Participant Observation in Risk Problems

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Abstract: Participant observation is a method to collect information through active participation in the social world that is under study, in this case two different risk-related working areas where confidentiality and secrecy are paramount. In reality there is a difference between what people do and say they do. With participant observation this discrepancy can be found. New research areas can be explored with participant observation when there is limited or no data available. In participant observation a level of immersion can be chosen. What position the observer takes depends on the situation and the goal of the research. In both studies discussed in this paper the 'observer as participant' form is chosen. The objective of this paper is to investigate whether in behavior or in operation between a traditional 'safety' working area and a 'security' working area show any similarities. We work from the hypothesis that since both are risk areas similarities exist. The object of study is rule violation and compliance in regulations. In this paper two relatively new areas of research are described which have limited data available. The main focus of one study is observation of decision making airport employees dealing with security. The other focus of study is observation of Seveso inspections of chemical corporations. Justification for participant observation comes from the fact that little is known of the strengths and weaknesses of current processes and procedures. Advantages and limitations of this method will be discussed after the comparison of results from the different working areas, as well as ethical issues that emerged in relation to confidentiality and secrecy. Other differences between settings and the influence of these differences of participant observation and methods of recording and interactions with the observed will be described in this paper.

Keywords: participant observation, airport security, chemical industry, triangulation

1. INTRODUCTION

Lack of compliance is a problem in many risk areas. In this paper we describe the similarities and the problems of using participant observation techniques to study rule violation and compliance in two risk areas: chemical safety and airport security. Both risk areas, safety and security, quantitative and qualitative research are tools of the trade. Researchers often use surveys or interviews to investigate a potential lack of compliance. Unfortunately people tend to give more socially acceptable answers when questions are asked about compliance and are often even not aware of their own lack of compliance. In addition the method of participant observation gives more insight into whether standard operating procedures are followed and how daily activities take place. Participant observation can help to uncover the daily activities of the setting that is under study. The advantages of this approach will be described in section 4 of this paper in more detail.

The studies that were performed in especially challenging environments due to the emphasis on confidentiality about standard operating procedures and incidents. Two areas are studied: government inspections of chemical process industries that have to abide by the Seveso regulations and decision making by airport employees dealing with security. The studies that were performed took place in areas where confidentiality was required to obtain information about among other things standard operating procedures and incidents.

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The observations in the chemical industry were performed during the actual Seveso inspections and the follow-up at fifteen chemical corporations in the Netherlands. The daily activities in these inspections are normally hidden for the general public and we still know very little on how inspectors regard compliance (Hutter, 1997). The observed inspections are the yearly inspections as required by the Seveso II Directive (Council Directive 96/82/EC). Observations were performed during the whole process of inspection including the preparation of inspection, inspection at the corporation, preparation of the agencies of the closing off the inspection, the closing off the inspection at the corporation and enforcement activities related to the inspection. Participant observation is done to gather data on the social interaction between law enforcement inspectors and corporation. The fact that the corporations that are inspected may have to deal with enforcement procedures makes these inspections very sensitive in a sense that confidentiality is paramount.

Airport security study observations were done in different countries in Europe and in different areas of the airport. People from all layers in society pass by and undergo the same security check process when departing from or arriving at an airport. These processes are standardized. The behavior of passengers and staff can be observed against the background of this standardization. The observations were done in several European countries and in different areas of airports, before and after the security check. The latter study is part of an European Union funded project called BEMOSA.

The veil of secrecy and confidentiality make participant observation by university researchers a tricky subject. This paper shares some of our experience in working on the boundary between open research and highly confidential and secret information. This paper starts with a brief discussion on participant observation as a method of studying risk areas. Stages are explained by which participant observation research was done. Furthermore particularities of participant observation are described when doing research in both risk areas. Advantages and disadvantages of using participant observation encountered during the research in these risk related areas. This paper ends with an outline of differences and similarities in these two application areas.

2. THE PARTICIPANT OBSERVATION APPROACH

Glendon et al. (2006) define participant observation as: *"One or more observers spending considerable periods of time within an organization, either overtly or covertly, collecting data usually using a semi structured approach"*.

According to Hofstede (2001) it is a direct method for data collection when you want to observe human behavior. The purpose is to identify or study a phenomenon for scientific or other purposes' (Morris, 1973, p.906). This requires that researchers actively witness phenomena in real time and observers do not manipulate or stimulate their subjects so that they study phenomena *'in the natural context of occurrence, among the actors who would naturally be participating in the interaction, and follows the stream of everyday life'* (Adler & Adler, 1994, p. 84).

