FENNEC: A DASHBOARD TO EVALUATE ENVIRONMENTAL SCANNING WITHIN BUSINESSES

(FENNEC is a knowledge based expert system)

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Abstract

Effective businesses are those which are to continuously monitor change in their environment. However, few business managers (especially when it comes to small and medium sized businesses) are aware of the importance of environmental scanning for their enterprise. Talk does not have much impact on their behaviour. We presume that their behaviour towards environmental scanning would develop more if we "show" them a practical tool and if we make them participate in a reflection session, supported by a tool which helps reflection and evaluation of environmental scanning function. We present here FENNEC which was created for this purpose. We also explain how FENNEC will enable new researches on environmental scanning.

Key Words

Technological scanning - Environmental scanning - Managerial information - small businesses - Information management - Decision support system - Strategic management of information - Management expert system - Audit.
This article is built around the following main question:

"How to make businesses' behaviour towards environmental scanning evolving, using other methods than speeches?"

Specialised as well as economical news papers are more and more dealing with technological, competitive or environmental scanning. There are only a few businesses however, where scanning has effectively been put into practice. Many business managers are not even able to say clearly whether their business really does or does not carry out any scanning. They often limit themselves to saying "We are doing environmental scanning without being aware of it." We should specify that businesses concerned by this article are mainly small businesses, or independent departments, members of groups.

Foreign businesses tend to be more advanced and tend to have a competitive advantage over French businesses. This article aims at giving a real help to those businesses which want to make a decisive step in environmental scanning. To be more precise, it provides assistance to businesses which are raising the following questions:

"Are we really doing environmental scanning: what is the present situation about it in our business?"

"What are our strengths and weaknesses concerning environmental scanning: how can we improve?"

"How have our environmental scanning practices evolved for the last year: have we improved or have we regressed?"

The tool we propose enables to efficiently answer these questions. This diagnosis and evaluating software is called FENNEC.
In the first part of this article, we define what business "environmental scanning" (or also the radar) is and we briefly remind one of this function importance. In the second part, we introduce the FENNEC software and its use as a dashboard for controlling environmental scanning within businesses. In the third part, we stand back and look at the disparities existing among small businesses in France and in other countries.

We will meanwhile show that FENNEC may also be used as an educational software program to increase awareness of and to train on environmental scanning.

First Part : Importance and requirements of environmental scanning for businesses.

1.1. What is business environmental scanning?

Environmental scanning refers to the effort made by businesses to scan their environment on a prospecting purpose (not just in calculating statistical forecast but in collecting anticipative information). This generic term includes different kinds of scanning: commercial, competitive, and technological scanning. Specialised newspapers tend to focus more and more on the latter, but also including other forms of scanning, such as political scanning, or even "acquiring scanning".

Environmental scanning plays for businesses the same role as a radar for ships. It aims at informing early enough head managers, about interesting opportunities as well as about threats to cope with.

Environmental scanning is a component of businesses' information system. It deals more specifically with information flows coming from external environment. As this information concerns external events and actors, and as its aims is turned to the future instead of past, we sometimes prefer the term "prospective environmental scanning". But whatever the term, this
very information presents some characteristics which don't make its management easy, as we'll see further on.

Environmental scanning, in its global form, is of more common use in Japanese or American firms than it is in French ones. However, some kinds of scanning are developing, like competitive scanning or technological scanning, within businesses which are -it is not just a matter of chance- among the most efficient ones.

