6 APPLICATION PROTOTYPES: BM^{2}L

As described in section 1.2 the business model ontology aims at being a generic framework to describe and capture any possible business model. Because the process of capturing a business model is largely facilitated by using a formalized language I introduce the so-called Business Model Modeling Language BM^{2}L. This is nothing else than a codification of the ontology with an eXtensible Markup Language XML structure, XML being a meta-language to describe information. BM^{2}L can then serve to describe and capture a specific business model. I have used it to seize the entire Montreux Jazz Festival business model (see www.hec.unil.ch/aosterwa/PhD).

6.1 FROM THE ONTOLOGY TO A FORMAL MARKUP LANGUAGE

As it seemed appropriate to translate the business model ontology into a formal description language and as the eXtensible Markup Language XML has rapidly become the first choice for defining document and data interchange formats I have chosen this technology to formalize the business model ontology.

In fact XML already has a strong foothold in business, especially in business transactions and particularly in e-business. Many existing technologies are being re-engineered to take advantage of XML’s qualities such as interoperability and reusability (Dumbill 2001). A multitude of XML consortiums and projects (e.g. xCBL, cXML) intend to rewrite the concepts of the aging Electronic Data Interchange (EDI) with XML syntax for business applications on the Internet (Haifei Li 2000). One of the most important projects is the joint initiative of Organizations for the Advancement of Structured Information Standards (OASIS) and the UN’s Center for Trade Facilitation and Electronic Business (UN/CEFACT). It focuses on enabling transactions across industries and businesses, particularly smaller companies, generally left out of EDI in the past (Kotok 2001).

However, XML is not limited to transaction purposes and can serve a wide range of other goals (Fensel 2001). XML is a metalanguage, which means that it is a standardizing format for describing structured and semi-structured information for a wide area of applications. XML provides a means of including metadata (i.e. data on data) in documents. This makes it ideal for my purpose of describing a business model in a formalized manner. Thus, based on the business model ontology I developed BM^{2}L to formally describe business models. Contrary to most existing xml languages in business that represent structures for the exchange of transaction-oriented messages or documents, BM^{2}L focuses on the representation of a company's business model. Rather than concentrating on e-business processes, like for example the Electronic Business using eXtensible Markup Language, short ebXML (ebXML 2003), BM^{2}L is situated at a higher level of abstraction, the one of the business model/business logic of a firm. BM^{2}L aims at making it possible to encode the business model of any given company. Concretely, a business model expressed in BM^{2}L is an XML document that respects the constraints and the rules imposed by an XML schema based on the business model ontology. An XML schema is a model that describes the logical structure of an XML document. First attempts to formalize the ontology in an XML-based language were already made at the beginning of this research (Ben Lagha, Osterwalder et al. 2001).

Such a formal representation and the multitude of existing tools to manipulate XML documents have a number of advantages. It becomes easy to verify the validity of a business model to the business model ontology. Different business models can be compared or can be evaluated to one another. Generating different views (such as specific documents) in function of different needs (such as descriptions, graphical representations, business plans, reports for financing, reports for eventual partners, acquisitions or mergers, etc.) becomes possible. Furthermore, XML's platform independence make the maintenance and the exchange of business models in heterogeneous IT environments a lot easier.

In short I have chosen XML for the following reasons. Because it is:

- a language to describe structured and semi-structured information
- an open standard (i.e. it is not proprietary and owned by a company) and recommendation of the World Wide Web Consortium (W3C).
- platform independent
- machine readable and can be used by different applications
- reusable
- transformable (e.g. to different formats such as HTML or PDF)
- a metalanguage that facilitates exchange
- a metalanguage that has open standards for visualization (Scalable Vector Graphics SVG)

Similarly, Fensel (2001) argues that XML represents an interesting solution of knowledge management and electronic commerce. The main reasons are that XML helps defining a language for describing the structure and semantics of data, it is a language for processing data and it is a protocol for exchanging data.