2.1. Triangulation

As said in the introduction research based only on process data does not reveal daily practice. A clearer view of what is really going on the operational level in both risk areas can be obtained by combining more data sources. This is a form of methodological triangulation. Triangulation has a purpose to enhance reliability and validity of data interpretation. Denzin (1978) describes four kinds of triangulation: methodological triangulation, data, time, place & person triangulation, theory triangulation and researcher triangulation. Methodological triangulation by which different methods are combined investigate the same phenomenon is mostly used to complement participant observation. Different research methods are combined to enhance reliability and validity through a combination of participant observation, interviews and research of existing documents. However, in working areas where confidentiality and secrecy play a role, triangulation can be difficult since key information is not available to researchers.

For the inspections in the chemical industry, documents, surveys and interviews are combined with observations but there are many issues with confidentiality. Firstly observing standard operation practices within corporations are confidential. Secondly, the data of that are often confidential. Third, the outcome of inspections and data could form the basis for juridical procedures and last but not least technical information about installations are confidential.

In the airports security study, participant observation was combined with interviews, a survey and an expert panel but the relevant documentation, e.g. on procedures, is secret and inadmissible for scientific publications. In this case the great variety of airports in Europe provided a kind of triangulation.

Research in both risk areas dealt with confidential standard operating procedures and sensitive corporate or industrial information. Although we used triangulation to combine data sources it was extremely difficult to get complete access. Participant observation served as an extra method in both studies to collect data, besides the surveys and interviews, which are more often used when studying human behavior in organizations.

2.2. Research roles

Participant observation can be seen as a continuum. Whatever position the observer takes depends in both continuums on the situation (context) and the goal of the research. Participant observation offers researchers a possibility to freely choose a level of immersion for her study. Which level of immersion the observer chooses depends on the situation that is studied (context or working area) and the goal of the research. The research object or site within participant observation is defined as the setting. The role of the researcher may vary in involvement in this setting. In this part of the paper we discuss the different roles and relate them to both studies. This work is based on Gold's (1958) classical typology of research roles defines four approaches of observers to gather data: the complete participant, the participant-as-observer, the observer-as-participant and the complete observer.

(i) The complete observer is a researcher who is removed from his setting and the social interaction of the setting. Observations in this approach can occur without subjects in the setting knowing they are being observed, for example by using videotapes. The advantage of this approach is that the setting is not manipulated in any way. The disadvantage is that the researcher does not really know what is going on in the setting, because he is not physically present. To put the observed data in perspective additional information needs to be gathered for example via in-depth interviews or expert panels.

(ii) In the second approach, observer-as-participant, the observer is present, but the emphasis is put on observing rather than participating. In this approach it is possible that the presence of the researcher is revealed by his informants to the setting but doesn't really participate in the setting itself. The disadvantage of this approach is the lack of in-depth contact which could cause misunderstandings. A more participating contact with the setting allows questions to be asked on the spot to clarify a situation.

(iii) In the participant-as-observer role emphasizes lies on participation and the researcher integrates participation with observation. The informants are fully aware of presence the researcher and know the purpose of his presence. In this approach it is difficult to find a balance between participation and observation.

(iv) The last approach is the complete participant. If a researcher is using this approach the true identity and the purpose of the research stays completely hidden from the setting. Intensive observation is an immersion technique in which there is an active interaction and participation with the setting. A more popular term for immersion is "going native" which got famous when the technique was used for the first time in Papua New Guinea (Malinowksi, 1922). The complete observer cannot be himself and is always pretending and playing a role. A disadvantage of this approach is that this role is hard to sustain, since a researcher often needs to deal with ethical dilemmas.