1.2. Environmental scanning is healthy for businesses.

Recent studies have shown that environmental scanning is particularly important for those businesses that combine the two following conditions:

a) to be in a changing environment (economically, technologically...)

b) to be willing to keep a durable competitive advantage

a) Under the first condition, businesses are to be compared with ships in the middle of an (economical) war and storm. They must watch in every directions and far enough to be able to react to opportunities and threats resulting from the surrounding changes. The question they must answer could be summarised in this one: to chose or to undergo? Without an appropriate environmental scanning, businesses act from day to day and have to fight with hardly any margin. This is what happens when daily activities are taking all the energy of businesses' members. These businesses cannot then stand back enough to have a proper global view. One way of summarising this is to say that "daily activity chokes strategy".

b) The second condition means that when businesses are successful at a given time, they must not rest on their laurels. It would be the worst thing to do, as shown by many examples in every country. Businesses that want to be durably competitive must take care of their competitors (not only current competitors but also potential ones). They should also nurture the innovation process which has made their success and which depends for a large part on
technological and scientific scanning. Innovation (either concerning product, manufacturing, process or services) is a long process, which requires an huge amount of different kind of relevant information.

1.3. Environmental scanning is an information process which on setting up, raises several issues that businesses must cope with.

a) Is there really a will in the business to use this information to raise a strategic reflection? This question is crucial: without any will from managers to have a prospective environmental scanning in order to build a competitive edge and detect opportunities and obstacles, there is no use for any strategic scanning within the business. Growing awareness and training of managers (particularly in small businesses) is a sine qua non condition.

b) Which ones are the information with an anticipative characteristic likely to be useful for our strategic reflection? Which criteria should we use to select such information?

c) Who is qualified among our business to collect this information? Do we have clearly defined “who collects what”?

d) Who is the manager in charge of making this information living? What is his status and which status do we recognise he has? Which means does he have?

e) How shall information circulation be organised, from the captors/collectors to the managers in charge of making it living? Which methodologies should we use? How can the transformation of information into strategic action be made easier?

According to us, however, the very first question a business should ask of itself is the following one: "Aren't we already doing environmental scanning without knowing it?" Indeed, the strategic scanning concept is relatively recent and very little developed in European countries. Not that businesses don't have any embryos of environmental scanning, but these embryos have been created on the spar of individuals, for their own needs and without any co-ordination. The
head managers rarely know about them and rarely want to know about them. A step has to be taken, otherwise European firms will stay far behind foreigner ones, especially Japanese.

1.4. Helping businesses in environmental scanning

How to help a business that would like to improve in environmental scanning? This is the question we would like to answer through the following proposition.

Our experience as environmental scanning consultants has shown us two main things that we wanted FENNEC to cope with:

a) Head managers seldom know what's going on inside their business concerning environmental scanning. They have no sharp vision. One way to help (and to motivate) them, consists in giving them a tool of evaluation and visualisation they could apply to their own business.

b) The business' staff tend to sacrifice the future for the benefit of immediate present time. The environmental scanning, when any, is progressively swept out when there is no regular "booster injection".

Evaluating the state of environmental scanning requires:

- to interview several persons among the business. Interviews are repetitive and lead to a synthesis.

- to give quick results to the interviewed people so as to thank them, making them aware of the situation and motivating them.

- to visualise the evaluation results in order to make them more understandable.
This lead us to the conception and realisation of a tool which would evaluate and visualise within a unique dashboard the state of environmental scanning in businesses or in some departments of one business.

**Second part: A dashboard based on FENNEC expert system, in order to manage environmental scanning.**

"*What is the quality of our environmental scanning: what are we doing exactly and which are our strengths and gaps?*"

There are in fact three circumstances, when this question is raised:

a) When the business' head managers have been freshly aware of environmental scanning. We will then talk about a pre-initial phase to environmental scanning.

b) When the head managers want to set up a durable environmental scanning function. They then feel the need to do regularly check-ups of the situation using a dashboard to evaluate environmental scanning. That's what we call the "booster injection" aspect.

In both cases, the issue is how to make the inventory of fixtures in the business. FENNEC was precisely created on this purpose. But it can also be used in a third case.

c) to provoke a "tilt" in the manager's mind, about the potential interest of environmental scanning. In this case, FENNEC plays the role of revealing. We particularly took care of this educational aspect. The goal we had, was to set off a demand from the manager, for an intervention on environmental scanning.