6.2 THE BUSINESS MODEL MODELING LANGUAGE BM^{2}L

BM^{2}L is defined by an XML schema. It is composed of a number of concepts (called elements) and attributes that represent the vocabulary of the ontology and the relationships between the elements. Together they stand for the construction rules of a business model. In other words, BM^{2}L defines the semantics and the syntax of the elements. The elementary elements are found on the lowest hierarchical level and contain a textual description of the concepts they represent. The content of each element is delimitated by an opening tag in the form of <element> and a closing tag in the form of </element> and can have a set of attributes.

To create the BM^{2}L schema and to capture business models I have opted for a set of tools provided by the Austrian company Altova. The privately held company was founded in 1992 and has been actively involved in the XML market from the early conception of XML. Altova's main tool, xmlspy, is one of the market leaders in XML editing and offers an appropriate toolset for the goals I pursue.

Concretely, BM^{2}L translates the business model ontology's semantics and syntax into an XML based language defined by an XML schema. It can then be applied to a real world business model, as I have done to capture the business logic of the Montreux Jazz Festival (see annex at www.hec.unil.ch/aosterwa/PhD).

Figure 57 illustrates the syntax of a VALUE PROPOSITION's elements in BM^{2}L (cf. section 4.2.1 on VALUE PROPOSITION). In the following lines I describe the XML schema of the VALUE PROPOSITION part in natural language, which might be a bit dull, but it will help to understand what I have exactly done in BM^{2}L. As Figure 57 shows, a company can have one or more VALUE PROPOSITIONs. Thus, the BM^{2}L schema defines that a BM^{2}L document can contain 1-n VALUE PROPOSITIONs expressed in an envelope of a <ValueProposition> opening tag and a </ValueProposition> closing tag. The content of the envelope is composed of a <ValuePropositionCharacteristics> and an optional <SetOfOfferings>. A <ValueProposition> has three attributes, from which one, ValuePropositionID, is its identifier. The other two attributes, AddressesCustomerIDREF and BasedOnCapabilityIDREF, reference the TARGET

CUSTOMERS the VALUE PROPOSITION addresses, respectively the CAPABILITIES on which it relies.

The <ValuePropositionCharacteristics> envelope contains a sequence of elements that describe the VALUE PROPOSITION. These are two textual elements, <Name> and <Description>, followed by the complex element <Reasoning> describing why the VALUE PROPOSITION is valuable to a customer. A complex element is an element that is composed of sub-elements. <Reasoning> is constituted by a sequence of 0-n elements containing text, which are <Use>, <Risk> or <Effort>. The next element after <Reasoning> is the <ValueLevel> tag, which describes the value level of a VALUE PROPOSITION. It is composed of either <MeToo>, <InnovativeInnovation>, <Excellence> or <Innovation>. <ValueLevel> is followed by <PriceLevel>, describing the price level of a VALUE PROPOSITION. It is composed of either <Free>, <Economy>, <Market> or <HighEnd>. <ValuePropositionCharacteristics> ends with an optional <LifeCycle>, which's attribute LifeCyclePhase defines in which phase the VALUE PROPOSITION creates value.

If a VALUE PROPOSITION is decomposed into a set of OFFERINGS, the <ValuePropositionCharacteristics> tag is followed by the <setOfOfferings> envelope. A <setOfOfferings> is a sequence of 1-n <Offering> that have an identifying attribute OfferingID. An <Offering> is composed of <OfferingCharecteristics> and of an optional <SetOfOfferings> if it is decomposable. <OfferingCharecteristics> is the same type as <ValuePropositionCharacteristics> and contains the same sub-elements, except that <LifeCycle> becomes cumpolsery.

In Figure 58 you can see how this structure is concretely applied when one describes a business model with BM^{2}L. It illustrates parts of the Montreux Jazz Festival's VALUE PROPOSITION encode with BM^{2}L.