In both areas it is important that the behavior of the observed is not changed by the feeling of being watched. Therefore in both studies discussed in this paper the observer-as participant form is chosen. In the study were the focus is on employees of airports, for instance security staff, the observer-as-participant form was chosen because subjects could start showing adapted behaviour if they would know that they are being observed. Observations in airports can be made freely or structured, with an observation list with predefined variables to look at. Security staff like any other staff, would show less formal behaviour and is more likely to show behaviour as it would occur in daily practice, as long as they were unaware of being watched. In the airport security investigation this choice led to observations of informal behavior and are more likely to show behavior as it would occur in every day practices. When watching an airport security screening for a long time without going through it, a security guards usually do become suspicious and start intervening with the observations. When one is watching an airport security screening for a long time, without going through it, the security official might get suspicious about your motive to do so. Security personnel at airports have good reasons to be suspicious of being watched, this will be describes later on in section 4. With participant observation the method is the least intrusive as the observer tries to do his observation without being observed. are interested in the work of security are suspicious because they could try to beat the system. For this reason the least obtrusive observation was chosen whilst still being on the ground. In case of the airport only the airport authorities knew about the observational research. A special limitation was that it was absolutely forbidden to take pictures of the technology used in airport security.

In the other study on chemical corporations, subjects under study are fully aware of the participation of the researcher. The researcher was making notes but does not participate in the inspection activities itself. However, since the objective is to find out how inspectors make decisions, interpret the law and apply the law the 'atmosphere' in the interview room was important. The studies that were performed took place in areas where confidentiality was required to obtain information about among other things standard operating procedures and incidents. Therefore, the distance between the subjects and the researcher had to be small and the researcher had to reveal herself.

2.3 Research objects

Two objects or settings were chosen for this investigation. Only limited knowledge is available on the decision making processes in these inspections. In the case of behavior in airports they are restricted to cognitive functioning during the screening process (Schwaninger et al., 2004). The object of the current study is to understand the result of the inspection efforts as it is determined by human behavior, decision making and interaction as individuals and as groups.

The first object of study are the so-called Seveso inspections in the Netherlands. These inspections have been performed for 10 years under the obligations of the Seveso Directive on Major Hazards of the European Union. The inspections are carried out annually by inspectors of the Environmental Protection Agency, the Occupational Safety and Health Inspection Agency and the Fire Department. Despite these inspections there are still many mistakes, accidents and even deliberate incidents in the chemical industry. The questions that are raised as a result are how some companies can sustain deliberate violations of the law despite the inspections and how in non-intentional circumstances the effectiveness and the results of these inspections can be improved. The observations were done during the annual inspections and the follow-up process after the inspections at fifteen chemical corporations.

The other object of study was compliance and human decision making in airport security processes. People from all layers in society pass by and undergo the same security check process when departing from or arriving at an airport. Long time observation allows to look at the process in general, such as the adherence to the standard and in detail, looking at the details in behavior such micro expressions of faces. Patterns can be observed in the movement of people. In order to recognize patterns in behavior, the population at an airport security checkpoint can be divided into groups, with different roles such as passengers, baggage checkers and supervisors. These groups need to be followed for a prolonged

period time. Also the interaction between groups can be studied in this way and patterns found in their interaction. For instance at a particular airports security officers were most of the time observed to work in pairs when surveilling the airport. The observations were done in several European countries and in different areas of airports, before and after the security check. The latter study is part of an European Union funded project.

3. STAGES OF OBSERVATION

When using participant observation as a research method it is advised to follow the different stages in chronological order as we show in figure 1 and discuss below.

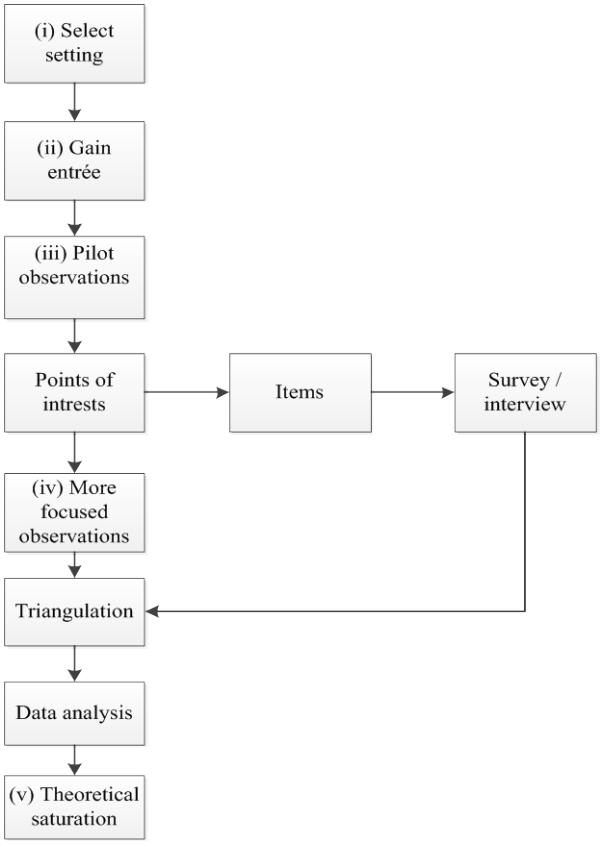

Figure 1. Flow chart participant observation

The first phase in an observational research process is to select a setting (i) where the observations will take place. These were described earlier in section 2.3. Two objects or settings were chosen for this investigation.

