘case process’ which is usually triggered when the case arrives. Ould (2005) defines a case process in a nice way by stating: “the process which takes a single case from ‘birth’ to ‘death’.” Case processes are named using the word *handle* or *prepare*.

Case management processes however are responsible for the flow of the instances of case processes. The decision about when an instance shall start is up to the CMP. It might also determine priorities between different cases. According to Ould (2005), CMPs are named with the start of the words: “manage the flow of...”

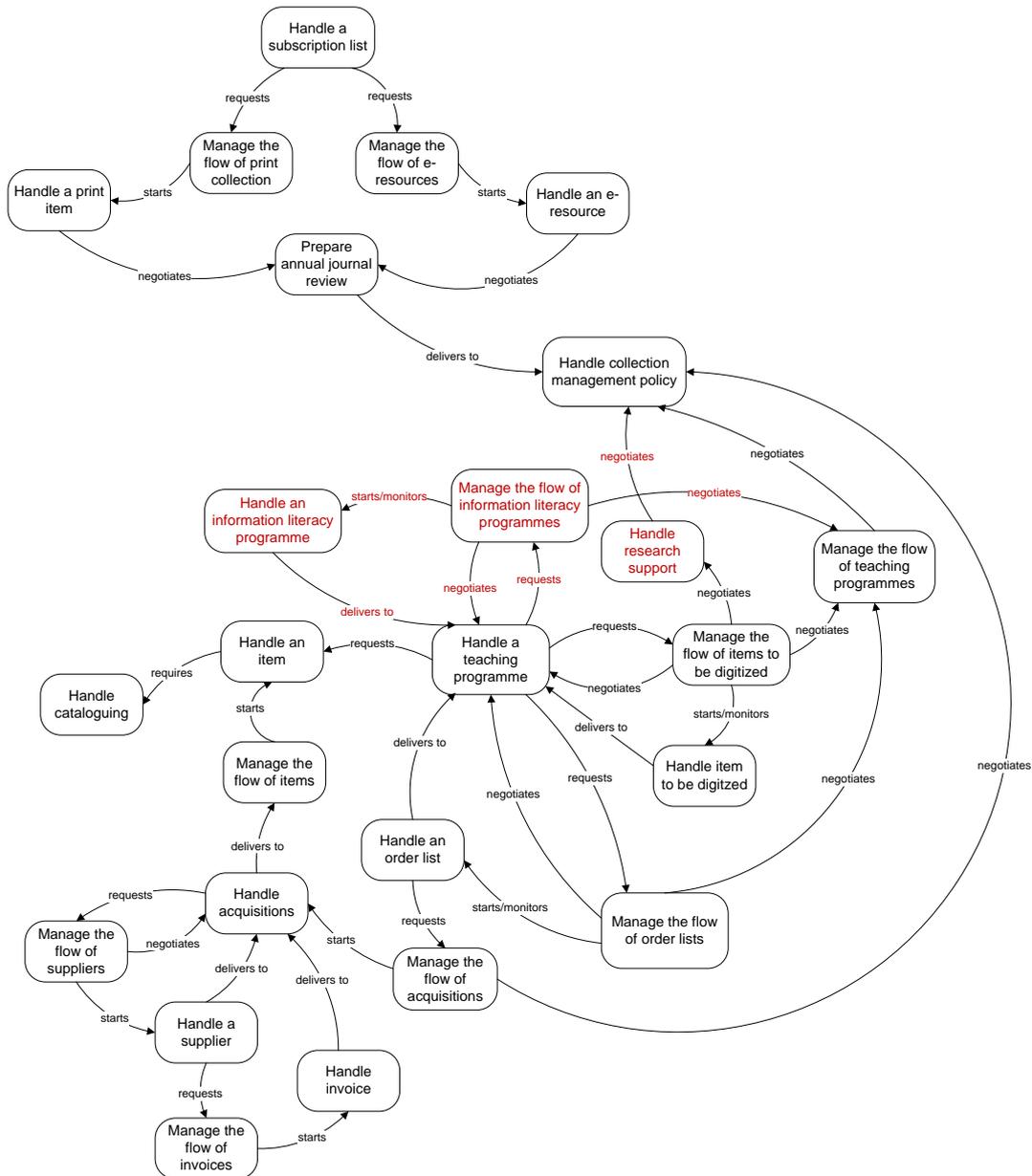
There is a third process type called ‘case strategy process’ (CSP). This is concerned with driving the CPs and CMPs according to the strategic view of the UOWs (Ould, 2005). This means that CSPs take a long term view of what is happening and therefore, they might cause changes in CPs and CMPs. Examples of such processes in this research include: 1) Changes in the nature of some of the UOWs such as the *Annual journal review* or the *Collection management policy*, where budgets are prone to change every year. There are also the changes in the license agreements and suppliers’ offers. In addition there may be changes in the volume of some of UOWs such as *Teaching programme*.

