

# Identification of Financial Market Experts

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*This article reports on the process of identifying a financial market expert. This work was undertaken as part of a thesis whose objective was an analysis of the knowledge actually mobilised by financial industry players in order to understand their investment choices in a context of decision-making in a natural situation. In the course of this undertaking, it appeared necessary to clarify a definition of the notion of financial market expert. This concept was built over time and following multiple meetings with financial players. Our iteration was based on the theoretical corpus developed by Naturalistic Decision Making (NDM). This allows us to identify criteria that aim to identify an expert through peer recognition, but also to specify the characteristics of this expertise through the ability to distinguish typical situations, the ability to make differences, and finally the ability to build stories to report situations. In conclusion, we highlight some of the particularities of the financial market expert, who constitutes a context in which evolution, uncertainty, and risk come together.*

*Keywords investigation, experts, financial markets, actions, decision-making in natural situations*

## INTRODUCTION

The purpose of this article is to report on the process we used to identify financial market experts in the context of a thesis whose objective was to report on the knowledge actually mobilised, in a decision-making situation, by a financial market player (Cellier-Courtil, 2018). Our reflection was mainly based on the theoretical corpus developed by Naturalistic Decision Making (Klein, Orasanu, Calderwood, & Zsambo, 1993; Klein, 1999; Klein, 2003; Kahneman & Klein, 2009), which allows us to identify criteria that aim to identify an expert through peer recognition but also to better specify the characteristics of this expertise through the ability to distinguish typical situations, the ability to make decisions and finally the ability to build stories to report situations. In the first part, we report on what an expert is from the NDM's point of view.

In the second part, we report how we identified a financial markets expert from this theoretical basis. In conclusion, we highlight some particularities of the financial market expert, who constitutes a particular context where evolution, uncertainty and risk are present.

## THE NOTION OF THE EXPERT FROM THE NDM'S PERSPECTIVE

We start from the definition proposed by Bootz, Lièvre and Schenk (2020) in the same issue by considering the figure of the expert between two registers, that of the cognitive and that of the social, as a unit with a double cognitive and social texture to arrive at the following definition: "An expert is a person

who possesses knowledge superior to other people (the cognitive dimension) and who will appear at a given moment as legitimate to be mobilized by a third party (the social dimension)" ( Bootz, Lièvre,& Schenk, 2015). This dual cognitive and social dimension of the expert appears within the NDM current but by mobilising the social dimension as a criterion for recognising what an expert is and by specifying more precisely the cognitive characteristics of this expertise.

### **Peer Recognition From the Expert**

We borrow the notion of expert described through the work of Naturalistic Decision Making. We retain the definition of Klein during his dialogue with Kahneman (Kahneman & Klein, 2009): "Except in rare situations (for example, a ranking of chess players according to their number of victories and defeats against other players), the level of performance of an expert cannot be determined with the help of any hierarchy". Research in the context of decision-making in natural situations shows that good performance criteria are considered as such by peers rather than quantitative measures that are very reductive in this case. An environment is thus determined in which performance is identified as an objective to be achieved based on the emergence of a consensus between the players in a situation even if it is not explicitly quantifiable. For Shanteau, "experts are operationally defined as those who have been recognized within their profession as having the skills and abilities necessary to achieve the highest level of recognition" (Shanteau, 1992). For example, fire captains are assessed not only for their ability to extinguish fires, but also for other criteria, such as the cost of damage caused before the fire is controlled. When there is an exchange of views among the collars of the fire brigade about the fact that if Mr. Antifeu had been there instead of Mr. Superfeu, the fire would have been less serious. Mr. Antifeu will count as an expert in this organisation after these exchanges: "the use of peer judgement makes it possible to distinguish between competent experts, mediocre ones and novices who have little experience. This level of differentiation is sufficient for most NDE studies" (Shanteau, 1992). It is this minimum basis of peer recognition that we will use to identify a financial markets expert. Cognitively, the expert differs from the novice.

