A Framework and a Tool
to Generate E-Business Options

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SOM theme A   The human and technical side of production: the management of interdependencies

Abstract

In early stages, many organizations started to use the internet in more or less ad hoc and experimental ways. After this first stage of learning and experimentation there often arises a need for more systematic approaches to identify, order, and assess e-business options. This paper addresses this need and presents a framework as well as a tool supporting this framework, helping management to generate and order e-business options for their organization.

The framework consists of two parts. The first part covers the identification of the dimensions of e-business options. Six dimensions are identified: external stakeholders groups, stakeholder statuses, channel strategies, communication modes, products/service groups, and product/service statuses. Users of this framework can apply these dimensions given the specific characteristics of the organization at hand. Subsequently, these dimensions are combined, generating, in many cases, a multitude of potential e-business options. The second part of the framework supports the process of ordering this large set of generated potential e-business options given certain criteria. This can be accomplished by ordering the dimensions as well as the elements along each distinguished dimension. Some of these elements are company-independent, while others are company-dependent. The framework is illustrated by a case study as a running example. We also offer a design of a tool supporting our framework.

The framework focuses on e-business options between an organization and its current or new external stakeholders: possible internal e-business applications are excluded in this paper. The framework can be used as a tool for practitioners, such as consultants or managers, to generate e-business options for a company. They can use it -for example- in workshops to support idea-generation with respect to e-business planning in a creative and structured way. The framework also contributes to theory by providing a method that systematically offers new possibilities for using the internet.

After the identification and the ordering of e-business options, the generated and ordered options have to be assessed and selected; this paper however, only focuses on the generating and ordering process.

1. INTRODUCTION

In recent years, many organizations started to use the internet in quite ad hoc and experimental ways. After this first stage of learning and experimentation there often arises a need for a more systematic approach to generate, order, and assess e-business options. The specific contribution of this paper is that it addresses this need by offering a framework and a tool which can help organizations to generate and order e-business options and, by doing so, that it supports the first part of decision-making processes regarding alternative e-business applications.

Figure 1 shows how a systematic decision-making process regarding e-business options can be organized. This is based on Simon's intelligence, design, choice trichotomy (Simon, 1960). Intelligence relates to the gathering of information, design relates to the determination of variables and dimensions and choice is about the selection of an option. Figure one shows that first, alternative e-business options have to be identified and ordered. Subsequently, the possible options have to be assessed and selected. After this stage, the selected opportunities have to be specified and designed. Finally, implementation, operation, maintenance, and evaluation may follow. In Figure 1 this is called the 'formal life cycle'. We reserve the word 'e-business option' for a possibility to use an electronic network for a business purpose. An 'e-business *opportunity*' is defined here as an assessed and selected e-business option.

When decisions are made in practice, different intermediate feedback activities, interrupts, delays, and adjustments are often necessary to reconsider earlier steps (Mintzberg et al., 1976). This is –among other reasons- because such decision-making processes take place in dynamic environments and are made in political contexts (Pettigrew, 2002). Moreover, participants of decision-making processes are often lacking necessary information to make well-informed decisions right at the start (Miller et al., 1996). In Figure 1 these activities are called 'intermediate feedback'.

During the last forty years several models have been developed to support decision-making processes (Jorna, 2001). One of the most influential is the model Edwards (1971), in which eight steps are discerned. These steps are: 1) identify the decision maker, 2) identify the alternatives, 3) identify the attributes that are relevant for the decision, 4) measure the performance of the alternatives for every attribute, 5) determine the weight of every attribute, 6) calculate for every alternative a weighted sum of the values for that alternatives, 7) make a provisional decision, and 8) perform a sensitivity analysis.

The framework presented in this paper focuses on the intelligence and the design phase of the e-business decision-making process, this means the identification of e-business options and the ordering of these options. According the model of Edwards, step 1 – 3 are supported by this framework. Besides, the focus is also only on e-business options between an organization and its (current or new) external stakeholders. For this reason, possible internal e-business applications (e.g. intranet or ERP applications) are excluded in this paper. In practice, internal and external e-business applications are strongly interrelated and integrated. As a consequence, the implementation of an external e-business application will have implications for the internal business processes and the support of this by information systems.