The next phase is to gain entrée (ii). Inspections and security checks are sensitive and gaining entrée needs to be done with caution. For the study on decision making on airport employees dealing with security it took almost a year to reach the persons with enough authority to allow access. In some airports the airport security management gave permission for the research and all the employees of corporations where allowed to be observed. In other airports the airport authorities' approval was not sufficient but also the approval of the management of airline companies was necessary for observing the employees. Although airport authorities approved access corporations in some airports did not allow their employees to be subject of the research. One goal of the European study was not reached, since it was not possible to compare all job groups between airports, the number of subjects per job group was not large enough.

In the study on chemical corporations it took the researcher approximately ten months to get permission of the inspection agencies and permission of the fifteen corporations, the inspection of which would be observed to be present during the inspections. In the case of the chemical companies the researchers needed to obtain the obligatory safety training and exams. In both studies it was found easier to gain access when introduced by a trusted person. In the case of the chemical corporation setting getting introduced by the inspector to the companies created an open atmosphere where people were less suspicious of the observer.

The third phase is the actual observation (iii). For these to be successful it has to be defined in advance what observations should be made as a minimum and what should be recorded. If the researchers operate in groups or many researches make observations at different locations, the observers need to be trained on how and what they observe in order to tune the observation activities (Adler & Adler, 1994). In the case of the airport setting various researchers worked in eight different airports across Europe. At the start they received training. In every airport the research method differed in the number of researchers involved and in the researchers' experiences with airport security. For instance in one case the research was done by one person only, who used to work for several years at one of the airports. In an another case in this project the observations were done by a pair and in a third case a situation was observed by fifteen people who did not received training and had little experience with airports and procedures. Despite these differences, all the researchers in this project worked with an observation list in which the points of interests were formulated.

In the study on observing inspections at chemical corporations, the researcher worked alone. The researcher did a pilot study and took the first four inspections as a test to find out if participant observation worked as a method to answer the research question (Kluin et al., 2011). During these inspections the researcher made records of the observations. These records contained explicit reference to participants, interactions, routines, rituals, temporal elements, interpretations, roles, working environment and behaviors. After the pilot the researcher was able to make a list of points of interests for the whole study. Although the list of points of interest will frame the analysis of the fifteen chemical corporations, the researcher continued to record the observations broad, unfocused and general to have a good base for future lines of research (Hutter, 1988).

In the fourth step a more focused study (iv) can be performed based on the findings of the more general observations in the previous phase. Adler & Adler (1994) indicate that in this part of the process the researchers need focus on establishing and refining the characteristics and relations among the elements they have selected as objects of study. As described previously, the researcher that focused on the chemical corporations started with a pilot to find out if the observations could answer the research question. Data were not categorized before this phase and points of interests were points of focus not categories. After phase three field notes were analyzed and classified by subject and location. These items served as goal-setting points for the survey and interviews in both risk areas studies.

The fifth and final phase is to reach theoretical saturation (v) and that is when the generic features of new findings consistently replicate earlier ones (Glaser & Strauss, 1967). Both studies mentioned in this paper did not reach this stage yet.

4. ISSUES OF PARTICIPANT OBSERVATION IN TWO RISK AREAS

The most important issues for these two risk areas are presented in table 01. A lot of these issues dealt with confidentiality. For both risk areas gaining entrée was difficult because of confidentiality. Not all points of interest were accessible at will and free movement was limited by the presence of security officers and inspectors. Data analysis and theoretical saturation; since both studies did not reach this phase yet it is not mentioned in table 1 below.