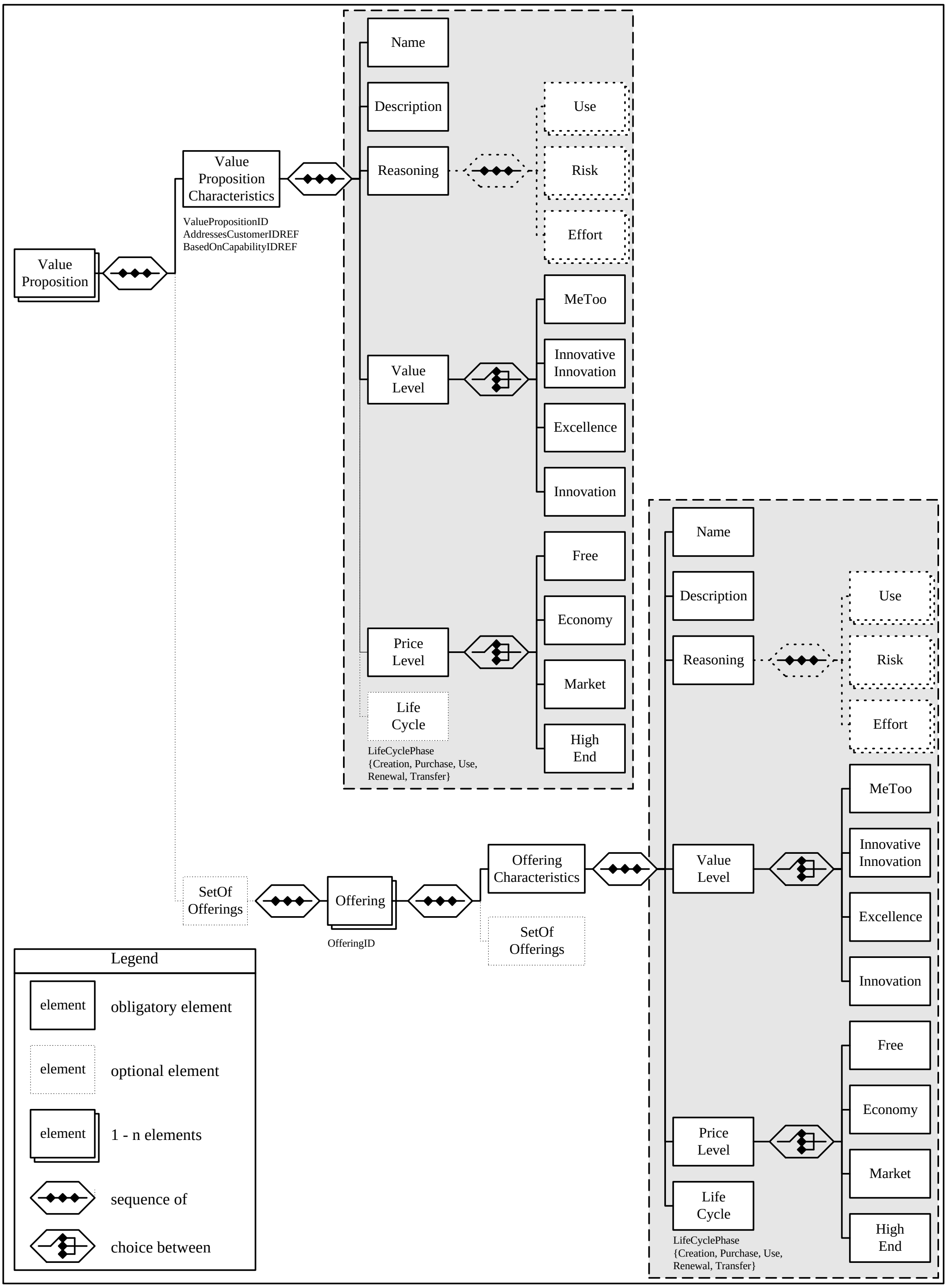


Figure 57: Diagram BM2L /XML schema VALUE PROPOSITION

```
<Product>
    <ValueProposition ValuePropositionID="vp1" BasedOnCapabilityIDREF="cp4 cp3 cp1"
    AddressesCustomerIDREF="tc4">
        <ValuePropositionCharacteristics>
            <Name>MJF Concerts</Name>
            <Description>The main attraction and VALUE PROPOSITION of the MJF are its prestigious
            concerts with stars from jazz, pop, rock, hip-hop and more. The MJF has made itself a name
            with the regular by unforgettable jazz musicians like Miles Davis, Keith Jarett, Charlie Mingus,
            Ella Fitzgerald and later from other fields like Bob Dylan, Phil Collins or Guru's Jazzmatazz.
            The 2003 event featured artists across the musical range, such as George Benson, Joao Gilberto,
            Simply Red or Cypress Hill. </Description>
            <Reasoning>
                <Use>For the customer the value essentially lies in going to the concert of the artist of
                his choice.</Use>
            </Reasoning>
            <ValueLevel>
                <MeToo>The MJF may be special because of its quality but it is not substantially
                different from other jazz festivals throughout the world.</MeToo>
            </ValueLevel>
            <PriceLevel>
                <Market>The MJF ticket prices are comparable to the market prices of what is paid for
                other concerts.</Market>
            </PriceLevel>
        </ValuePropositionCharacteristics>
        <SetOfOfferings>
            <Offering OfferingID="off10">
                <OfferingCharacteristics>
                    <Name>MJF evening concerts</Name>
                    <Description>The evening concerts comprise the major event of payable concerts
                    on three different stages, the Stravinski Auditorium, the Miles Davis Hall and the
                    Casino.</Description>
                    <Reasoning>
                        <Use>MJF concerts are of great quality.</Use>
                    </Reasoning>
                    <ValueLevel>
                        <MeToo>This offer competes with other concerts and