The framework helps to identify e-business options, to describe them in a global way by specifying each option in six dimensions and to order them according to organization dependent priorities. Only after management has assessed and selected an option, it is considered as an opportunity and will further elaboration lead to eventual design of an application (see also Figure 1).
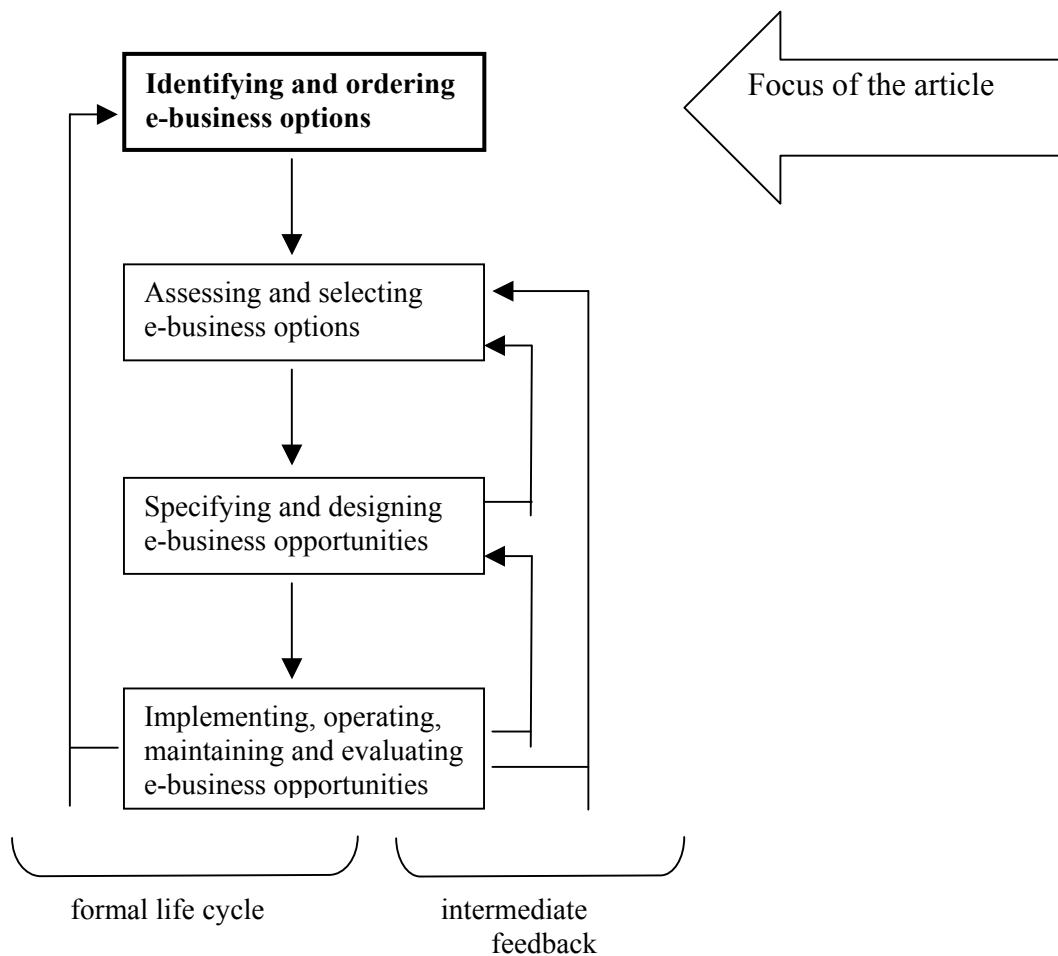
```
┌──────────────────────────┐                    ╱─────────────────────────┐
│ Identifying and ordering │            ◁───────  Focus of the article    │
│ e-business options       │                    ╲─────────────────────────┘
└──────────────────────────┘

┌──────────────────────────┐
│ Assessing and selecting  │
│ e-business options       │
└──────────────────────────┘

┌──────────────────────────┐
│ Specifying and designing │
│ e-business opportunities │
└──────────────────────────┘

┌──────────────────────────┐
│ Implementing, operating, │
│ maintaining and evaluating│
│ e-business opportunities │
└──────────────────────────┘

    formal life cycle        intermediate
                              feedback
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Figure 1   Focus of the article in its decision-making context

This framework aims to contribute to practice as well as to theory. Practitioners such as (e-business) managers and (e-business) consultants can use the framework to identify and to order e-business options in a systematic way rather than in an intuitive, imitating, or experience-based way. This framework can also be used to challenge certain e-business strategies or to consider unconventional alternatives.

The contribution to theory is that many existing e-business frameworks are directed to the assessment of certain e-business alternatives, but that general approaches that address the identification of e-business options from scratch, are scarce. This argument will be explained in the next section.

2. RELATED WORK

Lee (2001) contributes in a useful way to this field by providing a framework to evaluate e-commerce business models. This activity, however, can only take place after the identification of options, being the main focus of this article.

Barua et al. (2001) introduce an e-business value model conveying to management how to allocate organizational resources by highlighting specific areas of opportunity. They emphasize that not only the existing products or services and existing customers must be the central point of orientation, and suggest that the internet may open up opportunities to reach new customers and to introduce new products or services. However, their model does not focus on the generation of e-business options in a systematic way, but on the assessment and improvement of existing or new e-business applications. Barua et al. (ibid.) also focus more on design details of e-business options than on general strategies of applying the internet.

The ideas of Barua are in line with Ansoff (1965), who identifies product market areas to be focused on by organizations. Ansoff suggests that two important strategic questions of organizations are: 1) whether they will focus only on their existing markets and customers or also on new markets and customers, and 2) whether they will focus on existing products and services or also on the development of new products and services. These two fundamental questions are very relevant in relation to e-business, since the internet enables many organizations to fundamentally rethink their product-market combinations. Because of this, these two questions are addressed in the approach as described in this paper.

Straub en al. (2001) build on these ideas by stating that e-commerce can have three effects: 1st order, 2nd order and 3rd order effects. First-order effects are geared toward reducing costs and increasing productivity. Second-order effects involve the pursuit of new markets and improving services and third order effects lead to far going transformations affecting goods and services, targeting and distribution. These issues are also addressed in the framework as described in this article by identifying them explicitly in the dimensions of the framework.