### **The Expert Develops Specific Cognitive Abilities Related to the Novice**

The expert has his own characteristics that allow him to see a large number of events that are invisible to the rest of the world. Expertise is a specific field. The experts tend to be experts only in their field of expertise. The reason for excellence in their chosen field is that they have extensive specific knowledge in that field. This has been found, for example, in studies of medical diagnosis (Johnson et al., 1981) and taxi drivers (Chase, 1983). The distinction between an expert and a novice assumes that to achieve the capabilities of the expert, he or she has worked with a broad cognitive base of knowledge accumulated over years of practice. This is not to say that the novice does not attempt to use his or her abilities, but that the expert has more finely tuned skills. These are the result of more past experiences that he can look back on as a mental basis for scenarios he has already encountered. Thus, experts have different faculties at their disposal, allowing them to act better in a situation. They discern the main lines of the models, or blocks of information, rather than scattered pieces. They develop an acute sense of the typicality of the experience. From this point of view, the advantage of perception does not lie in a divergence of knowledge between experts and novices, but in the ability to see the invisible or perceive what is missing. They are also known to be able to function more effectively, consistently, and make fewer mistakes than beginners.

This is demonstrated by the ability of expert chess players playing with tighter delays between moves (Calderwood, Klein, & Crandall, 1988). This attitude is due to the automaticity of situations, where the expert does not need a thorough analysis to perform well. For example, while driving a car, you are able to do so competently and have sufficient other mental resources to conduct a conversation or listen to the radio. These actions are made possible because driving competence is acquired. They also have superior short-term and long-term memory in their areas of expertise (Chase & Ericsson, 1982). Information is instructed to be stored in cognitive models rather than in disjointed fractions of information. This implies that the expert can remember more than the novice. Besides, these blocks of information are integrated into a more meaningful knowledge base that facilitates their recall. It has also been found that the excellence of expert memory is based on the environmental constraints imposed by the field of the task. This is in terms

of the physical environment and the rules that govern it. The expert is well aware of the constraints of relevant objectives in his environment. The information can be called upon according to the constraints (Vicente & Wang, 1998).

Thus, it provides a recall mechanism that allows the expert to store and retrieve information in pieces based on the rules and constraints governing the task. Environmental conditions are an external aid to this recall. Experts project and represent a problem at a deeper level of reflection while novices tend to describe it superficially and based on appearances. Experience provides knowledge, patterns, and contexts that make the understanding of an environment intelligible on the basis of cause and effect relationships. This process involves constructing a mental representation of the problem from which the relationships that define the situation can be inferred. Constraints to the problem can then be added to define the limits of action. This contrasts with the novice who rushes in and begins action before any reflection. A good understanding of the problem often leads to a more effective path to a solution without being distracted by irrelevant and unsuccessful information during the action. The importance of situational awareness and problem definition is the key to expert decision making in a natural environment. They implement their own checks on the solutions adopted. This gives them the ability to rectify a situation when they make a mistake. They thus perceive why they have just not understood a problem. They also know when to check their solutions. Novices, lacking experience, do not have this ability to determine their own limits.

Experts differ from novices in three ways (Klein and Hoffman, 1992). Firstly, experts have the ability to distinguish typicality. There is no way for a novice to judge what is normal from what is an exception (Chi, Hut-chinson, & Robin, 1988). From their studies with expert firefighters, Klein, Calderwood, & Clinton-Cirocco (1986) found that the rapid establishment of a situation was facilitated by its typicality. It should evoke in the expert several sources of knowledge, such as recognizing relevant signs to analyze expected events and to develop plausible and achievable objectives. This ability enables experts to make a decision built into the action and avoid wasting time by identifying which objectives are achievable or not. They are thus able to avoid being overwhelmed by a flood of information by concentrating on the relevant clues. Furthermore, they are able to recognise whether or not the assessment of a situation is wrong or not based on their anticipation of expected events and the recognition of deviations from these expectations. Similarly, they can react quickly based on the recognition of the typical course of action and make adjustments under time pressure (Calderwood et al., 1988).