Table 1 shows the case processes (CPs) and case management processes (CMPs) that were identified:

**Table 1:** CPs and CMPs to be used in the PAD

<b>UOW</b>	<b>CP</b>	<b>CMP</b>
<b>Subscription list</b>	<b>Handle a subscription list</b>	
<b>Print collection</b>	<b>Handle a print item</b>	<b>Manage the flow of print collection</b>
<b>e-resources</b>	<b>Handle an e-resource</b>	<b>Manage the flow of e-resources</b>
<b>Annual journal review</b>	<b>Prepare an annual journal review</b>	
<b>Collection management policy</b>	<b>Handle collection management policy</b>	
<b>Teaching programme</b>	<b>Handle teaching programme</b>	<b>Manage the flow of teaching programme</b>
<b>Order list</b>	<b>Handle an order list</b>	<b>Manage the flow of order lists</b>
<b>Acquisitions</b>	<b>Handle acquisitions</b>	<b>Manage the flow of acquisitions</b>
<b>Item</b>	<b>Handle an item</b>	<b>Manage the flow of items</b>
<b>Cataloguing</b>	<b>Handle cataloguing</b>	
<b>Supplier</b>	<b>Handle suppliers</b>	<b>Manage the flow of suppliers</b>
<b>Invoices</b>	<b>Handle invoices</b>	<b>Manage the flow of invoices</b>
<b>Information literacy programme</b>	<b>Handle information literacy programme</b>	<b>Manage the flow of information literacy programmes</b>
<b>Research support</b>	<b>Handle research support</b>	
<b>Digitization</b>	<b>Handle item to be digitized</b>	<b>Manage the flow of items to be digitized</b>

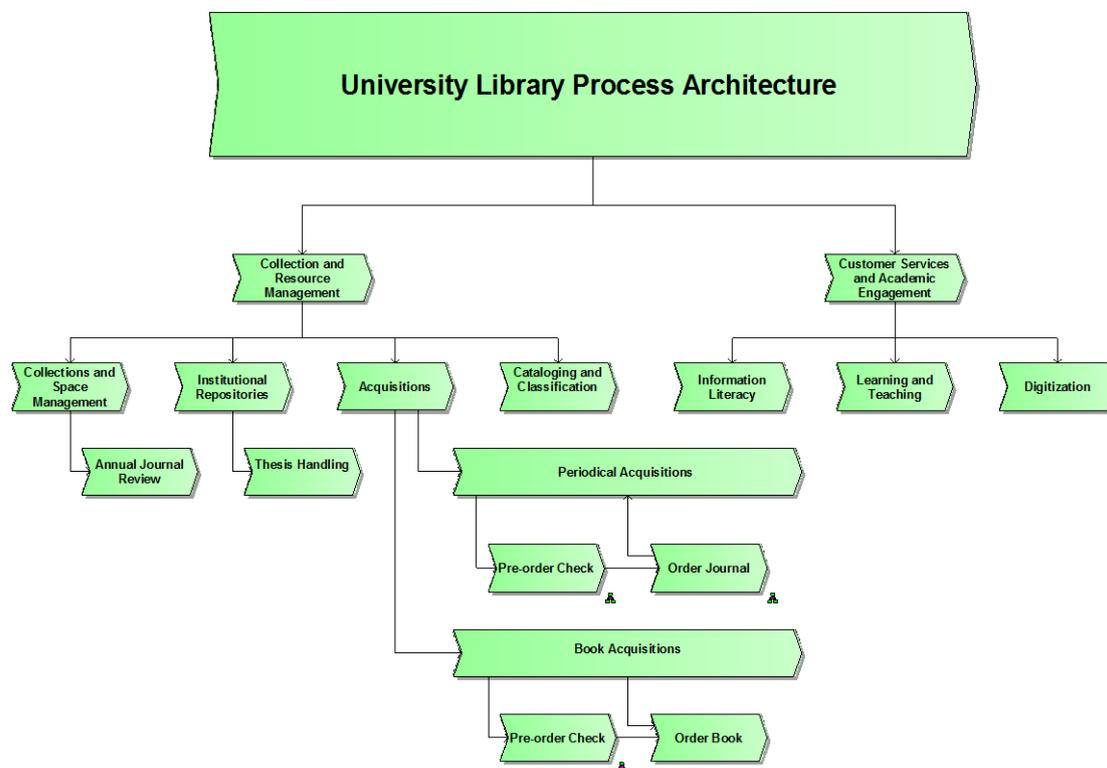
The final stage is to convert the UOW diagram to a process architecture diagram (PAD), by turning the relationships between the units of work into relationships between corresponding case and case management processes. Again, two processes are shown in red (regarding research support, and information literacy programme) as they may be instantiated in different ways, and to different extents.