                        festivals.</MeToo>
                    </ValueLevel>
                    <PriceLevel>
                        <Market>Ticket prices are between CHF 40.- to CHF 120.- and
                        comparable to other concerts and festivals. </Market>
                    </PriceLevel>
                    <LifeCycle LifeCyclePhase="Use"/>
                </OfferingCharacteristics>
            </Offering>
            <Offering OfferingID="off2">
                <OfferingCharacteristics>
                ...
                </OfferingCharacteristics>
            </Offering>
             ...
          <SetOfOfferings>
    </ValueProposition>

    <ValueProposition>
    ...
    </ValueProposition>
```

Figure 58: Excerpt of the product part of the BM^{2}L document of the MJF

6.3 TRANSFORMING XML DOCUMENTS

In section 6.2 I have demonstrated how the BM^{2}L schema (i.e. its structure) is conceived, how a BM^{2}L document looks like and how it can capture a business model. In the following, I demonstrate some of the potential usages that become possible once one has seized a business model with BM^{2}L.

For example, XML documents can easily be transformed into a variety of formats, such as HTML used to display web pages or PDF, the de facto standard for documents on the web. In fact, XML documents and structures can be transformed to any other structure and formatting. The standard way to describe how to transform (i.e. change) the structure of an XML document into an XML document with a different structure and presentation is called XSL Transformation (XSLT). Like XML, XSLT is an open standard and recommendation of the World Wide Web Consortium (W3C). XSLT can be thought of as an extension of the Extensible Stylesheet Language (XSL). XSL is a language for formatting an XML document, in order to display it, for instance as a web page. XSLT shows how the XML document should be reorganized into another data structure. Concretely, XSLT is used to describe how to transform the source data structure of an XML document into a new XML document, which can have a completely different data structure.