Secondly, experts are particularly adept at discerning differences. Competitions, in which the performance is judged by a judge, illustrate this ability, such as artistic diving or bull competitions. An inexperienced spectator often wonders why A-Diving or Bull X is different from the rest of the competition. The expert perceives important and relevant functional differences that are acquired through many years of active participation in a field such as the shoulder height of a bull (Shanteau & Phelps, 1977; Shanteau, 1987).

Thirdly, the expert is able to construct a story to explain how a situation presents itself. The story is simulated mentally in order to understand how the situation will develop or how a course of action might be envisaged. This ability is based on the perception of typicality and similarities to past experiences. It is also based on generating satisfactory expectations of what will happen according to the options chosen and identifying potential errors. This occurs during an awareness that the course of action has different consequences on the development of the situation. This mental simulation of an action plan has been compared to the idea of progressive adaptation used by Chess Masters by playing a sequence of moves against the opponent on the basis of probable reactions. (de Groot, 1946).

## **IDENTIFICATION OF A FINANCIAL MARKET EXPERT**

### **Identification Based on Social Recognition of the Expert**

Trader, asset manager, wealth management advisor, financial advisor, stock market journalist, financial consultant, analyst... Before identifying the expert, it would be necessary to better specify what is the "job" of this player in the financial markets that we target? This conception, of what we will define as a securities expert, has been built over time and following many meetings with financial professionals. The

identification of an expert in financial markets will be built through interactions with peers, but as we will be highlighting, other criteria will play a role in this operation.

The first basis of our questioning is based on the fact that a financial market expert is a person who invests savings. This first step *de facto* excludes *de facto* trading professionals whose mission is not the management of savings but speculation on the financial markets. By speculation, it is understood the transaction of goods whose objective is not "a gain resulting from their use" (Kaldor, 1939). It also excludes all advisory professionals such as economic journalists, financial consultants, analysts, etc. (Kaldor, 1939). These professions only offer advice but never invest in the markets (with the possible exception of personal savings).

The second level of recognition on which our analysis of an expertise is based is the direct intervention of our expert on the markets. By direct intervention, we tend to be able to buy or sell live securities. This level of analysis allows us to exclude once again from our field of expertise the sales staff, who, while they collect and invest their clients' savings on the markets, carry out this operation through the marketing of UCITS (Undertaking for Collective Investment in Transferable Securities) or FCP (Mutual Funds). They therefore do not buy and sell live securities. Moreover, these funds are not managed by sales staff but by managers who actually invest the savings collected by their distributors directly on the markets. Distributors can be defined as specialists, but not as experts. Their mission is limited to meeting the objectives set by their clients, their hierarchies or economic interests.

The third register of discernment of our experts is provided by regulations. In France, any person wishing to manage the savings of others must be authorised by the AMF (Autorité des Marchés Financiers). This independent administrative authority, established by Act 2003-706 of 1 August 2003 supplemented by Decree 2003-1109 of 21 November 2003 (amended by Decree 2005-131 of 14 February 2005), is responsible for the regulation of financial markets in France. In particular, the AMF is responsible for approving and monitoring asset management companies. These companies are active in discretionary and collective investment management. Approval is obtained from the financial market watchdog after examining the application for accreditation. Accreditation is granted on the basis of financial and competence criteria. It is thus specified that "the right to manage a portfolio on behalf of third parties requires professional aptitude and experience. If the AMF finds that the required conditions are not met, the authorisation will not be issued". This authority relies in particular on Article L532.9 of the Monetary and Financial Code and Article 322.10 of the AMF General Regulation to accredit management companies. It is therefore within these companies that we will be able to identify our qualified experts as managers.

