

**2014** **icopev**

*2<sup>nd</sup> International Conference on  
Project Evaluation*



# CONFERENCE --- PROCEEDINGS

**ICOPEV 2014**  
26<sup>th</sup> and 27<sup>th</sup> June  
Guimarães – Portugal

## PRÓ-INOVA: PROJECT TO IMPLEMENT INNOVATION MANAGEMENT IN INDUSTRIALS SMEs – RIO GRANDE DO NORTE, BRAZIL

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### KEYWORDS

Competitiveness, Industrial SMEs, Innovation

### ABSTRACT

This article aims to contribute with the learning and diffusion of the organizational innovation, presenting an experience of the Pró-Inova project in the Rio Grande do Norte state, located in Brazil's Northeastern region, conducted between 2012 and 2014. The project was promoted by the *Financiadora de Estudos e Projetos* (FINEP) [Studies and Projects Funder] and developed nationally, aiming to “motivate, mobilize and capacitate entrepreneurs; perform diagnostic and elaborate plans and projects of enterprise innovation management”. In order to reach this goal, the case here analyzed adopted the action research methodology (Coughlan & Coughlan, 2002), split in (1) data gathering, (2) data feedback and (3) data analysis, (4) action planning, (5) implementation, (6) evaluation and (7) monitoring of the actions. As results, it has been identified the innovation practices there are in the project participants industries, and it has been realized actions towards the development of this management culture, being implanted 88 innovating initiatives in the industries, with 117 new practices in the implementation stage. The performed study stimulates the researchers to think about the innovation management by consolidating the results of a practical experience, accomplished with a scientific approach, that can be expanded over the other project participants industries in the state and in the country, providing a larger amplitude and deepening to the subject in question, as well as replicated in another projects.

### INTRODUCTION

The fact that innovation and knowledge are the main factors that define the competitiveness and the development of nations, regions, enterprises, sectors and even individuals is one of the few consensus established

in the contemporary debate that seeks to comprehend current globalization process (Cassiolato & Lastres, 2000). The growing competition and the need to efficiently introduce the technological breakthroughs in the productive processes have been driving the enterprises to focus their strategies in the development of innovative capacity, a factor that marks the current stage of the capitalism. In this context, the innovation emerges as an essential element to leverage the competitive potential of enterprises. An example of the importance of this factor for the economy is pointed out in the report of the *Instituto de Pesquisa Econômica Aplicada* (De Negri, Salerno, & Castro, 2005) [Applied Economy Research Institute], whose data demonstrate that the productive scale of innovative enterprises is significantly bigger than the other categories. According to the study, the innovative enterprises' annual earnings is five times bigger than the ones of the enterprises specialized in standardized products. These data indicate that the innovation is a way for the enterprises to reach competitiveness and its implementation must be planned, since it requires financial, human and technological resources to be continually and systematically articulated by leaders capable of integrating the innovative attitudes of the team. This way, the innovation becomes part of the strategic positioning and the management model adopted by the enterprise, linked to the planner role.

According to the Oslo Manual (OCDE, 2005), innovation is the implementation of a product, be it a good or service, new or significantly improved, or a process, or a new marketing method, or a new organizational method in the business practices, workplace organization or external relationships. The aforementioned manual defines four types of innovation:

- Product Innovation: introduction of a new or significantly improved, regarding its features or intended use, good or service. This includes improvements in technical specifications, incorporated components or software, ease of use or other functional features.

- **Process Innovation:** execution of new production methods or distribution of significantly improved others. This process includes changes in techniques, equipments and/or software.
- **Organizational Innovation:** execution of a new organizational method in business practices of the enterprise, in the workplace organization or in the external relationships.
- **Marketing Innovation:** execution of a new marketing method covering significative changes in the conception or packaging of the product, in the positioning of the product, in the promotion of the product or in the formation of the prices.

In this same line of thought, Dauscha (Dauscha, 2010) asserts that innovation is the accomplishment of a new or significantly improved product, which can be a good or a service, or even a process effectively introduced in a market or enterprise where it did not exist before, being this the minimal requisite, not necessarily needing to be original to be classified as innovative.

The understanding of this author (Dauscha, 2010) refers to classification of the OCDE's Oslo Manual regarding the innovation ranks, that concern the intensity of the created differences in relation to the previous reality, being classified as radical or incremental.