FENNEC has been made to deliver a global diagnosis of environmental scanning after a one hour interview with a business head manager. This is an acceptable time from managers.
We would like to explain here that FENNEC is the French name for a small fox living in desert areas. It has very long ears, enabling it to listen perfectly to its environment and thus to have the best chances of surviving.

2.1. The dashboard in itself

The final outcome of FENNEC is a dashboard indicating the business’ situation concerning environmental scanning. This dashboard consists of nine global indicators.

Three indicators evaluate environmental scanning in itself. They affect commercial scanning, competitive scanning and technological scanning. These three aspects are the most commonly observed.

The other six indicators evaluate six factors of environmental scanning quality. They make it possible to determine strengths and weaknesses of the business’ environmental scanning, and point out some fields of improvement. These six indicators are based on the results of studies we have already published.

2.2. Evaluation of the dashboard indicators

The dashboard indicators are evaluated by using questionnaires. For each indicator, there are several questions appearing on the computer screen. You answer by "yes or no" choices or by using scales.

Intermediate messages are displayed on the screen, according to the answers. All the messages constitutes the first part of FENNEC knowledge data base.

Who's interviewed?

Generally the business' Director is the first one to be interviewed. Visualising the diagnosis, he makes his mind, asks for questions and justifications. Afterwards, he generally asks if other
persons from his business could be interviewed in order to make the diagnosis more reliable. We thus define together a panel of people to be interviewed.

The elaboration of the questions and intermediate messages result from a cognitive work. The questions are an important part of FENNEC knowledge data base.

This knowledge was acquired through a double process:

- a systematic analysis of any publications made in the environmental scanning field, especially in the United States;

- deep interviews with experts in environmental scanning within businesses.

It is mainly because FENNEC is based on experts’ knowledge that we qualify it an expert system software.

The facts database is made of all the answers collected during the different interviews.

2.3. From the asked questions to the synthetic dashboard

The dashboard indicators are appraised from the answers. The link between answers and the synthetic board is made by a set of relations called "inference rules". All these rules constitute the other important part of FENNEC knowledge data base.

The actual programming of FENNEC was realised with GURU, a generator of expert systems bought on the market and used by our laboratory. FENNEC software has GURU runtime.

2.4. Users of FENNEC

Using FENNEC is very easy. This simplicity makes it possible to have two different kinds of users:
- executives, for example the director himself in small businesses, or the organisation responsible.

- external consultant, specialised in environmental scanning. In this particular case, FENNEC is used as a methodological tool. This second form of utilisation is often more preferable as consultant can provide further explanations.

FENNEC is generally used on a laptop (PC compatible), in order to be brought to the meeting location.

Validation and enrichment of FENNEC has been made in the field within businesses which want to improve their environmental scanning.

2.5. Using FENNEC as an educational software to increase awareness and to train on environmental scanning.

FENNEC expert system includes didactic messages. At the end of each significant stage, a relevant message appeared, pointing out an essential element of environmental scanning. The user can thus compare the resulting situation with an "ideal" situation.

Third part: What can we learn out of the numerous diagnoses already carried out in small businesses?

A tool for men of action, FENNEC can also be regarded as a tool of data collecting for researchers in science of management.

Indeed the observations made after the use of FENNEC within many businesses enable us to answer the following questions:
- is there a wide disparity in the function of prospective environmental scanning among French businesses? If yes, which kind of typology of businesses can we propose?

- is there a wide disparity in the function of prospective environmental scanning among businesses from different countries? If yes, which kind of typology of businesses can we propose?

FENNEC is now right in its way of being used in several countries:

**France**: FENNEC has already being used in many businesses. The diagnoses carried out make it possible for a given business to stand back as well as to give an overview of some general trends at a national level.

**Europe**: FENNEC is today available in three different languages and we are working on the English version. The system is used in a European program of training of small businesses managers. Many diagnoses will be accumulated in order to be used for research.