Figure 59 illustrates how a transformation works. An XML document is fed to an XSL processor that will parse the document structure. Then the processor transforms and formats the document according to an XSL stylesheet and emits a new document. This process is quite powerful as it allows to select specific information of the input document to put into the new document. In other words, XSLT allows not only to create different output formats such as HTML or PDF but also to select different contents of the input document for the various output documents.

Applying this to the concept of the business model ontology this means that if one has seized a business model with BM^{2}L one can easily generate different documents tailored to specific needs. A venture capitalist might want a two-pager to compare different business models while an executive in a company may need a 10 page report to understand a business model and make decisions. And the business process designer might want a really detailed 50 page report to be able to engineer processes and workflows.

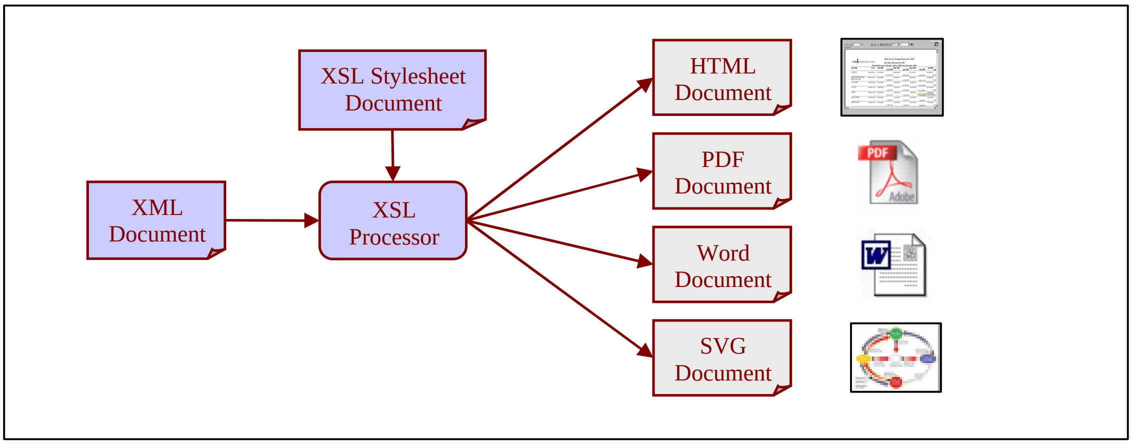


Figure 59: XSL Transformation

6.4 VISUALIZING A CHANNEL STRATEGY WITH SCALABLE VECTOR GRAPHICS SVG

In this section I demonstrate how XSLT can be used to transform parts of a BM^{2}L document into a graphical representation. I aim at automatically generating a visual illustration of the channel strategy of a company by extracting the information on channels in the BM2L document and transforming them into a visual form. To achieve this I apply the transformation capabilities of XML addressed in section 6.3 to a BM2L document by conceiving a XSL stylesheet and feeding them to an XSL processor (as illustrated in Figure 60).