Many consultancy firms developed models to assess the e-business 'maturity' of client organizations. To give some examples: KMPG (2000) developed SAVED to evaluate e-commerce operations. This model can be used to assess existing e-commerce applications rather than that it can be used to generate ideas for new directions of use. Ernst & Young (1999) launched their Internet Scorecard Assessment, mainly aimed at measuring current performance with respect to online presence of organizations. Forrester Research (2001) uses

its eBusiness Voyage model to analyze the e-business readiness of corporations. They use twenty key-questions to determine the level of maturity with respect to e-business opportunities.

We can conclude that there already exist many models that can be used to assess and to evaluate current e-business applications as well as to measure the readiness for the future. However, there seems to be a lack of approaches that may help analysts to generate options and future directions of utilizing the internet. The approach as described in this article aims to contribute by suggesting how such a framework could look like. This paper is an extension of the earlier published work of Boonstra and De Brock (2003).

3. DIMENSIONS AND ELEMENTS

Organizations can use the internet as a means of communication with the outside world in different ways. These different ways can be analyzed by distinguishing among the following dimensions: stakeholders groups, stakeholder statuses, channel strategies, communication modes, product/service groups, and product/service statuses.

These dimensions are derived from the elementary notion that organizations can be perceived as open systems (Scott, 1998). Appropriate relations have to be achieved with parties in the outside world in order to survive. For that reason, organizations provide and exchange information to relevant parties in the outside world. These communications may lead to transactions. See Figure 2.
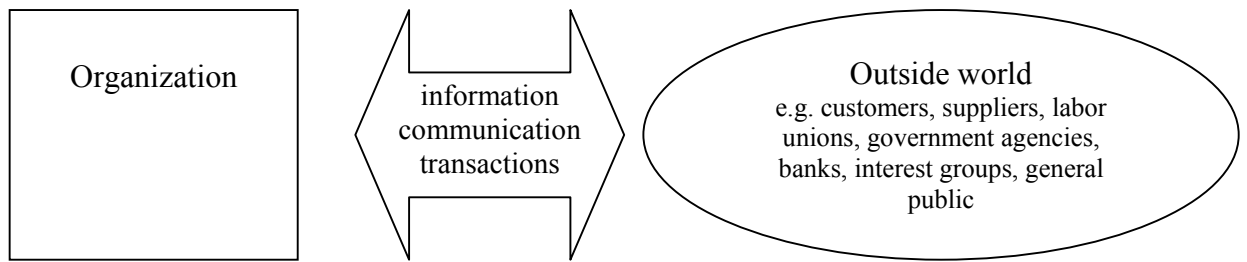
Figure 2   *Organization as an open system*

In some cases, electronic networks including the internet, can be used to interact with the outside world. The framework as set out in this article aims to identify and describe these cases. The question whether such a possibility makes sense from a business perspective has to be assessed in a later stage.

In order to generate potential e-business options, one has to identify with which parties in the outside world the organization intends to provide or exchange information. These can be current or new parties, since electronic networks can be used to extend or reduce the reach of organizations. Once this outside world has been identified, the way of using electronic networks has to be considered. Here we concentrate on communication modes, channel strategies, and (current or new) products and services. These dimensions and their elements are further explained below.

Dimension #1   (External) stakeholders groups

Organizations exchange information and communicate with external stakeholders, who can be divided into *business partners* and *other stakeholders* (or *non-business partners*). It is relevant to distinguish between business partners and other external stakeholders because the communication mode between the organization and these two kinds of stakeholders groups is different (see also the paragraph on communication modes). With business partners, an organization has a transactional (including monetary) exchange relation as well as an informational and communicational relation. Typical business partners include customers, suppliers, banks, insurance, shareholders, and governments (e.g. concerning taxes, licenses, and regulations). With other external stakeholders, organizations only have an informational or communicational relation. Typical examples are the press, special interest groups (e.g. environmental groups), and the general public.

The number of external stakeholders groups is organization dependent: the user of this framework has to map and to group all external stakeholders that may be relevant for the analysis.

Some relevant questions with respect to stakeholders are:
What are the current groups of business partners?
What are the current groups of other stakeholders?

Dimension #2   Stakeholder statuses

We distinguish two statuses, namely *current* and *new*. They constitute the two elements of this dimension. An organization can transform, extend, or limit its business, by using the internet, towards new stakeholders.