Radical innovation refers to the development of significant changes of features, attributes or use forms of a product or process, either by creating radically new technologies or by the combination of existent technologies for new utilizations.

For the incremental innovation, it corresponds to the reconfiguration of an already created technology to match new purposes.

It can be seen that the innovation, in the daily routine of industrial enterprises, is showing itself as an essential component to maintain the competitiveness. For the innovational practices to be present in the daily routine of these enterprises, it is necessary the adoption of routines and procedures of innovation management, what can be done through the technology transference.

Regarding the participants of the technology transference process, the inclusion of governmental agencies in the interactions of the universities and technological centers with the enterprises is a phenomenon that has been consolidating itself through the third millennium. It can be highlighted the government role in the interconnected and global environment that mark the current time, in which are required: integration instead of command, convincing instead of control, and the possibility of acting in partnership instead of isolated execution (Abonyi & Van Slyke, 2010; Mintzberg, 2004).

Based on this context, the *Financiadora de Estudos e Projetos* (FINEP) [Studies and Projects Funder] and the *Conselho Nacional de Desenvolvimento Científico e Tecnológico* (CNPq) [National Council of Scientific and Technological Development] promoted the realization of the Pró-Inova project between 2012 and 2014, aiming

to “motivate, mobilize and capacitate entrepreneurs; perform diagnostic and elaborate plans and projects of enterprise innovation management”. This article reports the development of the Pró-Inova in a region of the Rio Grande do Norte state, located in the Northeastern Brazil.

## METHODOLOGY

The Pró-Inova project official announcement – Center of Support for Innovation Management 11/2010 has been launched aiming to “motivate, mobilize and capacitate entrepreneurs; perform diagnostic and elaborate plans and projects of enterprise innovation management”. In order to accomplish Pró-Inova's goals, it has been chosen to adopt the action research methodology (AR), because it is “an research action that aims to the creation of the knowledge or theory about the action” (Coughlan & Coghlan, 2002).

According to Westbrook (Westbrook, 1995), the AR has a practical, interactive and interventionist nature, applicable to situations in which several variables can not emerge at once. According to Gummesson (2000, *apud* Coughlan & Brannick, 2005), the AR has ten main characteristics, which also corroborate to its choice as the methodology adopted by the Pró-Inova in Rio Grande do Norte:

- (1) Researchers-action perform the action, actively working to make it happen.
- (2) It always involves two goals: solve a problem and contribute to the science.
- (3) It is interactive, requiring the cooperation between the researchers and the target audience, and the continuous adjustment of new informations and new events.
- (4) Aims to develop the holistic comprehension during a Project and recognize its complexity.
- (5) It is fundamentally applicable to the comprehension, planning and implementation of changes in enterprises and organizations.
- (6) It requires the comprehension of the ethical structure, values and standards used in each particular context.
- (7) It can include all the data gathering methods.
- (8) It requires a large preliminary comprehension of the corporative environment, the business conditions, structure and dynamic of the operation system and the theoretical foundations of such systems.
- (9) It must be conducted in real time, although it can be done in retrospective as well.
- (10) It requires its own quality criterias.

This way, the aforementioned methodology has been adopted due to the progressive and interactive character required in the implantation of a new entrepreneurial management process, as the Pró-Inova is characterized.

The Figure 1 shows the action research cycle, composed by a sequence of seven activities, developed as from the

preliminary phase of contextualization of the work purpose's application and definition.

A relevant component of the AR's data gathering stage, applied to the project in question, is the realization of the initial diagnostics of the existence of innovation management practices (IM) in the participant enterprises.

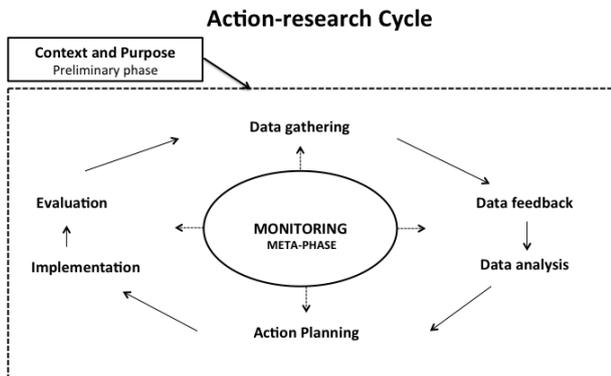


Figure 1 – Action Research Methodology.  
Source: (Coughlan & Coughlan, 2002).