According to the AMF, at 12 April 2013 there were 625 portfolio management companies in France. A directory of these companies is made available to the public every year. At this level we distinguish the way in which the request for expertise is solicited by the investor. If it is made on the image linked to an institution, there can be no social dimension linked to a manager and therefore it will not be an expert. Bootz, Lièvre and Schenk (2015) describe the legitimacy of the institutional expert as being "linked to the institution that grants the status of expert and to the very process of qualifying experts" (Bootz, Lièvre and Schenk, 2015). This approach is confirmed by research on experts in situations of uncertainty. Within the world of management companies, there is a form of "mercato" of managers between companies. This movement reflects the legitimacy of expertise granted to the manager not by institutional legitimacy but in his or her own name. This difference is confirmed in discussions with the chairmen of management companies. When an expert manager leaves a management company, his clients and the savings entrusted to him follow him to a large extent. However, according to the chairmen of the management companies, such managers are rare. However, this is a criterion that we use to determine whether or not the manager is an expert manager. In short, the expert is the one who takes his clients behind him.

Finally, we integrate a fourth stage of analysis linked to external legitimacy. Here it is quantitative and specific to the universe of management companies. A UCITS or FCP of a management company can only be recognised by its peers if it manages at least fifty million euros (investors talk about the threshold for appearing on the radars). By recognition, we mean the capacity of an institution, such as an insurance company, bank, pension fund, etc., to manage a minimum of EUR 50 million. (formerly commonly known as "zinzins"), to entrust savings to be managed. This threshold of EUR 50 million is obtained by juxtaposing

regulation with a logic of financial costs related to monitoring and analysing the investment made in a UCITS. At the regulatory level, the legislator prohibits an institution from holding more than 10% of total assets under management within a single UCITS. On the other hand, the institution considers that the break-even point of an investment in a UCITS must be at least EUR 5 million in order to cover its internal investment and annual monitoring costs. This criterion alone enables us to exclude managers whose funds under management are below this amount. This naturally leads us to look at the structure of the management company market. While there are more than 625 companies with applications for accreditation of around 50 per year, 80% of these companies manage less than one billion euros. This segmentation has been of particular interest to us and is highly pertinent to our analysis. From an amount of one billion euros in assets under management held by the management companies, they believe that they are in an active commercial approach aimed at having the excellence of the management of their managers recognized by the managers final savers. Managers of management companies present themselves as administrators of a "shop" by translation of the English term "Shop". Beyond the characteristic aspect of this term, it symbolizes a threshold from which a management company begins to count. That is to say that it, and especially its managers, are recognized by their peers and savings clients. This is why, in terms of our notion of expert, we only retain managers working in management companies with assets under management approaching the figure of one billion euros.

### **Identification Based on a Request for Expertise**

From this grid of social recognition of what an expert is, it was necessary to identify experts who accept the protocol linked to our request for expertise which refers to this social dimension of the expert as proposed by Bootz, Lièvre and Schenk (2015) in the first article of this special issue. Initially, he met with the chairmen of portfolio management companies and asset managers at the Patrimonia trade fair on 27 and 28 September 2012 (a trade fair for wealth management professionals). The objective was to raise awareness and obtain feedback on this expert research approach in the context of our thesis. This step appeared necessary in order to better discover the market and to know the specificities stated. On 1 August 2003, the legislator created the AMF by Financial Security Act 2003-706. As explained above, the AMF identifies and supervises several hundred companies. Based on this population, we were able to identify seventeen managers that corresponded to our definition of a financial market expert, thanks to the availability of a public communication space, a presentation of the structure's managers, third-party interviews with these managers, and an amount of savings managed by funds of at least EUR 50 million within entities managing a total of around EUR 1 billion in savings. Based on this sample, these managers were contacted either by recommendation or by direct contact via electronic mail and telephone reminders. They were thus offered a protocol to invest their practical knowledge to account for the decision-making mechanisms they use in their daily actions. Of these seventeen experts, six wished to deepen the request, four did not wish to follow up, one manager is still thinking about the approach, and six did not reply.