Table 1. Overview of the differences and similarities in participant observation

	Risk area: Chemical Industry	**Risk area: Security in Airports**
Phase 01. Setting	* one observer * observing joined Seveso inspections * 15 corporations in 1 country * locations not chosen by observer * duration of observation depended on inspection * although safety requirements are standardized, the nature of chemical processes of corporations under study differed	* multiple observers * observing employees when making decisions in airport security * 9 airports in 8 countries * free choice in locations to observe at airports * observation time of day and duration varied * levels of security are standardized by ICAO and monitored
Phase 02. To gain entrée	* permission for presence at inspections from 3 inspection agencies and 15 corporations * pass safety regulation exam * pass small exams of chemical products * getting introduced by a trusted person opened doors	* permission from airport authority is required in all cases in some airports permission of corporations was required as well no further training of screening was needed * getting introduced by a trusted person opened doors
Phase 03. Prepare observation	* general inspection list	* training
Phase 04. Bottleneck, more focused observations	* list of points of interest * always accompanied by inspectors	* list with points of interest * locations with interesting behavior relevant to the study were points of focus * repetitive patterns were points of focus * in some areas accompanied by a security officer

The examples below illustrate some of these issues.

You can discover phenomena through direct observation, which you may not have found out by interviews only, which is indirect. You can observe verbal and nonverbal behavior. Interviews and surveys also investigate behavior through self-report, but is subjective information from the testing person. The person giving the answers often tries to find out what the research can be about and can give socially accepted answers. Also the way questions are formulated might be of influence in the answering tendency. With participant observation more spontaneous verbal and nonverbal behavior could be measured, especially when the subject is unaware of being watched.

Example 01; issues dealing with anonymity
In the case of the airport study, going through a security check when working at the airport, was a different experience then going through the same security check in a company of a security official to visit the airside. Without the official the security check was more informal and less scrutiny was performed.

Example 02; nonverbal reactions required presence in the situation
Verbal and nonverbal behavior in the case of the study on chemical corporation is during the close out of an inspection, the inspection team informs the company of the results of the inspection. At that moment the researcher could observe directly the verbal and non-verbal reactions of the employees of the corporation. At one situation the corporation told the inspectors at the beginning of the inspection that they were an open and proactive corporation. The inspectors concluded that the corporation had his information spread and in different departments and even in different desk drawers. The corporation was judged by the inspection team as a reactive company and only active when demanded by the authorities. The inspection team informed the corporation and the employees didn't show many reactions at that time and stayed silent which the inspectors did not expected. After they received the results on paper they disagree with the results and the follow-up is still running at the time of writing this paper.

Example 03; cautiousness
Without the advantage of other members, observers are forced to rely on their own perceptions. Therefore they can have more problems with bias from their own subjective interpretations. The researcher can take measures to overcome this problem and improve the validity of their research by doing more interviews to control their findings or use multiple observers. For both risk areas it is not approved to share detailed information with the general public. More cautiousness is required when handling delicate information coming from this risk related areas. For example in the case of the research on the chemical industry corporations where concerned that details of industrial secrets would become available to competing companies.

Example 4; proximity to the subject
It is important to take note immediately of what is being observed to prevent observer bias. Observers can be selective in what they remember and how they write things down. In both studies observations were written down in a note book and digitalized within a short amount of time.

Example 05; influencing the group
If aware of being watched, behavior could change in a socially accepted form. If the researcher is obtrusive present during the observations, he is often accused of distorting the data. This is a disadvantage of participant observation in general since the researcher is present in the setting; it is possible to influence the normal process by its presence. According to Zaitch et al (2009) it is often forgotten that all research techniques have bias in a lesser or greater extent.

Example 06; confidentiality is a key competence for workers in these areas
Security staff often undergo audits by ICAO or airport authorities for quality control of the level of security. This could be a mystery guest, preparing an audit for quality control, to see if all procedures and rules are followed as prescribed by ICAO. The quality audit could also come from airport authorities themselves. At one airport passenger throughput, low costs and passenger satisfaction were the key performance indicators for the senior security manager of the airport authority. A tender was given every five years, where security companies where competing for the several different positions the different tenders would give. One company checked the airport staff, one company checked the centralized filters, one did the security at the gates and one performed perimeter security checks. This also means security should be observed in different locations, with different procedures. In one airport an ICAO audit took place during the time of the research. Security workers at the airport thought the researcher to be the ICAO auditor, showing their best behavior to passengers and screening when the researcher passed by. This also created a bias in the observations. When interviewing these employees they thought it was part of the audit as well and warned each other to stay out of the canteen, because the American from ICAO was present asking questions about work. It took a couple of days for this tension to go away. The researcher needed to explain the research goal to the employees and clarified the purpose of her presence.