**Canada**: a comparative study started with a research group from Quebec. Comparisons of French and Quebec small businesses are planned. These ones will also be a strong basis for further researches.

**Conclusion**

For the moment, we have noticed the following points:

- the number of question asked is well accepted: neither too few, nor too many.

- the language used to formulate the question is closed to the business language. It is simple and understandable.
- the questions are well focused and go deep into environmental scanning main factors.

- the rigorous process used makes business managers relying on FENNEC. One of them said "Words go away. Screens stay".

FENNEC seems to be the right support for communication and discussion within the business strategic committee. From this point of view, it really helps decision making of managers within the business.
APPENDIX 1 - DIAGNOSIS: EXAMPLE

Inventory of fixtures

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<th>prioritary effort</th>
<th>to be improved</th>
<th>in accordance with the PES activity</th>
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<tbody>
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<td>Competitive scanning</td>
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<td>Technological scanning</td>
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progress track

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<td>Management style</td>
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<td>Formalisation of the PES</td>
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<td>Sources of information used</td>
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<td>Transmission to the information</td>
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<td>Use to strategic purposes</td>
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<td>Staff commitment</td>
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APPENDIX 2 - QUESTIONNAIRE

Part 1: Commercial Information Scanning

1) Do you keep track of each of your customers? (at least your main customers)
   a-Yes       b-No

2) Do you update this file so that you can rely on it at any time?
   a-Yes       b-No

3) Is the stored information:
   a-only accountancy information?
   b-accountancy and commercial information?
   c-qualitative information in order to anticipate future relationships and trends?
   d-integrate these three types of data?

4) Is there a "potential customer" file?
   a-Yes       b-No

5) Regarding contents such as:
   - who are your current suppliers,
   - current needs, future needs,
   - previously implemented strategies,
   - weight on your market share (current, future),

   would you describe this file:
   a-Rather rich?   b-Rather poor?

6) Is it updated on a regular basis so that you could rely on it at any time?
   a-Yes       b-No

Part 2: Competitive Information Scanning

7) How would you describe:
   - the intensity of rivalry between competitors in your markets?
   - the likely emergence of substitution products?
   - the bargaining power of customers in your markets?
8) Does your organisation have the quick reflexes to ask itself these types of questions with regard to specific corporations?
   a-Yes          b-No

9) Could you hold up as examples names of your main competitors?
   a-Yes, from memory
   b-Yes, there exists on a list
   c-No

10) Based on the following criteria:
    - contacts with new suppliers,
    - interest showed in new technologies,
    - hiring notices for executives published in the press,
    - efforts displayed in R&D,

    Would you describe the information gathered on your current and potential competitors as:
    a-Rather rich?          b-Rather poor?

11) Is information updated on a regular basis so that you could rely on it at any time?
    a-Yes          b-No

**Part 3: Technological information scanning**

12) Does the business of your company integrate evolving technological components?
    a-Yes          b-No

13) Have you ever tried to identify R&D centres in your research fields that has an interest more or less for you?
    a-Yes          b-No

14) Do you follow carefully the development of these researches?
    a-Yes          b-No
Would you rather describe your degree of collaboration with higher education (promoting PhD....) as:

a-low?
b-medium?
c-high?

15) **Part 4: Management style**

16) Is the management team totally convinced that information scanning is strategically necessary?

   a-Yes                  b-No

17) Does the management team encourage by its acts information scanning (congratulations, quotation in the company’s newspaper)

   a-each time it has the opportunity?
b-sometimes?
c-in particular instances?

18) Does the CEO give the good example, communicating information he gathered

   a-each time he has the opportunity?
b-sometimes?
c-in particular instances?

19) Could you define the percentage of time involved by the top level management according to the issues they are dealing with:

<table>
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<th>1 week</th>
<th>1 month</th>
<th>1 year</th>
<th>&gt; 3 years</th>
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20) In what type of information is the management team rather interested?