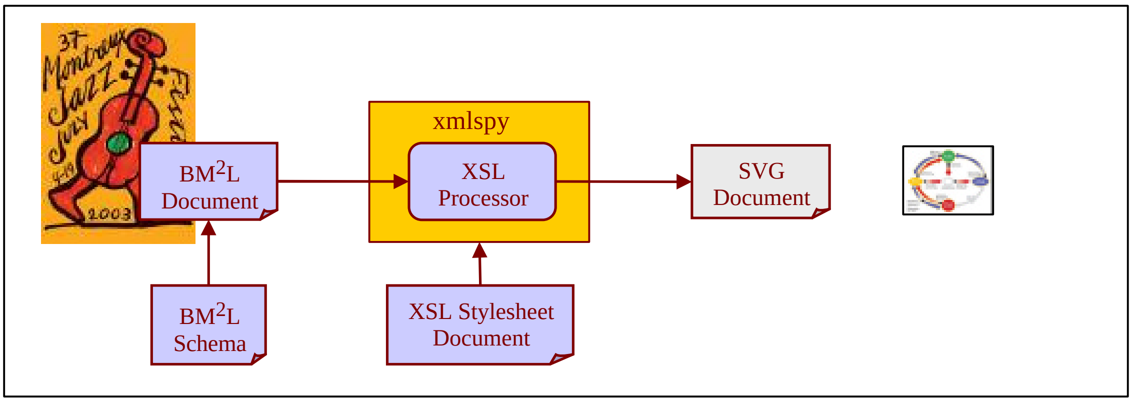
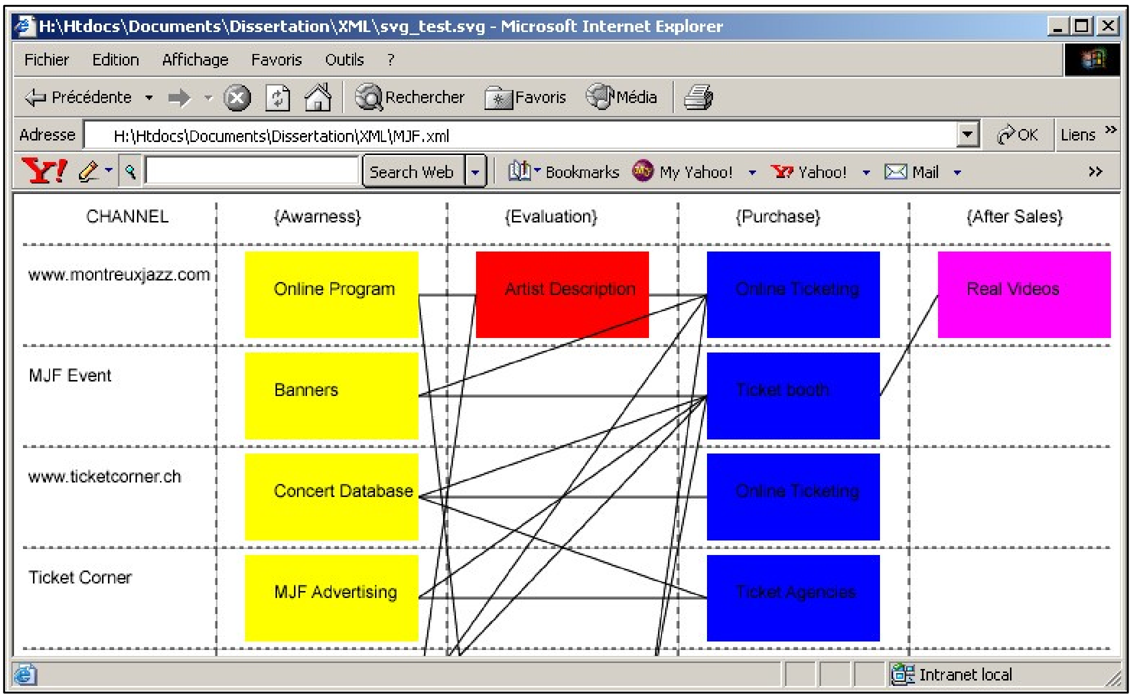


Figure 60: Transformation from BM2L to SVG

The generated image of a company's channel strategy is saved as a Scalable Vector Graphics (SVG) document. SVG is simply the description of an image in XML. Any program such as a web browser that recognizes XML can display the image using the information provided in the SVG format.