5. CONCLUSION

Although it seems that airports and the chemical industry are areas that are far apart, there are many similarities in the research process. In both areas outsiders are not allowed to enter risk areas without having a function in the process. For both worlds under study standard operating procedures and daily activities are confidential and hidden for the general public. Therefore publication and dissemination of findings needs to be done with caution. Comparing both risk areas in using the same research method, participant observation, show more practical issues than looking at the practical issues of one setting alone. A binding factor is the secrecy or confidentiality that puts a veil over these working areas.

For both study areas gaining entrée was the most time consuming of the participant observation approach. Secrecy and confidentiality were major factors why access was difficult to obtain. Being introduced by a trusted person was a good strategy to enter these domains. In the case of the airport study senior security managers of airport authority introduced the researcher to different corporations. The researcher was allowed to observe certain parts of the airports alone and areas after the security check accompanied with a chaperone while doing observations and interviews. Inspectors introduced the researcher during the Seveso inspections at employees of chemical corporations. Although being introduced by a trusted person, often further information was asked about the purpose of the research, for example when studying corporate sensitive information in the chemical industry.

In both studies points of interest were formulated after a pilot observation and a list of these points was made. Also in both studies items for a survey were formulated based on observations, for triangulation later on. Towards the next phase a bottle neck was formed and more focused observations were carried out. Extra exams of chemical products were needed in order to walk with the inspectors on the premises at the chemical corporations. Workers at airports are normally screened before they are allowed in the area after the checkpoint. Despite of this security measure to prescreen employees, the researchers were not screened by the military police before allowed entrée in this area. The researcher was not allowed to walk around freely on the chemical sites, also due to safety matters.

Doing participant observation is a time consuming matter, especially when you are looking at deviations of procedures and regulations. It indeed takes a lot of time in order to find out what is really going in the field.

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REFERENCES

-Adler, P.A. & Adler, P.,1994. Observational techniques. In N.K. Denzin and Y.S. Lincoln (eds), *Handbook of qualitative research*. Thousand Oaks, London, New Delhi: Sage Publications, pp. 377-392.
-Denzin, N. K., 1978. *The research act: A theoretical introduction to sociological methods.* New York: McGraw-Hill.
-Glaser, B. & Strauss, A.L., 1967. *The discovery of grounded theory, strategies for qualitative research.* Aldine Publishing Company, Chicago, IL.

-Glendon, I.A., Clarke, S.G. and McKenna, E.F., 2006. *Human Safety and Risk Management.* Boca Raton, FL : CRC/Taylor & Francis
-Gold, R. L., 1958. "Roles in sociological field observations." *Social Forces* 36(3): 217 - 223.
-Hofstede, G., 2001. *Culture's Consequences, Comparing Values, Behaviors, Institutions, and Organizations Across Nations.* Thousand Oaks CA: Sage Publications.
-Hutter, B. M., 1988. *The reasonable arm of the law.* Oxford - New York, Clarendon Press.
-Hutter, B. M., 1997. *Compliance: Regulation and Environment.* Oxford, Clarendon Press.
-Kluin, M., Ale, B. Huisman, W. Gulijk, C van (2011). Environmental regulations: case study research on chemical corporations. In Kluin, M. & Lin, P.H. eds. The Research Agenda of Risk and Design Anno 2011. Delft: Delft University of Technology.
-Malinowski, Bronislaw. 1922 [republished 1984 by Waveland Press]. *Argonauts of the Western Pacific: An Account of Native Enterprise and Adventure in the Archipelagoes of Melanesian New Guinea.* Studies in Economics and Political Science, no. 65. London: Routledge and Kegan Paul.
-Schwaninger, A., & Hofer, F., 2004. “Evaluation of CBT for increasing threat detection performance in x-ray screening. Advances in learning, commerce and security.” In K. Morgan and M. J. Spector, (eds) *The Internet Society, Advances in Learning Commerce and Security*, Wessex: WIT Press, pp. 147-156.
-Seveso II Directive, 1996, Council Directive 96/82/EC of the European Parliament on the control of major-accident hazards involving dangerous substances, Official Journal No. L010 of 14 January 1997.
-Zaitch, D., D. Mortelmans & Decorte, T., 2009. Participerende Observatie in de Criminologie. In Decorte, T. & D. Zaitch (eds.) Kwalitatieve methoden en technieken in de criminologie. Leuven/Den Haag: Uitgeverij Acco.