In order to perform the referred evaluation, it has been used a research instrument developed from (Bachmann, 2010), which was expanded in order to align with the requirements specified in the Pró-Inova official announcement. It was kept the 40 questions concerning the 13 dimensions of innovation proposed by (Bachmann, 2010): (1) Offer, (2) Technological Platform, (3) Brand, (4) Clients, (5) Solutions, (6) Relationship, (7) Value Aggregation, (8) Processes, (9) Organization, (10) Supply Chain, (11) Presence, (12) Network and (13) Environment Innovation. Ten complementary questions were included in the questionnaire, concerning the points whose identification was required in the official announcement, resulting in a total of 50 points of verification. The identified profiles were pontuated according to the *Likert* scale (Likert, Roslow, & Murphy, 1993), being presented together in a radar graphic (Figure 2), aiming to visually verify the evolution level of each analyzed perspective.

## DEVELOPMENT OF THE PROJECT

The Pró-Inova Project started its activities in 2012, being operationalized in the Rio Grande do Norte state by Higher Education Institutions in 4 regional cores. The Seridó Region Core, which by the end of its activities encompassed 18 industries characterized as small and microbusiness enterprises (SME), was conducted by the *Instituto Federal de Educação, Ciência e Tecnologia do Rio Grande do Norte* (IFRN) [Federal Institute of Education, Science and Technology], being operationalized by a group of CNPq's scholarship students with a multidisciplinary formation in the fields of management, architecture and

urbanism, foreign market, law, ecology, innovation management, logistics and marketing.

The prepare of the infrastructure and human resources (Tahmooresnejad, Shafia, & Salami, 2011) are factors that were detected, in the literature, as critical for the success of a technology transference process, referring to the emitter, the transference agents and to the receiver of the transferred technology. As the Pró-Inova case fits this profile, for 8 months the scholarship students of the Seridó Core gathered with the managers scholarship students of the remaining cores and with the state governance of the project, elaborating materials, standardizing the conceptual base to be adopted, contacting and picking entrepreneurs to be part of the initiative, as well as planning the required infrastructure. Once the team of each core were composed, it has started the detailing of the innovation management technology transfer process itself, according to the AR cycle. In the planning stage, the activities to be done were detailed in order to participant enterprises to develop the culture of the innovation management. The Pró-Inova official announcement established the performance of diagnostics, capacitation and counseling for the enterprises taking part in the project.

## Identification of innovation practices already existent in the industries

In March 2013, there was the data gathering stage, in which were identified innovation management practices already existent in the enterprises that took part in the project before its beginning. The activity were performed by means of individual interviews realized by the Pró-Inova's scholarship students, in order to apply a questionnaire for each enterprise. The gathered data was tabbed and consolidated by innovation dimension (Bachmann, 2010) and by enterprise, generating the individual and collective reports of the initial situation. The innovation management profile was collectively presented to the participants, while the individual situations were passed forward individually, keeping the secrecy required by the AR process.

## Innovation practices existent in the industries before the beginning of the project

The data feedback was presented to the entrepreneurs in a report containing the individual situation of each one's industry and the consolidated panorama of the group (Figure 2).

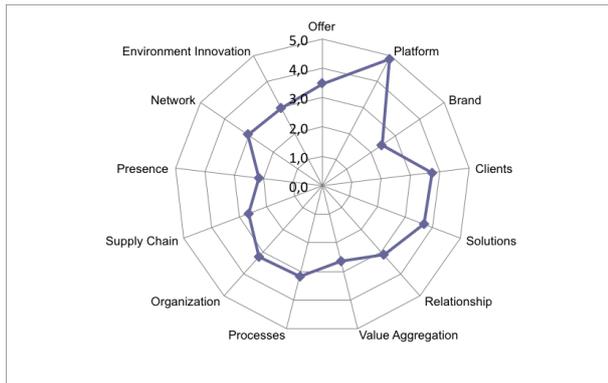


Figure 2 – Pró-Inova Seridó Region/RN:

Initial collective diagnosis of innovation management.  
Source: Own elaboration as from (Bachmann, 2010).