New stakeholders can be new customers, new suppliers, new banks, or even new governments. New customers can be reached by entering new markets (market extension) or by disintermediating current intermediaries and by doing so, targeting final consumers. The same can be stated about other stakeholders, for instance about suppliers. By using electronic marketplaces, organizations can broaden their suppliers' base or disintermediate backwards and replace suppliers by the initial producers of the supply.

Some relevant questions with respect to stakeholder statuses are:
Can the organization reach new business partners by using the internet?
Can the organization reach new other stakeholders by using the internet?

Dimension #3   Channel strategies

In this paper we distinguish internet channels and non-internet channels (although our framework also allows further refinements). Organizations can choose to use the internet as an exclusive medium for exchanges with one or more (groups of) stakeholders. This is called a *single-channel internet strategy*. The alternative is to combine the internet with non-internet channels. This is called a *multi-channel strategy*. These two strategies constitute the two elements of this dimension.

Some relevant questions with respect to channel strategies are:
Can the organization use the internet as the single channel to reach a current group of business partners?
Can the organization use the internet as an additional channel to reach a new group of business partners?

Can the organization use the internet as the single channel to reach a current group of current other stakeholders?

Dimension #4   Communication modes

We distinguish *informational*, *interactional*, and *transactional* communication modes. Therefore, this dimension has three elements. Informational means a one sided provision of information, interactional means a two sided information exchange, and transactional means the exchange of products or services or the agreement about such an exchange. Interactional includes informational; transactional includes interactional and, hence, informational.

A relevant question with respect to communication modes is:

Can the organization use the internet to provide information, to exchange information, or to complete transactions?

Dimension #5   Product (and service) groups

Organizations can use the internet to buy or to market their products and/or services.
The number of product/service groups is organization dependent: the user of this framework has to map and to group all current products and services that may be relevant to the analysis.

Some relevant questions with respect to product/service groups are:

What are the current or new final products and services and can the internet be used to facilitate the buying or selling process?

What are the current or new inputs and can the internet be used to facilitate the buying process?

Dimension #6   Product (and service) statuses

We distinguish two statuses, namely *current* and *new*. They constitute the two elements of this dimension. Organizations can use the internet to buy or sell their current products and services, but they can also transform or extend the business, by using the internet to buy or to market new products or new services. Many products can be extended or transformed by using the internet.

A relevant question with respect to product statuses is:

What could be possible new final products/services and inputs?

Could the internet be used to facilitate the buying or selling process of new products or services?

Examples of e-business options for a publisher of a regional newspaper

A publisher of a regional newspaper has many options to use the internet. We use the different dimensions to describe four of these options. These options are also shown in Table 1.

Option 1   The publisher can choose to put the content of (a part of) the newspaper on the internet as an additional and exclusive service to their current subscribers (extension of current product to current customers, multi-channel).

Option 2   The publisher can choose to put the content of (a part of) the newspaper on the internet, to make it accessible for anyone as a service extension of a current product for new clients as well as for current subscribers.

Option 3   The publisher can choose to develop a new single-channel internet newspaper, using special features of the internet (e.g. interactivity, news on demand) to reach new customers (new product, new customers, single-channel internet).