**Figure 2:** The process Architecture Diagram (PAD) using Riva

### 3. Process Architecture Diagram using ARIS

The next figure illustrates the process architecture using ARIS. As mentioned in section 1, the author generated the diagram in previous work (Tbaishat, 2015). The software used is ARIS 7.1. ARIS provides a large set of modelling diagrams that comprise many notations. The diagram that illustrates process architecture is called value added chain diagram, and it is shown next. It is worth mentioning that the architecture using ARIS is generated in levels, viewing every set of processes at one level together, rather than showing all processes in one diagram, to support the leveling feature provided by ARIS. For instance; the first level will have "collection and resource management" and "customer services and academic engagement", representing the main processes. Then inside the first main process, one will find "collections and space management", "institutional repositories", "acquisitions", and "cataloguing and classification". And so on until the final level is reached, and that is of a detailed process using the EPC diagram. For simplicity purposes, the diagram was illustrated on one page as follows.



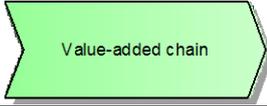
**Figure 3:** Process architecture for academic libraries using ARIS, Value Added Chain Diagram (Tbaishat, 2015)

It is important to remember that ARIS has one efficient advantage; the several views of the architecture provided, which reduces the complexity and ambiguity resulted by other models when attempting to produce a comprehensive architecture for complex organizations. The views are: the organizational view that represents the uses and units within the organization (who), the data view which refers to information objects (what information), the process (control) view that refers to the functions to be performed (is doing what), the function view that represents the activities, and finally the product which refers to the output provided (a service or product) (Tbaishat, 2015). Figure 3 demonstrates the process view, since we are looking at the architecture diagram. Another important aspect to remember about ARIS is the different descriptive levels, leading analysts from the business problem down to the technical implementation (Rippl, 2005).

#### **4. Comparative analysis**

The following table compares the PAD generated by the Riva method to the process architecture diagram provided by ARIS, in terms of the notations used, semantics, and other aspects.

**Table 2:** PAD and ARIS process architecture comparison – notations, semantics and other aspects

	<b>Riva Process Architecture Diagram (PAD)</b>	<b>ARIS process architecture</b>
<b>Concept 1: Process</b>		
<b>Notation</b>		
<b>Semantics</b>	<ul style="list-style-type: none"> <li>- Processes are divided into three types: case process, case management process, and case strategy process</li> <li>- Process types are expressed by verbs: "handle", "manage the flow of", and "maintain a strategic view of", respectively. These represent certain entities, the UOW</li> <li>- The PAD is not related to the Role Activity Diagram (RAD) that models each individual process – separate diagrams</li> </ul>	<ul style="list-style-type: none"> <li>- Processes are divided into four levels: main processes, sub-processes, activities, and work steps</li> <li>- Process is expressed by a verb or a noun to reflect the process</li> <li>- The symbol (  ) under some processes means that the process can be double-clicked to lead to the Event-Driven Process Chain (EPC) associated with the individual process</li> </ul>
<b>Concept 2: Connection</b>		
<b>Notation</b>		
<b>Semantics</b>	<ul style="list-style-type: none"> <li>- Denotes interaction between processes</li> <li>- Can be bent</li> <li>- Can be labeled to refer to the type of relationship (negotiates, requests, delivers to, etc...)</li> </ul>	<ul style="list-style-type: none"> <li>- Denotes interaction between processes</li> <li>- Cannot be bent</li> <li>- Can be labeled to refer to the type of relationship</li> </ul>
<b>Other aspects</b>		
<b>Views</b>	<ul style="list-style-type: none"> <li>- Single view supporting the whole organizational architecture or the individual processes</li> </ul>	<ul style="list-style-type: none"> <li>- Detailed breakdown from four views: organizational, data, process, function and product → the process view is used in this paper</li> </ul>
<b>Leveling</b>	<ul style="list-style-type: none"> <li>- Provides one big picture of organizational processes without leveling</li> </ul>	<ul style="list-style-type: none"> <li>- Processes can be double-clicked to reveal processes within current process (leveling)</li> </ul>