   - certain information < ++ + + ++ > hypothetical information
   - qualitative information < ++ + + ++ > quantitative information
   - complete information < ++ + + ++ > incomplete information
   - future oriented information < ++ + + ++ > information that facilitates control

21) **Part 5: Formalisation of the Scanning Function**

   Is the management of the scanning activity maintained by a specific department or person?
22) Is the person or department responsible directly to the top level management?
   a-Yes          b-No

23) Is the function shared within different departments of the firm?
   a-Yes          b-No

24) What is approximately the part of weekly time allowed for this business?
   a-less than an half day
   b-one day
   c-two days
   d-three days and more
   e-not specified in the shift

Part 6: Sources of information used

25) Is there a documentation office specific to your company?
   a-Yes          b-No

25bis) Does the documentation office enable you an easy and fast access to the sought information?
   a-Yes          b-No

25ter) Does staff consult it spontaneously when they are looking for any information?
   a-Yes          b-No

26) Do you centralise the subscriptions to specialised press?
   a-Yes          b-No

26bis) Is it possible to know at any time where to find the sought information?
   a-Yes          b-No

27) The reports developed internally (e.g. commercial visits reports) are:
    -written in the same way
      a-Yes          b-No
-stored in a place known by the persons who are likely to consult them
   a-Yes       b-No

-consulted and used within the company on a regular basis
   a-Yes       b-No

28) Is your company involved in trade fairs, expositions and other professional exhibitions (as a visitor or as an exhibitor)?
   a-as much as possible
   b-occasionally
   c-in particular instances

29) Do these visits often bring:
   a-commercial contacts?
   b-written reports, known and available?
   c-oral report to the top management?

30) In its search of information, does the company resort from time to time:
   -outside, bibliographic and statistic data banks,
   -outside organism (Chambers of Commerce and Manufacturers,...)
   a-Yes       b-No

Part 7: Transmission and access to the information

31) Does strategic information reach the "decision makers" at the right time?
   a-Yes
   b-Occasional delays
   c-Frequent delays

32) Do the staff members close to the environment know to whom they have to give information they gather?
   a-Yes       b-No

33) Are feedback circuits:
   a-Official, formalised?
   b-Informal, up to everyone?

34) At first glance, could the number of involved people in the feedback circuits be reduced?
   a-Yes       b-No
35) Are there new techniques of transmission (like E-mail, network) in your company?  
   a-Yes  b-No

36) Do you use them for the feedback of strategic information?  
   a-Yes  b-No

37) Does the storage system for external information enable you to find easily a piece of information required?  
   a-Yes  b-No

**Part 8: Use to strategic purposes**

38) Is there a consolidation process of the information gathered in order to get a global view from the environment?  
   a-Yes  b-No

39) Do the decision makers integrate information from their scanning activity during their reflection of a corporate strategy?  
   a-Yes, they have these good reflexes  
   b-Occasionally  
   c-In particular instances

40) To what purposes during the strategic process is this information the more frequently used?  
   a-To elaborate the strategy  
   b-To confirm or to change a strategy  
   c-To do both

**Part 9: Staff commitment**

41) Do employees participate actively and spontaneously to the gathering of information useful to the company?  
   a-Yes  b-No

42) Is the external gathering of information oriented by criteria pre-defined?  
   a-Yes  b-No

43) Are scanning areas provided to the company's "scanning" devices?  
   a-Yes  b-No
44) Do the staff members have good reasons to think that the information they gather and transmit are taken actually in consideration?
   a-Yes          b-No

45) Is the information gathered on an individual basis blocked by those who hold them?
   a-Yes          b-No

46) Must the reasons for information retention come from the fact that:
   a-information is considered as a source of power?
   b-communication within your organisation does not take part from the corporate culture?

47) Is your executives staff mainly made up with:
   a-engineers?
   b-academics?
   c-technicians?
   d-self-made men?
   e-people not from a dominant field?