Option 4   The publisher can choose to develop an internet newspaper, based on the current newspaper, using some special features of the internet. This is a free new service for their current subscribers and a chargeable service for new internet customers. (The English newspaper The Economist applies this option.)

Table 1   Examples of some e-business options for a publisher of newspapers

Option Nr	Stakeholders groups and statuses *Dimension # 1, # 2*	Channel strategies *Dimension #3*	Communication modes *Dimension #4*	Product and service groups *Dimension #5*	Product and service statuses *Dimension #6*
1	Current subscribers	Internet *and* traditional newspaper = multichannel	Informational	Content of current newspaper	Current
2	Current subscribers and New clients	Internet *and* traditional newspaper = multichannel	Informational	Content of current newspaper	Current
3	New customers	Single-channel internet	Transactional	Newspaper	New
4	Current subscribers and New customers	Internet and traditional newspaper = multichannel	Interactional for current subscribers, transactional for internet/only customers	Current newspaper, adapted	New

The e-business options of this example are generated in an ad hoc way just to illustrate the different dimensions of an e-business option. Many other options are also possible. In the next sections we will show how options can be generated and ordered in a systematic manner.

4. GENERATING POTENTIAL OPTIONS

In order to generate potential e-business options in a systematic manner once the (company-dependent) elements of all dimensions are determined, a closer inspection of the structure of the description of the potential options is needed. In our view, the following general format can describe all potential options:

<communication mode> ***options concerning*** <product status> <product group> ***with*** <stakeholder status> <stakeholders group> ***using a*** <channel strategy>

The complete set of potential options then consists of all possible combinations of values for the six variables in the general form above. If p is the number of product/service groups and s is the number of stakeholders groups that are distinguished by the organization concerned, this will lead to 2 * 2 * 2 * 3 * p * s (i.e., 24 * p * s) potential options. It is clear by now that these potential options can be generated in a systematic manner, namely by straightforwardly

combining each possible element of each of the six dimensions. Each combination now results in a potential option.

Instead of writing out those 24 * p * s potential options by hand, they can also be generated by a tool. The tool can consist of a database with a *Dimensions* table containing the six dimensions and an *Elements* table containing all (2 + 2 + 2 + 3 + p + s) elements. A sample content of such a database will be shown in the next section. Furthermore, the database must have a reporting facility that, based on the join of these two tables, can generate the 24 * p * s descriptions of the potential options in our general format.

5. ORDERING POTENTIAL OPTIONS

By adding an ordering of the dimensions as well as adding an ordering of the elements within each dimension we can order the potential options: these orderings of the dimensions and their elements implicitly imply an ordering of the generated options. The next example should make this clear.

Example

Suppose that the publisher distinguishes three general product groups (say physical newspaper, digital newspaper, and services) as well as five stakeholders groups (say subscribers, advertisers, news agencies, and banks as business partners, and general public as a group of other stakeholders, i.e., non-business partners). After choosing an ordering of the dimensions and of the elements within each dimension, the contents of our two database tables could be as follows (where type 'B' stands for business partners and 'N' for non-business partners):

Table 2   Dimensions of e-business options

Dimension	*Dimension order*
Stakeholders groups	6
Product groups	5
Channel strategies	1
Communication modes	4
Stakeholder statuses	2
Product statuses	3

Table 3   Elements of e-business options

Element	Dimension	Element order	Type
subscribers	Stakeholders groups	1	B
advertisers	Stakeholders groups	2	B
news agencies	Stakeholders groups	3	B
banks	Stakeholders groups	4	B
general public	Stakeholders groups	5	N
physical newspapers	Product groups	3	
digital newspapers	Product groups	1	
services	Product groups	2	
single-channel internet strategy	Channel strategies	1	
multi-channel strategy	Channel strategies	2	