This approach was selected because it allows the analysis and verification of the individual and collective innovation stage, aiming to configure a benchmarking process.

According to the results of the initial evaluation, the Technological Platform was the dimension in which the innovation most received attention by the firms before the beginning of the project, indicating that the producing systems of these SMEs suited more than two products families and that the same product or service was offered in more than two versions in order to reach different markets or niches.

Presence and Brand were the dimensions in which the innovation was most critical, due to the fact that the participant enterprises have not sought to develop new market or selling channels in the past 3 years before the performance of the diagnostics, as well as not possessing their own brand or having not registered it. Based on these results, actions were planned to be advised for the enterprises, in alignment with the subjects approached in each meeting, according to the specification in the FINEP's official announcement.

### Capacitation and counseling towards the development of the innovation management culture

During the Pró-Inova Project, the capacitation occurred in 12 innovation meetings, and the counseling in 12 visits to each enterprise, dealing with subjects indicated in the official announcement. The internal environment of the organizations that aim to be innovative is highly relevant to the effectiveness of the implantation process of the new management model, since it is in it that the new practice will become effective. When the receptor is a SME, it is essential the adoption of strategies and approaches that take in account the characteristics inherent to the type of enterprise (Nunes, Annansingh, Eaglestone, & Wakefield, 2006) since the preparatory stage of the process (Will, 2008). According to (Fernie, Green, Weller, & Newcombe, 2003), it is proposed a methodology for cooperative development, guided by

the adaptation of the knowledge there is in the emitter in response to the reality of the receptor.

With the support of this theoretical base, in the entrepreneurial counseling meetings was oriented the implantation and performed the monitoring of actions linked to the reality of each enterprise, aiming to the development of the innovation management culture.

The meetings' subject and the respective implantations oriented in the counselings followed the following script (Subject: counseling):

(1) Innovation Strategic Planning: creation of the innovation center in the enterprise, composed by professionals responsible for the dissemination of the innovation management culture among the others collaborators. The representatives of this center were the people that interacted with the scholarship students in the counselings, being mandatory the participation of the enterprise's owner.

(2) Human Resources (HR) Structuration for the Innovation Management: elaboration of the incremental innovation plan to be implemented in the enterprise, at short-term, in attendance to a need of the HR area identified by the innovation center.

(3) Methodologies and Evaluation Tools and Development of Product and Process: elaboration of the incremental innovation plan to be implemented in the enterprise, at short-term, in attendance to a need of the productive area identified by the innovation center.

(4) Methodologies and New Business Development Tools: elaboration of a business model according to the CANVAS methodology (Osterwalder & Pigneur, 2010), to be detailed during the Pró-Inova Project, to later fund raising and implementation.

(5) Methodologies and Competitive Intelligence Systems: application in the enterprise of a systematic to gather the data necessary to the development and implementation of the innovative idea according to the CANVAS, composed by several research forms.

(6) Learning Process Structuration: identification of the required competences for the implementation of the new business model.

(7) Innovative Environment Structuration: identification of the presence of practices that characterize an innovative environment and planning of the implementation of new actions that strengthen the innovative culture of the enterprise.

(8) Structuration of Information Systems for Innovation (public policies and innovation support programs): orientation for systematic follow-up of innovation support programs by the enterprise, with indications of which programs to adopt.

(9) Innovative Marketing System: identification of a marketing strategy that suits the business, the client and the product of the enterprise.

(10) Technological Prospection and Intellectual Property Management Actions: orientation towards verification and registration of brands and patents.

(11) Innovation Monitoring and Evaluation Systems (development and implantation of indicators): verification of the management and innovation indicators adopted by the enterprise and orientation towards the use of the gathered data and extension of the identified scope.

(12) Systematic of Informations about financing for innovation (venture capital and credit lines for fostering, research and innovation): orientation for the entrepreneurs towards the elaboration of Pitch of innovative project developed in the program; presentation of the project to potential funders and supporters.

### **Achieved Results**

The counseling and learning stage proposed by the Pró-Inova Project was concluded, in the participant enterprises of the Seridó Core, in March 2014, after one meeting to sensitize the group, 12 collective meetings of the entrepreneurs with specialists and 234 technical counseling visits, individual and personalized, totaling 1.196 hours dedicated to the orientation and support to the adoption of innovative practices by the enterprises' staffs.