### **An Example of a Meeting of a Non-Expert Manager**

On December 27, 2012, at 2:45 p.m., we met with Mr. M., Director of Development and manager at a portfolio management company. This meeting took place at the company's premises in Paris. The first part of this meeting was a presentation of the thesis project. During a second part, Mr. M. presented his company. The company is a portfolio management company approved by the Autorité des Marchés Financiers. It was founded in 2003. It is an independent company owned by its managers and employees. In 2012, it will manage approximately six hundred million euros through six mutual funds (FCP). In the third part, we discussed the company's organisation and investment specificities. The company's investment method is a value investment method for all the FCPs. However, this approach focuses on small and mid caps. The company rejects the "star" manager model and prefers to adopt a collegiate management model within its FCPs. Thus each of the six FCPs is managed by five players, each with its own investment envelope. This is allocated according to the convictions set out by each manager. Everyone is free to decide whether or not to accept the colleague's investment conviction.

Finally, we discuss the mistakes of the company and its desire to learn from the past. Indeed, despite this collegial investment approach, the management team was unable to anticipate the financial crisis of 2008. It was, as for the vast majority of portfolio companies, particularly difficult to manage, with, in particular the need to sell investment positions that have not yet reached maturity in order to meet savers' redemption requests. The performance of mutual funds was strongly affected during the year of the crisis but also during 2009, where despite the stock market recovery, some positions were not satisfactory. Also from 2008, the company wanted to strengthen the quality of the managers' investment choices. It has adopted the principle of a check-up to be carried out by each manager before any investment. This report consists of a document of thirty questions concerning the company targeted by a possible investment. The manager assigns a rating from -2 to +2 and a comment to each question. However, this methodology does not yet make it possible to avoid errors, such as the manager buying Carglass the day before a profit warning. This is despite the fact that he had been following the company scrupulously for two years and that he felt it was particularly appropriate to invest on this particular day. The analysis of the profit warning of this company showed that the turnover was not there, given that motorists changed their windshields less in 2012 than in 2011. The slightest renewal of these utensils was explained by two phenomena differentiating the two years. The first is a much milder climate in 2012. Thus, drivers feeling less cold through the microcracks in the windshields were less inclined to change them. The second concerns the number of kilometers traveled by motorists due to the price of gasoline and the recessionary environment of many countries in Western Europe where Carglass operates. Through this example, this company wishes to strengthen its quality methodology and is strongly interested in a construct of research work and its willingness to learn.

However, M. does not appear to be an expert manager. This is not due to the amount of assets under management of less than the EUR 1 billion mentioned above. Indeed, given the sharp decline in the markets since 2008, this company had, at one point, this threshold of eligibility for expertise. Also, M. does not intervene directly in the markets. He only ensures the presentation and promotion of his company's know-how. Even though he enjoys strong social recognition, speaking at round tables, or market reviews to the media or the asset management consulting industry alongside asset managers, he does not intervene in investment choices. He is therefore not an expert, but a specialist who reports on the methodologies, management orientations on the managers' markets, and the history of his company.

### **An Example of a Meeting With an Expert Manager**

On October 09, 2012, at 11:00 am, we met with A., founding president and manager of a management company based in New York. This is a hedge fund with representative offices in Paris, New York and Tokyo. This structure is not directly authorised in France by the AMF but is authorised by other regulatory structures abroad. However, its funds are marketed to retail investors by portfolio management companies that are themselves authorised by the AMF. This company manages more than USD 9 billion in assets under management. The main feature is the growing success of this investment method, which is based on questioning the "sacred cows of economic theory". The methodologies used in finance, in particular the hyper mathematisation of modeling, are strongly criticized. It is a total questioning of a certain number of dogmas and regrets the lack of room for the notion of intuition. Our speaker's criticism of the functioning of financial markets concerns the questioning of six points of classical finance: 1) Economic agents are not infinitely rational and do not seek to maximise the usefulness of their actions. 2) The future state of the world and the level of probability of its occurrence cannot be known. 3) Markets are not in equilibrium, i.e. at a price level where all supply equals demand. 4) Markets are not efficient. 5) New information is not the only thing that could cause the price of a security to change. 6) The null risk underlying the Black-Scholes model for valuing hedge options is nonsense.