	- The one picture of all processes and their relationships helps to “shine a light” on the business processes providing a more comprehensive view → if organizational processes are not too complicated	- In ARIS, it is preferred to use the leveling feature, however, if used, one cannot have a comprehensive look at all processes at once
<b>Simplicity</b>	- If organizational processes are complicated and the number of processes is large, the PAD provided could be difficult to understand	- Suits large organizations with large number of processes since ARIS supports leveling, therefore, a clear division of processes can be provided, hence, more understandable
<b>Database</b>	- Does not support the database concept. Once the free stencil for Riva is installed in Microsoft Visio, user can model the PAD and the RAD independently	- Database is used to build the models, allowing users to work simultaneously
<b>Integration</b>	- There is integration between processes	- Not only can integration be applied between processes, but also amongst different organizational units within the database, and with external parties as well – wider integration
<b>User authority</b>	- Simple graphical tool that does not support different users / authorities	- There are various products in ARIS (architect, designer, and publisher) support governance; different stakeholders can gain different authorities
<b>Learning the tool</b>	- Simple graphical tool that can be learnt easily and quickly	- Slightly more difficult to learn since it supports multiple functionalities beyond modelling and it acts as a whole system that can be used by different users
<b>Nature of the approach</b>	- Analytical and looks at the organization from a mechanistic point of view.	- Structured approach
<b>Scope</b>	- Common language to define, record, discuss and analyze processes. "Intellectual machinery that helps us to think about our processes and get to answers" (Ould, 2005)	- General framework covering all possible areas of business analysis. "It contains a large number of tools with rules for their usage and their relationship description" (Rippl, 2005) – broader than Riva
<b>Possible Improvement</b>	- Provides a basis for improvement and management by supporting the analysis of process performance and behaviour  - Easier to spot newly added	- Conducts a more detailed breakdown from four views, resulting in a less complicated architecture that becomes part of consecutive improvement cycle

	patterns of working that are incompatible with the whole processes, or those that might be beneficial to the overall architecture	
<b>Documentation</b>	- Can be used for documentation purposes	- Can be used for documentation purposes
<b>Limitations</b>	<ul style="list-style-type: none"> <li>- Generating the EBEs is challenging. It is not always clear what the EBSs are</li> <li>- Automating the legacy, for some organizations that are reluctant to change</li> </ul>	<ul style="list-style-type: none"> <li>- Processes selection is not based upon EBEs, therefore this challenge is overcome, however; since ARIS is a professional tool; further training is required, this could be challenging for librarians (taking the academic library context as an example here)</li> <li>- Automating the legacy, for some organizations that are reluctant to change</li> </ul>

## 5. Discussion

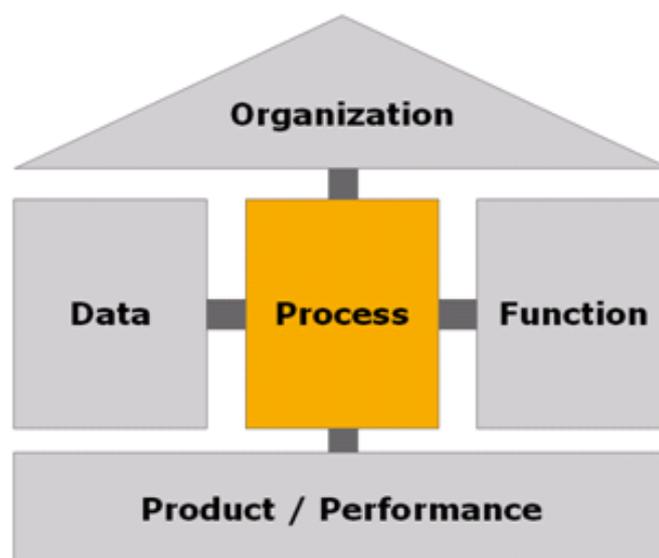
The notations used to generate the two architecture diagrams using the Riva and ARIS are illustrated in table 2, along with explanation of how processes are referred to. It is worth mentioning that the Riva method is divided into two parts, the PAD (that was explained in this paper), and the RAD (Role Activity Diagram) which models individual processes. When modelling using ARIS; the process architecture diagram can be linked to individual processes using the EPC diagram, the use of the notation  under a process means that it can be double clicked to lead to that process detailed activities. While in Riva, generating the PAD is separate from developing RADs for individual processes. This leveling and the distinction between major processes and embedded sub-processes, provides an easier understanding of the processes and their relationships. This is probably similar to Dijkman, Vanderfeeston and Reijers (2011) concept of 'containers'. The authors believe that it is important to distinguish between primary processes and support processes.