As ending results achieved, 88 innovative initiatives were implanted in the 18 industries and 117 new practices were under implementation in the last counseling.

The activity (1) – creation of a innovation management center, was implanted by all participants, since it is essential to the realization of the personalized counselings. The enterprises were oriented to keep the meetings of the innovation center after the conclusion of the project, as a way to keep alive the adopted practices and continue the future innovations.

Among the oriented practices, the activity (3) – incremental innovation plan for the productive area, scored the second place, alongside the activity (4) – CANVAS methodology, both of them adopted by 11 enterprises. The practices with less incidence were (10) brand and patents registration and (8) systematic follow-up of innovative programs by the enterprise, adopted by 2 enterprises.

These results allow to infer the interest of the participants in initiatives towards the productive process and new business ideas, as well as the need to strengthen the consciousness about the importance of the intellectual property and about the knowledge concerning innovation support programs.

A total of 18 innovation management programs were elaborated, describing in details the implementation process of the recommend practices in each enterprise.

The innovative projects elaborated during the Pró-Inova contemplate the establishment of horizontal partnership,

diversification of the business field, market change, product change, value aggregation to the developed products, restructuration of the organizational infrastructure with the acquisition of their own headquarters with integrated layout of the processes and sellings through the world wide web (Internet).

### **Project management - practices, opportunities and challenges**

The Pró-Inova Project faced some obstacles to achieve the sought results. It can be highlighted, among the challenges, ignorance of the entrepreneurs about the subject and the low incidence of innovation management practices in the participant enterprises, what limited the expansion potential of the competitiveness of these organizations.

The main identified opportunity was the opening of the entrepreneurs to acquire knowledge and to implement new practices in their enterprises, what was reinforced by the results of the initial diagnostics of innovation management. The observation of this behavior by the SME entrepreneurs corroborates with (Caputo, Cucchiella, Fratocchi, Pelagagge, & Scacchia, 2004), to whom the genuine effort of the SME entrepreneurs in the technology reception can be motivated by the observance of significative profits for the enterprise, low cost or the possibility to finance the process, agility and ease in the implementation, features present in the approach used by the Pró-Inova Project.

The actions monitoring stage was structured in order to stimulate the participation of the entrepreneurs during all the initiative. Of the starting 20 enterprises, 18 concluded the project. As a way to reach this, it was structured a Pró-Inova's execution management system, aiming to keep alive the interest of the participants.

The innovation meetings were conducted by distincts professionals, allowing to the entrepreneurs access to many repertoires of enriching experiences, composed by cases of success and failure.

By the other side, the scholarship students responsible for the counseling activities remained always dedicated to the same enterprises, allowing the stablishment of trust relationship with the components of the innovation center.

Assignments and routines were specified for coordinator scholarship students and for the counseling scholarship students, which were fulfilled in the stages that came before and after the meetings, as well as in the interaction moments in class and in the counselings. A strong feature of this systematic was the intense communication with the participants, done by e-mails, phone calls and messages, as well as intense dialogue in the presencial meetings.

The subjects to be approached in the counselings were continually reviewed and the planning of their execution debated by the group, allowing the exchange of experiences between the executors and the

personalization of the activities to the reality of each enterprise.

The scholarship students respected the particular situations experienced by the components of the innovation centers, being oriented referrals for questions presented by them that did not belong to Pró-Inova's scope.

## CONCLUSIONS AND FUTURE INVESTIGATIONS

Once the entrepreneurs were motivated, mobilized and capacitated, as well as the diagnostics of their enterprises realized and the plans and projects of innovation management elaborated, it can be asserted that the goals established by the FINEP for the Pró-Inova Project were achieved by the participants of the Seridó Core/RN.

Beyond this achievement, in the implementation of innovation management culture it has been adopted by the enterprises 88 innovative initiatives, being under application in the end of the project 117 new practices.

The same can be said about the reach of the goals of the article, to contribute to the learning and diffusion of the organizational innovation, presenting an experience of the Pró-Inova project in the Rio Grande do Norte state. The realized study stimulates researchers to reflect about innovation management by consolidating the results of a practical experience, performed with a scientific approach, that can be expanded to the other enterprises that take part in the project in the rest of the country, appropriating larger amplitude and deepening the subject in question, as well as replicated in another initiatives.