H:\Htdocs\Documents\Dissertation\XML\svg_test.svg - Microsoft Internet Explorer
Fichier Edition Affichage Favoris Outils ?
Précédente
Rechercher
Favoris
Média
Adresse
H:\Htdocs\Documents\Dissertation\XML\MJF.xml
OK
Liens
Search Web
Bookmarks
My Yahoo!
Yahoo!
Mail
Intranet local

CHANNEL	{Awarness}	{Evaluation}	{Purchase}	{After Sales}
www.montreuxjazz.com	Online Program	Artist Description	Online Ticketing	Real Videos
MJF Event	Banners		Ticket booth	
www.ticketcorner.ch	Concert Database		Online Ticketing	
Ticket Corner	MJF Advertising		Ticket Agencies	

Figure 61: SVG screenshot of channel strategy

In a nutshell, I applied an XSL document (cf. excerpt Figure 62) to the MJF case seized in BM2L and got a SVG document (cf. excerpt Figure 63). This outcome can be read by a web browser and gives me a graphical representation of a company's distribution channels (see Figure 61). The goal of this is to achieve a rapid understanding of a part of a business model, in this case channels, through visualization (cf. section 2.4.1 on visualization).

```
<?xml version="1.0" encoding="UTF-8"?>
<xsl:stylesheet version="1.0" xmlns:xsl="http://www.w3.org/1999/XSL/Transform"
xmlns:fo="http://www.w3.org/1999/XSL/Format">

<xsl:template match="/">
<xsl:apply-templates select="./BusinessModel/Customer"/>
</xsl:template>

<xsl:template match="Customer">
<svg xmlns:xlink="http://www.w3.org/1999/xlink" height="800px" width="800px" onload="init(evt)"
viewBox="0 0 800 800">
        <line y2="35" x2="760" y1="35" x1="6" stroke-dasharray="3" stroke="black"/>
    <text y="20" x="50">CHANNEL</text>
    <line y2="472" x2="140" y1="6" x1="140" stroke-dasharray="5" stroke="black"/>
    <text y="20" x="180">{Awarness}</text>
    <line y2="472" x2="300" y1="6" x1="300" stroke-dasharray="5" stroke="black"/>
    <text y="20" x="340">{Evaluation}</text>
    <line y2="472" x2="460" y1="6" x1="460" stroke-dasharray="5" stroke="black"/>
    <text y="20" x="500">{Purchase}</text>
    <line y2="472" x2="620" y1="6" x1="620" stroke-dasharray="5" stroke="black"/>
    <text y="20" x="660">{After Sales}</text>

    <xsl:for-each select="./DistributionChannel">
        <xsl:call-template name="DistributionChannel"/>
    </xsl:for-each>
 </svg>
</xsl:template>
```

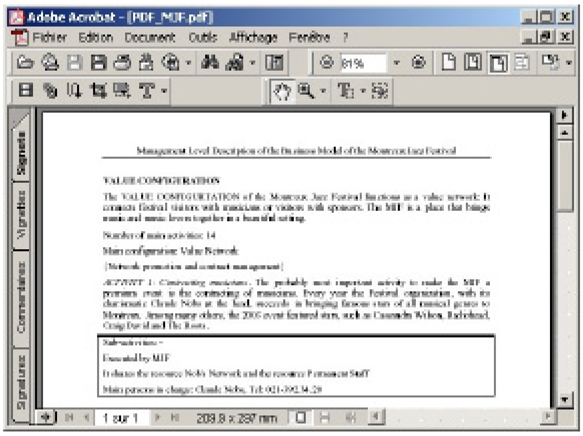
Figure 62: Excerpt of the XSL document

```
<?xml version="1.0" encoding="UTF-8"?>
<svg xmlns:fo="http://www.w3.org/1999/XSL/Format" xmlns:xlink="http://www.w3.org/1999/xlink"
height="800px" width="800px" onload="init(evt)" viewBox="0 0 800 800">
    <line y2="35" x2="760" y1="35" x1="6" stroke-dasharray="3" stroke="black"/>
    <text y="20" x="50">CHANNEL</text>
    <line y2="472" x2="140" y1="6" x1="140" stroke-dasharray="5" stroke="black"/>
    <text y="20" x="180">{Awarness}</text>
    <line y2="472" x2="300" y1="6" x1="300" stroke-dasharray="5" stroke="black"/>
    <text y="20" x="340">{Evaluation}</text>
    <line y2="472" x2="460" y1="6" x1="460" stroke-dasharray="5" stroke="black"/>
    <text y="20" x="500">{Purchase}</text>
    <line y2="472" x2="620" y1="6" x1="620" stroke-dasharray="5" stroke="black"/>
    <text y="20" x="660">{After Sales}</text>
    <text y="60" x="10">www.montreuxjazz.com</text>
    <line y2="105" x2="760" y1="105" x1="6" stroke-dasharray="3" stroke="black"/>
    <line y2="420" x2="320" y1="70" x1="280" stroke="black" stroke-dasharray="solid"/>
    <line y2="70" x2="320" y1="70" x1="280" stroke="black" stroke-dasharray="solid"/>
    <rect height="60" width="120" y="40" x="160" fill="yellow"/>
```