One important difference between the two methods is the use of database to build the diagrams. ARIS is based on the concept of a database, where the analyst creates a database for the project and develops all related diagrams from there. This allows users to work on the project simultaneously. While in Riva once the free stencil for

Riva is installed in Microsoft Visio, user can model the PAD and the RAD independently, and files are saved as any ordinary files. This probably makes it harder to learn ARIS since it is more complicated. In addition; the database concept in ARIS allows integration between processes and also amongst organizational units within the database, and with external parties – hence, wider integration is achieved.

Regarding user authority, Riva is a simple graphical tool that does not support user authority the way ARIS does. There are various products in ARIS (architect, designer, publisher and more) that support governance; different stakeholders can gain different authorities. When logging into ARIS, user can go to the "user management page" where the users, groups and privileges are available. When clicking on the licenses tab on that page, user can upload license files they need, which in turn will provide the user with all ARIS products they are entitled for. This facility was not exploited in this research as the author was the only user, with a single user name and password.

Riva is more of an analytical approach that looks at the organization from a mechanistic point of view. The PAD from Riva is an attempt to understand how the organization sees itself in relation to its environment, and for others to judge how its "nervous system" operates. ARIS on the other hand is a structured approach; which is apparent from ARIS HOBE (HOUse of Business Engineering), see next figure. "ARIS uses break-down structure diagrams created by top-down analysis" (Rippl, 2005).



**Figure 4:** The general schema of ARIS architecture (ARIS HOBE)

Every descriptive view is described at the three levels of requirements definition, design specification, and implementation. Tang and Hwang (2006) state that consistency between enterprise application programs and information technology can then be understood clearly through this distinction of these three levels. ARIS is a broader approach than Riva; it contains a large set of rules that govern a general framework covering all possible areas of business analysis. Riva on the other hand provides two diagrams supporting organization process architecture (PAD) and individual process modelling (RAD). These two diagrams act as common language to understand, model, discuss and then improve business processes. The PAD can be used to distinguish between newly added processes (patterns of work) that are incompatible with the current way of working, and also recognize promising processes that could add value to the overall work of the organization. Fady and Beeson (2009) believe that this can be achieved more easily if the existing practices can be measured against the process architecture diagram. Modelling using ARIS can also lead to process improvement; since the detailed breakdown from four views comes up with a less complicated architecture that becomes part of consecutive improvement cycle (Tang and Hwang, 2006), (Christian, Michel and Johan, 2006).

The PAD using Riva maybe viewed as being conceptually simpler than ARIS process architecture, however; the detailed breakdown from four views in ARIS means that a less complicated architecture can be produced. Therefore, ARIS is more professional tool that can be used to support large organizational systems with clear division of processes, many users and less complicated architecture. This indeed will add value to some organizations, however, it might be challenging to others as using ARIS needs training specially for beginners, this could be challenging in the academic library environment. On the other hand; Riva has a limitation of producing the right set of EBEs, this is a challenge. Beeson, Green and Kamm (2013) states: "If the production of the UOW diagram can be made a surer exercise, the transition to the process architecture should become simpler, and might be achieved through the application of a single set of heuristics instead of the present two 'cuts'".

Finally, the translation from ARIS process architecture to Riva's PAD is not likely to be straightforward, since there are major differences between the two methods, and it will rely on the analyst's ability of interpretation.

## 6. Future work

As can be seen in this paper title, this paper presents part 1, in which process architecture diagrams were compared. In part 2 later on, the author shall investigate business process modelling in terms of individual process modelling rather than a whole organizational structure. The methods to be compared will also be Riva and ARIS; demonstrating a library process as an example using Role Activity Diagram (RAD) that represents the Riva method, and Event-Driven Process Chain (EPC) that represents ARIS.

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