It is recommended that the intellectual property and the innovation support programs subjects to receive a larger emphasis in future projects, given their relevance and low adoption rate.

When questioned about the resistance to these practices, the entrepreneurs alleged the complexity existent in the country to register brands and patents, as well as to elaborate themselves innovation support projects.

The data of the final diagnostics of innovative practices in the enterprises after the participation in the project are under elaboration. Through comparative analysis with the initial diagnostics, it will be possible to measure the evolution of the innovation management in the enterprises in each analyzed perspective, being recommended its publication in a future stage.

## REFERENCES

Abonyi, G., & Van Slyke, D. M. (2010). Governing on the Edges: Globalization of Production and the Challenge to Public Administration in the Twenty-First Century. *Public Administration Review*, 70(s1), s33–s45. doi: 10.1111/j.1540-6210.2010.02244.x

Bachmann, D. (2010). Guia para a inovação. *Instrumento de orientação de ações para melhoria das dimensões da inovação*. Curitiba: Sebrae PR.

Caputo, A. C., Cucchiella, F., Fratocchi, L., Pelagagge, P. M., & Scacchia, F. (2004). Analysis and evaluation of e-supply chain performances. *Industrial Management & Data Systems*, 104(7), 546-557. doi: 10.1108/02635570410550214

Cassiolo, J. E., & Lastres, H. M. M. (2000). Sistemas de Inovação: Políticas e Perspectivas. *Parcerias Estratégicas*, 5(8), 237-255.

Coghlan, D., & Brannick, T. (2005). *Doing Action Research in Your Own Organization*: SAGE Publications Ltd.

Coughlan, P., & Coghlan, D. (2002). Action research for operations management. *International Journal of Operations & Production Management*, 22(2), 220-240. doi: 10.1108/01443570210417515

Dauscha, R. M. (2010). Definição de Inovação em Negócios para o Brasil. In S. R. H. Parolin, D. Farfus & M. C. d. S. Rocha (Eds.), *Inovação e Propriedade Intelectual na Indústria* (Vol. IV, pp. 151). Curitiba: Senai-Sesi.

De Negri, J. A., Salerno, M. S., & Castro, A. B. (2005). Inovações, padrões tecnológicos e desempenho das firmas industriais brasileiras. In J. A. De Negri & M. S. O. Salerno (Eds.), *Inovações, padrões tecnológicos e desempenho das firmas industriais brasileiras* (Vol. I, pp. 728). Brasília: IPEA.

Fernie, S., Green, S. D., Weller, S., & Newcombe, R. (2003). Knowledge sharing: context, confusion and controversy. *International Journal of Project Management*, 21(3), 177–187. doi: 10.1016/S0263-7863(02)00092-3

Likert, R., Roslow, S., & Murphy, G. (1993). A simple and reliable method of scoring the Thurstone attitude scales. *Personnel Psychology*, 46(3), 689-690. doi: 10.1111/j.1744-6570.1993.tb00893.x

Mintzberg, H. (2004). *Ascensão e Queda do Planejamento Estratégico* (Primeira ed.). Porto Alegre: Bookman.

Nunes, M. B., Annansingh, F., Eaglestone, B., & Wakefield, R. (2006). Knowledge management issues in knowledge-intensive SMEs. *Journal of Documentation*, 62(1), 101-119. doi: 10.1108/00220410610642075

OCDE. (2005). *Manual de Oslo. Diretrizes para coleta e interpretação de dados sobre inovação* (terceira ed.): Organização para a Cooperação e Desenvolvimento Econômico.

Osterwalder, A., & Pigneur, Y. (2010). *Business Model Generation: A Handbook for Visionaries, Game Changers, and Challengers*: John Wiley & Sons.

Tahmoosresnejad, L., Shafia, M. A., & Salami, R. (2011). Identifying Impact Factors in Technology Transfer with the Aim of Technology Localization. *World Academy of Science, Engineering and Technology*, 5(5), 477-481.

Westbrook, R. (1995). Action research: a new paradigm for research in production and operations management. *International Journal of Operations & Production Management*, 15(12), 6-20. doi: 10.1108/01443579510104466

Will, M. (2008). Talking about the future within an SME?: Corporate foresight and the potential contributions to sustainable development. *Management of Environmental Quality: An International Journal*, 19(2), 234-242. doi: 10.1108/14777830810856618

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