Figure 63: Excerpt of the SVG document

6.5 GENERATING A REPORT IN PDF

Building on the same transformation capabilities as demonstrated in the previous example with SVG one can also imagine the generation of a specific report from a business model seized with BM^{2}L. Such a report could resemble the business model overview presented in section 5 or could be more detailed according to particular needs.


Adobe Acrobat - [PDF_MJF.pdf]
Fichier Edition Document Outils Affichage Fenêtre ?
81%
Signets
Vignettes
Commentaires
Signatures
1 sur 1
209.9 x 297 mm

Management Level Description of the Business Model of the Montreux Jazz Festival

VALUE CONFIGURATION

The VALUE CONFIGURATION of the Montreux Jazz Festival functions as a value network: It connects festival visitors with musicians or visitors with sponsors. The MJF is a place that brings music and music lovers together in a beautiful setting.

Number of main activities: 14

Main configuration: Value Network

[Network promotion and contract management]

ACTIVITY 1: Contracting musicians. The probably most important activity to make the MJF a premium event is the contracting of musicians. Every year the Festival organization, with its charismatic Claude Nobs at the head, succeeds in bringing famous stars of all musical genres to Montreux. Among many others, the 2005 event featured stars, such as Cassandra Wilson, Radiohead, Craig David and The Roots.

Sub-activities: -

Executed by MJF

It shares the resource Nobs Network and the resource Permanent Staff

Main persons in charge: Claude Nobs, Tel: 021-392.34.29

Different communications ask for different document types with different information. These can easily be generated, for example as PDF documents, from the basic business model description captured in BM2L. These could target:

- managers
- employees
- customers
- investors

Figure 64: screenshot of the PDF report

6.6 CONCLUDING: WHY USE BM2L

For this dissertation BM2L has become more than just a simple prototype and instantiation of the business model ontology. It was a truly practical tool that helped me asses the Montreux Jazz Festival case study. Having solely worked with the structure of the ontology and a word processor to capture the MJF's business logic at the beginning I decided to design BM2L to simplify the task. To seize a business model formally and to take into account elements, attributes and relationships can be quite cumbersome and complicated without computer assistance. But on the other hand computer assistance for capturing business models only becomes possible after formalizing the concepts and making them computable.

BM2L in combination with the off-the-shelf XML tool xmlspy is comparable to a CASE tool (Computer Assisted Software Engineering) in software or process development. Among other things CASE tools particularly help to seize, manage and analyze complex projects. Though a simple prototype, BM2L already makes it possible to seize business models and makes first modest steps in the direction of analysis (e.g. visualization of complexities).

Pursuing this direction further would include the development of a real business model design tool with a graphical interface assisting the designer in capturing and designing elements, attributes and relationships. The next step would involve adding analyzing and management capacities. Some of these ideas that could be based on BM2L are outlined in section 1 on ontology applications and further research.

Concluding, it can be said that introducing BM2L has made things easier in regards of capturing business models. In my opinion further researching the design and use of similar tools would be a genuine step forwards in business model research, as they could also be tested in management settings.