informational	Communication modes	1	
interactional	Communication modes	2	
transactional	Communication modes	3	
current	Stakeholder statuses	1	
new	Stakeholder statuses	2	
current	Product statuses	1	
new	Product statuses	2	

This means that in this example we first consider

informational options concerning current digital newspapers with current subscribers using a single-channel internet strategy

then similar options for the other stakeholders groups (4 groups in this case),

then the foregoing for the other product groups (2 groups in this case),

then the foregoing for the other communication modes (2 modes in this case),

then the foregoing for the *new* products,

then the foregoing for the *new* stakeholders, and,

finally, the foregoing for the other channel strategy.

We obtain these descriptions of potential options by simply substituting the respective elements into the general format we introduced earlier.

In our example this generates 360 potential options (i.e., 5 * 3 * 3 * 2 * 2 * 2).

As mentioned earlier in the context of stakeholders groups, we distinguish between business partners and other stakeholders (or non-business partners). The reason for this distinction is that organizations do not have a transactional relation with non-business partners. As a consequence, we should not generate (questions regarding) potential options involving such

combinations. So, instead of combining all three communication modes with all stakeholders groups, we combine two communication modes with all stakeholders groups and one communication mode (namely transactional) with all business partners groups only. If b is the number of business partners groups (and hence b ≤ s) then the factor 3 * s in our earlier formula

8 * p * (3 * s) for the number of potential options is replaced by (2 * s + b), finally resulting in 8 * p * (2 * s + b) potential options. The technicalities of a database solution and its implementation will be described in Section 6.

Different criteria can be used to order the different elements. One criterion might be to prioritize from current to new. This means that potential options including current stakeholders, current products and multi-channel strategies appear on a higher place on the list than potential options including new stakeholders, new products and single channel strategies. This is in accordance with Straub et al. (2001) who state that internet applications tend to move from 1st order to 2nd order and then to 3rd order effects (see also Section 2). When a company chooses to follow this pattern, the list of potential options suggests the less risky options first.

Another approach might be to look for a strategic fit. When a company intends to reach new groups of customers it is reasonable to give options which include new customers a higher ranking. The same holds when an organization intends to use the internet to launch new (internet-based) products or services. In that case, new products and services should get a higher priority. But in all cases the list provides all potential options when the company dependent elements are identified in an accurate way.

When the list of potential options has been generated and ordered, a list of real options has to be composed. The difference between a potential option and a real option can be determined by the answer to the question whether a potential option is possible. This means that impossibilities have to be removed from the list. To give an example: it is impossible to deliver a bottle of orange juice over the internet. So delivering orange juice over the internet is a potential option, but not a real one. Ordering orange juice over the internet is a potential option as well as a real one, since this option is possible.

However, not all (real) options will make sense from a business perspective. This means that options have to be assessed, often by using several criteria. So when the list of real options is there, the assessment phase may start (see also Figure 1).

6. TOOL SUPPORT

The approach as described in this paper will be supported by a tool, which can support by:

- recording the product/service groups and the stakeholders groups (organization-dependent);
- generating the potential e-business options, and
- ordering those e-business options by given criteria.

The tool will consist of a database, which contains the proper:

- data structures (tables) that already contain all organization-independent data;