A. sets out its quantitative study claims in support. Its management method is therefore entirely uncorrelated to any economic value of an asset and is strictly based on statistical analysis. It also corresponds to the management style known as quantitative management. This expert has developed a shared, taught and perfected model. The number of his clients is growing and they are international. The

company's approach is disseminated at conferences and seminars given in professional and academic circles.

A. also benefits from high-quality financial performance. Unfortunately, this expert did not wish to take part in the experiment due to a wish for confidentiality on the content of the databases used in the company's management methodology. The identification and recognition of a financial markets expert required a great deal of analytical finesse. The meetings carried out made it possible to detect the particular skills specific to the expertise and to invalidate or not this quality with the actors met.

## **CONCLUSION**

This quest to identify and solicit financial market experts in connection with a thesis work whose purpose is to highlight the knowledge actually mobilised by a financial market operator (Cellier-Courtil, 2018), documents other possible combinations between the social and cognitive dimensions of the expert. The NDM corpus (Klein et al., 1993; Klein, 1999; Klein, 2003; Kahneman & Klein, 2009) was an important starting point, highlighting peer identification as a social dimension and proposing cognitive characteristics according to three points: typification of situations, ability to recognise differences and, finally, the possibility of constructing stories to account for certain aspects of practice. Peer recognition has taken on several aspects: peer identification of this expertise but also the fact of accepting a request for expertise. But in the face of the uncertainty prevailing on financial markets (Orléan, 2009), we have a long way to go in mobilising various elements such as specifying the fact that our financial markets expert is a person who invests savings, that intervenes directly on the markets, that is authorised by the Autorité des Marchés Financiers, that manages a portfolio of at least fifty million euros. Finally, we had to adapt certain social criteria and mobilise cognitive elements in this identification of experts, such as developing an argument to justify a practice, a criterion stated by the NDM.

In the end, we were finally able to identify an expert who answered our request in the framework of our thesis. He is the founder of a portfolio management company who took the risk of leaving his former position as an employee in order to pursue the entrepreneurial adventure. This approach is accompanied by the willingness of former clients but also former colleagues to follow this expert in this new adventure. These decisions are characteristic of the trust he enjoys. This trust has been built up through experience in the financial markets, where the growth, uncertainty, and risk generated by the assets under management strengthen, over time, the relationship of trust initiated between the portfolio manager, investors, and employees. As a result, it has significant assets under management, well in excess of several hundred million euros. He is also heavily solicited by the media to take part in conferences, round tables, or interviews offered to an insider audience. These interventions attract interest by the emergence of controversies leading to a questioning of the expert and the need to deepen the explanations formulated in the face of fashion effects. He thus appears as the reference for other actors and benefits from professional rewards validating his expertise.

By mobilising the NDM corpus, we position the financial market expert in relation to other experts in sectors of activity such as the fire brigade or the military, the emergency services, etc. In fine, we question the existence of a typical management situation that we qualify as extreme where breakdowns, radical uncertainty and risk are combined (Lièvre, 2016). Would transfers of "good practices" be conceivable between these various sectors of activity? This perspective is echoed in an inter-disciplinary approach to finance (Chambost, Lenglet, & Tadjeddine, 2016).