- forms to add and update the data (e.g., the product/service groups and the stakeholders groups), and
- a reporting facility to generate and order the potential e-business options, e.g., in the form of a questionnaire.

Below we work out a design for such a tool to support the framework. The two tables in our newspaper example already suggest (parts of) the structure of the underlying database. We will now make this database structure explicit, first informally and then more formally in SQL.

6.1. Description of the database

We will call our database *E-Database*. The database will consist of two tables, called *Dimensions* and *Elements*.

The table *Dimensions* has two attributes, called *Dimension* and *Dim-order*. The attribute *Dimension* is string-typed and *Dim-order* is integer-typed, with range [1 .. 6]. Each of the two attributes forms a key in its own right.

The table *Elements* has four attributes, namely the string-typed attributes *Dimension* and *Element*, the integer-typed attribute *Elem-order*, and the two-valued attribute *Type*, meant for stakeholders groups to indicate whether they are business partners ('B') or non-business partners ('N'). Our implementation presupposes that the attribute *Elem-order* consists of only one digit. The table *Elements* has two keys, namely the combination of the attributes *Dimension* and *Element*, and also the combination of the attributes *Dimension* and *Elem-order*. Moreover, the attribute *Dimension* in the table *Elements* refers to the attribute *Dimension* in the table *Dimensions*.

This leads to the following SQL-declarations:

CREATE SCHEMA   E-Database

CREATE TABLE   Dimensions
(Dimension   Varchar(25)   NOT NULL,
  Dim-order   Integer   CHECK(0 < Dim-order and Dim-order < 7),

  UNIQUE(Dimension),
  UNIQUE(Dim-order)
)

CREATE TABLE   Elements
(Dimension   Varchar(25)   NOT NULL,
  Element   Varchar(30)   NOT NULL,
  Elem-order   Integer   CHECK(0 < Elem-order and Elem-order < 10),
  Type   Varchar(1)   CHECK(Type IN ('B', 'N')),

  UNIQUE(Dimension, Element),
  UNIQUE(Dimension, Elem-order),

  FOREIGN KEY (Dimension) REFERENCES Dimensions(Dimension)
)

We can give the database the following *starting state*, which contains all (and only) company-independent ingredients:

Dimensions

Dimension	Dim-order
Channel strategies	
Communication modes	
Product groups	
Product statuses	
Stakeholders groups	
Stakeholder statuses	

Elements

Dimension	Element	Elem-order	Type
Channel strategies	single-channel internet strategy		
Channel strategies	multi-channel strategy		
Communication modes	informational		
Communication modes	interactional		
Communication modes	transactional		
Product statuses	current		
Product statuses	new		
Stakeholder statuses	current		
Stakeholder statuses	new		

Our starting state can be obtained from the empty state by six INSERT-statements for the table *Dimensions* followed by nine INSERT-statements for the table *Elements*.

6.2. Description of the reporting facility

The questionnaire that our reporting facility should generate can be considered as the result of a query over our database. This result could be of the form as shown in the appendix. Here we recall the general format for potential option description:

<communication mode> ***options concerning*** <product status> <product group> ***with*** <stakeholder status> <stakeholders group> ***using a*** <channel strategy>

The complete set of potential options consists of all possible combinations of values for the six variables in the format above (excluding the combinations of the *transactional* communication mode with *non-business partners*).

The Option-code in our questionnaire is constructed from the order of the elements, which are concatenated in the order prescribed by their dimension orders.

The Answer field in our generated questionnaire is left empty.

Finally, the potential options on the questionnaire are ordered by the Option-code.

Before we present the query for the generation of the questionnaire, we first define an auxiliary view ED, constructed from the (natural) join of the tables *Dimensions* and *Elements* (joined on the common attribute *Dimension*). In this view we obtain the proper 10-power for the element order in the final option-code by subtracting its dimension order from 6. (Note that the first dimension constitutes the most significant digit in the option-code and the last dimension constitutes the least significant digit.)

```
CREATE VIEW  ED  AS
SELECT  e.Dimension  AS  Dim,
        e.Element        AS  Elem,
        e.Type           AS  Type,
        e.Elem-order     AS  EO,
        6 – d.Dim-order  AS  Power
FROM    Elements e  NATURAL JOIN  Dimensions d
```

The SELECT-statement below expresses the query for the generation of the questionnaire. We took out two (elaborate) sub-expressions and wrote them out separately *after* the SELECT-statement, for reasons of readability.

```
CREATE VIEW  Questionnaire  AS
SELECT  α     AS  Option-code,
        ' '   AS  Answer,
        β     AS  Option-description
```

```
FROM      ED cm,  ED cs,  ED pg,  ED ps,  ED sg,  ED ss
WHERE    cm.Dim = 'Communication modes' AND
         cs.Dim  = 'Channel strategies' AND
         pg.Dim  = 'Product groups' AND
         ps.Dim  = 'Product statuses' AND
         sg.Dim  = 'Stakeholders groups' AND
         ss.Dim  = 'Stakeholder statuses' AND
         NOT( cm.Elem = 'transactional' AND sg.Type = 'N' )
ORDER BY Option-code
```

Here β stands for the (string) expression

cm.Elem & ' options concerning ' & ps.Elem & ' ' & pg.Elem & ' with ' &
ss.Elem & ' ' & sg.Elem & ' using a ' & cs.Elem

which constructs our general format for potential options, and α stands for the (integer) expression

cm.EO * (10 $\uparrow$ cm.Power) + cs.EO * (10 $\uparrow$ cs.Power) + pg.EO * (10 $\uparrow$ pg.Power) +
 ps.EO * (10 $\uparrow$ ps.Power)   + sg.EO * (10 $\uparrow$ sg.Power) + ss.EO * (10 $\uparrow$ ss.Power)

which constructs the option-code from the order of the elements and their relative position (as indicated by their dimension order). Here '$\uparrow$' designates the power symbol.

E-business consultants, managers, and business analysts can use this tool to support the process of business improvement of organizations. The framework suggests conventional as well as very unconventional options to using the internet and helps people to specify certain directions of e-business related change.

This approach including this tool, can be used during interviews and in workshops to generate and to discuss directions of change, which may improve final decision- making.

7. FUTURE WORK

When options are identified and ordered, they have to be assessed and selected by using one or more criteria (see Figure 1). These criteria are organization dependent. Many organizations use multi-criteria methods (Grembergen et al., 2001; Parker et al., 1988) to assess ICT investment alternatives, including e-business options. We intend to extend the framework as well as the tool as described in this paper by incorporating these next steps (De Boer et.al., 2002). Among other things, the tool has to be able to record the results of the assessment and

selection process for an organization. This means that the framework aims to cover and support the first two stages of the e-business decision-making process as depicted in Figure 1.

An earlier version of the framework as described in this paper has been applied in two organizations. We intend to describe these cases and to extend this case base in order to refine and improve the framework.

8. CONCLUSIONS

We conclude that there are already a variety of models for assessing current e-business applications, as well as for measuring the e-business readiness for the future. However, there is a lack of approaches, which can help consultants, managers, business analysts, and academics to generate new options and new directions of utilizing the internet. In this paper, such an approach has been offered, including a tool that supports this activity. The specific contribution of this approach is that it supports a more creative as well as a more systematic decision-making in matters concerning e-business; it describes more trivial as well as very unconventional e-business options in a global, but nonetheless complete and systematic way. These descriptions can lead to an extensive list of potential options offering a basis for further systematic decision-making, and also urges people to make conscious and well-considered e-business decisions. This approach can be extended to incorporate the assessment and selection process as well. This step in the decision making process can also be supported by an extended version of the tool.

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APPENDIX

On the next page we show (the first) part of our questionnaire when applied to the newspaper example given in Section 5.

Option-Code	Answer	Option-description
111111		informational options concerning current digital newspapers with current subscribers using a single-channel internet strategy
111112		informational options concerning current digital newspapers with current advertisers using a single-channel internet strategy
111113		informational options concerning current digital newspapers with current news agencies using a single-channel internet strategy
111114		informational options concerning current digital newspapers with current banks using a single-channel internet strategy
111115		informational options concerning current digital newspapers with current general public using a single-channel internet strategy
111121		informational options concerning current services with current subscribers using a single-channel internet strategy
111122		informational options concerning current services with current advertisers using a single-channel internet strategy
111123		informational options concerning current services with current news agencies using a single-channel internet strategy
111124		informational options concerning current services with current banks using a single-channel internet strategy
111125		informational options concerning current services with current general public using a single-channel internet strategy
111131		informational options concerning current physical newspapers with current subscribers using a single-channel internet strategy
111132		informational options concerning current physical newspapers with current advertisers using a single-channel internet strategy
111133		informational options concerning current physical newspapers with current news agencies using a single-channel internet strategy
111134		informational options concerning current physical newspapers with current banks using a single-channel internet strategy
111135		informational options concerning current physical newspapers with current general public using a single-channel internet strategy
111211		interactional options concerning current digital newspapers with current subscribers using a single-channel internet strategy
111212		interactional options concerning current digital newspapers with current advertisers using a single-channel internet strategy
111213		interactional options concerning current digital newspapers with current news agencies using a single-channel internet strategy
111214		interactional options concerning current digital newspapers with current banks using a single-channel internet strategy
111215		interactional options concerning current digital newspapers with current general public using a single-channel internet strategy
111221		interactional options concerning current services with current subscribers using a single-channel internet strategy
111222		interactional options concerning current services with current advertisers using a single-channel internet strategy
111223		interactional options concerning current services with current news agencies using a single-channel internet strategy
111224		interactional options concerning current services with current banks using a single-channel internet strategy
111225		interactional options concerning current services with current general public using a single-channel internet strategy
111231		interactional options concerning current physical newspapers with current subscribers using a single-channel internet strategy
…		…