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## REFERENCES

- Bootz, J.P., Lievre, P., & Schenk, E. (2015). Solicitation of experts in an undetermined environment: The case of a polar exploration. *Journal of Knowledge Management*, 19(5), 900-911.
- Bootz, J-P., Lièvre, P., & Schenk E. (2020). The expert within organizations: Definition and theoretical framework. *International Journal of Psychosociology and Organizational Behavior Management*, XXV(62), xx-xx. in RIPCO.
- Calderwood, R., Klein, G., & Crandall, B. (1988). Time pressure, skill, and move quality in chess. *American Journal of Psychology*, 101(4), 481-493.
- Cellier-Courtill, S. (2018). *Building action knowledge for a securities portfolio manager*. Doctoral thesis in management sciences from the University of Clermont-Ferrand, Clermont-Ferrand.
- Chambost, I., Lenglet, M., & Tadjeddine, Y. (2016). *The finance factory*. Presses Universitaires du Septentrion, Villeneuve d'Ascq.
- Chase, W. (1983). Spatial representations of taxi drivers. In Sloboda and Rogers, *Acquisition of symbolic skills* (pp. 391-405). Nato Conference Series 3, human factors, New York.
- Chase, W., & Ericsson, K. (1982). Skill and working memory. In G. Bower (Dir.), *Psychology of learning and motivation* (16, pp. 1-58). Academic Press, New-York.
- Chi, M., Hutchinson, J., & Robin, A. (1988). *How inferences about domain-related concepts can be constrained by structured knowledge*. Learning Research and Development Center, University of Pittsburgh, Pittsburgh.
- De Groot, A. (1946). *Thought and choice in chess*. Amsterdam University Press, Amsterdam.
- Hare, P. (2016). Status of a research program: management of extreme situations. *French Review of Management*, 42 (257), 79-94.
- Johnson, P., Duran, A., Hassebrock, F., Moller, J., Prietula, M., Feltovich, P., & Swanson, D. (1981). Expertise and error in diagnostic reasoning. *Cognitive Science*, 5(3), 235-283.
- Kahneman, D., & Klein, G. (2009). Conditions for intuitive expertise. *American Psychologist*, 64(6), 515-526.
- Kaldor, N. (1939). Speculation and Economic Activity. *Review of Economic Studies*, 7(1), 1-27.
- Klein G. (2003). *The Power of Intuition: How to Use Your Gut feelings to Make Better decisions At Work*. New York: Crown Business.
- Klein, G. (1999). *Sources of Power: How People Make decisions*. Cambridge, England :England: The MIT Press.
- Klein, G., Calderwood, R., & Clinton-Cirocco, A. (1986). Rapid decision making on the fire ground. *Proceedings Human Factors Society*, 1, 576-580.
- Klein, K., & Hoffman, R. (1992). Seeing the invisible: Perceptual-cognitive aspects of expertise. In M. Rabinowitz (EdDir.), *Cognitive science foundations of instruction* (pp. 203-226). New Jersey: Mahwah.
- Klein, K., Orasanu, J., Calderwood, R., & Zsambo, C. (1993). *Decision making in action: Models and methods*. Ablex Publishing Corporation. Norwood. New Jersey.
- Orléan, A. (2009). *From euphoria to panic: Thinking about the financial crisis* (Vol. 16). Editions rue d'Ulm.
- Shanteau, J. (1987). Psychological characteristics of expert decision-makers. *Applied Experimental Psychology Series*, 85, 289-304. Manhattan: Kansas State University. Springer-Verlag, Berlin.
- Shanteau, J. (1992). Competence in experts: The Role of task Characteristics. *Organizational Behavior and Human Decision Processes*, 53(2), 252-266.
- Shanteau, J., & Phelps, R. (1977). Judgment and swine: Approaches and issues in applied judgment analysis. In M. Kaplan & S. Schwartz (EdsDir.), *Human judgment and decision processes in applied settings* (pp. 255-272). New York. Academic Press.
- Vicente, K.J., & Wang, J.H. (1998). An ecological theory of expertise effects in memory recall. *Psychological Review*, 105(1), 33-57.